ARCHITECTURE

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Rossel Edward Mitchell, Architect.

From a drawing by J. Floyd Yewell.

THE MONUMENTAL FEATURE OF THE GROUP IS THE CENTRAL MEMORIAL HALL.

ARCHITECTVRE

THE PROFESSIONAL ARCHITECTURAL MONTHLY

VOL. XLI JANUARY, 1920 No. 1

A Plan for an International Historical and Memorial Museum at Washington, D. C.

By Rossel Edward Mitchell

THE progress of any civilization is measured by its advancement in the arts. There is no surer index; no other revelation of the mental vigor, refinement, and accomplishments of a civilization is so clear and readable as the record left by the hands of men as they wrought for use, comfort, or for the expression of the deeper strivings of the mind as influenced by religious instinct and desire for immortality.

The archæologist delves into a heap of dust, and shortly from the misty fogs of centuries, and by means of clay from the hands of a potter dead five thousand years, he rebuilds, so to speak, the civilization of a Nineveh or a Babylon.

The extreme refinement of the Periclean age is revealed to a world that has not yet ceased to wonder, by the marbles of Phidias, the architecture of the Parthenon and the Propylæa. Pericles did not succeed in his great ambition to form "A grand Hellenic Confederation in order to put an end to the mutually destructive wars of kindred peoples," but he did succeed in putting through his plans for the embellishment of Athens. And although the philosophy of his day has been succeeded by many others, the arts of his age are still the delight and despair of millions.

The sensual, pleasure-loving life of the citizen of Pompeii is known and read of all men who care to look. The world-ambitious Roman projected across twenty centuries the grandeur of his conceptions of conquest, triumph, luxury, and religious impulse by means of the major arts of architecture and sculpture.

Nor is the record limited to dead civilizations; it is written large on every page of current events and in every country on earth. Is it mere chance, that Germany possesses no architecture to be admired? Is there no significance in the fact that this people have slavishly copied and appropriated every conceivable form of architecture without once showing evidence of having imbibed the spirit of any? Who but a German could have conceived the Sieges Allee? Or who but a Prussian could adorn every street corner with statues which in every instance but two out of several hundred are engaged in the noble act of killing a fellow creature?

When the record of the World War is written—it will not be written, it cannot be written, in terms of triumph over fallen foes; nor will it be indited in periods of fulsome praise of conquering chieftains—it will not dwell unduly on the glory of combat nor the machinery and panoply of the unparalleled struggle; it will trace the divergent currents of national life, the processes of thought and consequent action which animated the minds and absorbed the energies of nations, and which, by their very divergence made conflict inevitable. Such a record will show, most clearly, the breakdown of the supreme falsehood of history: the divine right of a few to decide the destinies of the millions; the belief in material force as an overcoming influence when counteracted by spiritual and moral resources; and the easy hypocrisy that any one people possess to a surpassing degree the qualities that make for world leadership.

But the record must be written. And where better could it be written than at the capital of America; at the capital of the free nation that reluctantly forsook the paths of peace, but once awakened to the vital issues of life and liberty involved in the struggle, put aside the freedom of the individual so dearly prized and deliberately donned the servitude and endured the privations of the common soldier; bringing her overwhelming strength to the struggle in time to galvanize the weary legions of the Allies into new life and vigor, and to join with them in a swift and sweeping victory.

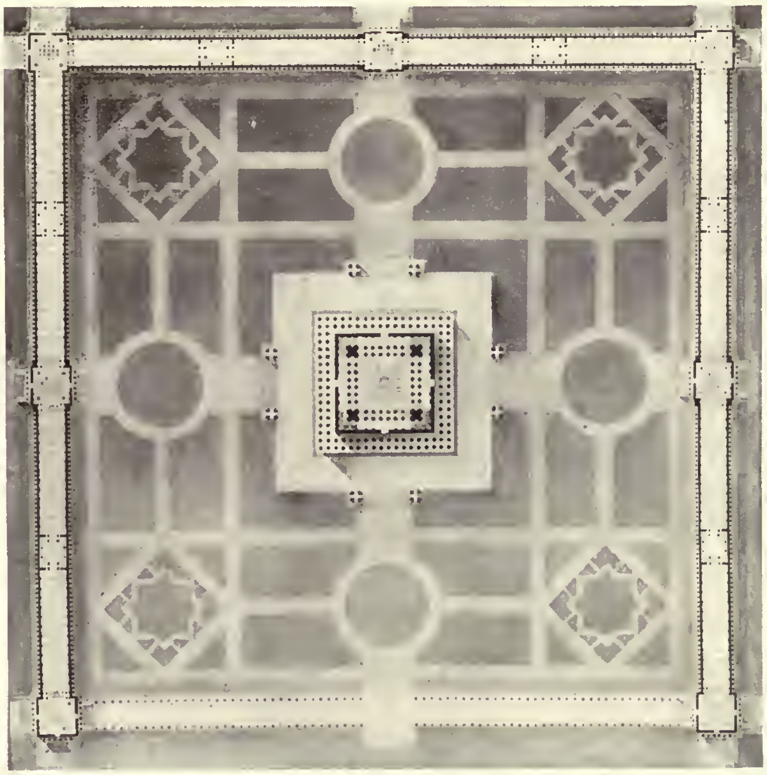
Indeed it is not possible that a great Historic and Commemorative Monument and Museum which should fittingly set forth the purposes, the struggles, and the achievements of the Allied nations can be erected in any other country. On France and Belgium the ravages of war have fallen too directly. The shadow of the fearful tragedy will not depart for a century from those countries. Britain, engrossed in the perplexing problems of a world-scattered empire, could not possibly undertake it. America alone has the resources, the spirit, the idealism, and, by no means least, the perfect setting for such an undertaking. On the shores of the beautiful Potomac, in harmony with the grand design which is gradually making Washington the finest city in the world, at a sufficient distance from the turmoil of a devastated Europe, an International Historical and Memorial Museum may find as fitting a setting as Ictinus found for the Parthenon on the Acropolis of Athens.

To give every civilized nation a portion in this great edifice, or group of edifices, will require a structure of vast dimensions. It is, therefore, proposed to build three great galleries, each one thousand feet long from centre to centre of the terminal pavilions. These galleries to be forty feet wide, between walls, and in addition to the terminal pavilions are divided into equal lengths of five hundred feet by centre pavilions, or rotundas. The galleries may be subdivided at will and in accordance with the wishes of the participating nations. America, France, and Great Britain, and, perhaps, Italy, with its unlimited artistic wealth, would each wish to have allotted to them, no doubt, both a terminal

DETAIL OF CENTRAL MEMORIAL HALL. Drawn by J. Floyd Yewell. Rossel Edward Mitchell, Architect.
INTERNATIONAL HISTORICAL AND MEMORIAL MUSEUM, WASHINGTON, D.C.

pavilion, with its great rotunda, and at least two hundred and fifty feet of gallery space. Other nations in proportion. The participating nations would send their own artists, sculptors, mural painters; their own relics, mementos, trophies, records, and memorials. Under the supervision of a general board of design these artists, mural painters, decorators, and directors would embellish the interior of the galleries allotted to them or selected by them, in accordance with the national history, the aspirations, the historic events, and the artistic tastes of the peoples whom they represent.

The monumental feature, the crux of the group, is the central memorial hall which occupies the exact centre of the great enclosed square. This lofty building rises from a high marble terrace three hundred and twenty feet square. The terrace is reached by four broad flights of steps, flanked by entrance pylons. The memorial hall is a square building alike on all sides. By the technical the lower story would be described as a dipteral octadecastyle peristyle of the Corinthian order. To the non-technical it is a double row of Corinthian columns, eighteen across each front row. This peristyle is surmounted by a Corinthian entablature and parapet. The parapet in turn is divided by pedestals over each column, and each pedestal supports a heroic statue of a plain soldier or sailor of an Allied nation. Back of this great colonnade rises the square mass of the building proper, the upper portion of which is finished with a further Corinthian cornice. Beneath this cornice is a band of sculpture of heroic proportions, extending around all four sides. This sculptured band, a "Gigantomachia," is designed to exemplify the efforts of peoples in all walks of life to support the purposes for which the World War was waged to a successful conclusion. The toiler on farm, factory, and mine, in home, in school, on land and sea, would be here portrayed; this having been a war, not of soldiers and armies alone, but of peoples.


Plot Plan.

Above the imposing mass of the main building rises an octagonal pedestal; this supports a lesser peristyle of Corinthian design. Surmounting the peristyle, the glistening white marble of the dome, unbroken by line or detail, and the whole crowned by a bronze altar of liberty, with its finely wrought candlesticks designed to typify the cardinal virtues of Truth, Justice, Patience, and Charity, without which liberty cannot exist.

The interior of this central building consists of a great and lofty rotunda, around which are elaborate galleries and halls. In this rotunda would be placed the statues of the supreme leaders of the Allied nations, both in peace and in war. Here would be found mural paintings, statuary, and portraits of the highest excellence, especially those designed to portray events of international history and significance. The ceiling of the grand dome above the rotunda would be covered with one great painting; its subject an international event of unparalleled importance. The surrounding galleries and halls will be sumptuously furnished and decorated to accommodate meetings of an international character.

This central building could be reached not only from the long museum galleries, by means of the open walks leading from centre to centre of the enclosed square, but also by underground passages for use in inclement weather and for privacy.

The four corner pavilions are designed primarily as entrances to the galleries; as such they require the emphasis of height. The classic character of the design, however, is preserved in them, Renaissance detail being avoided.

The pyramidal roofs of these pavilions are supported by circular walls, outside of which are sculptured Canephora. The Canephora are chosen, rather than Caryatids, the latter being derived from the slave women of Caria who were traitors to the Greek cause in the war with Persia. The Canephora, however, being bearers of baskets of flowers and voluntary gifts to the Temple, are, therefore, proper symbols of the vital part taken by the womanhood of the world in the Great War.

Many years would be required for the construction of the buildings and the completion of the interiors. The task should be undertaken while the inspiration of the vast efforts, the high ideals, the unstinted sacrifices of the World War still lingers. It would cost much money, for no great good is obtained without great cost. It would bring to America the talent, the genius of the entire world. Americans spend countless millions to see the art and architecture of the Old World. This great Historical and Memorial Museum would exceed in the scope of its purpose, its historic interest and eventually in the wealth of its embellishments any known structure. It would rival the greatest galleries of Europe and be a Mecca for travellers from all quarters of the globe.

The student of history will find history here portrayed by master hands to appeal to the sense most readily reached, the sight. The scholar will find authentic matter for study and research. The student of men will observe the sculptured features of the leading minds of all nations. The sociologist will mark important epochs in the development of mankind, the patriot find endless inspiration, the sightseer entertainment of the highest order.

It is estimated the buildings will cost fifty million dollars. The interior fittings, paintings, sculpture, and other embellishments supplied by the Allied participating nations, half that amount additional.

Plan for an International Historical and Memorial Museum, Washington, D. C. From a drawing by J. Floyd Yewell. Rossel Edward Mitchell, Architect.

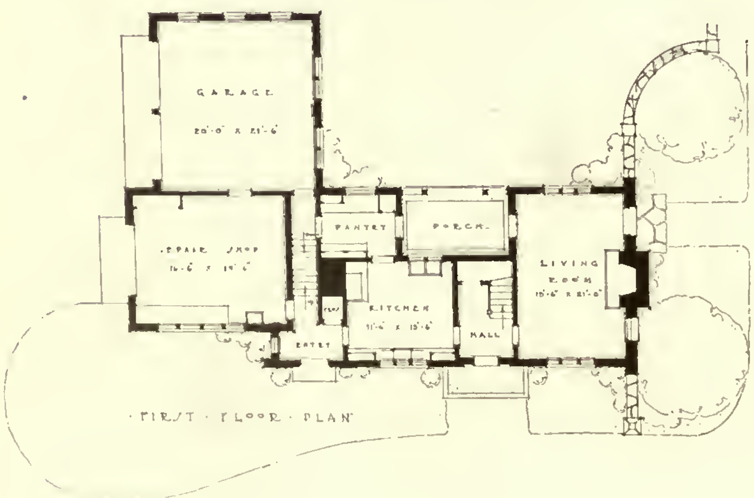
The materials of all the buildings would be the hardest, whitest marble obtainable. The rich Corinthian order is chosen as most graceful, ornate, and pleasing to the eye, when used in splendid repetition and when contrasted with the simple major lines of the great buildings.

The galleries and pavilions form three sides of a square; the fourth side being formed by open colonnades, called "stoæ" by the ancients. This thousand-foot colonnade would form a grand international avenue, along which would be placed groups of sculpture of appropriate significance.

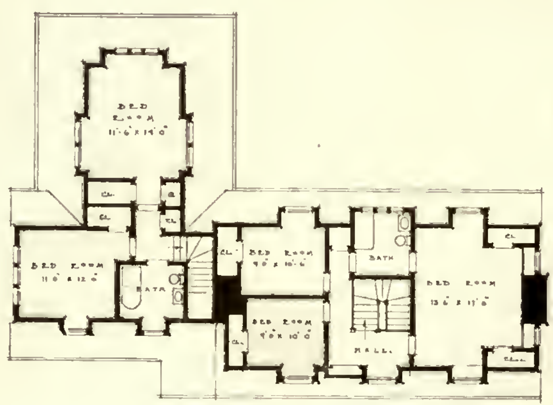
LODGE FOR EDWIN THANHAUSER, BAYVILLE, LONG ISLAND.

Tooker & Marsh, Architects.

LIVING-ROOM.



·FIRST · FLOOR · PLAN·



·SECOND · FLOOR PLAN·

Tooker & Marsh, Architects.

LODGE FOR EDWIN THANHAUSER, BAYVILLE, LONG ISLAND.

FRONT.

GARDEN IN REAR.

Tooker & Marsh, Architects.

LODGE FOR EDWIN THANHAUSER, BAYVILLE, LONG ISLAND.

Announcements

Bind Your Copies of Architecture.—The Title-Page and Index for Volumes 39 and 40, January to December, 1919, of Architecture are now ready, and will be mailed without charge to any subscriber upon request. Address Circulation Department, Architecture, 597 Fifth Avenue, New York City.

Edward H. Wigham and J. Elder Blackledge, architects, announce the opening of their offices in the Indiana Pythian Building, Indianapolis, Indiana. Manufacturers' catalogues and samples are requested.

Edgar M. Wood announces that he has moved his offices from Alma, Michigan, to suite 519 Oakland Building, Lansing, Michigan.

F. S. Montgomery, for the past six years advertising manager, National Metal Molding Company, Pittsburgh, and prior to that, for several years district manager in charge of the Atlanta office of the same company, has tendered his resignation to take effect December 31, after which date he will be associated with the Ivan B. Nordhem Co., Outdoor Advertising, 8 West 40th Street, New York City. Mr. Montgomery's successor has not been announced.

W. V. Marshall, formerly of the firm of McIver, Cohagen & Marshall, architects, Billings, Montana, announces the opening of an office for the general practice of architecture, at room 204 First National Bank Building, Missoula, Montana. Member Montana Association of Architects.

The Magnesia Association of America has recently placed a large display case, containing samples of 85 per cent magnesia, steam-pipe and boiler-coverings, on exhibition with the Architects Samples Corporation, 191 Park Avenue, New York.

This has been done in order to give visiting architects the opportunity of inspecting the various kinds of 85 per cent magnesia coverings, and thereby becoming better acquainted with their great value as savers of heat and coal.

In addition to the exhibit the Architects Samples Corporation has a stock of the Magnesia Association Specification and other literature for distribution.

It is announced that negotiations have been completed whereby Jenkins Brothers will, in the near future, increase their manufacturing facilities by owning and operating a plant in Bridgeport, Connecticut. This plant will be devoted entirely to the manufacture of the Jenkins valve—an engineering product which dates back to 1865, when Nathaniel Jenkins invented and first introduced the renewable disc type of valve.

Beginning January 1, 1920, the Contracting and Sales Business carried on since 1892 by the General Fire Extinguisher Company will be taken over by Grinnell Company, Inc., with executive offices at Providence, R. I.

The new company will retain the executive, engineering and construction staffs of all the five sections of the business.

The Bishopric Manufacturing Co. advises us that they have purchased about ten acres of land in Ottawa, Canada, and have already started to build factories at that point for the manufacture of Bishopric Board to supply the Canadian market.

The Arden Studios, Inc., 599 Fifth Avenue, are showing a number of objects suitable for decorative purposes, many of them from original Arden designs, and a very comprehensive exhibit of Durant faience of great interest to all who follow the development of American applied art. They announce also a special exhibition of portrait busts and bas-reliefs by James Earle Fraser, January 6th to January 24th, 1920.

Westinghouse, Church, Kerr & Company, Inc., take pleasure in announcing the appointment of Russell W. Stovel [recently lieutenant-colonel, Engineers, U. S. Army] as a consulting engineer. Mr. Stovel has had an unusually comprehensive experience in the mechanical and electrical problems connected with central power station and steam railroad electrification work, as well as a valuable experience in the mechanical handling of freight at water terminals. With the American Expeditionary Forces in France, Lieutenant-Colonel Stovel served as chief of the Terminal Facilities Division of the Army Transport Service, one of the two big divisions of transportation of which Brigadier-General Atterbury was the chief.

Mr. Bache Hamilton Brown and Mr. Samuel R. T. Very announce their association for the resumption of the general practice of architecture under the firm name of Very & Brown, Architects, with offices at 70 East 45th Street, New York City (Grand Central Terminal Office Building).

Benedict Stone Corporation, successor to Emerson-Norris Company of New York, cut cast stone, Aeolian Hall, 35 West 42d St., New York, announce the corporate change in their business as above. This does not involve any change in the management of the company, the principal officers remaining the same as since the start of the business.

Alfred C. Bossom, the bank architect and engineer, is just removing his offices from 366 Fifth Avenue to 680 Fifth Avenue, where he has taken the entire top story of that handsome structure, recently built by Mr. John D. Rockefeller, Jr., and has arranged it to accommodate a most complete architectural and engineering organization. In the new quarters, he has introduced a very novel feature by making special provision for any of his banking clients when they visit New York.

A l'Ecole des Beaux-Arts

"Le décret qui a fixé à cinq ans la durée du professorat à l'Ecole des beaux-arts a reçu son application: tous les vides ont été comblés, pour cinq ans.

M. Raphaël Collin, décédé, est remplacé par M. Ernest Laurent. M. Peter et M. Antonin Mercié, décédés, sont remplacés à la sculpture par M. Jean Boucher et M. Carli. M. Jaussely est nommé à la chaire d'histoire générale de l'architecture. MM. Pierre André et Pontremoli remplacent, aux ateliers d'architecture, MM. Bernier et Pantin.

Enfin, la chaire d'histoire générale de l'art, où professait, avec tant de savoir et de distinction, notre regretté collaborateur et ami de Louis de Fourcaud, décédé en 1914, est confiée à M. Louis Hourticq.

Un atelier de fresque est créé: il est confié à M. Paul Baudouin."

Entrance doors, residence, Mrs. Frederick Lewisohn, New York.

The Residence of Mrs. Frederick Lewisohn

Harry Allan Jacobs, Architect

THE problem of designing a house on a twenty-five foot inside lot is an extremely difficult one, as so many things have to be crowded in a small space. It then becomes a question of eliminating and concentrating one's space to the best advantage.

On the second floor of the Lewisohn residence the usual foyer hall has been eliminated and the space thrown into the living-room, thereby getting a room twenty-three feet wide and forty-six feet deep and seventeen feet high. The house is of the English basement type, with reception-room and dining-room on the entrance floor, the kitchen, servants' dining-room, and laundry being in the basement. The second floor contains the large living-room, the drawing-room in the rear, and the private dining-room or card-room in the extension.

The third floor has the library in the front, the bedrooms and dressing-rooms and baths in the rear. The same scheme is repeated on the fourth floor.

The fifth floor has two guest bedrooms in the front and servants' rooms in the rear.

The sixth floor contains servants' rooms.

The entrance floor is quite Italian throughout, the second floor English, and the upper part of the house French.

The façade is of South Dover marble, and has been kept very simple. It is two part composition, consisting of two windows, which is probably in better scale than three windows for a twenty-five foot front. The more masonry one can secure in these narrow façades, the better effect one gets and also better contrast by having a large plain surface surrounding the rich carved places, giving plenty of light and shade and color to the composition.

"History of Art" pediment for Mr. Henry C. Frick's residence, New York. Charles Keck, Sculptor. Carrère & Hastings, Architects.

The American Academy in Rome

THE American Academy in Rome recently closed an exhibition at the Century Club, New York, of the work of its graduates—architects, painters, sculptors. These men are leaders in American practice and talent in their respective fields; the American Academy in Rome has placed its stamp upon them, giving them the weapons with which careers are carved, knowledge and technical training in constant association with the workmanship and prowess of Renaissance Rome as well as the ancient city of the Cæsars. They have thus been able to make contact with the channels of thought that guided the artistic output of an age the emulation of which is at once our joy and our despair.

The exhibition contains examples of the work of the architects: John Russell Pope, Lucian Smith, H. Van Buren Magonigle, Edgar I. Williams, William S. Koyle, Alfred Githens. The sculptors: H. A. MacNeil, Charles Keck, Paul Manship, John Gregory, Albin Polasek, Sherry Fry. The painters: F. Tolles Chamberlin, Eugene Savage, Barry Faulkner, Ezra Winter, F. P. Fairbanks, Charles Stickroth, all of whom owe a debt of gratitude for a golden opportunity to the foresight of the founders of the Academy and to the energy and educational policy of its present administrators.

The American Academy in Rome is an established institution with a history beginning in 1894—over a quarter century of yeoman work and unbroken faith. It was in the fertile brain of that most distinguished ornament of American architecture, Charles F. McKim, that the idea of such an Academy was born; under his fervor and enthusiasm, together with that of Daniel Burnham, it took shape; to their unswerving devotion to this idea, their gifts to it of money and time; to their inspiring example; to the years of Frank Millet's unselfish service; and to the adherence of such others as La Farge and Saint-Gaudens, now gone, Mowbray, French, and Blashfield, happily still active among us, that the seed came to its present fine fruition.

In Rome the American Academy occupies the finest site in the city. Its buildings stand upon the summit of Mount Janiculum, the highest point within the walls.

Mr. C. Grant La Farge, Secretary of the Academy, who is devoted to the principles which have been its guide for twenty-five years, writes enthusiastically of its great work. The American Academy in Rome offers opportunities for architects, painters, and sculptors in its School of Fine Arts, and for archæologists, historians, and students of literature in its School of Classical Studies. The latter was founded in 1895, and a union between the two institutions was effected in 1912. Says Mr. La Farge: "Although its two co-ordinate branches are called 'schools,' they are not schools in any commonly accepted sense. The Academy is not for teaching rudiments, it does not have classes, nor does it even impose a very rigid prescribed course. Its beneficiaries are those who have advanced far beyond the preliminary stages in their various callings. What the Academy offers—its Prize of Rome—is not meant to be benevolent assistance to worthy youth, but the means whereby the best material discoverable may be raised to its highest powers for the elevation of American art and letters." The Academy sends out Fellows annually, and offers in addition the privilege of its facilities to the fellowship-holders sent out from fifteen American Universities and other educational institutions. Fellows are chosen in competitions held throughout America.

The American Academy in Rome is a national institution, and it is erected upon the underlying conception of the value of, and need for, collaborative work among artists. Its students come from all parts of the United States, and they are thrown together in working out their problems: "Not Fellowships only, but fellowship truly." It is most enlightening to note that the Board of Trustees of the Academy is composed of representatives of the provinces of architecture, sculpture, painting, archæology, literature, and history; it is furthermore stipulated that three-fifths of the trustees must at all times be professionally engaged in their respective types of work and that the three major fine arts must always be represented by no less than two-thirds of the professional members of the board. Devoted experts thus control the destiny of the American Academy in Rome.

The exhibition just closed was an index of the Academy's success and usefulness and a sustained test of its policy of educational work. The entire collection of drawings, paintings, photographs, reliefs, figures, etc., are to be sent on tour throughout the country, as one of its regular travelling exhibitions, by the American Federation of Arts.

Officers of the American Academy in Rome: William Rutherford Mead, *President;* Breck Trowbridge, *vice-president;* C. Grant La Farge, *secretary;* William A. Boring, *treasurer.* *Trustees:* Edwin H. Blashfield, Professor J. C. Egbert, Daniel C. French, Henry C. Frick, Cass Gilbert, C. Grant La Farge, Wm. Rutherford Mead, Edward P. Mellon, Jas. Sturgis Pray, Anson Phelps Stokes, Frank Frost Abbott, Geo. Allison Armour, William A. Boring, Charles A. Coolidge, Robert W. DeForest, Wm. Mitchell Kendall, Hermon A. MacNeil, George B. McClellan, Edward K. Rand, Breck Trowbridge, Edward D. Adams, Herbert Adams, Francis C. Jones, Charles D. Norton, H. Siddons Mowbray, John B. Pine, J. C. Rolfe, Henry Walters, Andrew F. West.

Editorial and Other Comment

1920 Will Be a Great Year for Architects

THERE is no lack of optimism apparently in the expressed opinions of various competent authorities as to the immense building programmes for the coming year. Supply is far behind demand in every kind of building, industrial, office buildings, apartments, homes, and if we can only arrive at some fairly settled state with regard to labor and the adequate production of materials, we shall see a development unprecedented in our history. Let us get together in encouraging an optimism that can be built upon the solid foundations of facts, not upon the here and there evidences of individual or local prosperity, but upon a general prosperity that only unified, consistent and intelligent co-operation can make possible. We hear of many offices that find it difficult to find the time to keep up with work in hand, and good draftsmen were never in such demand.

The period of waiting with any expectation of a marked reduction in cost of materials has long since passed. There will be no going back to pre-war conditions. Clients who have been waiting with any such idea in mind can be assured that if anything prices will be higher. The vastly increased rentals that are being paid, due to both congestion of population and increased incomes, will make up for differences in cost. It is only a short-sighted and unimaginative man of business who will fail to see the handwriting on the wall. It is written plainly on thousands of walls that inclose spaces utterly inadequate for present needs. There are great lines of would-be tenants ready to enter every new portal opened, ready to pay the price for places to work, places to live.

Looked at in terms of figures, 1919 was the largest ever known in the history of construction industries. There is not a community in the country where the demand for building is not far behind the supply, and with the adjustment of labor troubles on some promise of a fixed basis, 1920 will go as far beyond 1919 as that year was ahead of its predecessors.

Calling in Doctor Architect

NEVER was there a time when the services, taste, and special knowledge of the trained architect were more needed or more in demand. The carpenter and builder have for years been the consulting experts in the building of thousands of suburban homes and farmhouses, and let us give them credit, at least, before the jig-saw era for many beautiful and charming old houses.

Following the building shortage in these latter years has come an appreciation of the fact that any old house, or new, be it as hopelessly ugly as it may be, has possibilities. Architecture has shown many instances of "before and after," of old ramshackle, barn-like structures, altered into most delightful homes. Old barns have been made over into charming studios and living quarters, woodsheds incorporated into the redesigning of an old farmhouse. Everywhere is shown a wider appreciation that nothing is impossible to the architect of taste and skill.

The old and hopelessly ugly city brownstone house and the little two or three story brick house or stable on a side street have been made into artistic and attractive apartments or studio buildings.

It is to the architect that we owe this renaissance and we have only made a beginning toward the development of the city beautiful from old and unsightly and out-of-date structures. Lest some should say that we are dealing with merely idealistic matters, with our own desire for better things artistically, we remark that in every instance these "artistic" improvements have proved the very best of business in increased rents and more desirable tenants.

If the cost of new buildings has deterred many from carrying out their long cherished dream of owning their own home, there is abundant opportunity almost everywhere for the alteration of old places at very moderate cost. And old houses nearly always offer the nucleus of a more substantial structure than many hurriedly built modern houses put up in quantities for speculative purposes.

In considering a new house the architect can very often effect a large saving by taking full advantage of local materials. The familiar stone houses of Pennsylvania are greatly admired, and throughout the New England States there are abundant reasons for using the local stone. It is right at hand and the transportation cost is a minimum one. An instance of the effective use of local stone came to mind some time ago in the purchase from an old Connecticut farm of the moss-covered stone fences that for generations had testified to the hard labor of the first owners of the fields they enclosed. They added a picturesque and inexpensive note to a big fireplace and outside chimney.

An International Memorial

SINCE we arranged some months ago for the publication of Mr. Mitchell's "Plan for an International Historical and Memorial Museum," a somewhat similar idea has been presented in the "Peace Commemoration Number" of the *Architectural Review*, of London. In the accompanying text the English architects say: "They are frankly put forward as proposals to quicken the imagination, leaving to the future to consider how they may need modification." It is with this idea in mind that ARCHITECTURE presents in this number Mr. Mitchell's dignified and interesting drawings and plan. Washington would certainly be the logical place for a great International Memorial, and we shall be interested in the discussion that may follow the presentation of this proposal. From the article in the English magazine we also quote the following significant passage:

"America has played the principal part in establishing the League of Nations. It is to be hoped that American architects will remind themselves that, when the United States came into being as an independent State, the great man and genius to whom it owed that being seized the opportunity to lay out a capital worthy of the occasion. Along the shores of the Potomac, to the plan of the great French architect L'Enfant, arose the city of Washington, the home of the legislature and the executive of the United

States. Unique in being not the capital of any one of the States over which it was to rule, but the capital of them all; more unique in being the first capital in which the functions of the legislature and the executive were separated; most unique in being the capital in which the legislature was made predominant over the executive—Washington, the home of the league of States which has made the United States of America, is the fitting model for the home of the League of Nations which is to make the United States of the world."

The Incomparable Educational Opportunities Offered by the Metropolitan Museum of Art

NO doubt there are few readers of ARCHITECTURE who have not at some time availed themselves of the great opportunities for special study offered by the Museum, but perhaps some are not aware of the special service offered in the way of lantern-slides, photographs, casts, etc. The series of lectures that are given during the winter by authorities on the special subjects should attract members of the profession and all concerned in the betterment of the associated arts and crafts. The Saturday lectures, given at four o'clock, offered for 1919–20 include:

Jan. 17. "The Art of Louis XIV and Modern America." E. Raymond Bossange, Carnegie Institute of Technology, Pittsburgh. Jan. 24. "The Art of Louis XV and Louis XVI and Modern America." E. Raymond Bossange. Jan. 31. (Subject to be announced later.) A. D. F. Hamlin, Professor Columbia University. Feb. 7. "Italian Baroque Sculpture." Chandler R. Post, Professor Harvard University. Feb. 14. "The Development of Italian Gardens in the Renaissance, with a Study of Certain Examples." James S. Pray, Professor Harvard University. Feb. 21. "Further Examples of Italian Renaissance Gardens; Their Bearing on American Work." James S. Pray. Feb. 28. "Early French Book Illustration: The Hours of the Blessed Virgin Mary." William M. Ivins, Jr., the Metropolitan Museum of Art. Mar. 6. "The Rise and Early Development of Spanish Painting." Charles Upson Clark, Lecturer. Mar. 13. "The Great Spanish Masters." Charles Upson Clark. Mar. 20. "The Morris Ideal in Craftsmanship." Elizabeth Luther Cary, Author. Mar. 27. "English Illustrators of the Sixties." Elizabeth Luther Cary.

SUNDAY LECTURES.—Jan. 25. "The Mediæval House." Henry A. Frost. 4.00 P. M. Feb. 1. "French Country Houses." Mrs. John W. Alexander. 4.00 P. M. Feb. 29. "The Architectural Growth of New York." Richard F. Bach. 4.00 P. M.

J. Alden Weir

THE death of Mr. Weir took from us not only one of our greatest and most admired painters—and when we say this we say that he was a painter universally admired by his own profession—but a man who was loved by all who knew him. His influence for good among the younger generation was incalculable, for he was a generous critic and a helpful and kindly advisor. Mr. Weir's pictures are hung in nearly every public gallery in America, and his career illustrated with rare emphasis that a man may be at the same time conservative and progressive. He was ever looking in new ways, ever expressing old ideals with the inspiration and truth, regardless of mere variations in technique, that belong to all art that endures.

Book Reviews

"THE PRACTICAL BOOK OF INTERIOR DECORATION," by HAROLD DONALDSON EBERLEIN, ABBOT McCLURE and EDWARD STRATTON HOLLOWAY. 460 pages of text, 300 illustrations of interiors and furniture, including 7 pages in color. J. B. Lippincott Co., Philadelphia.

Here is a book that has been needed and one that has the authority of writers qualified by experience and special study. It covers very fully the things that are of particular interest to the architect, the decorator, the manufacturer, the dealer, and all who are looking for practical information and suggestion. It is especially helpful for its exceptionally full account of period decoration. Part II discusses the essentials of harmonious decoration and furnishing, questions of color, walls, floors and their coverings, textiles, etc. Part III, on the Assembling of Various Styles, will do much to save the feelings of the architect whose work is so often made negative by the conglomerate and tasteless furniture that clutters up so many charmingly designed interiors. There is too much interior decoration based upon what is called "a taste for effects" without any basis of knowledge or authority.

"THE COLONIAL ARCHITECTURE OF SALEM," by FRANK COUSINS and PHIL M. RILEY. Little, Brown & Co., Boston.

Salem has been and will be, as long as the old houses there continue to stand, a rich mine for every student of Colonial architecture. This book covers the period from 1628 to 1818 and presents the architecture of Salem with a view to giving in the fullest measure a presentation of the best and most typical examples of four distinct periods of development.

It should prove an invaluable and necessary reference for every architect's library. Together with the many examples of complete houses is a treasury of details, porches, halls, stairways, doorways, mantelpieces, cornices, and wood trim.

The illustrations from Mr. Cousins's incomparable collection of photographs are profuse and are handsomely printed. The edition is a limited one and will be probably eagerly sought by collectors.

"COLOR SCHEMES AND MODEL INTERIORS," by HENRY W. FROHNE, editor of *Good Furniture Magazine*, and ALICE and BETTINA JACKSON, Interior Decorators. J. B. Lippincott Co., Philadelphia. With 20 full-page color plates showing actual color schemes for rooms —wall-paper, rugs, upholstery and detail—20 full-page suggestive instructions for the use of these schemes; 20 full-page illustrations of fully furnished rooms, specially designed as a guide to furnishing.

This is a book of practical service, and the many excellent color plates will be valued. They are worth many pages of the usual descriptive matter, and though the schemes are adapted mostly to large spaces, they can be modified for use in smaller houses.

THE MONOGRAPH SERIES. Rogers & Manson, Publishers, New York and Boston. Paper covers. "Old Colonial Brick Houses of New England." Photographs and measured details. "Twelve Old Houses West of Chesapeake Bay." With text and measured drawings by Addison F. Worthington. "Interiors of Old Houses in Salem and Vicinity." Mantels, stairways, fireplaces, doorways. "Parish Churches of England." By C. Howard Walker. Every one of this admirable series is of interest and value.

"USEFUL DATA ON REINFORCED CONCRETE BUILDINGS FOR THE DESIGNER AND ESTIMATOR," by the Engineering Staff of the Corrugated Bar Co., Inc. Published by the Corrugated Bar Co., Inc., Buffalo, N. Y.

A book radically different from any other heretofore published on the subject of Reinforced Concrete. *It aims to give the answer* rather than to deal with methods and theory of design. It is a handbook in the true sense of the word—a reference or guide-book for the designer and estimator —as essential to the reinforced concrete engineer as the structural steel handbook is to the engineer of steel structures.

The text, tables and diagrams have all been prepared for the practical problems confronting the engineer. The greatest care has been exercised to make the tabular results comply rigidly with theoretical requirements but at the same time to be in accord with commercial limitations.

The data included is practical, of everyday use and in such form as to be of constant service to the concrete engineer and of inestimable value to the architect or engineer in general practice.

"LUMBER AND ITS USES," by R. S. KELLOGG. Illustrated. The Radford Architectural Company, Chicago.

A valuable treatise upon lumber, its uses, its various qualities, kinds, and handling. It is a book for architects and for anyone interested in forestry and the special qualities and particular uses and value of trees.

"CHECKING SCHEDULE FOR PROJECTED SCHOOL BUILDINGS," by JAMES O. BETELLE. Bruce Publishing Co., Milwaukee. Paper cover.

Of use to every architect in the planning and specifications of school buildings.

In the November number of *The Western Electric News*, delayed like the rest of us by the printers' strike, appears an interesting historical record of "A Half Century of Western Electric Achievement."

Walter S. Schneider, Architect; Henry B. Herts, Associate.

TEMPLE B'NAI JESHURUN, WEST 88TH STREET (NEAR BROADWAY), NEW YORK.

Walter S. Schneider, Architect; Henry B. Herts, Associate.

ENTRANCE DETAIL, TEMPLE B'NAI JESHURUN, WEST 88TH STREET (NEAR BROADWAY), NEW YORK.

MAIN LOBBY.

AUDITORIUM. Walter S. Schneider, Architect; Henry B. Herts, Associate.

TEMPLE B'NAI JESHURUN, WEST 88TH STREET (NEAR BROADWAY), NEW YORK.

AUDITORIUM AND SANCTUARY, TEMPLE B'NAI JESHURUN, WEST 88TH STREET (NEAR BROADWAY), NEW YORK. Walter S. Schneider, Architect; Henry B. Herts, Associate.

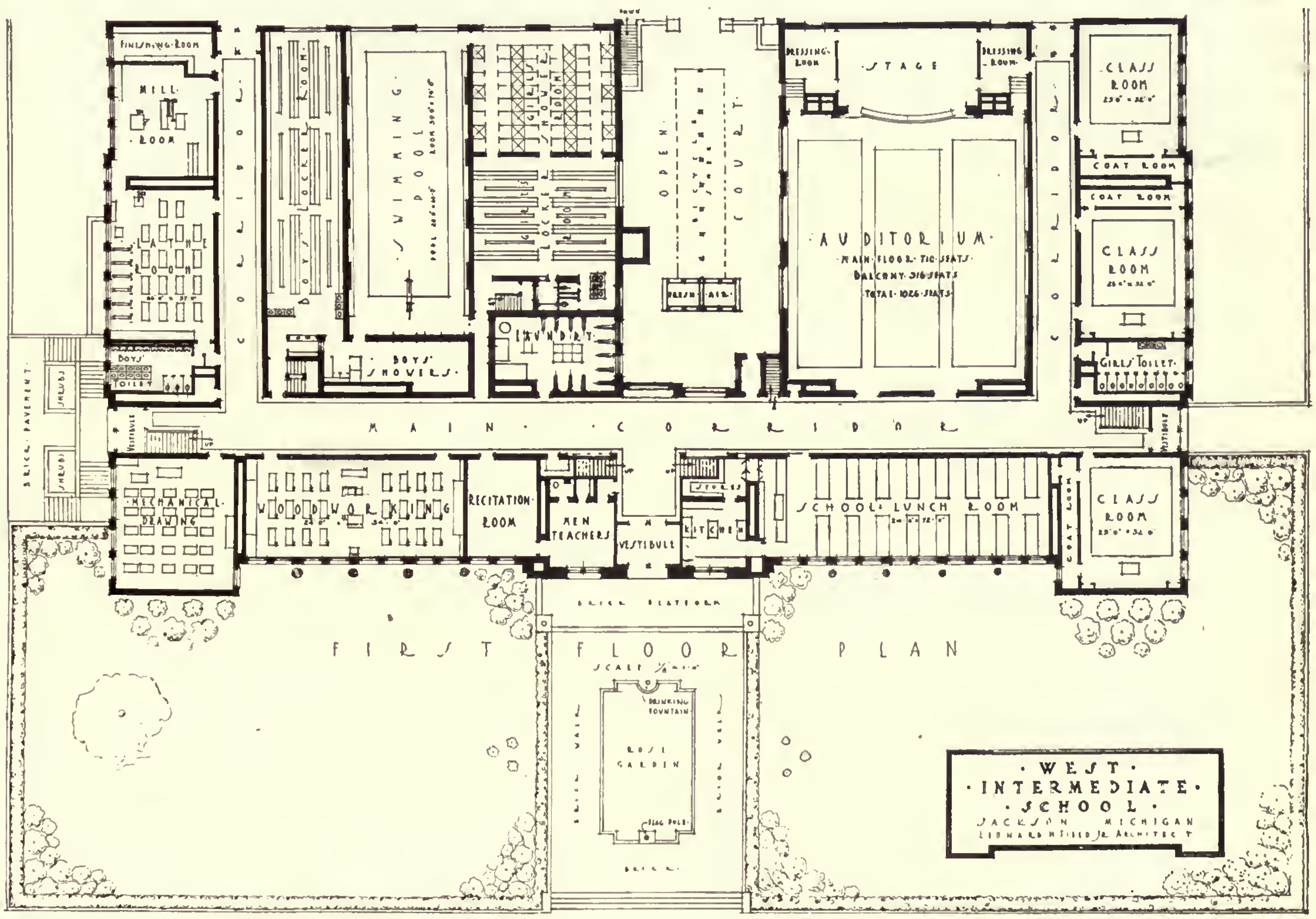
Walter S. Schneider, Architect; Henry B. Herts, Associate.

DETAIL OF SANCTUARY, TEMPLE B'NAI JESHURUN, WEST 88th STREET (NEAR BROADWAY), NEW YORK.

DETAIL OF FRONT, WEST INTERMEDIATE SCHOOL, JACKSON, MICH.

Leonard H. Field, Jr., Architect.

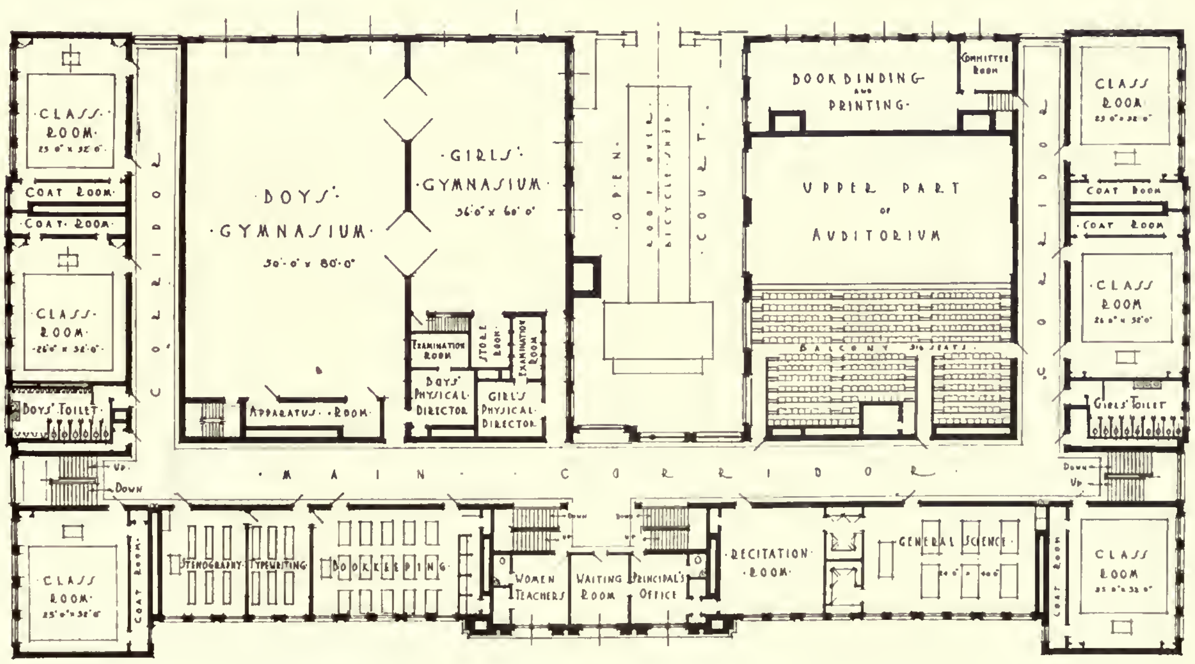
MAIN FAÇADE.



Leonard H. Field, Jr., Architect.

WEST INTERMEDIATE SCHOOL, JACKSON, MICH.

AUDITORIUM STAGE.

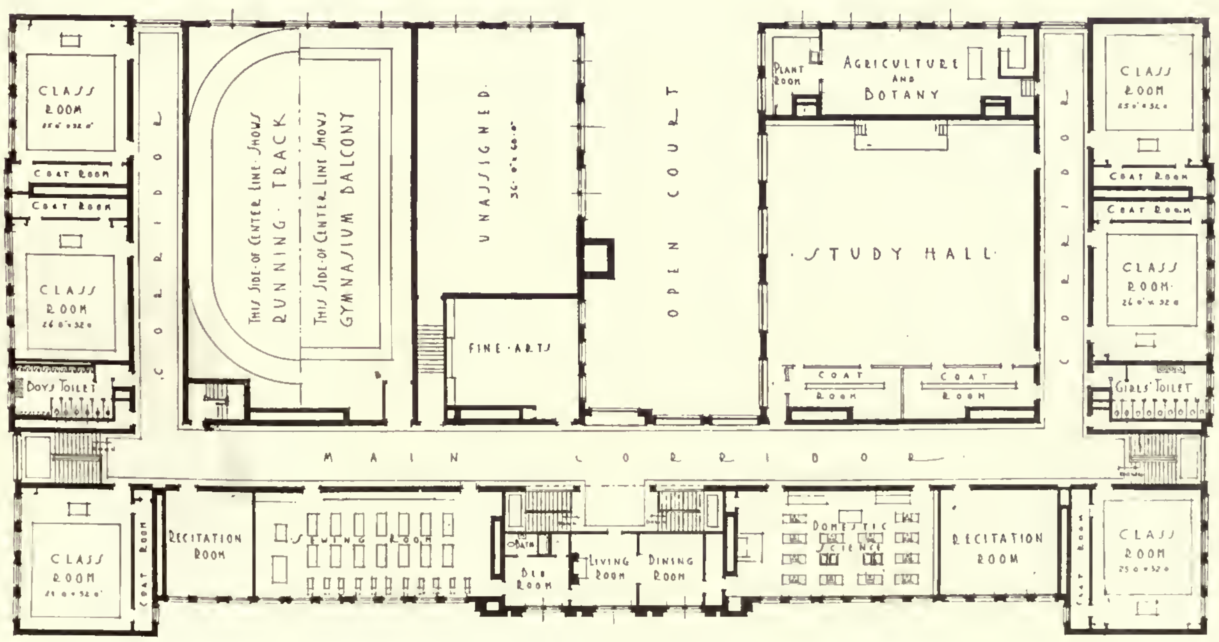


SECOND FLOOR PLAN

Leonard H. Field, Jr., Architect.

WEST INTERMEDIATE SCHOOL, JACKSON, MICH.

CORTLAND STREET ELEVATION.



THIRD FLOOR PLAN

Leonard H. Field, Jr., Architect.

WEST INTERMEDIATE SCHOOL, JACKSON, MICH.

RESIDENCE, MRS. FREDERICK LEWISOHN, 835 FIFTH AVENUE, NEW YORK. Harry Allan Jacobs, Architect.

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Harry Allan Jacobs, Architect

"HAMPTON" TOWSON, MD. (HISTORIC COLONIAL MANSION), RESIDENCE OF MRS. JOHN RIDGELY.

DRAWING-ROOM, "HAMPTON," TOWSON, MD. (HISTORIC COLONIAL MANSION), RESIDENCE OF MRS. JOHN RIDGELY.

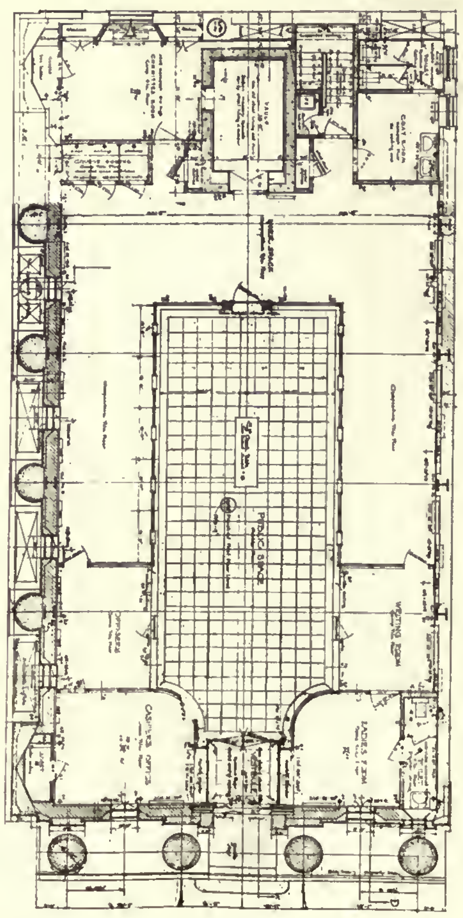
GARDEN.

LIBRARY.

"HAMPTON," TOWSON, MD. (HISTORIC COLONIAL MANSION), RESIDENCE OF MRS. JOHN RIDGELY.

EXTERIOR.

BANKING-ROOM.



PLAN. Albert Kahn, Architect.

WAYNE COUNTY AND HOME SAVINGS-BANK, DETROIT, MICH.

What the Huns Have Done for French Art

By A. Kingsley Porter

Illustrations from Photographs by L. W. Porter

MUCH inconsistency and some bad judgment marked the choice of objects which the Germans selected for evacuation. At Marchais, for example, a château belonging to the Prince of Monaco, a number of cases of furniture and tapestries have arrived, sent back from the German depot at Brussels. But a Louis XV bed, a superb piece of carving, finer indeed than many removed, had been left to take its chance in the château. The soldiers had carried it off to the trenches, where they had evidently put it to practical uses. When the family returned, after the district had been liberated, they had the good fortune to find the bed, water-soaked and stained, but still essentially undamaged, in the trenches where it had been left by the retreating Boches. Much other furniture, doubtless of an equal beauty, had disappeared at Marchais. It will, perhaps, never be known whether such objects were stolen or simply destroyed. During the winters the soldiers had the habit of taking to burn whatever came handy in the line of wood. This was the lot which fell to much wood-carving in the churches.

Pronleroy (Oise). Lecturn which saw the Germans come and go and is still intact. Polychrome wood, period of Louis XIV.

The mining of St.-Quentin was not an exceptional procedure. In other churches, unhappily, the fortunate chance which saved that basilica did not intervene. The great majority of those deliberately blown up were destroyed just before the final retreat of the Germans. One of the most brutal instances that have come to my knowledge was at Puisieux (Aisne). In this otherwise undamaged town even the débris of the church has disappeared. It is believed locally that the Germans needed stone to repair the roads, and took this way to procure it. The houses were spared because useful for quartering troops. Similar motives appear to have determined the destruction of Ciry, a church of considerable archæological importance, and which also has obviously been mined. Toward the end of the war the quality of the German explosives apparently fell off. An eye-witness told me that three attempts were made before the beautiful little church at Cugny was finally destroyed. Seven attempts were made at St.-Martin of Chauny, notwithstanding which, considerable parts of the building still stand. Unfortunately, however, the explosives generally worked only too well. Heaps of stone like that at Couramont are all that remain of many once lovely monuments.

One of the losses that will be most keenly felt is the destruction of the bells. Almost all of the village churches in France had ancient bells, which in some cases dated from as far back as the twelfth century. It was, of course, rare to find examples of such antiquity, but bells of the sixteenth or seventeenth century were common. These bells generally bore inscriptions of interest. I suppose I had always realized in a vague way that ancient bells were remarkable. Every one knows the description by Fra Salimbene—the mediæval Benvenuto—of the founding of the great bells at Parma in the thirteenth century. A German, strangely enough, Hauptmann in his *Versunkene Glocke*—has understood the beauty that lies in bells, and has expressed it with the vision of a poet. Yet I confess I never appreciated bells until I heard the sad silence of French churches deprived of them.

No other class of objects was so systematically stolen by the Germans as the bells. The bronze of which they were made was probably needed to supply metal for munitions. At any event, wherever the Germans occupied territory for an appreciable length of time, the bells disappeared. The very few which escaped probably owe their good fortune to difficulties of transportation. A large bell is not easy to move. Thus at Montcornet the bell was with great labor dismounted and carried just outside the church; but although the Germans held the town four years, they never found the means of carrying it farther, and there it still remains. Another bell, evidently from some church in the neighborhood,

Veuilly-la-Poterie (Aisne), June 13, 1919. Photograph shows the Louis XV woodwork.

Seringes (Aisne), May 20, 1919. The débris has been partially cleared.

Oulchy-la-Ville (Aisne), June 4, 1919. Ruins still uncleared.

got as far as the railway-station at Berzy-le-Sec, where it still is, or was a short time ago. Such cases are, however, exceedingly rare, and the lovely old bells throughout the occupied territory were with unusual thoroughness collected, carried off, and doubtless melted down.

The task of removing them was sometimes complicated. In certain portions of France, notably in the northern half of the department of the Aisne, it is the tradition to mount the bells before the tower is finished. To take down the bells, it was therefore necessary to tear out a portion of the belfry. One notices in passing through this-district church after church with the tower ripped open. When there were vaults beneath the clocher, these were often blown up to allow the passage of the bells. Short work was made of the elaborate and often costly machinery for running the clocks and ringing the chimes.

These Germans who melted bells and mined churches still made grandiose gestures of love for art. It is rumored, and I doubt not correctly, although as yet I have been unable to obtain the publications, that at Laon certain Boche scholars excavated the ancient abbey of St. Vincent, thus disproving a thesis of French archæologists in regard to the architectural forms of the building. The excavations were filled in by the French military authorities when they retook the city. Even more amusing is the exposition of paintings the Germans opened in the museum of Valenciennes. A monumental catalogue was published in commemoration of this exhibition, which was formed exclusively of works of art stolen* from collections in the occupied territory. The catalogue is edited by Doctor Theodore Demmler, assisted by Doctor Adolph Feulner and Doctor Hermann Burg. The title is delightfully characteristic: "Geborgene Kunstwerke aus dem besetzten Nordfrankreich. Bergungswerk der deutschen Heeresverwaltung. Kunstwerke aus dem besetzten Nordfrankreich ausgestellt in Museum zu Valenciennes. München, 1918." In an amusing passage of the preface the editor apologizes for the absence of Italian paintings of the first order; but visitors must be lenient, for there were really none to be found in the districts so far invaded! He perhaps hoped for better results from the Louvre.

The German plunderings have resulted in bringing into prominence several works of art previously not so well known as they deserved. This was apparently the case with certain pictures at La Fère the Boches are said to have published for the first time. I make the statement, however, under reserve, for I have seen neither the paintings nor the publication. The most famous instance of such an event is assuredly the collection of pastels by La Tour formerly at St.-Quentin. These portraits were one of the artistic treasures of France. It is not true, as has been said, that they were unknown. La Tour has been long much appreciated by connoisseurs, and the bibliography of the works which refer to the St.-Quentin pastels would be long. Nevertheless, it is strange that the pilgrimage of St.-Quentin was not made by art-lovers as frequently as it should have been, and this is an age which tended rather to overappreciate the eighteenth century. It is also true that the Germans in 1917 removed the pastels to Maubeuge, where they were exposed at the *Pauvre Diable*, temporarily converted into a museum. In 1918, while the pastels were still at St.-Quentin

* "Stolen" is a hard word. The French authorities placed on the dépôt of objects of art collected at Metz the following sign: "Garde des objets d'art volés par les Allemands." Subsequently, however, the word "volés" was erased. It is certain that the Germans evacuated objects of art generally only at the express desire of the owners. It is also certain that the dépôts were generally kept on French soil. It is equally certain that in February, 1919, all these objects were punctiliously returned to the French. But would they have been, had the victory fallen on the other side?

Timeo Danaos et dona ferentes.

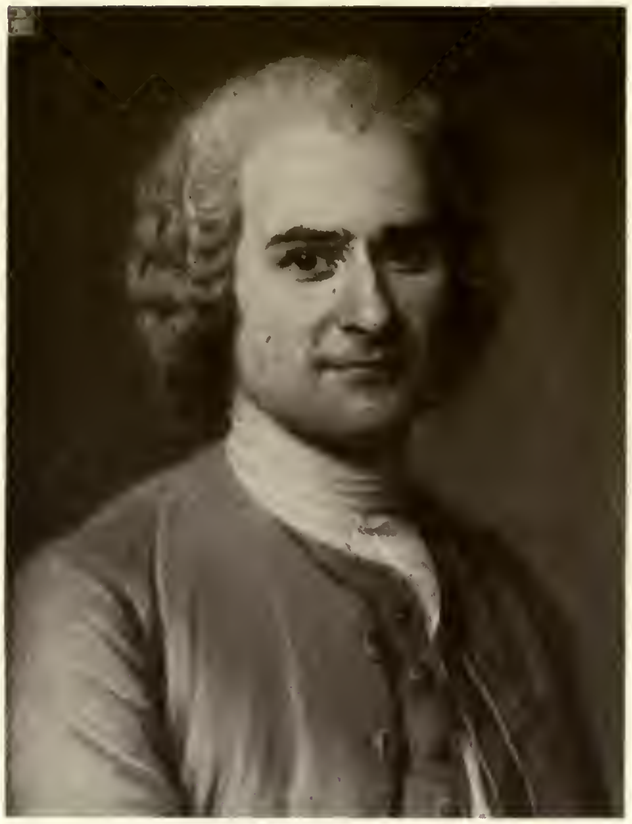
and while that city was occupied by the Germans, they were the subject of a monograph by Hermann Erhard. A copy of this book with numerous reproductions, some even in color, is now in the War Museum at Paris, where I was able to inspect it. It is dedicated to William II, King of Würtemberg, and is published by a reserve corps in garrison at Bapaume.

When Maubeuge fell before the English, the La Tour pastels were brought to Paris and exposed in the Louvre, pending the reconstruction of the Museum of St.-Quentin. The Parisian public has extended to these war-tossed refugees a welcome of extraordinary warmth. This is, indeed, as it should be. On entering the room where the pastels are hung, one seems to find one's self suddenly before a translation into painting of the "*Confessions*." Many characters familiar in Rousseau's pages are immediately recognized, from the writer himself to the Abbé Hubert (in this portrait La Tour touches a note of almost tragic grandeur he has nowhere else attained) and that Madame de la Popelinière who snubbed Rousseau for no better reason than because he was the compatriot of her enemy, the same Abbé Hubert. The effect of the pictures, however, is perhaps due not so much to their literary and historical interest as to the circumstance that they reflect the very spirit of the eighteenth century—that folly-loving eighteenth century which is so exquisite, so charming, and so light-hearted. Indeed, its very absence of conscience is singularly refreshing to us who live in a time overburdened with the gloom of causes and uplift. In those days the world was child-like. People were naïvely selfish as only a child can be; they indulged each whim, each caprice, each passion as a child would like to; they played with the self-abandon and the prettiness of a child, and they were naughty as only a thoroughly bad child can be naughty. All these qualities are idealized by the dainty technic of La Tour. In his pastels we make the acquaintance of superbly groomed gentlemen, of ladies without a wrinkle, all gay, all witty, and all malicious. One feels that for them the only unpardonable sin is dulness. This clever company, of touch so unfailingly light, has the power to transport us, heavy-footed mortals, for a moment into their own more brilliant if also more cruel age, an age when pleasure was the supreme law, and when the purpose of life was laughter. If we once grant the eighteenth-century premise that art (or anything else) has only to please, we must concede that the pastels of La Tour are among the greatest of masterworks. For they undeniably please; they please even the most fastidious taste more, possibly, but as the tapestry-covered, gilt and white furniture Louis XVI. It is chiefly in La Tour's sketches that we catch glimpses of something deeper than the prettiness of a day that is gone; as for his finished work, it seems most artificial —and hence most delightful—in those rare moments when he plays at being sincere.

Port-à-Binson (Marne), June 13, 1919. What the Germans left.

The last chapter of the history of the Germans and French art must occupy itself with events since the armistice. It was poetic justice that the Boche prisoners should be made to labor at repairing, so far as they could, the damage they had wrought. And they have everywhere been set to work by the French at clearing up the débris of the ruined churches, and even at building temporary roofs. They have been far from bringing to the work of reconstruction the enthusiasm which marked that of destruction. The dragging and shuffling pace of the prisoners, their slow movements, a something indefinably tragic in their listlessness, those who have seen will never forget. Yet by the sheer force of their numbers much work has been accomplished. And certain skilled men have shown real competence.

Thanks to this labor of the prisoners, throughout the devastated regions the more important monuments have been cleared of refuse, the stones piled up, and any bits of carving that could be saved put in security. The most urgent repairs have already been carried out. In many ruined churches a side-aisle or a chapel has been boarded off, so as to form a room where mass can be celebrated. In others less injured, the ruined portion has been separated from the rest by temporary walls. This has been done, for example, at Estrées-St.-Denis, where the chevet vault has been destroyed, and is being done at Soissons, where a substantial wall will separate, probably for long, the ruined western portion of the cathedral from the more fortunate choir. It has been done, too, in the cathedral of Châlons. Here a vault of the ambulatory was destroyed by a bomb dropped from an aeroplane. This is the only casualty, happily, among the noble group of Châlons churches. Notre-Dame-en-Vaux, St.-Alpin, St.-Jean, St.-Loup, and Notre-Dame-de-Lépine are all intact. Even the glass of the cathedral of Notre-Dame was dismounted and saved by the French Government. The escape of the churches is part of an immunity shared by the entire city of Châlons, and so extraordinary that it is considered miraculous. In 1914 the bishop of Châlons vowed an annual pilgrimage to Notre-Dame-de-Lépine if the city should not again fall into the hands of the enemy. And it never did, although for four years it lay within a few kilometres of the front. In payment of his vow the bishop conducted his people this year on the first of these pilgrimages, which may very probably become one of the important religious festivals of France. Almost as remarkable as the escape of the churches of Châlons is that of the abbey of Mouzon in the Ardennes, a church which is particularly interesting because of a copy of the cathedral at Laon. Although the town was much destroyed, the abbey is uninjured.



Maurice Quentin de la Tour. Portrait of Jean Jacques Rousseau.

Maurice Quentin de la Tour. Portrait of Madame de la Popelinière.

A temporary roof, destined to protect the building against damage by rain-water, is already in place at Noyon. Similar roofs will be erected on the other great monuments which have been so damaged as to be exposed to the weather. The one for St.-Quentin is nearly ready. These roofs are constructed in sections, transported, and then put up. They are a remarkable achievement from the point of view of practical construction, as they are efficient umbrellas very quickly constructed and inexpensive. When one remembers what a long and serious task it was in the Middle Ages to construct a roof over a great cathedral, this modern accomplishment seems doubly remarkable. The temporary roof of Noyon is not as distressing from an æsthetic standpoint as I confess I had feared. I first saw it from the ridge near Bellefontaine, where one looks down on the broad plain and sees the cathedral of Noyon some fifteen miles away. This used to be one of the romantic views of France, and I was distinctly shocked to see, not the picturesque mass of the cathedral loved of old, but only the new roof of corrugated iron glistening in the sun. But from the city of Noyon itself the roof is extremely inconspicuous, a model of discretion and good taste in temporary construction. It is so low as to be practically invisible, and one could look at the cathedral long and carefully without being aware of its existence.

Maurice Quentin de la Tour. Portrait of the Abbé Hubert.

Thus the last phase of German activity amid French art has been, in a sense, an expiation. The Huns have been forced to help gather up a few fragments of the vase they wantonly shattered. There is nothing more futile than to speak in such a connection of "reparation." The art that has been destroyed in France can never be repaired. No redress is possible. A man whose child has been murdered will not be repaid by forcing the assassin to liquidate in part the funeral expenses. No treaty of peace can bring the dead to life. The crime which Germany has committed against art will endure to the ending of time. It is impossible ever to repair or ever to forget. Nothing is possible but forgiveness. In this necessary act of forgiveness we may, perhaps, be aided by the thought that the fatal germ of materialism, the poison which caused the German madness, is, notwithstanding the war, rampant in our own blood, and that it is driving capitalist, and even more socialist—for the socialists are more crassly materialistic than any Prussian military clique—toward an abyss of equal insanity and horror.

The Columbia Trust Co. Building

By Talbot Faulkner Hamlin

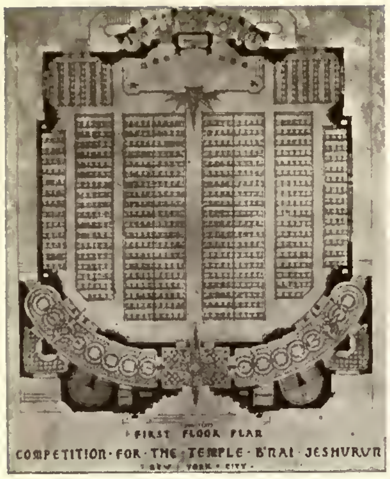
THE COLUMBIA TRUST CO. BUILDING, FIFTH AVENUE AND 34TH STREET, N. Y. McKim, Mead & White, Architects.

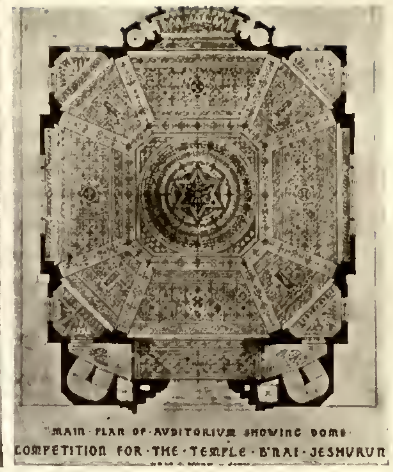
THE colossal order as a decoration for a building of several stories is no new device, but seldom has it been used as simply and as consistently as on the old Knickerbocker Trust Building, now the Columbia Trust Company. This is a building that is a monument to the genius of its designers, who, having once adopted the old idea, suppressed every other detail relentlessly, merging windows and wall together into one dark pattern of metal and glass between the marble columns. This conception, so easy to express in a sketch, and so difficult to handle in reality, is realized almost perfectly in the Columbia Trust Company by the careful treatment of surfaces and color; the contrasting of dark grille and cream-toned columns, of flat metal detail and the bold relief on capital and entablature; and is further emphasized by the deep recessing of the walls between the columns so that heavy shadows are caused which are a pleasing change from the flatness of most of our city buildings.

The ornament of the building throughout is as successful as it is rich. It is principally due to an absolute mastery of scale that such richness can appear so simple. From the detail of the entrance door, with its restrained relief, small in scale and delicately cut, to the bold capitals and the gorgeous frieze, there is not a shadow that is out of tone, not a moulding profile or a leaf which is not studied with regard to its position, its material, and its distance from the eye.

Like all buildings with colossal decorative orders, purists can criticise this one as illogical. Modern fashion seems to be more sympathetic to the delicacy of the Adam period than to the rich and noble power of Roman work. Yet even the purist must allow that in consistency of conception, in beauty of detail, and in mastery of scale the solution of the problem of the colossal order in this building is well-nigh perfect. And even the modernist must realize that this massive and rhythmically scrolled acanthus frieze, the rich beauty of the capitals, the powerfully profiled base, all cut from marble like yellow ivory against the dark green grilles between, form a decorative whole of great nobility and powerful dignity that has been a pleasure and an inspiration to thousands of passers-by.

NOTE: This beautiful structure has been sold recently and is to be reconstructed, with an addition of a number of stories, into a general office building.





Front elevation. Competition for the Temple B'nai Jeshurun. The original design.

The Temple B'nai Jeshurun

Walter S. Schneider, Architect; Henry B. Herts, Associate

STRIKINGLY unusual, and a noteworthy addition to ecclesiastic monuments, is the Temple B'nai Jeshurun of New York, that expresses in its conception a more nearly Semitic type of architecture than can be found in any other modern building of its kind.

Upon entering the competition for the building, the purpose was to seek among the archæologic fragments of the period and time most closely related to Jewish unity as a nation in Palestine. Extensive research in the various collections in the Metropolitan Museum of Art furnished inspiration for a design that reflects a blending of several styles and periods more or less related.

For financial reasons, the original design was not executed in all its details, but it has been so planned that ultimately several features of the original scheme may be carried out without disturbing the present structure—notably, placing the Sunday-school above the auditorium, with an elevator as shown on the plan, insuring ready access from the basement or auditorium to the roof.

In treating the façade, an effort was made to soften the chill and somewhat bleak effect so usual in granite by using stone that had weathered, so that a rich buff color is the prevailing tone. The seamed-face granite façade shows the influence of Egyptian stonework, relieved of too great severity by the ornate treatment of the main portal.

In the lobby, restraint and simplicity of treatment are evidenced. Whatever ornament there is, is well studied and in low relief. Cast stone perforated grilles conceal radiators; and a slight amount of color is introduced in the soft buff of the high marble base and of the rough buff floor tile, set in squares, and bordered by glazed tile running in color from a deep blue to mottled blue and buff.

At the opposite ends of the lobby, marble stairs ascend to the balcony, and descend to the basement. Here the Sunday-school has been temporarily installed, and here also are located the board rooms, lavatories, an apartment for the janitor, and facilities for heating and artificially ventilating the building.

The Sunday-school, which now occupies the major amount of floor space, is so arranged that by means of folding partitions it can either be divided off into classrooms, or used in its entirety as an auditorium for lectures or other assemblages. The auditorium of the synagogue proper has a seating capacity of about eleven hundred.

In plan, the auditorium is a square, with the four corners worked out as pendentives, each with two pilasters, highly decorated with low relief ornament, supporting decorative brackets carrying an octagonal dome, which surmounts the whole. The perpendicular surface of the octagon is perforated by a number of segmental arches. The octagon and its elaborate stalactite ceiling are thrown into high relief by means of concealed lighting.

Between the projecting brackets framing the octagon, the auditorium ceiling is a geometric design of stalactites, similar to that above the octagon.

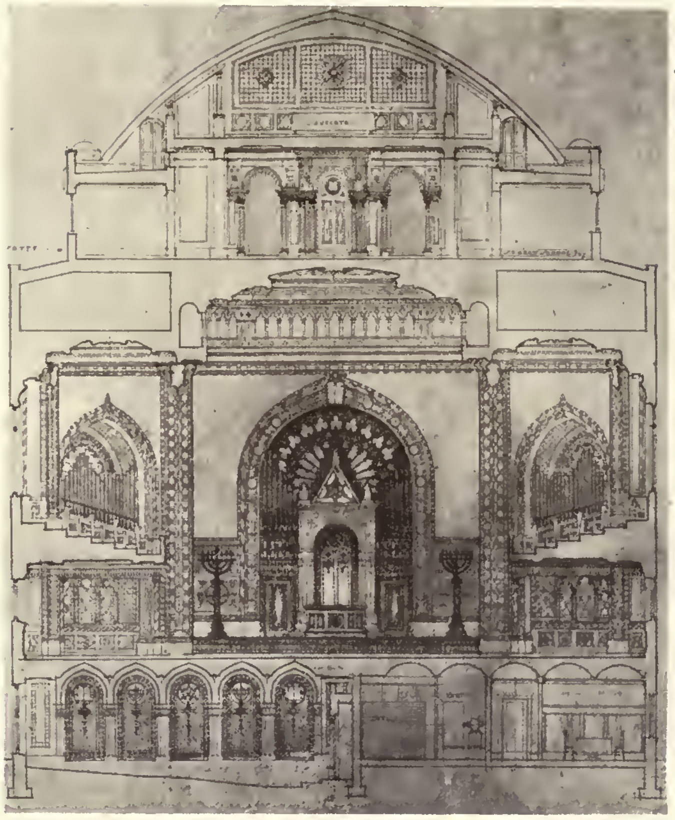
The sanctuary has been so treated that it immediately arrests and centres attention. Intricately and richly ornamented, the compartment containing the scrolls of the law has been further enhanced in beauty through the use of color. Veined blue marble columns are clustered about the openings, and the surrounding ornamented surfaces have been richly colored in dull tones of blue, buff, red, and gold. Pendant above the portals of the sanctuary is the everlasting light, symbolic of eternal faith.

Above the sanctuary and reached by a stairway from the ambulatory, is the choir and organ loft. This, together with the sanctuary, is framed by an ornamental perforated arch of geometric design.

In front of the sanctuary is the altar or reader's desk. This is of buff-colored marble, inlaid with a richly blended mosaic. Concealed light reflects its rays upon the altar table. The altar is flanked on either side, near the outer ends of the platform, by large seven-branched candelabra.

Distinctly decorative in their treatment, and somewhat reminiscent of the Moorish, are four large candelabra which are pendant over the auditorium from the four points where the brackets form the octagon. These also have been colored to harmonize with the general color note touched in the treatment of the sanctuary.

The ornament throughout the interior is a free interpretation of Coptic design, interpolated with suggestions from Moorish and Persian sources. Adapted to modern conditions, it gives in a building of this character a harmonious result, insuring a Semitic character that certainly no classic treatment of columns and cornices could approach.



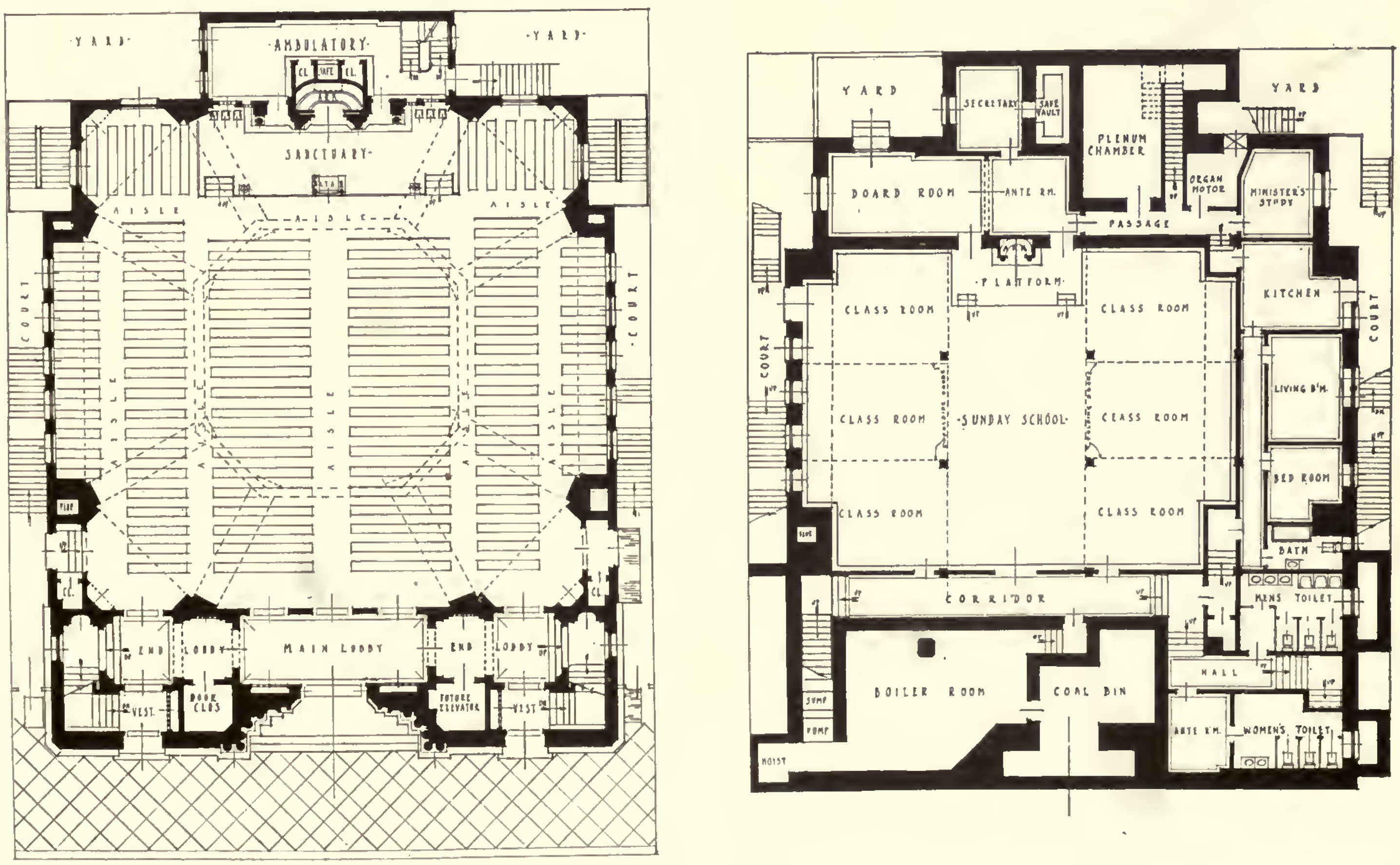
Section. Competition for the Temple B'nai Jeshurun. Above the roof line of the present building is shown the proposed Sunday-school.

An added effect of dignity, and a certain mystical quality, is obtained in the treatment of the larger windows, which are of cathedral glass. These, together with the rose-window in the main portal, are, in general, in two colors only—blue and golden yellow. Simply treated with a diaper pattern, the only allegorical design is at the rounded window head. The yellow tone gives a cheerful sunlight effect, contrasted with the mystic quality imparted by the blue windows near the sanctuary. This note is carried further in the dull blue upholstery of the pews and the carpeting of the aisles and floor of the sanctuary.

Practically all radiators are concealed from view behind perforated ornamental cast-stone grilles, while at regular intervals, beneath the pews in the auditorium, mushroom ventilators, operated from the plenum chamber in the basement, are placed—insuring filtered air of an even temperature at all times.

But no auditorium of any kind, no matter what its artistic attributes, may be called "successful" if acoustic considerations have been neglected. To this end the interior has been carefully studied, so that sound is taken up at all points, and not reflected, there being no disturbing echoes.

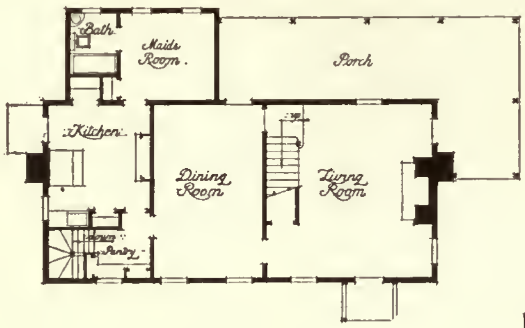
The Temple B'nai Jeshurun shows a most careful study of plan, design and ornamentation, and the result is a building expressive of its purposes and of unique artistic interest.



Plans of completed building.

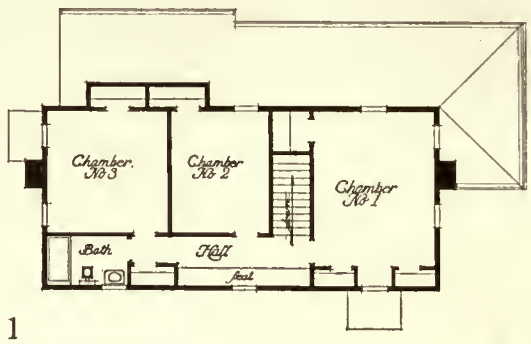
Front · Elevation

End Elevation



First Floor Plan

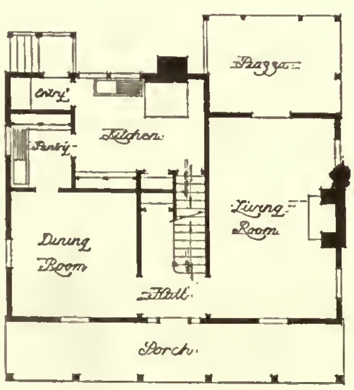
HOUSE No. 1



Second Floor Plan

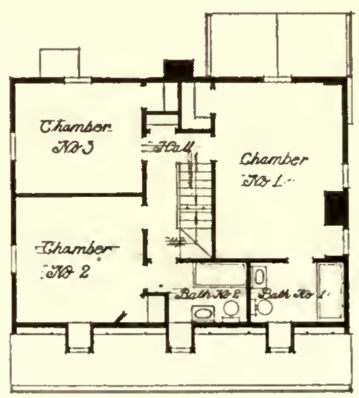
Front Elevation

Side Elevation



First Floor Plan

HOUSE No. 2



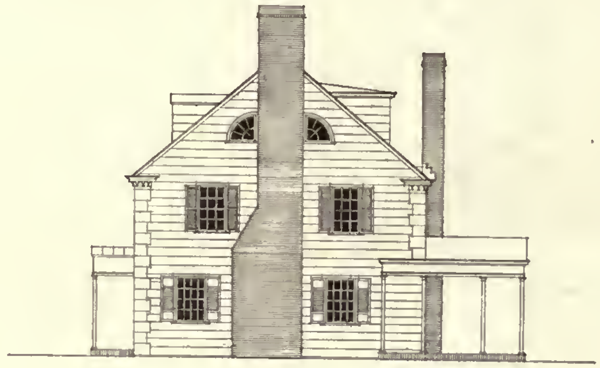
Second Floor Plan

HOUSES BEING BUILT AT SCARSDALE, N. Y.

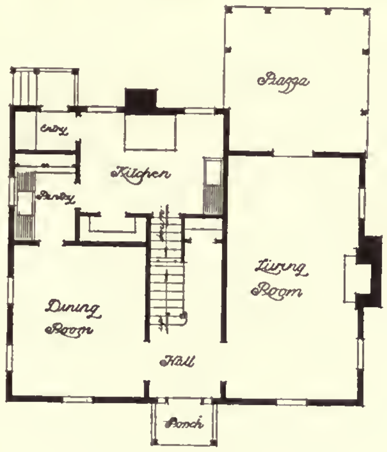
Eugene J. Lang, Architect.

See page 22.

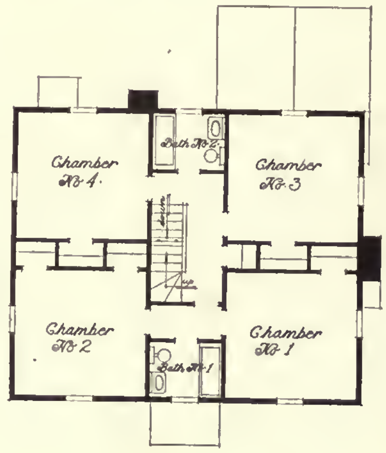
Front Elevation



Side Elevation



First Floor Plan

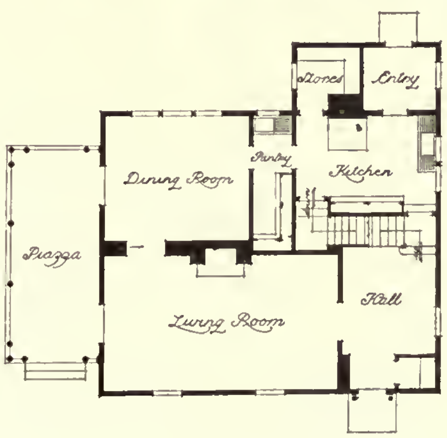


Second Floor Plan

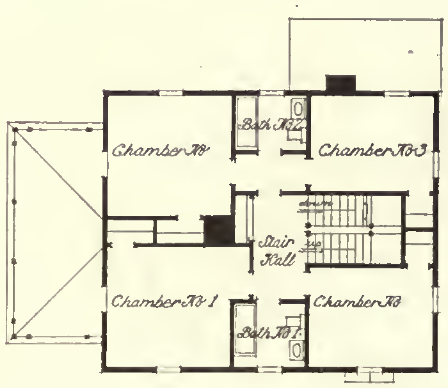
HOUSE No. 3

Front Elevation.

Side Elevation.



First Floor Plan.



Second Floor Plan.

HOUSE No. 4

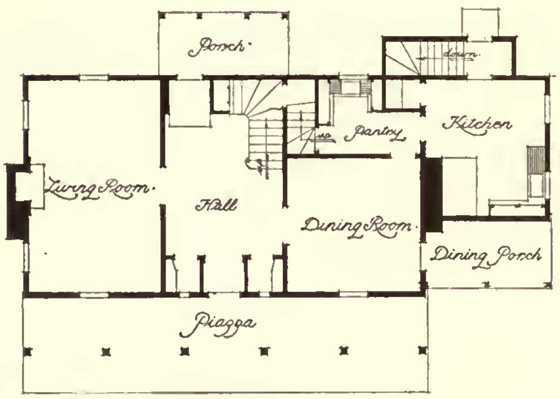
HOUSES BEING BUILT AT SCARSDALE, N. Y.

Eugene J. Lang, Architect.

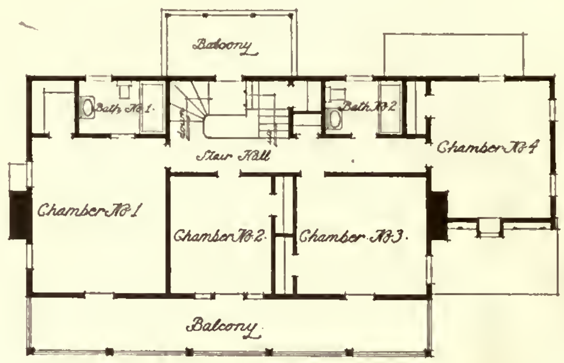
See page 22.

Front Elevation

Side Elevation



First Floor Plan



Second Floor Plan

HOUSE No. 5

HOUSES BEING BUILT AT SCARSDALE, N. Y. — Eugene J. Lang, Architect.

Designs and plans shown on this and two preceding pages represent a group of five frame buildings now under construction at Scarsdale, N. Y. They are straight Colonial Academic architecture, designed for definite sites with regard to outlook, location of porches being determined by orientation. The architect aimed to get within a compact plan of 1,000 square feet floor space at least 1,200 square feet of accommodation. The houses range in price from $9,000 to $18,000, the average cost being $15,000.

Architectural History and the Designer

By Rexford Newcomb

Assistant Professor of Architecture, University of Illinois

WITH the changes that have been wrought in our thinking as a result of the Great War, many questions have been raised regarding the future of architectural education in America. There seems to be abroad among architects an idea that the architect of the future needs, if he has not done so in the past, to get closer to the realities of his work, to understand better engineering procedures, to have a better knowledge of materials, to think more logically and clearly, to act more orderly and surely. And well may such ideas run through the mind of the observing practitioner, for of all professional men the architect came in for the severest criticism during the war. The architect's performance, when compared with that of the engineer, for instance, left much to be desired. The architect saw work that from time immemorial had been given to him turned over to the engineer for execution. Clearly something was wrong. Some have tried to lay the blame upon the schools that have trained a portion of the profession; others have blamed it upon the profession and its attitude toward the current questions of the day. All agree, however, that now is the time to seek out better methods and formulate better policies to guide the profession, whether it be the practical man or the educator, in the future.

In such a stock-taking time as this, clearly the education of the future generation of architects should be carefully considered, and constructive suggestions offered. Now seems a good time for educators to reconsider the educational trend, discard those practices which a changed social order has made obsolete, and restate the policy that is to guide them through the post-war period. In this connection the subject of architectural history and its place in the curriculum might be profitably considered.

In none of the various suggested schemes for changed architectural curricula, that have resulted from a desire to reorientate architectural study, has the writer found anything that would seem to challenge the place that the study of architectural history has held in the curriculum of the past or attempt to exclude it from the curriculum of the future. Yet, although its place seems unchallenged, the methods by which it is presented and the attitude held toward it in many of our schools should not go uncriticised.

The writer is well aware of the attitude which most young students have toward the study of architectural history. To the student, taking up for the first time the study of architectural history, some of the following questions are likely to arise: Of what use is this study of past architecture, anyway? Why not concentrate upon the best that is being accomplished in the world to-day and let the past —the dead past—lie undisturbed? It is to the future, not to the past, that we look; why should so large a percentage of our time be spent on what has gone before when we could be contemplating what we are going to do in the future? All these questions and many more are likely to disturb the mind of the young American, especially if he comes from a section of our country which has neither much of a historic background nor many old things to reverence. Now and again these very questions arise in the minds of the more thoughtful practitioners as well, especially in the minds of those who are fearful that we shall never arrive in America at an adequate expression, architecturally, of our life, ideals, and civilization. Now and again arises a "modernist" who counsels us to "leave off the copying of the forms of the past and strike out for the future," and if he does not counsel by word of mouth, he does by act and deed.

The importance of the study of architectural history to the practical designer has thus been challenged in the past and doubtless will be in the future. Thirty years ago Mr. Henry Van Brunt, in a report of the Committee on Education of the American Institute of Architects, urged strongly upon the profession and the architectural schools the extreme importance of a detailed study of architectural history to the designer. His emphasis was placed then, as it should be now, upon that aspect of the study which would bring out the "fundamental principles that underlie design and show the student how form and ornament were developed out of the genius of civilizations and peoples."

The history of architecture has always occupied a prominent place in American curricula, and the arguments of such reports as that just mentioned only served to emphasize, and correctly, too, in the writer's estimation, the importance of such study. Some ten years ago there began to be manifest in certain branches of the profession a growing dissatisfaction with the subject of architectural history. It was argued that a formal study of architectural history only operated to enslave the student to the forms of the past and to abridge his ability to do real creative work. It was further argued that the great designers of ancient and mediæval times knew nothing of their architectural past and that they were concerned only with the solving of the problems of the present and future. They had succeeded admirably and why should it not be possible for our designers to proceed in the same fashion? The recommendation was that a detailed study of architectural history be given up and that the resulting extra time be spent upon design.

Now there was ground, no doubt, for such reasoning, and the writer believes that some of the blame for mediocre design, as far as the schools are concerned, can be with justice laid at the door of poor history teaching. This question, however, should be asked: Were designers doing parrot-like work as a result of a detailed study of architectural history, or was there some other cause for their intense worship of dead, past forms? There are probably two answers to this question. In the first place the detailed study of architectural history, as a thing in itself, was not wrong, but the method of approach used with few exceptions in those days, and from then even down to the present, was fundamentally wrong. Even with this admission, however, the whole blame cannot be laid at the door of the teachers of architectural history. Some of the blame must be charged up to the teachers of design, who, as a class, have taught as unsuccessfully as the historians. The prevalent habit, as practised in schools of design, of taking good historic examples, things, of course, perfect as far as their material, time, and place are concerned, and "adapting them to modern uses," has, the writer is constrained to believe, been as large a factor in the making of parrot-like archæological designers, as an archæological approach to the study of architectural history could ever possibly have been. The writer remembers with perfect clarity the procedure in the design classes of his day and, so far as he can observe, the methods in use to-day offer no greater incentive to sane, logical, original, creative thinking than the methods in vogue at that time. It is not with the glowing folly so apparent in the teaching of design that the writer is here concerned, however, but with the less obvious, yet perhaps just as dangerous methods that are currently used in the presentation of the study of architectural history to the undergraduate.

As has been charged, much of our architectural history teaching has been nothing more nor less than archæology. In many schools it has amounted to scarcely more than a superficial criticism of the æsthetic externals of the buildings of the past, with no attempt upon the part of the instructor to inspire the student really to seek to understand the social order which brought forth these monuments, the geological or commercial conditions which made possible their construction, the correlation of their æsthetic and structural elements, or an appreciation of the fact that out of these pre-conditions, in a given time and place, there could not have come any other expression architecturally than the one that resulted.

This method of presentation may indeed have been largely influenced by the books on architectural history, for it is lamentably true that in many schools the course in history is based upon a text-book, which usually divides the subject into a series of "styles" with hair-splitting differences and fine distinctions drawn, distinctions that are clearly more archæological than artistic. Style has been over-emphasized, over-worshipped, with the result that the study of history often degenerates into nothing more than a learning of the characteristics of these sacred styles, a "grammar" of details and ornament to be drawn upon indiscriminately as the occasion arises. And right here, perhaps, lies one of the fatal mistakes that history-teachers make. Realizing that the shortest way to a high standard of taste and a highly developed appreciation lies in the study of the best examples of the past, the teacher places great emphasis upon the study of these masterpieces. He analyzes their beauties upon plan and elevation, he expands upon the charm of their detail and the wonder of their color. All this is very well, but the mistake has been to stop when this has been done, and to say, "This is the end of our quest; these things are perfect—art consummate."

They are perfect as far as form is concerned, and the student, practical-minded, reasons that if these things are perfect why not use them, and so he borrows bodily this or that from a Byzantine church, or a Roman bath, or a Gothic cathedral, and "applies it to a new use." His sole reason is that it is beautiful. Whether it is appropriate and logical, expressive of this race and place and time, is never considered. What has been lost sight of is the fact that behind all these forms and through them there is a "guiding spirit," and this spirit which, most of all, the student should have grasped, he has most completely missed.

What we need is the study of architectural history from an approach that will compel the student to appreciate the fact that the great architecture of the world has always evolved in obedience to certain unfailing principles, that form grows out of structure, and that structure is in turn the result of man's using the materials that he is able to lay his hands upon, to accomplish a very definite, practical result. Above all, it should be pointed out that various peoples approach the same problem in very different ways, these differences being due to their different mental habits, which, in turn, are determined by their history as a race, their religious ideas, their social order, or their present environmental conditions. The student should be led to see that great architecture is the result, always, of a frank, logical, and straightforward meeting of the conditions imposed, the intelligent selection of means to the accomplishment of ends, and that, after all, outward form is significant only when it expresses in a direct way the inward organism.

It has occurred to the writer that in courses in the history of architecture there are several opportunities for the student. First of all, he can gain an appreciation of form through the study of the best historic examples. If he does this he is progressing, but every intelligent layman should do at least this much. What is more fundamental to his future studies and work as a creative artist is this: he may order his architectural philosophy. In this second case there is a grave responsibility laid upon the instructor, and it seems well to remind the student as the course proceeds that these forms, these buildings, this subject-matter, if you will, though interesting and beautiful in themselves, are not the sole object and end of the course. They are only the subject-matter, the visible remains that show us in concrete form the results of all the forces that have been at work in a given place at a given period. He should be taught how these forms do express their civilization and time.

At first, it will be necessary to point out to the student what he will, if he is a thinker, discover sooner or later for himself; namely, that architecture is a perfect index to the life and thought of a people, and, in this sense, is the result of many influences, among which might be mentioned geography, geology, climate, ethnographic and historical relationships, political and religious systems. There are hundreds of classic examples to bear home to the student the truth of the above proposition. Secondly, the student will soon discover that man builds or constructs for two sets of reasons, and that what he rears he builds because it satisfies his physical needs or satisfies his mental, his spiritual needs, and that in the accomplishment of these things he takes the line of least resistance. In this connection he will soon discover that structure is physical, results from a physical demand, while ornament is mental, results from a psychological demand. This observation should teach him why forms, particularly ornamental forms, have persisted in architecture and the other arts of design, long after they are no longer racially or nationally appropriate. They persist simply because they satisfy man mentally, spiritually.

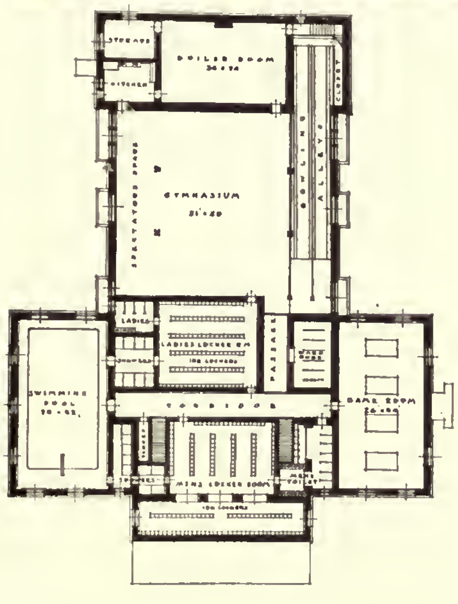
Moreover, the student will soon discover that in all great periods of architectural activity there has been behind the new evolving forms a new structural principle, and he will soon come to feel that in the world's history there have been, after all, only two great architectural trends, the first the development and perfection of the post-and-lintel system of construction, that is the static system; and the second, the development and perfection of the arcuated system, the dynamic system of construction.

He will soon discover, also, that ornament, as the fulfilment of a psychological demand in mankind, follows structure, and that when ornament, at any period, dictates structure, architecture becomes decadent. In other words, there must be a perfect balance structure, logical, simple, and appropriate to time, place, people, and materials on one hand, with form for its perfect æsthetic expression, enhanced by sane ornament, upon the other. Thus it seems to the writer that any course in architectural history that does not satisfactorily and adequately correlate architectural expression and its pre-conditions is a failure. For if architecture is the perfect index to the life and ideals of a people, the young designer will reason that in order to make his art vital, appropriate, and living to-day, he needs not take parrot-like the forms of the past and paste them upon the structures of the present, with little thought of their meaning or significance, but that he needs to fathom the spirit, the life, the civilization of his time, and by the same processes used by the great architects of other days arrive at as worthy results in the expression of that new civilization. In other words, he should emulate the spirit, the method of work that brought forth these forms, not copy the forms themselves.

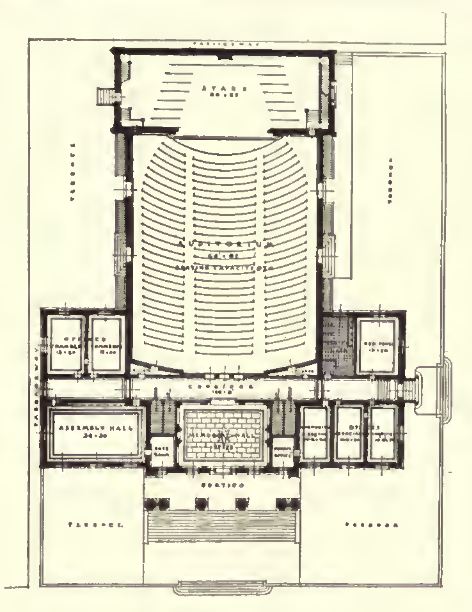
In this connection it should be noted, however, that there are many forms that have been used throughout all the styles, that have been common to many peoples. This is especially true of ornamental forms, and in this sense they are "world forms," and persist because they express the fulfilment of a definite psychological need. Whenever man is able to do without them mentally they will cease to be used.

It is needless to argue that structure precedes ornament; it goes without saying that here it should be noted that ornament should grow out of structure, should enhance it. In this sense architectural procedure would seem to follow biological precedent. It is to be noted, moreover, that what has in one age been a structural necessity has often persisted in a succeeding age as a pleasant ornamental reminiscence. The reason is again to be found in a psychological analysis. These columns, for instance, now structurally obsolete, are demanded æsthetically, or, at least, a vertical element in the design is demanded. Where we have made our mistake has been to supply the columns which, in the material of which we have made them, are totally illogical and preposterous, if we expect them to do the work that they seem to be asked to do.

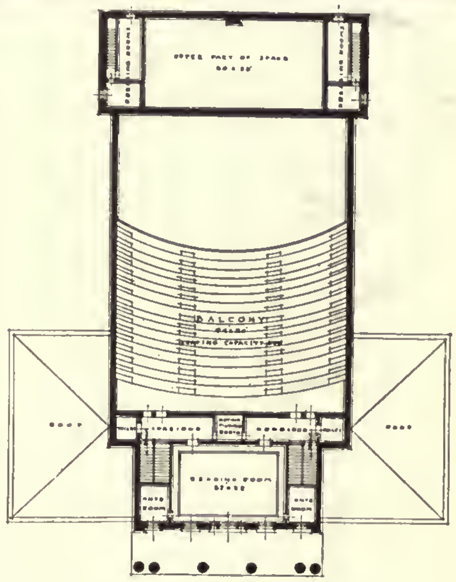
It appears, then, that there are many vital and helpful lessons to be gained from the right study of architectural history, but in order to accomplish some of the things here mentioned it is necessary to go thoroughly into the pre-conditions, to make complete analyses of all the other phases of a nation's history; in other words, to try to master completely an understanding of the civilization of which the architecture is, after all, the visual expression. Approached in this spirit, architectural history may, instead of being the study of dead forms, be the means of realizing more fully and appropriately the architectural expressions of our own times.



BASEMENT PLAN



MAIN FLOOR PLAN



SECOND FLOOR PLAN

Memorial Community Building, Goldsboro, N. C.

C. Adrian Casner, Architect

Features Embodied in the Building.—A memorial hall on whose walls shall be inscribed the names of all the boys who saw service in the war and in addition thereto records, relics and trophies of the war.

An auditorium with a seating capacity for fifteen hundred and suitable for large county and community gatherings, with a modern stage and equipment.

A public comfort room with suitable toilet facilities. Suitable rooms for all county and city public welfare agencies and social organizations. A reading room. A gymnasium. A swimming pool and shower baths for both men and women. A room for games and amusements. A bowling alley. A lunch room and kitchenette.

Plans.—The architect has prepared and submited plans for such a building, embodying all of the above features and answering the needs of the community.

Cost.—The estimated cost of the building is $200,000, and the estimated cost of the building equipment and grounds is $50,000, making an estimated total of $250,000 to be raised in order to finance the undertaking.

Modern Building Superintendence

By David B. Emerson

CHAPTER V

PLASTERING, MARBLE AND TILE WORK

THE ceilings in the first story were to be furred and lathed with metal lath, and the top story had a hung ceiling two feet below the bottom of the lowest roof-beams to give an insulating space under the roof. To carry the furring, steel hangers were clamped to the flanges of the beams; to these hangers were bolted one and one-half-inch by one-quarter-inch running bars spaced five feet apart. To these running bars were clipped by means of No. 9 gauge galvanized-wire clips three-quarter-inch steel channels, spaced twelve inches on centres; this formed the furring to which the lath was to be fastened.

Where the beams in the coffered ceiling of the bank occurred, longitudinal rails of one inch by three-sixteenth-inch flat steel, fastened to the floor-beams, were run, and to these rails were fastened brackets of flat steel bars, which were bent to conform with the shape of the beams, and were spaced twelve inches on centres. To hold the whole frame in place stiffening rods of three-eighth-inch round steel were run at right angles to the brackets and securely wired to them. The lath which was used was a galvanized No. 18 gauge wire lath. It was tied in place and drawn tight to the furring with No. 18 gauge galvanized annealed wire; ties were spaced every six inches, given a double turn, and the raw ends bent back flush with the face of the lath. All end joints were lapped two inches, and care was taken to make all side joints along a furring bar, and they were lapped one inch and securely laced together. The ceilings were all carefully tested to see if they were perfectly level and true before starting the plastering. All of the external angles throughout the building were protected with galvanized-iron corner bends, which were secured to the terra-cotta block partitions by means of iron clips three inches long, which held them firmly in place. In some of the rooms in the bank, and in the tiled rooms in the Turkish bath in the basement, two-inch solid plaster partitions were called for. These partitions were constructed of galvanized corrugated expanded sheet metal, secured at floor and ceiling with special expanded metal angles. After setting the lath, the partitions were ordered to be braced with temporary bracing, until the plaster was on and set, for although these partitions are very firm after the plaster has set, the lath is very shaky until the plaster has been put on. Before the plastering was commenced the carpenter closed all exterior openings with well-braced wood frames, and covered them with heavy muslin to keep out the weather. The plastering was done with patent plaster, which is by far the most efficient method of plastering a large building in a city, as it is practically impossible to slake enough lime and keep it on hand for any large operation, whereas patent plaster can be mixed and used at once; in fact has to be done that way on account of the nature of the material. All plastering which was done on lath was three-coat work, and that which was done on terra-cotta walls and partitions and on the concrete floor slabs was two-coat work. Bevelled grounds thirteen-sixteenths of an inch thick of dressed white pine were set at all openings, and wherever required, and plastering was ordered to be worked up full to the grounds. It is a great mistake to put patent plaster on too thin, and a great many unsuccessful jobs of plastering can be traced back to this error. The plaster for the scratch-coat was fibred, but that for the burnt coat was unfibred. When the plaster was mixed particular attention was given to seeing that all mortar-boxes were clean before starting to mix the plaster in them, and that they were thoroughly cleaned out after each gauging. The mortar mixers were warned not to wash hoes and shovels in the gauging water. Not more than enough plaster to last one hour was allowed to be mixed at a time on account of the quickness with which it sets, as patent plaster, unlike lime plaster, sets instead of drying. No plaster which had commenced to set was allowed to be used. We were very careful when the scratch-coat was put on to see that the plasterers applied enough pressure to push it through the mesh of the lath and give it a good key. Plaster was filled in between window-frames and walls in all cases to make a wind-stop. All terra-cotta partition tile and furring were ordered to be well wet down before commencing any plastering on them. The burnt coat was properly screeded up and finished with straight edge and darby, using a float to knock off all lumps and fill cut faces. Once or twice during the progress of the work we noticed some of the plasterers picking up some of the droppings on the staging and using them on the ceiling; this we ordered stopped at once, as the droppings have frequently commenced to set, and do not as a result have a good adhesion, so that any jar on the floor above will cause a fall of a portion of the ceiling, with the accompanying discomfort to the occupants of the room. The finish coat of plaster on all walls and ceilings was composed of hydrated finishing lime, gauged with twenty-five pounds of calcined plaster to each one hundred pounds of lime. The finish was trowelled smooth, and all brush marks worked out. The ornamental plaster-work in the banking-rooms was done before the finish coat was put on the walls. The beams and cornices were given a scratch and burnt coat of plaster, roughly following the profiles over which the gauged plaster was to be run. The plaster for all new mouldings was mixed in the proportion of two parts plaster of Paris and one part of well-seasoned lime paste, so that it would not set too rapidly as it was being run. All ornamental mouldings and applied ornaments on the surface of the ceilings were cast from pure plaster of Paris and set in freshly mixed plaster. We were careful to see that all of the work was well mitred and joined, and that all ornaments were centred in the panels, all of which contributes to the mechanical accuracy of the work. When the plastering was completed the installing of the interior marble and tile work was commenced. All of the vertical surfaces of the marble which were not carved were highly polished; the floors and stair-treads were hone finished. In all cases the base course was ordered to be set before laying the finished floors. All of the marble work was set in plaster of Paris, and the plaster was called for to be the best casting plaster. Where the marble bases had to set out any distance from the wall we instructed the contractor to build brick backing for marble; brick was laid up in lime mortar, so as not to stain the marble.

Before laying the floors we had the concrete slabs thoroughly swept broom-clean, and then thoroughly saturated with clean water and sprinkled with dry cement to the thickness of about a sixteenth of an inch. A levelling coat of cement mortar composed of one part Portland cement and three parts clean-washed sand was put down, and the floors were laid on this bed. The floor of the first-story vestibule and halls was of marble tile, eight inches by twelve inches, with border strips. The marble used was pink-and-gray Tennessee marble, which on account of its hardness gives an excellent wearing floor. In laying marble floors, where two or three kinds of marble are used to get color effects, care should always be exercised to select marbles of very nearly the same degree of hardness, otherwise walking over them will wear down the soft marble faster than the harder ones, giving an uneven surface which is very disagreeable to walk upon. The marble tiles which composed the floor were bedded in the cement mortar and well grouted with cement. The floors in the corridors in the upper stories were of marble mosaic. Before commencing to lay the mosaic an open-mesh galvanized-wire netting was placed on top of the cement levelling coat; to prevent cracking of the flooring, the netting was stretched tight and fastened at the ends to hold it firmly in place. The mosaic was composed of a field of Carrara chips and a fret border composed of colored marbles. Borders were set upon heavy paper face down and laid in strips on the levelling coat; fields were set by hand in the cement. Care was taken to see that the mosaic was kept to a line. After the mosaic was laid it was well grouted with cement, and when the cement had set the entire floor was ground down to an even level surface by means of electrically driven carborundum wheels. The walls of the first-story corridor and the banking-room were wainscoted with marble up to the cornice, with pilasters panelling, etc. All of the corridors throughout the building had a plain marble wainscot seven-eighths-inch thick and five feet high, with base one-and-one-eighth-inch thick by eight inches wide, and a plain cap one-and-one-eighth-inch thick by four inches wide. All offices had seven-eighths-inch marble base six inches high. All marble was well anchored as it was set with No. 6 gauge copper-wire anchors; all slabs were anchored by the edge, and all corners of the pilasters and wainscoting were cross-anchored. The anchors were well wedged in and covered with plaster of Paris. The marble was backed up with plaster of Paris as it was set. All joints in the marble should be as neat and close as possible, and none of the slabs should have the edges chipped or spawled in the setting. No screens were allowed to be used in the face of the marble work. The treads and platforms of the stairs were of gray Tennessee marble one and one-half inches thick, with rounded nosings. The treads were secured to the iron risers and strings by means of brass screws, the marble being drilled, and the holes filled with lead to give a grip to the threads of the screws. All of the toilet-room floors were of three-inch hexagonal vitreous tile, and the walls of toilet-rooms were wainscoted to the height of seven feet with three-inch by six-inch enamelled white tile, with a sanitary base and moulded cap. Tile by reason of its being absolutely impervious, makes the most sanitary material known. The bed for the floor tile was prepared the same as that for the mosaic flooring. Tile were placed upon the mortar and firmly pressed into place, and tamped down with block and hammer until exactly true and even with the finished floor. All tile were grouted with cement mortar, the grouting was ordered done the morning after laying, to insure a proper bond between the grout and the cement mortar. All surplus grout was removed before it had commenced to set. The walls of the toilet-rooms were prepared for tiling by giving them a scratch-coat of cement mortar, mixed one part Portland cement to two parts sand, and well scratched horizontally. The cove base was set before setting the wall tile to give a good start for the tiling. Wall tile were set by buttering; this was done by spotting tile on the walls about thirty inches apart, and plumbing them accurately with the finished face of the wall. The scratch-coat on the walls was thoroughly saturated with water. Neat cement mortar was spread on the back of each tile, and they were gently tamped into place and plumbed with the spot tile by means of a straight-edge. After the tile had set, the joints were washed out and filled with a thinly mixed white Portland cement. Care was taken to see that all cement was cleaned off before it hardened.

The only defect to watch for in wall tiling is crazing. All of the enclosures around the water-closets in the toilet-rooms and the back linings of the compartments were of structural glass, with white enamelled iron door-stiles. This material, on account of its being absolutely impervious and practically non-staining, and offering a great resistance to abrasion, makes a most ideal partition for use in public toilet-rooms. The partitions were erected according to standard details and specifications, issued by the manufacturers. When the work just described was completed, the building was ready for the metal and wood trim, much of which had arrived at the building and was ready to be installed.

The Palais de Justice, in Andersen and Hébard's scheme for an international world centre. *From The Architectural Review, London.*

EXTERIOR.

WAITING-ROOM. Bigelow & Wadsworth, Architects. Stone & Webster, Engineers.

DALLAS INTERURBAN TERMINAL, DALLAS, TEXAS.

Some Significant and Encouraging Facts Regarding Building Prospects as Shown in November, 1919

BUILDING operations for which arrangements were made in the United States last November must be referred to as simply stupendous. As winter approaches there is invariably a tendency toward contraction in construction work as compared with periods immediately preceding, and 1919 was not an exception to the rule, but the contraction was extremely moderate, and the plans entered into summed up an extraordinarily heavy total of contemplated expenditures. In fact the volume of projected operations for the month was not only the heaviest by a very decided margin of which we have record for November, but actually in excess of all earlier months in 1919, excepting only August and October. Furthermore, all indications would seem to be for the continuation of marked activity in building lines for some time to come, the incentive being the urgent need for housing accommodations in virtually all sections. Some relief has been afforded locally, in part by the alteration of private dwellings into apartments capable of housing a number of families, but otherwise the demand is as keen as ever.

Our compilation of building statistics for November included 159 cities, all but 9 showing gains over 1918, and in many cases the percentages of increase was phenomenally heavy. This was especially true of Greater New York, Chicago, Philadelphia, Boston, Detroit, Cleveland, Cincinnati, Kansas City, Baltimore, San Francisco, Los Angeles, Milwaukee, Minneapolis, Newark, Pittsburgh, Washington, Seattle, St. Paul, St. Louis—in fact, of practically all of the leading cities of the country and many of those of lesser prominence. The total of intended outlay reaches no less than $140,691,829 against only $18,347,234 last year, $47,000,000 in 1917, and $75,000,000 in 1916, this latter until now the high-water mark for November. Greater New York exhibits a very decided expansion from the very low total of a year ago, the comparison being between $20,428,281 and $1,688,949, the most striking gains being in Brooklyn and Queens boroughs. The aggregate for the outside cities (158 in number) is $120,213,548 against but $16,658,285. The Middle West group of 29 cities reports a total of $43,904,311 against $4,591,212 last year, and the territory west of the Mississippi River (24 cities), exclusive of the Pacific Coast section, furnishes an aggregate of $15,939,557 against $2,457,445. The total for the 37 cities in the Middle Atlantic division (not including Greater New York) at $27,736,256 is over seven times that of a year ago; New England cities to the number of 24 give an aggregate of $7,835,538 against $1,388,827; the South (31 cities) discloses a result of $12,348,996 against $1,590,174, while a total of $12,448,190 on the Pacific Coast contrasts with $2,801,691.

For eleven months of the calendar year 1919 the expansion was of course extremely heavy, the aggregate exceeding by a considerable amount the high record for the period established in 1916, which latter obviously was upon a lower-cost basis for labor and material than now prevails. A total of approximately 1,175 million dollars compares with only 425 millions in 1918 and 945 millions in 1916. Greater New York's aggregate for the eleven months at 215 millions is 161¼ millions above that of 1918, and outside of this city the comparison is between 960 millions and 371½ millions. The contrast with 1918 at a few leading cities is: Chicago, 95¼ millions against 33¾ millions; Philadelphia, 54 millions against 14⅝ millions; and Los Angeles, 24⅝ millions against 8 millions.

Returns from the Dominion of Canada for November furnished evidence of activity at most of the reporting cities, and the activity was especially notable at Montreal, Toronto, Ottawa, Winnipeg, and Vancouver. For the eleven months of last year the intended outlay exceeded that of the like period of either of the five preceding years but fell behind 1913.

From the Commercial and Financial Chronicle, New York.

State Societies of Architects

THE formation of State Societies of Architects, as recommended by the American Institute of Architects, will not only accomplish much for the profession but will also aid in making the profession of ever-increasing benefit to society.

The Committee on State Societies is now engaged in the preparation of a simple form of Constitution and By-Laws which, after approval by the Executive Council, will be submitted to the Chairman of all State or Major Locality Committees as an aid in the formation of State Societies. In the meantime the Committee on State Societies tenders you its services in any manner that it may aid you or the profession in your State in organizing all of the architects of your State, or the States in your major locality, into State Societies.

Such State Societies should admit to membership every registered or licensed architect in those States where registration or license laws are in effect and in other States should admit every honorable practitioner.

At the next convention of the American Institute an amendment to the Institute's by-laws will undoubtedly be considered which, if adopted, will give to all State Societies the privilege of being represented at the Institute conventions. Thus, by the organization of State Societies, admitting all practitioners to membership, and the representation of State Societies in the Institute itself, the entire profession will be united in one national body, not only making membership in either State or national Society of more value to the individual, but through organization the entire profession will have more influence in local, State, and national affairs.

The chairman would welcome from you any suggestions you may have to offer as to how best to proceed to secure the formation of a State Society in your State. Will you as chairman of your locality appoint a special committee to do this work? If so, will you please give the name and address of your special Committee Chairman so that the general committee on State Societies may keep in close touch with the work of your local committee?

Yours very truly,

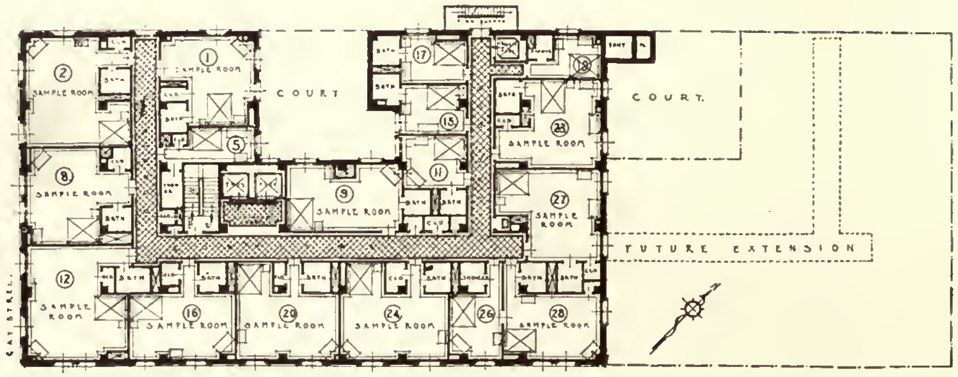
N. MAX DUNNING,

Chairman, Committee on State Societies,

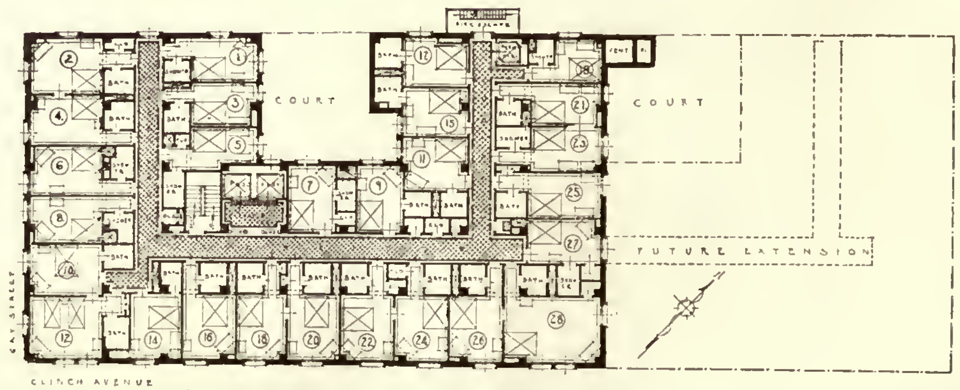
53 W. Jackson Blvd., Chicago, Ill.

Some Strike Facts

DURING the twenty years from 1881 to 1900 the building trades had more strikes than any other one industry —19½ per cent of the total number—but they involved a smaller number of men per strike; far fewer, for instance, than were involved in railroad strikes during the same period, although these numbered only 5.6 per cent of the total number recorded. Out of a total of 22,793 strikes reported from 1881 to 1900, 52.8 per cent were successful, 13.6 per cent partly successful, and 33.54 per cent failed.



SAMPLE ROOM FLOOR PLAN. (9th FLOOR)

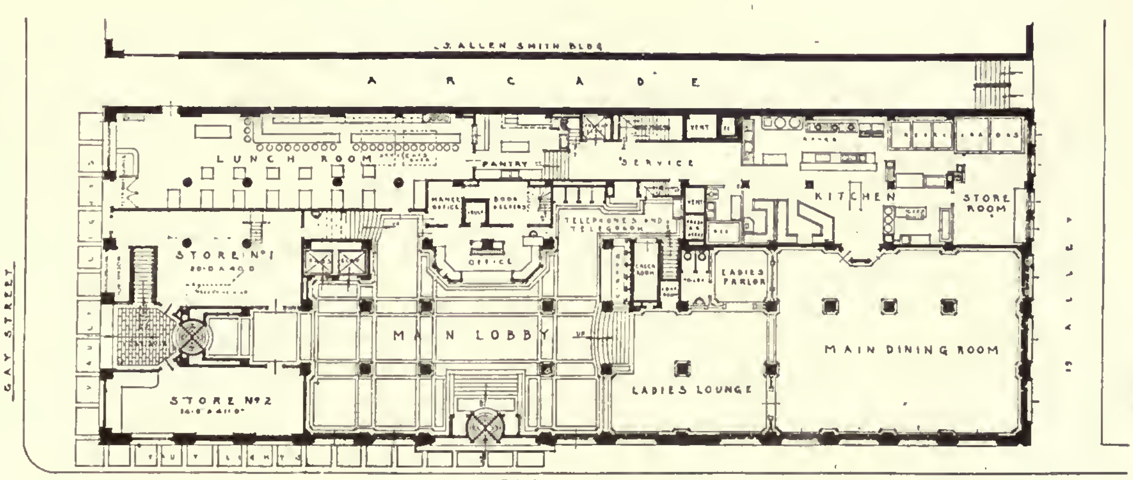


TYPICAL FLOOR PLAN [3rd TO 8th FLOOR INCLUSIVE]

FARRAGUT HOTEL, KNOXVILLE, TENN.

W. L. Stoddart, Architect.

DINING-ROOM.



FIRST FLOOR PLAN

FARRAGUT HOTEL, KNOXVILLE, TENN. W. L. Stoddart, Architect.

Bostwick Bostwick

St. Bernard's.
R. C. Church,
Akron, Ohio
Wm. P. Ginther
Architect

Assured protection for ceiling ornament

YOUR hours of study and effort and your artistic labors are largely wasted if the surface to which your designs are applied is not rigid and lasting.

BOSTWICK "TRUSS-LOOP," because of its truss construction and its double weight (4½ lbs. per square yard), is assurance against sagging, buckling or cracking.

So distinctive is this extra strength that it permits the spacing of studding 16, 20 or 24 inch centers—reducing the cost of framing at least 25%.

A letter will bring you complete data and an exact form of specification if the logic of TRUSS-LOOP appeals to you.

ABOUT the Bostwick Truss-Loop used in St. Bernard's R. C. Church, Akron, O., Mr. Wm. P. Ginther, the architect, writes:

Niles, Ohio
September 3rd, 1919

THE BOSTWICK STEEL LATH CO.,
NILES, OHIO

Gentlemen:—Having had occasion to redecorate the St. Bernard Roman Catholic Church in which I used your "Truss-Loop" Lath about fifteen (15) years ago, I was interested to note that from every indication the Metal was as intact as when originally built.

While this is the usual experience I have had with your product, yet I thought you would be interested to also learn as to this condition.

Yours very truly,
WM. P. GINTHER

THE BOSTWICK STEEL LATH COMPANY
NILES, OHIO, U. S. A.

Bostwick
TRUSS-LOOP
(*Steel Lath*)

Frontispiece to No 2.

From the original water-color sketch for an earlier proposed central feature of the quadrangle. Wesley S. Bessell, Architect.

MOUNT VERNON SEMINARY, WASHINGTON, D. C.

ARCHITECTVRE

THE PROFESSIONAL ARCHITECTURAL MONTHLY

VOL. XLI FEBRUARY, 1920 No. 2

The Mount Vernon Seminary, Washington, D. C.

By Wesley Sherwood Bessell

Perspective.

THE problems presented in the development of a college or educational institution are so varied and numerous, that it is almost impossible to set down any particular one. An outstanding purpose, however, always to be considered in our present-day institutions devoted to the higher education of our future citizens, is the problem of how to overcome the prevailing feeling, when one enters such buildings, of "this is an institution."

Long, uninteresting tunnel-like corridors, large forbidding rooms, or cold, nondescript, characterless and poorly furnished parlors seem to be abundant. This feeling of "institution" has always left its impression upon the writer, so that in approaching the problem of providing the proper dormitories, together with the administration and purely educational facilities under one roof, this was the uppermost obstacle to overcome. To combine all three, and still maintain an atmosphere of home, was the first and foremost idea. How well it has been met, is for others to decide, but as a problem for solution, it was most compelling and intensely interesting.

Of the other problems, that one of unity of a whole, seemed next to the elimination of the institutional atmosphere. So many schools are a collection of heterogeneous types, that in order to avoid this, a complete scheme was developed, both as to present and future building, with gardens and all other accessories carefully studied and developed, and leading to a culmination of the whole.

Believing that any project of this sort should hold to certain defined lines as to its completed ideas, it was with this thought that the Mount Vernon Seminary was laid out. The result to be obtained being the blending of a definite type of architecture, into a whole, yet with each individual bit interesting in itself.

Aside from these main factors, there were, as one became engrossed in the problem, unlimited bits of delightful opportunities unfolding themselves. Among them special features became desirable, such rooms as a post-office, great hall, study halls, refectory, art studios, and numerous other interesting subsidiary rooms.

With all this at hand, one's imagination might easily run rampant. Think of being privileged to design and create twenty separate and distinct outside doorways, each with its own little idiosyncrasies, of the fun in slipping in little surprises here and there, all tending to add interest and picturesqueness!


CLOISTER.


THE CLOISTER ARCHES.


DOORWAY TO REFECTORY.


THE CLOISTER STAIRS.

Wesley Sherwood Bessell, Architect.

THE MOUNT VERNON SEMINARY, WASHINGTON, D. C.

Entrance-hall and corridor.

School mistress desk-library.

Situated as it is on a commanding ridge on the outskirts of Washington, and facing old Virginia, an earnest effort was made to produce in Mount Vernon Seminary an atmosphere of our traditional past. This was a consideration both without and within. It was hoped that girls attending might unconsciously absorb something of this atmosphere, something that would count in their future. To eliminate the institutional feeling and supplant it by one of a home environment, simple, dignified, and refined, was the purpose to be accomplished if possible in the designing and execution of Mount Vernon Seminary.

The building is built on the U-shape plan with cloisters both sides and a quad, opened at one end, one hundred feet wide. This quadrangle and cloister permit the girls freedom for exercise, and are secluded from public view. All of the bedrooms at one time during the day receive sunlight, and these rooms are arranged in groups of two double rooms with a connecting bathroom and also a few double rooms

View in quad.

without these connecting baths. There are twenty single bedrooms, a senior hall and a corresponding room called the optima. These rooms are club-rooms for the girls' use.

On the third floor are sound-proof practice-rooms and an art studio.

In the lower end of the north wing above grade is located the swimming-pool, which is built of reinforced concrete and finished in white cement. This pool is twenty feet by forty feet, and four to eight feet in depth. It contains also a visitors' gallery and dressing-rooms. Back of the swimming-pool is a gymnasium of ample size.

In the south wing, lower end, is located the domestic science department and telephone-room. Here also is the kitchen with its necessary adjuncts such as the bakery, butcher shop, dairy and ice-cream room.

Main entrance design.

Just over the kitchen there is a large serving pantry fully equipped with the necessary equipment that goes with the making of economical and efficient service. Next to the pantry is the main dining-hall with windows on both sides—that means sunlight at all meals. Next to this room are the French and private dining-rooms, and to the front of these connected by a hall is located what is known as the "Great Hall." Across the entrance front are the necessary reception-rooms and administration quarters, and in the north wing, facing the north light, are all of the class-rooms.

The heating plant is located at the rear and away from the main building, and connected only by a pipe tunnel.

Such, in a brief way, is the general layout of this school, which has proven to date to be a satisfactory, complete, and workable unit.

The Remodelling of the Residence of Mr. Isaac T. Mann

George Oakley Totten, Jr., Architect

ALTERATION and reconstruction seem in these times of high prices and scarcity of labor the order of the day. To make more usable what we have is the final step before entering upon what we hope is to be the greatest and most glorious construction period of all times. To alter and make attractive the old Victorian brick home which Mr. I. T. Mann had purchased in a very desirable location in Washington was the problem presented to the architect. The adjoining lot had also been acquired so that additional space might be added and light and air assured.

The first criticism which suggests itself in the old house was the excessive fenestration of the main façade. It was possible to reduce this in two ways. On the second floor the two front rooms were thrown into one, so it was possible to eliminate two windows and to add a central one, making one large group on the axes, and this had the additional advantage of giving restful plain wall surfaces on either side. The other change was placing transoms in the third-story windows, not reducing their actual but apparent size. The gables of the dormers were made steeper and enriched, and the entrance altered to be in keeping with the new design.

A cresting was placed upon the roof ridge and a balustrade around the parking. The entire building was stuccoed. This was a very successful piece of workmanship. The color of the stucco is a light yellow, similar to aged stone, and the texture rather fine.

An addition was built on the adjoining vacant lot and a two-story garage added in the rear on the side street. On the first floor the entrance hall was re-designed and the walls plastered with Caen stone cement. A ladies' reception-room and a billiard-room were added.

The one really fine feature of the old house was the staircase, but this was confined to a narrow staircase hall. On the second floor a partition was removed, so that the staircase enters directly into a large and attractive living-hall, some forty feet square. This is panelled from floor to ceiling in walnut of a rich brown tone, as is also the main stairs.

To one side of this central hallway is the drawing-room, extending entirely across the front of the house. There had been two rooms here, but by removing the partition between them a fine large room was possible. This seemed rather high and narrow, so the apparent height was reduced by the introduction of an elliptical barrel vault and the apparent length reduced by cross ribs dividing the vault into three motives. The result is thought to be quite successful.

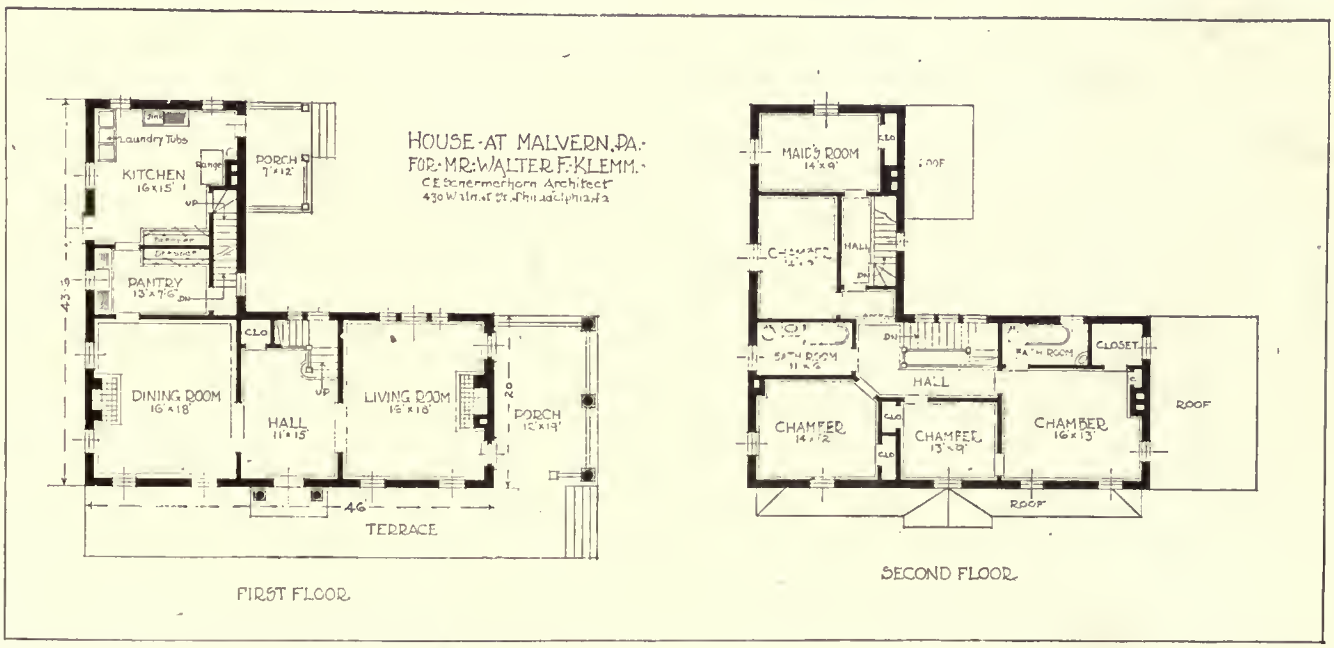
Directly opposite the main stairs is the sun room. Two sides of this are entirely of glass, leaded, and with just a touch of color; on the other a central fountain in tiles, and on the fourth are the entrance doorways and a fireplace. The general tone of color is a grayish green. The floor is of brownish tiles.

On the third side of the living-hall is the dining-room. This was also enlarged and panelled in oak and corresponds in color with the brown walnut of the hall. The ceiling of the dining-room is panelled in plaster.

The floors of the living-hall, reception-room, and dining-room are of teak.

On the third floor is the library. This is panelled to the ceiling in oak and is Elizabethan in style. Several different periods of architecture have been employed on the interior.

The style of architecture for the exterior, the transitional period of the French château, suggested itself from the fenestration and main lines of the building. Having adopted this style, great care was taken to carry it out in the minutest detail.



HOUSE AND PLANS, WALTER F. KLEMM, MALVERN, PA. C. E. Schermerhorn, Architect.

War Memorials

By Charles Moore

Chairman of the Commission of Fine Arts

(An address delivered at the Metropolitan Museum, New York, December 21, 1919)

IT does not make much difference what kind of a war memorial a community shall erect. There are a score or more of forms to choose from, any one of which may be suitable. They may have a building or a flag-pole, a park or a statue, a fountain or a tablet. The memorial may serve some useful purpose, like a bridge or an art gallery; or it may be its own excuse for being. Communities often excite themselves unduly, and even wax acrimonious, over the choice of a form, neglecting entirely the weightier matters of the law.

If, then, the form is not essential, is not the problem simplified? By no means. If a community could only do as most communities are doing—go to a firm of brass founders and order a tablet so many inches long and so many inches high, to fit a given space—then the problem would be as easy as selecting presents during Christmas week—and quite as satisfactory!

The ordinary method of procedure is to hold a meeting to express the desire of the community to honor the brave boys who have given their lives for their country. One such committee took to itself the name "Supreme Sacrifice Committee," and the bad taste in the name saturated the memorial they erected. The committee, on being appointed, enters into correspondence with the firms of tablet-makers. A certain committee, having less than a thousand dollars to expend, secured designs from forty-six different establishments. Five of these designs, each differing from the others but all with the same inscription, were made by a single firm in New York, to whom the job would be farmed out in the event that one of the five designs should find favor. Several founders sent more than one design; and the whole series represented, for the work of designing alone, more money than the tablet would cost. Of course, that cost is reduced by using the same general design many times, with a change of lettering or ornaments—falsely so called.

It so happened that this series of designs was submitted to a committee of five artists, each one of whom had won his spurs as an architect or a sculptor. They rejected every one of the designs. Why? In the first place, because the lettering was positively bad. Next, because the proportions were bad; because the inscriptions were not harmoniously disposed on the tablet; because there was such a profusion of ornament as to produce an example of bad taste; because the eagles and cannons and other war paraphernalia were badly designed; because some of the subjects treated were beyond the art of sculpture; in short, because the designs lacked simplicity, suitability, and elegance—because they had in them the seeds of speedy death rather than of eternal life.

All of the designs were presented in the form of drawings. In order to obtain any adequate idea of how a tablet would really look, a model is absolutely necessary. Of course, these particular designs were so bad that they could be rejected without going to the length of a model; but had any one of them given promise, a model would have been required before making final decision.

The usual committee, bewildered by so numerous an array, would probably have chosen one of the forty-six varieties and breathed a sigh of relief that their warfare was accomplished. Then the tablet would have been erected; and before the bronze had its color no one would pay attention to it, save perhaps members of the families of those whose names it bore. On the other hand, a tablet good in form and material, with a suitable inscription well cut, is a source of joy to the beholder and of honor to the persons or events commemorated. The Romans, retreating from Britain, left behind them tablets every letter on which was a work of art.

The objection then is not to the tablet as such, but to the futile, puerile and inadequate design of the tablet. It is not to the thing itself, but to the way in which the thing is done. This is what is meant by the opening proposition. It does not much matter what kind of a war memorial you shall erect; it is the way you do it that counts.

II

Of course every community not only desires to erect a work of art, but also confidently expects to do so. After the memorial is in place, they are going to tell people that it is the finest thing of its kind in this country—and, if in a very confident mood, they will add, the finest in the world.

Now, works of art are rare; and war memorials that are works of art are still rarer. The Kings of Assyria decorated the walls of their palaces with sculptures depicting their successful battles. Few of these works have survived. The Egyptian artists were concerned with the mysteries of life and death, and with the arts of peace. At Thebes and Karnak there are representations of fights in Syria and Mesopotamia, cut in the rock thirty-three centuries before Allenby's campaigns of restoration in 1918; but these, few in number, possess an archæological rather than an art value. Moreover, these works are the memorials of individual kings, not of the nation. The Greeks expressed the joy of victory in festivals and processions, wherein spoils of war, animate and inanimate, found prominent place. Also, they made permanent memorials of their triumphs in the form of temples and statues—like the Nereid Monument taken from Xanthos in Lycia to the British Museum; and the colossal lion from Cnidus in Asia Minor, which has found a like resting-place. Picture to yourselves this great lion, standing out on a headland two hundred feet in height; and, on its pedestal, raised forty feet into the clear air. So the Athenians commemorated the victory of Colon in 394 B. C., who met the enemy of three hundred sail, no more than eight escaping.

Then, too, Athens had a Street of Tombs, lined with "monuments to all those Athenians who came by their death in battle by sea or land, except those who fought at Marathon, for these have their tombs upon the place itself as a memorial of their bravery." For the brave men who laid down their lives in that most memorable battle in the history of the world—the first victory of the West over the East—it was esteemed a mark of highest honor that their bodies lie where they fell. It was a like spirit that impelled Theodore Roosevelt to declare that the body of his son should lie where he fell, fighting the latest—dare we hope the last?—great battle between civilization and greed of dominion. Is it possible to conceive any more fitting, any more truly commemorative memorial to one of our boys than the simple headstone, bearing his name, his service, and the date of his death, placed side by side with like memorials of his comrades of trench and battle, shaded by the trees with whose branches the sun paints ever-varying shadow-pictures on the white stone, and visited by multitudes of his countrymen?

It is the purpose of the War Department to maintain at least four American cemeteries in France, and in each case to create a field of honor. To have a son, a husband, a relative buried in one of those four cemeteries will be a high distinction.

In opposition to this plan of the Department the American Undertakers' Association has set its face like a flint, and has induced many relatives to have the bodies of their soldiers returned to this country. There is a potential scandal in every such removal.

III

There is one Greek war-memorial that has become the admiration of the civilized world—the Winged Victory of Samothrace. We know little of the naval battle save the date (B. C. 306), and not much more of the Ægean islet near which the fight took place. With trumpet gone, without arms or head, far removed from the scene of triumph, the goddess to-day subjugates the hearts and minds of men the world around. The poise, the forward sweep of that glorious body, expresses the concentrated and irresistible force of a great cause. Not fighting, not prowess, not tactics, but the invincible power of right, is what this winged victory typifies. And so, with careful thought, the victory medal of the Allies was planned at the Peace Table in Paris—a full-faced, full-length figure of Victory with wings. In days to come, the American soldier, catching sight of that benign figure, worn in honor by Greek or Montenegrin, or Frenchman or Briton, will say to his former brother in arms: "I, too, went over the top in war, and by this emblem which we both wear, I am ready now to stand shoulder to shoulder with you to fight the battles of peace —the battles of right and order and law and fair-dealing."

We Americans are more akin to the Romans than to the Greeks in our expression of national ideals. The Greek strove for individuality and refinement; the Roman sought grandeur and dignity. Energy and power are the ideals expressed in their triumphal arches. Rome, small as was its circumference, had no fewer than forty arches of triumph. Doubtless we would have had even more memorial arches, only that they are very expensive, and our victors have not the resources that Titus and Constantine enjoyed—that of paying for his arch with the spoils of war. We did get spoils from Mexico, but we put the money into land in Washington for a home to shelter incapacitated men of the regular army. Since the boys began to return we have built innumerable triumphal arches in lath and plaster and muslin. Not the smallest part of their success was in their speedy exits. With the Romans the arch stood for a triumph in arms. We have erected an arch at Valley Forge, where the only triumph to be celebrated was the triumph of mind over matter, of faith and endurance over the grim array of the forces of nature—an American soldiery, hungry and ill-clad, but still conquering their surroundings by the spirit of an indomitable commander. The buildings of the Valley Forge arch threw suitability to the winds; and even disregarded the matter of appropriateness in the choice of site, dropping their arch casually across the road. In order to produce a work of art every element should be considered, and among these elements none is more important than suitability of location. The relief experienced when the New York temporary arch disappeared from Madison Square was due to the general feeling that as located the arch was an obstruction—an impediment rather than an ornament.

The Washington Arch in New York with its park setting is recognized abroad as well as at home as one of the world's worthy memorials. There is no sense of conquest, no exaltation of Washington as a conqueror. Rather, the simple dignity and graceful serenity typifies a completed nation emerging from strife.

In the Arch of Triumph of the Star, the French have carried the arch to its conclusion as to location, architecture, and sculpture, making it a portion of the organic unity of Paris. Napoleon, in order to impress Europe with a just sense of his majesty and relentless power, ordered Paris to erect a monument to commemorate the victories of his armies. Paris gladly obeyed the command. Two of the foremost architects of their day were selected to carry out the work, which occupied thirty-two years. During this period one of the original architects withdrew, the other died and was succeeded by his pupil, who in turn was associated with two others, so that the arch represents the combined work of four architects. To the four architects must be added sixteen sculptors, who set themselves not so much to praise Napoleon as to express in majestic fashion the undying heroism of France. That arch, by reason of its focal site and the arrangement and distribution of the avenues leading to it, as well as because of its intrinsic grandeur, is a constituent portion of the City of Paris. And in like manner, any arch that we shall erect should be so tied into the city as to become an integral part of that city.

The cost of the entire French work was $1,875,000. The Lincoln Memorial, the work of one architect, one sculptor, and one painter, has cost about $2,600,000, exclusive of the enhancing landscape treatment. The location of the Lincoln Memorial in Washington was suggested by that of the Arch of Triumph in Paris. Both are terminals of the great central composition of the city. In Paris we have on the main axis the Palace of the Tuileries, in Washington the Capitol; there the gardens, here the Mall; there the cross-axis, with the Madeleine where we have the White House; the Obelisk where we have the Washington Monument; and the Chamber of Deputies where we have a still unoccupied site of the first order endowed with axial relations in the Central Washington composition. Finally, as the termination of the composition, Paris has the Arch and we have the Lincoln Memorial. The plan of Paris and the plan of Washington both are great plans in civic economy. Both were designed by Frenchmen, and both have the same end in view—the expression of unity, dignity, and grandeur in the making of the city.

In point of style, the Arch and the Memorial are in striking contrast. Lincoln had no conquests to celebrate, no battles to record. Instead of martial sculpture, we have Daniel French's statue of the clear-sighted, patient man; and, cut into the walls, both his Gettysburg speech of consecration, and also his Second Inaugural—his plea that the consequences of sin might be averted and that the peace of brotherhood might be restored. Nor is there a single note of war in Jules Guerin's two mural paintings, but rather the idea of emancipation from slavery, a condition as old as the world itself; and of the joy that reconciliation brings to members of one family after estrangement; and of the blessings of peace in fostering the arts and sciences. Indeed Henry Bacon's entire work as an architect has been to make the Lincoln Memorial a true expression of the simplicity, dignity, and moral grandeur of Lincoln.

When Napoleon said that he would make Paris the capital of the world—that is, the ruler of taste—he proclaimed his greatest success. Due to the artists who drew their inspiration from his victories, the French classical tradition was carried throughout Europe. Even England, having withstood the power of Napoleon's armies, succumbed to the dominion of his artists. Through the French architects the world has learned to speak one and the same language in commemorative monuments and in those structures that may justly be called monumental. To-day our young men are trained in the great Paris school of architecture; our sculptors and painters seek instruction and stimulating companionship in the studios of Paris. Then, if they are seriously ambitious to place themselves among the immortals, they win their way to the American Academy in Rome, where they are brought face to face with works that have lived throughout the centuries and never were more alive than they are to-day.

Thomas Jefferson, a contemporary ruler with the great Napoleon, sought to set up here in America standards of taste in architecture and sculpture. In public architecture he would have us derive neither from the classicism regnant in Paris, nor yet from the Palladian style with which the uninspired followers of Sir Christopher Wren were decorating London buildings. Rather he would send our builders back to the finest examples of Greek and Roman architecture for their standards of simplicity, proportion, and elegance. He understood—none better—the difference between body and spirit. He did not seek the reproduction of Greek and Roman buildings, thereby putting new wine into old bottles; but he did insist that our public buildings should be planned for the uses they were intended to serve, and also that they should be a joy and a delight to the eye, by reason of location, landscape-setting, harmonious proportions and worthy materials. He sought to produce in the American mind those emotions of patriotism, love of country, desire for the things of the spirit, which to his mind were the real satisfactions of life. Often he cast pearls to a heedless generation, and especially to the generations succeeding; but may not we approach our national and commemorative art in his spirit, and with an intelligence such as his—enriched by travel and meditation, and by a disposition to enjoy rather than to criticise?

IV

To celebrate his victories over the Dacians, the Emperor Trajan set up a marble Doric column, up the surface of which winds a spiral band of sculpture, depicting scenes from his triumphs; and the amiable Marcus Aurelius followed his example. Each emperor had his own statue placed upon the summit of his column, a position that ultimately proved precarious to those royal pagans; for, after standing on their lofty summits for some fifteen centuries, they were forced at last to give place respectively to St. Peter and St. Paul, who have now some three hundred years to their credit.

In 1805 Napoleon commanded a copy of Trajan's Column set up in the Place Vendome, in Paris, the sculpture in bronze, to depict his victories in Germany and Austria. With us the shaft has taken many forms. In the case of the Bunker Hill and the Washington Monuments, the obelisk was used. There are people who are so set against the idea of an obelisk which is not a monolith that they will see no beauty in the Washington Monument. It is well to let such people take their theories off into a corner, as a dog takes a bone. The good Washingtonian lives happily within the sphere of influence exerted by the dominating shaft, which takes color and form from the atmosphere, changing from hour to hour, but always standing strong, serene; planted on the earth yet towering far above it, like the benignant Father of his Country, to whose prescience and taste we owe the fact that our national capital may, in another century, come to stand among the greatest capitals of the world.

Brooklyn has used the column for its monument to the Prisonship Martyrs of the Revolution; and the Lake States have set up, at Put-in-Bay, a memorial of Perry's Victory on Lake Erie, in the form of a great column, rising almost from the surface of the water, and bearing a burning tripod as a signal for the multitude of ships using that waterway. In setting and design the Battle Monument at West Point leaves nothing to be desired.

In all three instances the beholder is moved by the happy way in which nature and art combine to stir patriotic pulses and excite feelings of satisfaction that our heroes have been beautifully and nobly honored.

V

Ever since 1853, when Clark Mills mounted Andrew Jackson upon a prancing steed, and made him doff his hat to the White House, the equestrian statue[1] has been the favorite memorial for martial heroes, until to-day Washington can boast of more bronze men on horseback than can any other city in the world—if, indeed, it is a matter for boastfulness! Among American equestrian statues are some that may be classed as works of art, and one which seems destined to be accounted so surpassingly good as to take place with the two acknowledged pre-eminent equestrian statues of the world—the Gattamelata at Padua and the Colleoni at Venice.[2] The Sherman statue at the entrance of

[1] The first equestrian statue set up in this country was one of George III, made in England, of lead, gilded. It was erected at the foot of Broadway, New York, in 1770. Six years later it furnished 42,088 balls for Continental muskets. In 1803, an equestrian statue of Charles IV of Spain was executed in the City of Mexico, and was cast in one piece in that city. The first equestrian statue executed in the United States is the Andrew Jackson, by Clark Mills, unveiled in Lafayette Square, Washington, January 8, 1853, on the thirty-eighth anniversary of the battle of New Orleans. Henry K. Brown's statue of Washington, in Union Square, New York City, was unveiled July 4, 1856. This is one of the few good equestrian statues of Washington in the United States.

[2] During the period of the Renaissance in Italy, three great equestrian statues of military heroes were fashioned. The first of these was set up at Padua in 1453, in memory of the famous condottiere, Erasmo de Narni, called Gattamelata. The sculptor was Donatello, who achieved one of the great equestrian statues of the world. It is "powerful and majestic in its very repose; there is no striving for dramatic effect, no exaggerated muscular action, but the whole is dominated by the strong, energetic head, which is modelled with searching realism." The second great statue is the Colleoni in Venice; the third was Leonardo da Vinci's statue of Francesco Sforza, which never got beyond the model stage.

The monument to General Colleoni stands in the centre of the Campo Santi Giovanni e Paolo, at Venice. It was modelled by Andrea Verrocchio, a pupil of Donatello, and was cast in bronze by Alessandro Leopardi, who designed the perfect pedestal, and probably had a part in the statue itself. It was unveiled March 12, 1496. Professor Middleton says: "This is, perhaps, the noblest equestrian statue in the world, being in some respects superior to the antique bronze of Marcus Aurelius in Rome and to that of the Gatta-Melata at Padua, by Donatello. The horse is designed with wonderful nobility and spirit, and the easy pose of the great General, combining perfect balance with absolute ease and security, is a model of sculpturesque ability."

Central Park, New York, makes use of man and animal to portray the steady, determined, resistless march of armies bent only on the conquest of peace. The figure of Victory is the harbinger not of cruelty and oppression but of reunion and good will. As a portrait the work is excellent, but its real value lies in the fact that it arouses in the spectator strong patriotic emotions.

VI

Now as to that perplexing subject of the memorial building—community centre, auditorium, or art gallery. The question is not whether it is useful, but whether it can be made to arouse in coming generations feelings of honor, respect, and gratitude for the lives sacrificed on the altar of country. Remember, those boys were great idealists, as every one knows who mingled with them in camp and on shipboard. In the trenches ideals were often concealed under the helmet, and showed themselves only in the stiffening of the knees that came at the end of the first twenty yards on the Hun side of the top. Can the building be made to express their service and sacrifice? If so, by all means build it. Once it has been done in this country. The Memorial Hall that dominates Harvard University is conceived in a spirit not military but peaceful. Dedicated by a great prayer and a poem in which the character of Lincoln is enshrined, bearing the names of those who died in battle to save the Union, adorned with windows depicting the world's noblest characters, carrying on its walls the portraits of men and women whose service to learning and the community makes them worthy of enduring remembrance, Memorial Hall rises high above its utilitarian uses—even above its bad architecture—and proclaims the supreme virtue of valor and sacrifice for one's country.

So the Pantheon in Rome and the Invalides in Paris are great memorials, because of the emotions they inspire. Therefore, it is not impossible to make a memorial of a building; but it has been done rarely.

VII

In the discussion thus far, emphasis has been placed rather on the effect of the memorial than on its form. The question then arises, How can such effects be created, such high emotions be inspired? Unfortunately, there is no straight and certain road to the goal. It is not sufficient to say, Go to an artist and put yourself in his hands. We have but to look back on the discarded or dishonored works of the past to be modest as to present achievements or even possibilities. There is no beaten path which leads directly to the artist who shall surely express emotions comparable with the courageous facing of ignominious death, as in MacMonnies' Nathan Hale; or the gracious dignity and controlled power of this nation, as in French's colossal statue of the republic; or the leadership of a despised race fighting for freedom, as in Saint-Gaudens' Shaw Memorial.

Yet there are some practical considerations that will be helpful. An artist must be capable of thinking greatly before he can express himself greatly. He may not be able to put his thought into words, but he must be able to express himself in his chosen medium—architecture, sculpture, painting. Further, he must be able to express his own emotions in such manner as shall arouse like emotions in the beholder of his work. He must have the technical ability to deliver his message clearly, distinctly, powerfully. He must have something to say.

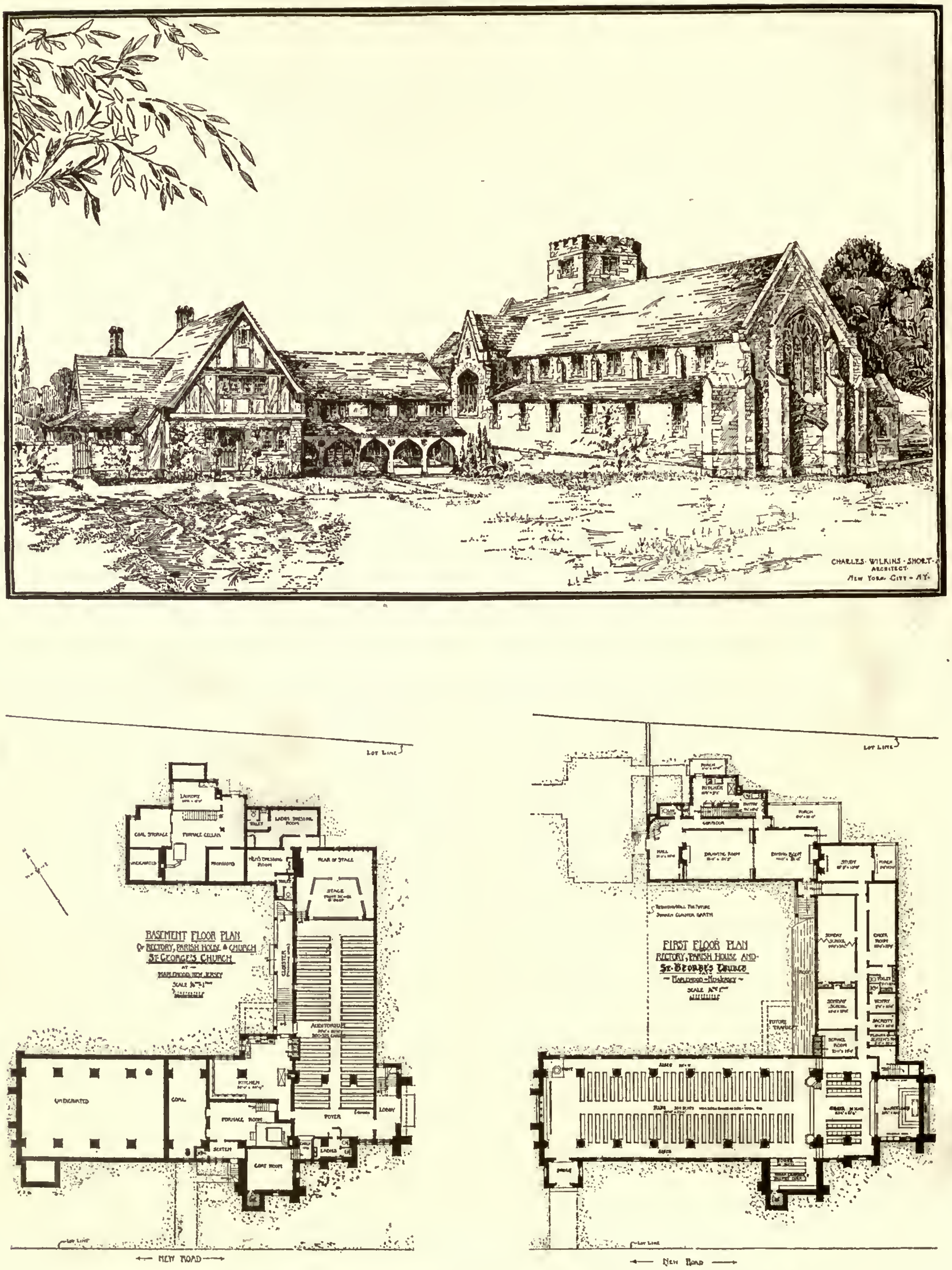
What shall the artist say to-day? We went into this war with high ideals. Have we realized them? Have we even formulated them? Shall we be in haste to undertake great works while the world is still in a chaotic mental state; before the ship of civilization rights itself and rides on an even keel after the greatest of storms?

Is the last word to be one of helpless pessimism? By no means. Nothing can check the passion for the expression of national, patriotic feeling in monumental form. We shall have plenty of monuments, such as they are. But, now that we have an opportunity to give thought and consideration to the matter, let us hasten slowly. Let us first find out for ourselves what really constitutes an enduring memorial, and then strive to attain for our own community an ideal creation, a real work of art; and let that creation breathe the spirit not of carnage but of peace.

Americans have regarded art as a luxury smacking of effeminacy. To-day there are people who would not enter an art gallery, not only because they have no desire to see pictures and statues but also because they fear the ridicule of their fellow-men. Art and music and poetry they leave to the women of the family. They want serious things—like golf and poker, shooting and shows. They want to talk about business, and their own automobiles.

Unless the artist shall be clear in his conception, noble in his thought, and skilful in his expression, the memorial will fail lastingly to count. Unless the community shall be patriotic at heart, appreciative of excellence in the work, the artist will labor in vain. That was a true saying of John La Farge: "You do not judge a work of art; a work of art judges you."

A work of art is the graphic expression of the emotions of the artist in such manner as to call forth similar emotions in the beholder. But suppose the individual or the community is immune to emotions, or is carried away by gusts of emotion. Suppose the ideals that our boys carried overseas have been put back in the closet until some great crisis shall again bring them into use. Suppose the idea prevails that we can buy, as we would buy diamonds or pearls, a memorial worthy of those who for our sakes laid down their lives on the battle-fields of France and Belgium, or amid the snows of Russia. Now, as a matter of conscience and of justice toward the dead, can we so slight them? Shall we not rather give time and thought and serious consideration to make our war memorials real works of art—works that shall express our deep-felt convictions, our appreciation of sacrifice made, and our high determination to work for the protection and advancement of that civilization for which they fought? Can we not put minds and hearts, as well as our money, into our war memorials?



DESIGN FOR RECTORY, PARISH HOUSE, AND ST. GEORGE'S CHURCH, MAPLEWOOD, N. J. Charles W. Short, Jr., Architect.

Editorial and Other Comment

A Brand from the Burning

WE extend our most sincere sympathy to the architects and artists who suffered loss in the surprising fire that destroyed the galleries of the Fine Arts Building on Fifty-seventh Street, where the exhibition of the Architectural League was all ready to be opened on January 31. The exhibition was to have been one of unusual interest and distinction. Architects from all over the country had sent work to be shown. From an appreciative editorial in the New York *Times* we quote the following, as it gives a very good idea of how attractively the exhibition had been planned, and expresses so well our own feeling regarding the zeal and efficiency of the men who had so generously given their time and services and skill toward making the exhibition what it was hoped would prove one of the most notable in the history of the league.

BEAUTY BURNED AWAY

"The Architectural League had planned and carried through the most beautiful and logical exhibition of architecture and the allied arts ever held in this country. Men were working at full speed over the final details on Thursday making ready for the reception to be held yesterday, but before the exhibition was opened the result of many weeks of labor of hand and brain was in ashes. Comparatively few people had seen the exhibits in the Fine Arts Building before the catastrophe, but those who had been admitted will not forget the dignity of their appearance at the eleventh hour. The art of exhibition had been practised with a high degree of intelligence. The Vanderbilt Gallery was divided into small alcove rooms and each of these was designed by an architect and decorated and furnished under his supervision, and was so placed in the gallery as to preserve its aspect of spaciousness; the sculpture, with the exception of the large central groups, was placed in recesses and seen against a background of decorative paintings or fabrics, so that beauty of color contributed to the general effect. The skeleton of the old galleries was reconstructed in harmony with the architectural plan of the exhibition. The whole was eloquent of a generous spirit of collaboration and of the immense industry and single-mindedness of the workers in making the exhibition successful."

There was never a time when such an exhibition could be made of more public service, for there has never been a time when there is such a crying need for building, for the services of the trained architect and for the intelligent and tasteful uses of the allied arts.

For some years the tendency of the league exhibitions has been, it has seemed to us, toward a rather overaccentuation of the work of the interior decorator and the manufacturer of materials. The architectural exhibits have been more or less submerged. There were perhaps good business reasons for making this particular appeal on the house furnishing side, for it no doubt brought many visitors to the show who had little appreciation and, perhaps, less interest in purely architectural matters. The whole tendency of the present in the arts seems toward the cultivation of a wider interest in the decorative arts and both the Metropolitan Museum and the Museum of Natural History have done splendid work in helping extend this interest in creating a better public taste.

In spite of the losses due to the fire the league announces that it hopes to have an exhibition, and no doubt architects everywhere will respond to the request for new material to take the places of what has been destroyed. No one interested at all in the arts, who has followed the course of various exhibitions in the Fine Arts Building, will think of the loss without at the same time a hope that perhaps at last the long and crying need for an adequate fireproof building large enough to house the various art societies may come from this disaster. It has been for many years a shameful reflection upon New York's attitude toward the arts that there was nowhere an adequate place for a comprehensive and really important exhibition of American art. The academy shows have been woefully limited by inadequate wall space, and much of the criticism of that dignified and well-meaning institution has been due entirely to this lack of space and not to any lack of a generous attitude toward the younger men.

We are informed that plans have already been formed by the Architectural League for the construction of a building, and we sincerely hope that the project will materialize. There is a fine opportunity here for some of our rich men interested in the arts to establish enduring monuments and to perform a great public service. We had the Vanderbilt Gallery in the Fine Arts Building, why may we not have a series of galleries in a great new building endowed and named after their donors? There is no reason why a suitable building should not be constructed that will house all the various art societies, provide adequate exhibition galleries for all purposes, and with its schools and exhibitions be made to support itself.

The prizes of the Architectural League had been awarded before the fire and include the following:

Medal of Honor for architecture to Delano & Aldrich; for painting to Arthur Crisp. For landscape architecture, to Vitale Brinckerhoff & Geiffert; the Helen Barnett Prize for sculpture, to Laurence Mandarelli; the Avery Prize to Karl H. Gruppe.

A Fine Achievement

THERE were a number of admirable things done in a large way by our architects during the war, and some of the housing developments were not only great practical successes but were artistic successes as well. Many of the houses built in large numbers were admirably designed and have set a standard that will be of use all over the country.

Nowhere was the demand for building more urgent or the problems greater and more difficult than in the city of Washington, and here under the direction of Mr. Waddy B. Wood were constructed buildings that covered in all the great floor space of fifty-six acres. Among the buildings were the Food Administration buildings, the Fuel Administration buildings, the Council of National Defense, War Industries Board, War Trade building, Aviation building, Medical Corps building, two large buildings for the Ordnance Department, and the numerous buildings for the Industrial Housing Corporation.

This work was done with an office force averaging six men and one stenographer, in about two and one-half years and amounted to over $7,500,000. The first building was for Mr. Hoover, for which he was apparently willing to pay the normal commissions, but which the architect declined to charge a cent for, executing the contract without any profit. Mr. Wood also offered to do all the other buildings for fifty cents up to the normal overhead. In every case the government, which decided the fees, paid under the normal overhead for all expenses and personal compensation. In no case did any of the work cost the government over 2 per cent gross, and in the work done for the Housing Corporation, taking what was designed and built and what was not built, the total fee including the architect's profit and all expenses was six-tenths of one per cent. In addition to the above work that was completed working drawings were made for the Housing Corporation for $5,313,000 worth of work that was not built, besides preliminaries for other projects that would amount to several millions more. In every instance this work was completed inside the time allowed and the money appropriated, with the exception of the Housing, and in the case of the Trade Board $100,000 was saved on the appropriation.

There is no doubt that all of this work was done under the most difficult conditions with pressure from all sides, with many conflicting judgments. The result is a worthy manifestation of what can be achieved under the direction of conscientious and thoroughly trained architects, and reflects honor upon the profession in general. They were not only ready to give their services but gave them freely and effectively whenever they were called upon.

Co-operative Apartments

THERE are thousands of families, many thousand individuals, living in makeshift apartments in New York, in every city and town in the country. They are paying exorbitant rents, getting less and less service in return for their money, and wondering when the house is going to be sold and another landlord pirate come in for his pound of flesh. There is a solution of the problem in well-organized co-operation, and by well-organized we mean not only from a merely business point of view but from a view of filling a house with the right sort of co-operators. Co-operation on a dollar basis, any one coming in who can pay the price, is no better than present arrangements where the high price of an apartment has nothing whatever to do with the character and selection of tenants. There are so few places for the relatively poor but respectable professional man and his kind.

A properly qualified organizer of co-operative apartments who started out with the idea of building places that could be looked upon as permanent homes, where every tenant could be assured of the respectability of his neighbors, and the peace and quiet sought by the decent tired business man at the end of his day, would be besieged by numbers. Small apartments are wanted at modest prices. They can be built and made to yield a handsome and assured income.

For a Library of Civic Art

BY a plan recently agreed upon, New York has taken a step toward a nucleus for a library of civic art as the result of an agreement made recently by the Municipal Art Commission and the Municipal Reference Library. Finding that there was some duplication and overlapping in the work being carried on in the Art Commission's library and in the Municipal Reference Library, Mr. Henry Rutgers Marshall, Assistant Secretary of the Commission, arranged with Mr. Dorsey W. Hyde, Jr., Municipal Reference Librarian, for the latter to assume complete responsibility for the art commission's collection, which was duly constituted a branch of the Municipal Reference Library, to be devoted to civic art.

In accordance with this plan a civic art division of the Municipal Reference Library has been created, and the work of consolidating the two collections is now in progress. A classification scheme is being prepared, and some progress has been made in the compilation of an index. Index cards will be duplicated in the index of the Municipal Reference Library, 512 Municipal Building, in accordance with the plan already followed for the books of the library's Public Health Division. Suggestions from New York architects as to how the new library can be made of wider usefulness will be gladly received.

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ENTRANCE FAÇADE, MOUNT VERNON SEMINARY, WASHINGTON, D. C.

Wesley S. Bessell, Architect.

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NORTH WING, MOUNT VERNON SEMINARY, WASHINGTON, D. C.

Wesley S. Bessell, Architect.

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THE CLOCK BALCONY, MOUNT VERNON SEMINARY, WASHINGTON, D. C.

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DOOR TO SCHOOLROOM.

DOOR IN QUADRANGLE.

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MOUNT VERNON SEMINARY, WASHINGTON, D. C

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THE GREAT HALL FIREPLACE, MOUNT VERNON SEMINARY, WASHINGTON, D. C.

Wesley S. Bessell, Architect.

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A RECEPTION-ROOM MANTEL.

FIREPLACE, HEADMISTRESS'S OFFICE.

Wesley S. Bessell, Architect.

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MAIN STAIRWAY.

VIEW IN CLOISTER.

Wesley S. Bessell, Architect.

MOUNT VERNON SEMINARY, WASHINGTON, D. C.

DETAIL OF MAIN ENTRANCE, MOUNT VERNON SEMINARY, WASHINGTON, D. C.

Wesley S. Bessell, Architect.

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RESIDENCE, ISAAC T. MANN, WASHINGTON, D. C. George Oakley Totten, Jr., Architect.

LIVING-HALL, RESIDENCE, ISAAC T. MANN, WASHINGTON, D. C.

George Oakley Totten, Jr., Architect.

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SUN-ROOM.

ENTRANCE-HALL.

George Oakley Totten, Jr., Architect.

RESIDENCE, ISAAC T. MANN, WASHINGTON, D. C.

SIGMA PHI PLACE, HAMILTON COLLEGE, CLINTON, N. Y.

Clement R. Newkirk, Architect.

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ENTRANCE DETAIL, SIGMA PHI PLACE, HAMILTON COLLEGE, CLINTON, N. Y. Clement R. Newkirk, Architect.

DETAIL.

DETAIL.

Clement R. Newkirk, Architect.

SIGMA PHI PLACE, HAMILTON COLLEGE, CLINTON, N. Y.

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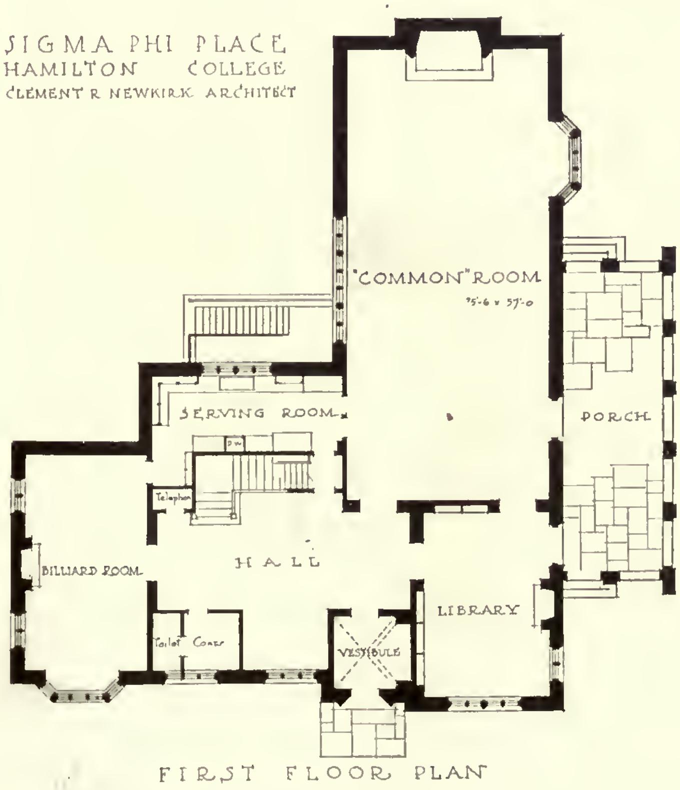
MANTEL AND FIREPLACE IN "COMMON" ROOM.

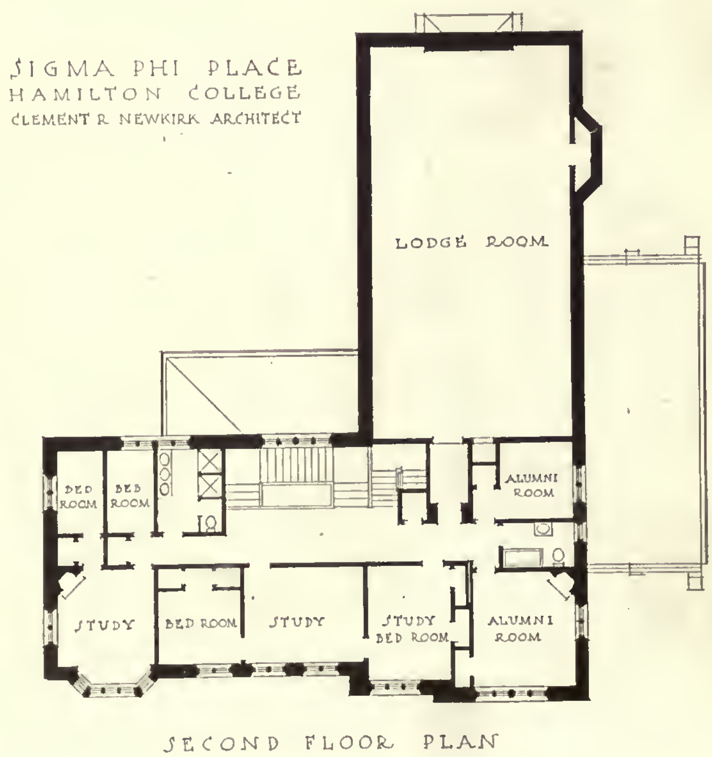
"COMMON" ROOM.

Clement R. Newkirk, Architect.

SIGMA PHI PLACE, HAMILTON COLLEGE, CLINTON, N. Y.

BILLIARD–ROOM.





What Artificial Light Means to the Modern Structure

By H. Vandervoort Walsh

IN the words of one of our popular songs, "We never miss the sunshine until the sun is set. We never miss the laughter until the eyes are wet," we find the same strain of human nature with which we look upon the marvellous development of lighting in our modern building. We have no thrills any more when we are dazzled in the brilliant lights of a hotel lobby, nor are we charmed by the soft mysterious glow in the reading-room of some home where bowls of light pour their indirect illumination around us.

Suppose that to-morrow night we should suddenly revert back to one hundred years ago with our lighting systems of sperm-oil lamps and primitive candles. We would then appreciate how dependent the modern structure is upon its lighting. The gloom of darkness which the war required would be daylight in comparison. The hottest radiator could not dispel the mental chill upon the air. Then, think of the cost! One hundred years ago to burn sperm-oil you spent $2.50 for every 1,000 candle-hours. When you realize that to-day we use nearly eighteen times as much light in the home as was used then, and that we pay about 10 cents per 1,000 candle-hours or about one-twenty-fifth of what it used to cost, the picture becomes even more vivid. Indeed, you cannot get away from the fact that artificial light is the very life-blood of the modern structure.

As progress in lighting increased there were two lines which it followed, and each of these lines has produced a force for illumination which has supplanted all others. These two lines of development were caused by the fact that we can secure light by two physical means: first, by the flame where chemical action took place, and, secondly, by the incandescent object where no chemical action occurred but some filament is heated to such a high temperature that it glows. Gas has become the force behind the flame method of illumination, but even this has slipped half-way over to the incandescent system in the Welsbach mantle. Electricity has become the force behind the incandescent system.

To-day we have two classes of illuminating gas: one for the isolated house and the other for the cities. Acetylene gas and gasoline gas are extensively used in homes which are separated from any central supply, and have produced a lighting system which brings comfort and cheer into the lonely farmhouse. Coal gas and water gas are the two great sources of flame illumination in the cities, and before the electric light was developed in usefulness held the supreme position. In certain localities where natural gas can be secured at a very cheap rate it still holds its own.

The general tendency in gas-light development has been to reproduce as far as possible the incandescent system of electric lighting. The use of the old-fashioned gas flame is not only out of date but is highly uneconomical. One of the first principles of good gas lighting is the use of the very best gas mantles and maintaining them in good condition. The mantles are caused to glow by heat produced by the burning gas, which is designed to combust like a Bunsen burner. The comparatively white light produced by this mantle should be hidden by properly designed globes to secure the best effects.

The employment by the gas companies of highly specialized men has led to very remarkable developments of this system of lighting, and although living in a city where electricity is the prevailing form of illumination, no architect should allow himself to develop the scorn that many people have for gas light, which is largely due to ignorance of the best methods. In many localities gas lighting is as much a blessing to the community as electricity is in others. There are many places where the electric service is irregular and liable to breakdown, and the use of gas is quite necessary as a stable standby. Double outlet fixtures should be provided for such emergency. Where there is good pressure, uniformity of quality, and proper purification of gas, and the electric service develops variations of more than 5 per cent from the maximum, gas lighting is much to be preferred.

One of the best aids to the architect for securing information concerning gas lighting is through the National Commercial Gas Association. They have developed a standard system and table for piping a house for gas which is founded on a carefully studied formula for the flow of gas through pipes. Unlike other methods of measuring gas, this table is based upon the quantity of gas delivered through a pipe in terms of 3/8-inch outlets instead of cubic feet. It is found by comparison that 3/8-inch outlets consume 10 cubic feet of gas per hour. The aim of this table for laying out gas-pipes is to have the loss in pressure not to exceed 1/10-inch water pressure in 30 feet of length of piping, and to have the size of the pipe increase from the extremity of the system toward the meter, according as each section has an increased number of outlets to supply.

Of course the developments in electric lighting have made such great strides that it has really been this form of lighting which has made possible our enormous commercial structures, and it is to this system that the architect most naturally turns his attention. Here he has at his disposal a great variety of lights, such as the Cooper-Hewitt lamp, the enclosed and the open arc-lamp, the incandescent lamps, like the tantalum and the tungsten and Nernst; and the Mazda lamp filled with nitrogen. All of these have their special places and adaptable qualities. The easy switch control of any system makes possible almost any effect.

At the same time the architect has at his disposal the information of the finest specialists in the country. He need not worry much if his specifications require that the electric wiring in the building follow the National Electric Code of the National Board of Fire Underwriters. Nor does he need to wait long for information if he calls upon the Society for Electrical Development. With two such excellent sources of information handy, there is hardly any reason why the architect of to-day should have much difficulty in solving his electric-light problems.

In attacking this subject with each new building, the architect should constantly keep in mind the economical value of good lighting and what it means to the modern building. In the business building it makes possible great powers of advertisement. Flood-lights played upon the structure bring out the architectural beauties of the structure on the blackest nights. Good lighting on the inside decreases the fatigue of employees and therefore their liabilities to make mistakes. It hardly is necessary to tell of the advantages it has in the showrooms to make sales or in the windows to attract trade. In the home, club, or hotel good lighting is as much a part of the decorative scheme as the walls themselves. It gives good comfort and cheer. It is better to read by and live in.

The proper study of the problem requires five distinct steps: (1) To determine the kind of lighting system to be employed; (2) to locate all outlets and settle upon the arrangement of wiring; (3) to select the kind of lamps to be used; (4) to decide upon the lighting method to be used, and (5) to make a selection of the fixtures and the glassware to be used on them. Each building has its own difficulties which must be surmounted, but on the whole there are some very good general rules to be followed.

The general consideration of what system of lighting will be used has already been discussed; as to the location of outlets, the architect must be influenced by the class of structure he is dealing with, and also by the method of lighting he is using. For this reason he should have a clear idea of these general methods and what they mean.

There are three methods of lighting a room. The simplest and the most efficient is the direct lighting. It was the first to be used and is the least affected by the color of the walls and the ceilings. A more recently developed method is the indirect lighting. Here the source of light is hidden from view by opaque reflectors, and the light which is utilized is first thrown to the ceiling and walls and then reflected onto the objects in the room to be illuminated. The efficiency of this method of lighting is lower than the direct method, but there is a restfulness about it which is pleasing to the eye in that there is a total absence of glare. The third method is the semi-indirect, which is half-way between the two former. Here the light is thrown toward the ceiling and then down, but it also permits a certain percentage of it to pass through the reflector. The glare of direct lighting is removed and the dark spot of the reflector, which is seen in the indirect system, is relieved. Its efficiency is partly between the two former methods.

The direct-lighting system is the one most commonly used in industrial buildings. It is not only the most economical but it is the least affected by the color of the walls and ceilings. The common practice in locating lights is to place them as high as possible where the ceilings are low and to drop them slightly when the ceilings are high. A good rule is to make eight feet the minimum height and consider ten or twelve as better if it can be secured. The horizontal spacing ought to be such that there is the same distance between lights as there is above the floor. No areas of low intensity should be allowed to develop. Reflectors should be of such a character as to reduce any visual glare or eye fatigue. The use of the semi-indirect method of lighting is limited to rooms where special effects are desired and the ceilings are light. The horizontal spacing of these lights may be twice as great as the distance from the floor to the lamp. Unless the ceiling and the fixture-reflector can be kept clear of dust considerable amount of inefficiency will result.

The entrance-halls of this class of building should be lighted brilliantly for advertising purposes. Semi-indirect in this case is quite satisfactory. Side-brackets will also enhance the effect at times, and the use of decorative globes improves the artistic results of the decorations. The stairs are an important part to keep well lighted, especially where platforms end and steps begin. A light on every landing and the avoidance of glary lights is a good rule to follow. The intensity of light on the edge of the landing should never be less than one foot-candle. The lights for halls and elevators should follow similar lines.

In determining the intensity of any lighting system there are a few fundamental rules with which the architect should be familiar. If he desires to compute the intensity of light at a certain interval from its source, he should divide the candle-power of the light by the square of the feet distant from that source. This result is expressed in foot-candles. This foot-candle in the following table will be considered as the factor of illumination. In rooms for general work this factor is from 3 to 6. For fine bench-work the factor is 5 to 10.

To produce an intensity of 1.0 the following table gives the watts to each square foot of floor surface with lamps of 1.0 watt per candle-power. Lamps with higher efficient change the table in proportion.

WATTS PER SQUARE FOOT NECESSARY AT ONE W. P. C. TO PRODUCE AN INTENSITY OF ONE FOOT-CANDLE

LIGHTING UNITS	AREAS 30 x 30 OR LARGER		SMALL AREAS	
	LIGHT CEILING IN BOTH CASES			
	LIGHT WALLS	DARK WALLS	LIGHT WALLS	DARK WALLS
Prismatic	0.19	0.21	0.27	0.30
Heavy density opal	0.40	0.21	0.26	0.29
Light density opal	0.24	0.27	0.34	0.37
Semi-indirect	0.32	0.37	0.50	0.62
Totally indirect	0.32	0.37	0.50	0.62

Extract from the National Electric Light Association salesman's handbook.

Example of Application.—Find the number of watts necessary to properly illuminate a 50 x 100-foot book-store using semi-indirect lighting and considering that the walls are dark. Then as our factor we would take 5 foot-candles, and 5 x 50 x 100 x 0.37 would give us 9,250 watts necessary to illumine it properly. To secure this with 100-watt lamps we would have to use 92 of them, or if we had 150-watt lamps we would have to use 82 of them, etc.

It must be noticed that we considered these lamps to have an efficiency of one watt to a candle-power. If the lamps we are to use are of higher efficiency, we reduce the number of lamps accordingly, and vice versa.

Now, in the case of laying out a lighting system for the home, the architect should make ample provision for all the extra loads which may be placed upon the wires in the way of auxiliary electrical devices, for these must be considered along with the lighting system. A liberal use of switches not only makes for convenience but also invites economy. A liberal distribution of baseboard outlets is almost a necessity for portable light attachments and electrical apparatus.

The living-room should be provided with side outlets and also a central outlet, and two or more baseboard receptacles for electroliers and additional fixtures. If the room is long, it is best to have the lights at both ends controlled by separate switches for convenience and economy. A wall switch ought also to control the baseboard receptacle where any electrical device like a vacuum cleaner may be connected. If there is a library, the room should be lighted with a general soft glow, and for reading purposes there should be a number of baseboard outlets for connecting portable reading-lamps without too long cord extensions.

The dining-room will require as much consideration for auxiliary outlets as for light outlets. The central lighting dome over the table ought to be controlled by a three-way switch at the door from the pantry and by another at the general door from the rest of the house into the dining-room. Generally four lights of 50 watts each are satisfactory for this central light. There ought also to be provided extra side-wall brackets to go near sideboards and tables. A special outlet near the centre of the floor should be provided for connecting electric cookers, toasters, egg-boilers, percolators, etc. Another special wall outlet should be provided for heater, fan, or vacuum cleaner, and another near the serving-table for serving-tray or drink-mixer.

The arrangement of lights in the halls should be such that they can be turned on or off from each floor together or independently. A similar control switch should be located in the master bedroom independent of the other line.

Care should be taken in the bedrooms to place no light so that the dresser will be between it and the window, for shadows cast on the window-curtain at night are very annoying. This is especially to be avoided in bathrooms. The side-wall brackets are the best for lighting the bedroom, and they should be controlled by a switch at the entrance-door, which can be worked from both sides of the partition. Outlets for reading-lamp and desk-lamp ought also to be included. Additional outlets may also be installed for connecting electrical apparatus. In both the bedrooms and the bath turn-down lamps are very convenient. The usual height satisfactory for fixtures in the bedrooms is five feet and for switches four feet.

Due to the very easy effect upon the eye the use of the semi-indirect or indirect system of lighting has been introduced into the lighting of the home wherever possible. To be successful, the ceilings must be white, cream, or light buff colors, and the finish should be matt or satin rather than glazed or varnished. The colors of the walls and hangings must also be considered in selecting the proper light. Dark greens, reds, or blues may reduce the light from 40 to 60 per cent. The elevation at which the bowls should be hung depends largely upon the ceiling height. Where the ceilings are eight feet, it is best to dispense with any attempt to light them with the indirect method. If they are about nine feet and the space to be lighted does not exceed 350 square feet, the bowl may be placed 6 feet 6 inches to 7 feet 3 inches above the floor, or if the ceiling height is ten feet, 7 feet 8 inches is a good location. This assumes the use of bowls 10 inches to 18 inches in diameter for ceilings up to eleven feet and 16 inches for ceilings from twelve to fifteen feet. Another thing which determines the height is whether the bowl diffuses the light broadly or focuses it closely. The thing to secure is the overlapping of lighted ceiling areas and reduction of any dark spaces to a minimum. The selection of bowls depends mostly upon their appearance with the furnishings and decorations of the rooms, but they should always cover the light.

Of course the selection of the kind of glass and the type of fixture is as much a part of the architect's duty as the determination of what decorations are to be used. His taste and personal likes and dislikes will enter into the problem, and no general requirements can be laid down for him. His taste has full play if he has built up the practical foundation beforehand in the correct layout of his lighting system and the right calculations for light requirements. However, if he has failed to first build his practical skeleton, he cannot expect to secure satisfying results with all the artistic skill in the world.

Book Reviews

"SMALL COUNTRY HOUSES OF TO-DAY." Second series. By LAWRENCE WEAVER. Charles Scribner's Sons, New York.

A wholly new volume on the same lines as the author's former book, containing the work of many architects here published for the first time. "It is permissible to wonder what manner of houses will be illustrated in a book similar to this published twenty years hence. Will the present upheaval of social life make an indelible mark on domestic architecture and change the character of our country houses as it is changing our national policies?" We doubt it, for the English traditions of domestic architecture have survived many changes, and the deep-seated admiration for them that is becoming more and more evident even in so many of our own country houses will be a continuing influence. In this volume the author devotes a chapter each to houses in many parts of Great Britain, including a number of examples of interesting alterations. The introductory chapter dealing with "Client and Architect," "Fees and Services," "The Value of Models," "Examples in Various Materials," "Architects and the Public," "The War and House Design," contains many ideas of interest to the profession everywhere. The volume is rich in its numerous photographs of typical houses, various details and plans, and should prove of value to every architect in studying the possibilities of variation of the English styles in our own domestic architecture.

"WHERE THE GREAT CITY STANDS. A STUDY IN THE NEW CIVICS." By C. R. ASHBEE. Charles Scribner's Sons, New York.

As stated by the author, this book is "An Appeal to the Practical Idealist." In all idealism that is worth while, that has something behind it beside vague dreams and undigested thought, is the element of the practical. More often than not it is to the practical idealist that we owe the things that ultimately count the most in the public welfare. The book might be called Town Planning, based upon something more enduring than merely present material comfort. It is written in full sympathy with the great need of, and the aspiration for, a wider expression of spiritual things in our environment. We can hardly better give an idea of the author's intention than by quoting some of the chapter headings. "The Idea Behind the Arts and Crafts Movement," "What William Morris Stood For," "The Housing and Town Planning Movement," "The City Centre," "Zones, Lungs, and Spaces," "Dirt, Noise and the Menace of Mechanism," "Exhibition and Endowment in the Arts," "The Reaction of Town and Country." Here is a plea for standards in town planning, life, and workmanship. Among the illustrations are included the work of some American architects.

A Great Architectural Library

THE largest architectural library in the western hemisphere and probably the second or third largest in the world, consisting of twenty-five thousand volumes relating to architecture and the allied arts, has been definitely linked with the School of Architecture of Columbia University by the appointment of Mr. William B. Dinsmoor as librarian and also as a member of the staff of the School of Architecture.

This library, located in Avery Hall on the campus of Columbia University, was completed in 1912 as a memorial of the late Samuel P. Avery and of his son, the late Henry P. Avery. Although the School of Architecture has been occupying three floors of this same building and been in constant contact with this library, there has been no human tie between them such as will now exist by the appointment of Mr. Dinsmoor to be librarian and also instructor in the school. Mr. Dinsmoor holds a degree from the Architectural School of Harvard University, has specialized in the history of architecture and art, and is the author of a number of articles and books on these subjects, and has made extensive archæological studies in Greece.

We have received a copy of the University of Kansas Architectural Year-Book. It contains a number of interesting drawings and is a credit to the teaching and ideals of the university's fine school of architecture. Information regarding the courses in architecture and architectural engineering may be had by writing the registrar of the university. Among the illustrations is one of the new Administration Building.


FARMINGTON, CONN.


COHASSET, MASS.


WATERTOWN, CONN.


IPSWICH, MASS.


BENNINGTON, VT.


MILFORD, CONN.

SOME OLD NEW ENGLAND CHURCHES. FROM PHOTOGRAPHS BY ALBERT G. ROBINSON, AUTHOR OF "OLD NEW ENGLAND DOORWAYS."

Possible and Actual Savings in Building Expense

By Rossel Edward Mitchell

IN the October number of ARCHITECTURE is a splendid suggestive article by Richard P. Wallis entitled "A Possible Saving in Building Expense." After discussing the facts leading to the present high cost of building and consequent slowing down of building operations, Mr. Wallis concludes that "every effort should be made to discover a method that will tend to diminish this reluctance to build."

He then suggests that one very evident way of saving a considerable percentage of the cost of the building would be the elimination of the unearned profit made by the general contractor on the work of his various subcontractors. "The general contractor has in a sense become the clearing-house of building rather than the builder himself. He rarely combines within himself all of the trades necessary to turn out a completed building. Most likely in the past he has been a masonry contractor or a carpenter contractor who has taken over to himself the handling and direction of the other trades incidental to building."

Some further noteworthy truths brought out by Mr. Wallis are:

The number of profits paid under the general-contract system are three: one to the architect, one to the general contractor, and one to the subcontractor.

The dissatisfaction of the subcontractors with the general-contract method on account of the manipulation of bids by the general contractor, together with the great credit risks entailed by the subman, while the general contractor has little to lose, the consequences of this condition being that the owner's interests are militated against, and the lowest bids cannot be obtained because frequently the general contractors cannot get the lowest subbids.

Also, the general dissatisfaction caused by the employment of incompetent and unreliable subcontractors, making the owner dissatisfied, getting the general contractor into arguments with the owner, and making it impossible for the architect to give satisfaction.

Mr. Wallis concludes from this that the logical solution is to make the designing architect or engineer responsible for the coherent prosecution of the work.

In this we most heartily agree. We would like to have the entire discussion as set forth by Mr. Wallis framed and hung up in the office of every architect in the United States who is interested to know why the profession is being pushed aside from major fields of building activity by men far less competent, less thoroughly trained, less interested in creditable building, and less disinterested from every standpoint than is the architect.

The only addenda we would make to the able and practicable discussion by Mr. Wallis is to say that his conclusion that his suggestions "could" be followed should be changed to "are being" followed, and successfully, by numbers of competent architects. This firm has been practising just the methods outlined by Mr. Wallis for ten years. For the benefit of the profession we take this means of summarizing the results:

First, by eliminating the general contractor we have come directly in touch with large numbers of subcontractors and material-men, thus coming into intimate contact with every phase of the building business.

We have been able to attain a position among the subcontractors characterized by confidence and eagerness to submit bids.

We have entirely eliminated the vital credit risk which exists with the subman when he bids to the general contractor; consequently, we get the lowest bids possible at cash prices.

By eliminating the general contractor we have been able to build from 10 to 20 per cent cheaper, as evidenced by bids occasionally submitted by general contractors who wish to try their skill at bidding in competition with our preferred methods.

We have gained complete control of our building operations; each subcontractor must come to us for his certificate, and we are in a position to make him "walk chalk."

We have eliminated dual responsibility to the owner; instead of the owner ricochetting between the general contractor and the architect, he comes to us and to no one else; the subman does not come in contact with the owner at all.

We have been able to extend our office organization to include expert estimators and superintendents.

We have been able to give our work better superintendence than under the general-contract system, because we secure a higher price for our services.

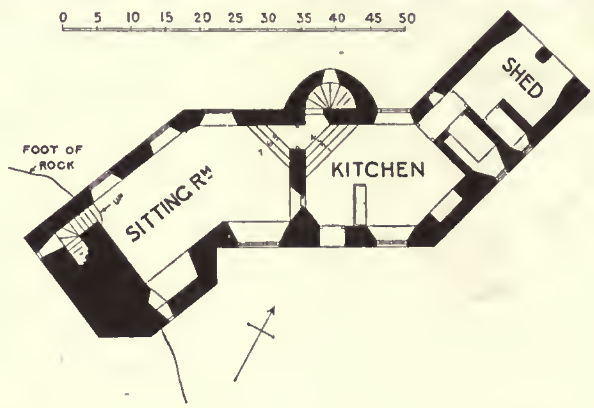
We have been able to give our clients greater satisfaction, because they know the exact cost of every branch of the work; consequently, have a fuller realization of what they are getting for their money. We are able on small buildings to put on a superintendent at the owner's expense, because the owner knows he is paying no big general contractor's profit.

We are able to pay the salary of a superintendent out of our own charges for the larger class of work, because our charges are sufficient to justify it.

Last, but not least, the general contractor is not backing us off the stage; we have yet to find a business man who does not see the advantage of our methods as soon as they are explained to him; consequently, we are now doing investment work which a few years ago in our local field was handled almost entirely by the general contractor.

In conclusion, we are very positive that our methods are the only ones which will place the architect where he belongs—at the head of the building profession. Under these methods the client gladly pays us 10 per cent, whereas under the general-contract method he frequently begrudges 6 per cent, and sometimes eliminates the architect from the actual construction work.

The architect, under this plan, is able to render a high quality of service; he is able to build up an efficient organization; he is enabled to build more cheaply and secure better work. By rendering a greater service to his clients and an obvious service, he secures the respect and good-will of the client, and is able to put his calling on a strong financial basis.



Stonewell Cottage

THE great chimney rises like a buttress at the south corner, and the adjoining gable nestles down in the hillside as though the cottage sought protection in the bosom of the hills (No. 1). No. 2 shows how swiftly the ground slopes, and the plan (No. 3) marks how the building twists to follow the contour of the site; yet, even so, seven steps are needed between kitchen and sitting-room. The entrance door brings us straight into the kitchen—the soft protection of a porch was scorned—and a settle serves to screen the hearth from the draught. The lintel over the fireplace is an amazing bit of construction, a single gigantic slab weighing a ton and a half, a rough shard of slate that had lain neglected in an old quarry. To the right is a door to a passage, with adjoining larder and an exit to a shed, or, more properly, undercroft, where wood and the like may be stored. In the north wall is a big window, giving ample light, and to the left broad steps laid cornerwise lead to a triangular landing. Here starts a winding stair in a circular projection (shown in No. 2) that would take us to the bedroom floor; but first we go to the left, up three steps, into a sitting-room. To the left is a recess (that is in truth a chimney-corner, for it is the internal result of the great stack outside), and in the right-hand corner a steep and narrow stone stair winds up in the thickness of the wall to the chief bedroom. It is wholly in the sloping roof. From this room we enter another—there is, of course, no corridor—from which again we may, if we will, pass upward to another, neatly named Olympus. Reference to No. 1 shows a tiny window set high in the thatch. This it is that lights this entertaining bedroom, which it is fair to say was an afterthought, and is used only when the pressure of hospitality demands an extra and unusual bed. There is yet another bedroom over the northeast end of the cottage, which is reached from the middle staircase.

From "Small Country Houses of To-Day," second series, by Lawrence Weaver.

Modern Building Superintendence

By David B. Emerson

CHAPTER VI

SHEET METAL WORK, ORNAMENTAL IRON AND CARPENTER WORK

BEFORE the plastering was commenced the skylights on the roof were set and glazed. They were constructed of galvanized rust and corrosion-resisting sheet iron, which is made up from a pure iron-ore base. The bars in skylights were made up of No. 24 gauge metal, with condensation gutters formed on the bars; they had wrought-iron stiffening bars encased in the sheet metal. These bars were well painted with red lead before the skylights were assembled. The skylights had gutters around the eaves, into which condensation gutters discharged, and were provided with leaders to discharge all water onto the main roof. Wherever the galvanized iron was brought down onto the skylight curbs, it was kept away from the copper by means of a three-eighths-inch wooden strip placed between the two metals, to prevent electrolitic action. All skylights except those over the elevators were glazed with wired glass; the skylights over the elevators were glazed with rough plate glass, one-eighth inch thick, and protected with heavy galvanized wire netting guards, inside and outside, which is one of the requirements of the National Board of Fire Underwriters. While this work was being done, and the plasterers were still working, the ornamental ironworkers were busy setting their work, the vault-light in the sidewalk being set as soon as the construction was ready to receive them. The vault-lights were constructed with reinforced concrete frames, set with prismatic glass, and fitted with abrasive metal buttons, to prevent pedestrians from slipping, which is the cause of many serious accidents. The coal-hole covers in sidewalk were placed as near to the curb as practicable, and were of the flush safety-hopper type, of abrasive metal with concreted hinges.

On the interior, work was commenced setting the ornamental railings for the staircase. All castings were inspected as previously described, and a few were found to have sand-holes and to be defective, and were rejected. In the setting of this work no exposed screw-heads were allowed, all of the work having to be put together by means of concealed screws and rivets, and had to be fitted without breaks or shoulders. The elevator enclosures were made up of cast-iron frames, glazed with polished plate wire glass. The doors to enclosures were hung on ball-bearing, two-speed hangers, made with an enclosed track, hung from an angle iron bolted to the inside of the elevator enclosure; the hangers had adjusting screws so that they might be quickly adjusted at any time, and kept in perfect alignment. Elevator-door saddles were grooved to hold doors in place, and were made with a non-slipping surface, as the usual iron elevator-door saddles become very slippery with use, and are dangerous to passengers. The elevator doors were equipped with combination liquid and spring checking and closing devices, with positive electric interlocks which made it impossible to open the doors until the car had stopped, or to start the car until the door was closed. The doors were opened by hand and closed by the action of the spring in the closer; the piston descending through the liquid in the cylinder checked the door in the last few inches of its travel, and prevented slamming. The electric interlocks were connected to the arm of the closer and were wired in series with the elevator control circuit, so that when the door was closed the circuit was closed, and when the door was opened the elevator control circuit was opened, thus absolutely preventing any movement of the elevator car while the door was open.

In each elevator there was installed an emergency release switch, so that in case of fire or other emergency the interlock was made inoperative. The setting of the window-frames and sash was progressing during the time that the other work was going on, and they were now all in place. The windows in the first story on the street fronts were of cast and wrought bronze, of a wind and weather tight construction. The cast and wrought bronze was to be of even color throughout. All of the wrought bronze was worked through steel dies, and had to be carefully examined to see that all mouldings were true and straight, and none was allowed to be less than No. 10 standard American bronze gauge in thickness. All cast bronze had the fireskin removed, and all of the ornament was rechased. Castings were all inspected for sand-holes and defects in finish. All joints in frames and sash were brazed, and the work was put together by means of concealed screws and rivets. The glass stops and hardware were held in place by means of screws of the same alloy and color as the rest of the work; brass screws were positively not allowed to be used.

The frames and sash in the upper stories of the building were made up of sound, thoroughly seasoned white pine, and covered on all exposed surfaces with sixteen-ounce soft rolled copper. The covering was carried into the glass rebates of the sash. The frames and sash were inspected to see that all metal was drawn down smooth over the wood, and that it was free from kinks and buckles, also that it was turned down over the wood at the intersections, and that all joints were well soldered, so that no water could reach the cores and cause decay. All sash were provided with glass stops covered with twelve-ounce copper.

All of the glass in elevator enclosures, metal sash and metal-covered sash was well bedded in self-hardening putty before applying the glass stops. The putty was made up in the proportions of 87 per cent pigment and 13 per cent vehicle; the pigment was composed of 85 per cent whiting, 10 per cent pure white lead, and 5 per cent litharge or monoxide of lead; the vehicle was pure raw linseed oil. This putty was used, as the ordinary glazing putty, composed of whiting, white lead, and oil will not harden on metal surfaces. The work of glazing the windows being completed, and the plastering having thoroughly dried, the work of setting the steel trim and hanging the doors was commenced. All of this work was made up of furniture stock drawn steel, which was patent levelled and finished in five coats of enamel baked on. All joints in trim were made interlocking and were electrically welded. The angle joints in all mouldings were formed by coping the vertical mouldings over the ends of the horizontal mouldings, which gives the appear-

(*Continued on page 54*)

DOLLAR SAVINGS-BANK, 147TH STREET AND WILLIS AVENUE, NEW YORK.

Renwick, Aspinwall & Tucker. Architects.

(*Continued from page 52*)

ance of a perfect mitre, and imparts the greatest strength to the joint. All of the work was erected and fastened by means of concealed fasteners on the back of trim, so that no nails or screws were exposed on the face of work. The door-jambs were made up of No. 18 gauge metal, formed of one piece, with moulded stops. The jambs were securely fastened to the steel bucks. The doors were made up of No. 18 gauge steel, with panels of one thickness of No. 12 gauge steel. The stiles and rails were formed from one piece of metal brought together on the inside edge and turned back upon itself, thereby forming a lip to receive the panels, and then riveted together. The doors had iron reinforcements on the inside to receive the hardware. All of the hardware was of patterns especially designed for hollow metal construction. The transom lifters and door checks were of the concealed type. Locks were of the unit type, and were master-keyed and grand master-keyed.

The carpenter work on a building of this type is not a very large item, but is nevertheless still a necessary item. The carpenter makes all of the rough centres for the arches and does whatever wood framing there may be to do throughout the building. After the roof was covered the flagstaff was set in the iron foot-block which was provided for it. Although steel flagstaffs are made and are more fire resisting than wood ones, the fire risk is so infinitesimally small that it is better to use a wood staff, which can be made far more graceful than a steel staff. The staff on our building was figured to show forty-five feet above the cornice, and to be nine inches in diameter at the base. It was worked from a selected stick of Oregon fir. As no instructions had been given for tapering the staff, we gave orders that the top diameter should be four and one-half inches, which was one-half the lower diameter. The height of the staff was then divided into four quarters, the diameter of the first quarter above the roof was made fifteen-sixteenths of the lower diameter, the second quarter was seven-eighths of the lower diameter, and the third quarter was three-quarters of the lower diameter. The flagstaff was finished at the top with a lignum vitæ truck with a hollow spun-copper ball, eight inches in diameter, set on a galvanized iron rod, one-half inch in diameter. The flagstaff was painted two coats of white lead and oil before it was erected and one coat after erection. The ball was gilded with leaf gold. The carpenters had already commenced work in the banking rooms while the metal trim was being set in the building. The floor sleepers were laid on the concrete floor-slabs; they set sixteen inches on centres and were nailed to spot grounds set twenty-four inches apart and well bedded in cement mortar, and carefully levelled up to receive the sleepers. The sleepers were two-inch by four-inch, short-leaf yellow pine, bevelled on both sides. The first load of sleepers which were delivered at the building were only bevelled on one side, which is quite a saving to the contractor, as a wide stick is run through the saw once and two sleepers are the result, whereas to bevel both sides means running each piece through the saw twice. We ordered these sleepers removed from the building and sleepers bevelled according to the specifications furnished in their place. All sleepers were given a brush coat of creosote wood preservative before laying. After the sleepers were in place they were filled between with cinder concrete made up of one part Portland cement, two parts clean, sharp sand, and ten parts clean steam cinders. The cinders were well washed to remove all sulphur and other foreign matter. After the cinder concrete had set, the under flooring was laid. The under floors were of one and one-eighth inch, C-grade, square-edged boards, laid with open joints, not less than one-quarter of an inch wide, and well mitred to every sleeper with two eight-penny nails. By this time the finish for the director's room and the president's had arrived and was being installed. Care was taken as soon as the finish arrived at the building to stack it so that it would not be damaged, and in a thoroughly dry place, so that it would not absorb moisture, strict orders having been previously given to the cabinet-maker not to deliver any finished material on damp nor rainy days, as kiln-dried material absorbs moisture very readily, and the result of the kiln drying is entirely lost if the wood is allowed to become filled with moisture. We made several visits to the cabinet shop to inspect the work while it was being made up.

The finish in the director's room was specified to be of first quality Honduras mahogany, all of the work to be veneered. The face veneers for panels were cut one-twenty-eighth of an inch thick, the veneers for stiles and cross-rails and for doors were cut one-eighth inch thick, and the end veneers of doors were one-half inch thick. All of the large wall panels were veneered in four sections carefully matched, using a crotch mahogany. All of the panels were built up of what is known as five-ply laminated construction. The cores for all of the work were made up of well-seasoned, C-grade white pine, free from loose knots and shakes, care being taken to see that all of the wood was old stock. It was glued together in strips not more than three inches wide. The work was glued up at least two weeks before any of the cross veneering was done. The cores were all carefully levelled up perfectly true, and brought to an even thickness, and then veneered with a one-eighth inch white wood veneer and then cross-veneered with the mahogany veneers. The backs of all panels were veneered with the same stock mahogany as the fronts, to prevent warping and twisting. All doors were veneered on built-up cores and were framed together with mortise and tenon; the tenons were made with three-quarter-inch shoulders, and were securely wedged and glued into the mortises. The stiles and rails of the doors were grooved on the inner edge and a five-eighths inch white-pine cleat was glued into the grooves to receive the panel mouldings, so that the panels would be loose. The woodwork was all built up and put together at the factory, and was dowelled and fastened with lay screws at the corners. The finish in the president's room was of unselected birch, to be enamelled. This wood, on account of its hard surface, density, and texture, takes enamel particularly well. The back of all of the woodwork was given a heavy coat of damp-proof paint before leaving the factory. In erecting the woodwork at the building it was all required to be back-fastened, as no face nailing or screening was allowed.

Practically all that was now left to be done in this portion of the building was the finishing of the woodwork and the laying of the parquet floors, which was not done until the woodwork was finished. Before applying any finish to the woodwork it was all carefully sandpapered with the grain, and thoroughly dusted off and wiped clean. The mahogany woodwork in the director's room was washed with a mild potash solution to kill all sap, and to remove any grease in the wood. It was then given a coat of acid stain applied with a sponge, and then rubbed into the wood with a cheese-cloth pad which distributes the stain evenly over the surface of the wood; the work was then sanded down with 00 sandpaper, and given another coat of stain, diluted with one-half water. It was then filled with a paste wood-filler, which was allowed to set until a flat effect was produced, when it was rubbed briskly across the grain with a piece of burlap, and the surplus filler wiped off with a clean rag. After that it was given three thin coats of pure gum shellac, and sandpapered between each coat with 00 sandpaper, the final coat being rubbed down with pumice-stone and water, and it was finally finished with two coats of prepared beeswax. The woodwork in the president's room was given a priming coat of pure white-lead reduced with equal parts of linseed oil and spirits turpentine, then two coats of special enamel undercoating and two coats of an approved enamel were applied, each coat being allowed to harden thoroughly before another coat was applied. Each coat was sanded with 00 sandpaper, and the final coat was rubbed to a dull finish with fine pumice-stone and water. The painter was instructed to shellac and varnish the bottom and top edges of all doors to prevent moisture from entering the stiles, which is a frequent cause of swelling and twisting of doors, with the consequent annoyance to the occupants of the building. After the woodwork in the director's room and president's room had been finished and was thoroughly dry, the finished floors were laid. Before laying the finished parquet flooring a levelling floor five-eighths of an inch thick was laid on top of the under flooring and running in the opposite direction. The parquet flooring in the director's room and the president's room was of Philippine teak, and that in the working space in the bank was of clear white maple. The flooring was five-eighths of an inch thick, in two-inch by eight-inch strips, tongued and grooved, and laid herringbone pattern, with four-inch wall-line borders. It was blind-nailed, with one and one-eighth inch No. 15 cement-coated parquet-flooring nails, using two nails to each strip. After the floors were laid, they were hand scraped, the scraping being done with a shearing cut lengthwise of the grain. They were then gone over thoroughly with No. 1½ sandpaper, swept clean, and wiped with a soft cloth until all of the dust was removed, and were then ready for finishing. They were given a wax finish, after first filling with wood alcohol and light-colored umber, mixed to the consistency of thick cream, which was thoroughly rubbed into wood, followed with two coats of alcohol shellac, each coat being well rubbed when dry, then one coat of linseed oil and pumice-stone, and one coat of wood alcohol and turpentine in equal parts were applied, and finally three coats of prepared floor wax, rubbed in with hot irons. The work described in this chapter completed the general construction, and while it was in progress the work of installing the plumbing, heating, electric wiring, elevators, bank fixtures, and vaults was progressing, and was now completed and will be described each in its turn.

(To be continued.)

Announcements

Dillon, McLellan & Beadel, architects, 149 Broadway, Singer Building, New York City, wish to announce that Mr. Arthur Dillon, having finished his work for the Federal Division of Rehabilitation, has resumed the practice of architecture.

Mr. A. A. Baerresen announces that Mr. Frederic Hutchinson Porter, of Salem, Mass., is a member of the new firm of Baerresen & Porter, with offices at 1821 Carey Avenue, Cheyenne, Wyo. Manufacturers' catalogues and samples are requested.

Miss Marian Coffin, landscape architect, Fellow A. S. L. A., begs to announce that she has removed her office to 830 Lexington Avenue and has associated with her Mr. James M. Scheiner, architect, late of the 302d Engineers.

Jallade and Lindsay, architects and engineers, wish to announce the association with them of Mr. Harry E. Warren, S.M., in the general practice of architecture and engineering under the firm name of Jallade, Lindsay and Warren, 37 Liberty Street, New York.

$300 *in Prizes*.—The Chicago Brick Exchange calls the attention of Chicago architects and draughtsmen to the new variety common brick known as "Dearborn" brick. Chicago architects and draughtsmen are asked to submit designs for a fireplace, counter, and one or two more panels. The Chicago Brick Exchange is the patron of the competition, and offers the following prizes: First prize, $150; Second prize, $100; Third prize, $50. Mr. Charles L. Frost, Mr. Emery B. Jackson, Mr. I. K. Pond, and Mr. Howard Shaw have very kindly consented to act as judges. Designs must be in by Tuesday, February 17, 1920. Write, phone, or call the Chicago Brick Exchange, 133 West Washington Street, Chicago, Illinois, for complete programme and blue-print showing dimensions of room. Phone, Main 2745 and 2746.

This competition has the approval of the committee on competition of the Illinois Chapter of the American Institute of Architects.

First Pan-American Exposition of Architecture.—Architectural and professional institutions of the United States are invited to send exhibits to the first Pan-American Exposition of Architecture, which will take place in the city of Montevideo, Uruguay, from the 1st to the 7th of March, 1920. Copies of a preliminary programme of this meeting in Spanish may be seen at the district and co-operative offices of the Bureau of Foreign and Domestic Commerce.

Harold Laurence Young, 253 West 42d Street, New York, has resumed the practice of architecture and will be glad to receive catalogues and samples and prices on building materials.

The architects of the Overland Service Building, Boston, published in the December number, were Mills, Phines, Bellman & Nordhoff.

William G. Herbst and Edwin O. Kuenzli take pleasure in announcing their partnership for the practice of architecture. The firm, now known as Herbst & Kuenzli, architects, maintains offices at 721 and 722 Caswell Block, Milwaukee. Mr. Herbst was formerly associated with the late William F. Hufschmidt. Mr. Kuenzli was a member of the firm of Charlton & Kuenzli of Milwaukee, Wis., and Marquette, Mich.

EXTERIOR.

BANKING-ROOM. Shampan & Shampan, Architects.

THE THRIFT BANK, DE KALB AVENUE CORNER RYERSON STREET, BROOKLYN, N. Y.

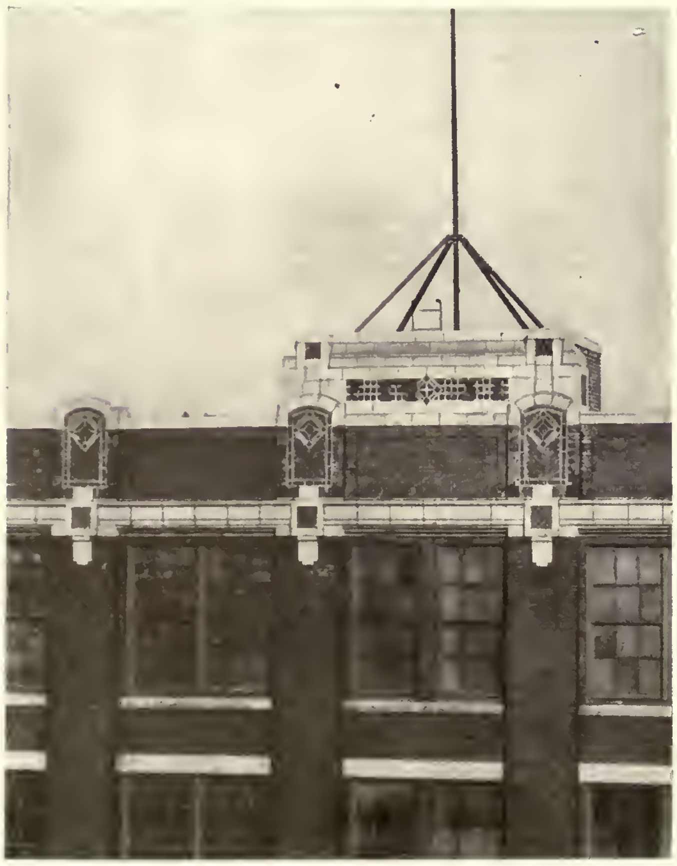
ENTRANCE DETAIL, THE THRIFT BANK, DE KALB AVENUE CORNER RYERSON STREET, BROOKLYN, N. Y. Shampan & Shampan, Architects.

SERVICE BUILDINGS NO. 1 AND NO. 2.

BUILDING NO. 3.

Frederick A. Waldron, Engineer.

EDISON ELECTRIC ILLUMINATING CO., BOSTON, MASS.



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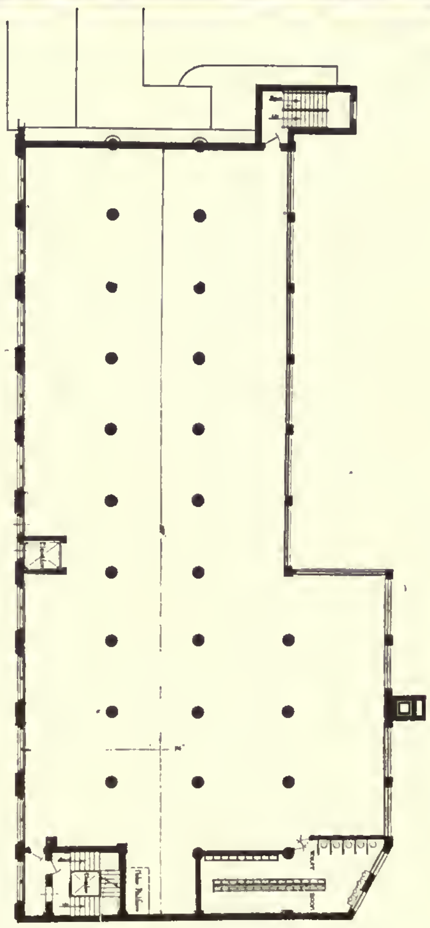

PLAN.

Ballinger & Perrot, Architects and Engineers.

HUGO BILGRAM GEAR WORKS, PHILADELPHIA, PA.

Programme of Competition for Design of Architect's Certificate

THE COMMONWEALTH OF PENNSYLVANIA

Purpose: The State Board of Examiners of Architects are to issue certificates to all persons entitled to practice architecture in the State of Pennsylvania and therefore hereby institute a competition for the purpose of securing a design for a certificate of a character and artistic quality worthy of the profession. It is proposed that designers shall have as much freedom as possible in working out their respective solutions of the problem. It is suggested, however, that inclusion in some form of the Pennsylvania State coat of arms will be appropriate.

Competitors: All architects, draftsmen, or other designers are eligible to enter the competition.

Text: The treatment of the lettering and placing of signatures and seal shall be shown by each competitor using the following text:

In the Name and by Authority of the
COMMONWEALTH OF PENNSYLVANIA
To all to whom these Presents shall come, Greeting:
KNOW YE THAT

....

of.............................., County of...................., State of....................

Having given satisfactory evidence of the qualifications required by law to practice as an *Architect* is hereby

ADMITTED TO PRACTICE ARCHITECTURE
IN THE STATE OF PENNSYLVANIA

this..........................day of.........................., 1920, and, therefore, is a Registered Architect.

STATE BOARD OF EXAMINERS OF ARCHITECTS.

[Actual size of seal 2¼ inches diameter.] .... *President.*

In witness whereof the Board of Examiners of Architects issues this Certificate No..............under the seal of the State.

....

....

.... *Secretary.*

Medium: Certificate shall be designed for reproduction from engraved steel plate, printed on parchment.

Size: Certificates are to be printed on 16 x 14 inch sheets of parchment. Each design submitted shall be drawn 16 x 14 inches for the purpose of reduction to the final size of 12 x 10 inches. The horizontal dimensions are given first.

Rendering: The design of each competitor shall be rendered with a pen in Indian ink on white bond paper.

Anonymous Designs: Each design shall be submitted without any distinguishing mark which would identify the author. Each design shall be presented accompanied with a plain sealed envelope containing the name and address of the author.

Time and Place of Submission: Each design shall be wrapped under seal and marked on the outside: "Competition for design of architect's certificate," and delivered on or before April 1, 1920, to Mr. M. I. Kast, 222 Market Street, Harrisburg, Pennsylvania.

Jury: C. C. Zantzinger, Philadelphia; Edgar V. Seeler, Philadelphia; Paul P. Cret, Philadelphia; Reinhardt Dempwolf, York; Frederick A. Russell, Pittsburgh. In the event that any of the jurors are unable to act the vacancy or vacancies will be filled by the State Board of Examiners of Architects.

Prizes: Successful competitors will receive the following cash prizes: first, $200; second, $100.

STATE BOARD OF EXAMINERS OF ARCHITECTS,
JOHN HALL RANKIN, *President.* CLARENCE W. BRAZER,
M. I. KAST, *Secretary,* EDWARD STOTZ,
EDWARD H. DAVIS.

A Competition for the Development of a Small Country Property

A competition for the development of a small country property will be held by the Own Your Home Exposition, under the auspices of the New York Chapter of the American Society of Landscape Architects, Mr. Geiffert, Jr., acting as professional adviser to the exposition management.

The object of the competition is to secure the best design for a plot located at the intersection of an avenue and a street; 144 feet on the avenue and 270 feet on the street. One side of the lot faces a sandy beach. The street runs at right angles to the beach and ends at the high-water line. The first prize design will be executed in miniature, one-sixth full size, at the Own Your Home Exposition at the Grand Central Palace during the week of May 1, 1920. The residence, greenhouse, and garage at the same scale are now being built. These three buildings are to be located on the plan, and there must be a flower garden and a vegetable garden. Any other features are left to the discretion and judgment of the competitor. Any one who signifies his intention to compete may ask questions of Mr. Geiffert in regard to the work, and the answers to any such questions will be sent to all competitors. No questions will be answered after March 6th.

The first prize will be $125, the second $75, the third $50.

Three drawings are to be submitted:

1st. A general plan on mounted paper, rendered. 2d. A planting plan drawn in ink on tracing paper. 3d. A drawing on mounted paper showing such details as the designer wishes, to explain his work.

The scale of all drawings is to be that of the topographic map. The size of the drawings is to be twenty-six inches by thirty-eight inches. The general plan should show grades by figures, no contours. No fences are permitted on the boundary lines. Any medium may be used in rendering the drawings; however, much more importance will be given to the logical and artistic planning of the plot and the selection of materials in regard to their fitness to local conditions and their effective composition than to the presentation, which shall not go beyond what is strictly necessary to make the plans intelligent. Each set of drawings will be signed by a *nom de plume* or device and accompanying the same shall be a sealed envelope with the *nom de plume* or the device on the exterior. The name and address of the contestant is to be inside. No contestant shall be permitted to submit more than one design alone or in association with other men. The drawings are to be delivered at the office of the Own Your Home Exposition, Grand Central Palace, Lexington Avenue and 46th Street, not later than March 27th.

The jury appointed by the Chapter to judge these designs is Charles Downing Lay, Gilmore D. Clarke, Noel Chamberlin. The decision of the jury will be final. The jury will send a copy of its report to each competitor, and will reach its decision not later than April 3d. All designs will be exhibited at the Own Your Home Exposition, at the conclusion of which all except those receiving prizes will be returned to their authors.

The competition is open to all members of the New York Chapter of the American Society of Landscape Architects, all draftsmen and junior draftsmen employed in offices of practising members of the Chapter, and students of landscape architecture at Cornell University.

Building's the Thing

By Colonel W. A. Starrett

LINES of congested traffic, cold winter evenings, crowds standing waiting for overcrowded street-cars that pass without even stopping; women tired, bundles in their arms, waiting expectantly at the curb, unable to obtain means of transportation—waiting patiently, doggedly; the lights in rows upon rows of solidly built streets twinkle to the last window, and the din of traffic aggravates the jaded nerves of tired people, who feel the spirit of unrest. A thousand reasons overwhelm the mind as to the cause, and the crowds, in numb bewilderment, turn from one thing to another as the reason for their discomfort, which of late years seems to present an unbearable burden.

People gaze dully at the automobiles that rush past in the evening gloom, bearing what seems to them the more fortunate, who are able thus to own their own transportation—yet in those automobiles the same spirit of unrest pervades; something's wrong. A subconscious feeling of dissatisfaction is everywhere manifest. From soap-boxes and cart-tails street-corner orators scream their favorite doctrines to the restless groups around them. Everything from Bolshevism to monarchy is hailed or accused, and with it all the spirit of unrest remains.

Building's the thing. Throughout the length and breadth of the land the cry for proper housing and shelter goes up. Every big city is infected with the virus of unrest which arises from the physical discomfort of thousands of people. The housing is inadequate. Many of those who have homes are desirous of better ones; those less fortunate desire any home at all; the very animals require better shelter. And all the time, while the population is growing, the country's building demand is constantly widening the gap that lies between it and its supply.

Habitations of all kinds, for rich and poor alike, are required—yes, even demanded and fought for; and silently the unconscious appeal, which expresses itself in unrest, goes out through the nation for still more structures.

The war, with all its cruelties, inflicted unseen, and at first unobserved, one of the greatest cruelties on civilization by wrenching from its natural course the steady flow of building construction, which had, almost from time immemorial, kept its pace with the demands of the human race. Like the air we breathe and the water we drink, it seemed to continue to fill its appointed place without effort and in the natural course of events. For all time the human race has been led on its path of civilization by its structures. The shock of war caused the dissipation of this mighty current of human necessity, and now we are faced with the consequences of that interruption. To-day the cry throughout the civilized world will not be stilled.

Human intelligence could not have started with anything more fundamental. First, the cavemen must have had among them artisans who were more skilful than others in the removal of obstacles and the hewing out of hollows in the hillsides. Special aptitude and knack in these then prodigious tasks must certainly have been the first human efforts in the division of labor, and men who were dexterous at these things must have been in demand to continue at their work, while others afforded them protection and brought them food.

Down through the ages the path of civilization is marked by the structures men have built. Archæology finds its greatest support in the remains of buildings, and in the twilight of antiquity the records of ancient civilization turn upon the remaining fragments of their structures.

Italy and France in the Renaissance left the measure of their cultural civilization in the useful and ingenious structures of their times, and the early dawn of modern times is ushered in with the glorious heritage of the decorative skill of the constructors who, upon first finding shelter, turned their thoughts toward the gratification of their eyes in the beautiful interpretations we now call the classics.

The magnificent cathedrals of the Middle Ages expressed structurally the spiritual unrest which was the only escape the people of that era saw from oppression by a vicious monarchical system. These structures remain to tell the story so much more plainly than the whole literature of that time to him who runs and reads.

Northern France and Belgium emerge from the hail of war to find that their oppressors considered them most vulnerable through the destruction of their structures, and while we observe with loathing and repulsion the destruction of the great cathedrals at Rheims and Ypres, we realize that they are after all only the blind stabs of fury—the spiritual insults to the people—but the deadly blight of Germany laid its most ruthless hands upon the habitations of the people. To destroy their homes and workshops was to destroy them.

Through all the ages men in their spirit of unrest have turned from one standard to another as the panacea for their seeming greatest ills. Religions have come and gone; isms and fads. The Jews moved from a mighty liberator through all the gamut of forms of government to the judgeships, and then were themselves destroyed; and yet they were the closest to happiness and the fulfilment of their national aspirations when they had built the city of David.

Such temporary and ephemeral standards of value as have come and gone through all ages have grouped themselves about the things that, in each time, seemed most important. Spain was overwhelmed by a love for gold; Holland's fleeting maritime supremacy set its store on the same theory of the domination by a fleet that led the Venetians into the illusory sense of security that turned on the question of the domination of the seas. And yet Holland's greatest historic achievement turned out to be what seemed the obscure performance of necessity. The building of the dikes, probably the greatest engineering feat of all times, measured in terms of human usefulness, was nothing but a preamble to the building of the permanent structures which are to-day the visible evidences of her standing.

In our modern complex economic system men's minds cloy at the vast diversity of elements that go to make up the sum total of human existence. In despair they turn from one standard to another—now it is gold—now it is copper—now it is wheat. Of late generations it has been thought that the index of human requirements could be built upon iron and steel. These fundamentals, entering as they do into almost every conceivable human activity, must surely be the standards by which men may judge their progress and their material advancement. Yet these things are illusory, for back of it all lies the same fundamental requirement—shelter and habitations. The national index, perhaps too profound ever to be brought out for clear comprehension by the masses, must nevertheless be founded, when founded it is, upon the country's progress in building. Structures of steel, more structures, habitations, offices, factories, hotels—the whole human cry fundamentally goes up for food and shelter; and yet, without shelter, food is not possible. Squarely across the path of human civilization lies its building programme.

The soap-box orators may be able to impose their vicious propaganda upon a distraught and bewildered people. Monarchies may rise to rob nations of the fruits of their productive efforts on the spurious argument of centralized control; but underlying all these, the yard-stick of civilization changeth not.

Unless men build they will not progress; unless they build they will retrogress, and the measure of their civilization, whether under Bolshevism or monarchy, will be recorded for all ages in the adequacy of their structures.

Unrest, Bolshevism, Socialism, anarchy, perhaps monarchy; wages, hours of toil, production, government itself, of whatever source, cannot escape the inevitable fundamental—the measure of our progress from the delirium of war and the convalescence of the post-war unrest will inevitably rest on the resolution of the people to turn from their isms and apply themselves to the production of the structures necessary for the continuance of their civilization. Building's the thing.

Announcements

The Indiana Limestone Quarrymen's Association with headquarters at Bedford, Indiana, in anticipation of a year of unprecedented building, has recently been reorganized and expanded with a view to increasing its facilities for serving the architectural profession. The association maintains a staff of field representatives who, unhampered by the bias of salesmen, are able to render valuable help in the solution of problems connected with their industry.

The personnel of the association has been increased and several important appointments made. Mr. H. S. Brightly, formerly of Chicago, becomes secretary.

Mr. George B. McGrath has been transferred from Washington, D. C., and is now in charge of the Metropolitan Service Bureau at 489 Fifth Avenue, New York City. He will also temporarily continue his activities as field representative of the association in the Atlantic States.

Mr. C. Roland Yanson has been transferred from Bedford, Indiana, and placed in charge of the Chicago Service Bureau at 231 Insurance Exchange, Chicago. Mr. W. S. Whyte with headquarters in Bedford will cover the Middle States territory succeeding Mr. Yanson.

The association's activities in the Western field will continue under the able supervision of Mr. J. R. Sargent with headquarters in Topeka, Kansas.

Mrs. C. L. Walters has been promoted to the position of secretary of the Bedford Stone Club Auxiliary, and Mr. C. H. Badgley, of Toronto, Canada, will act as manager of the Canadian organization.

The attractive little booklet published by the Stanley Works, New Britain, Conn., "Eight Garages and the Stanley Hardware," will be sent free of cost to any one interested in building a garage.

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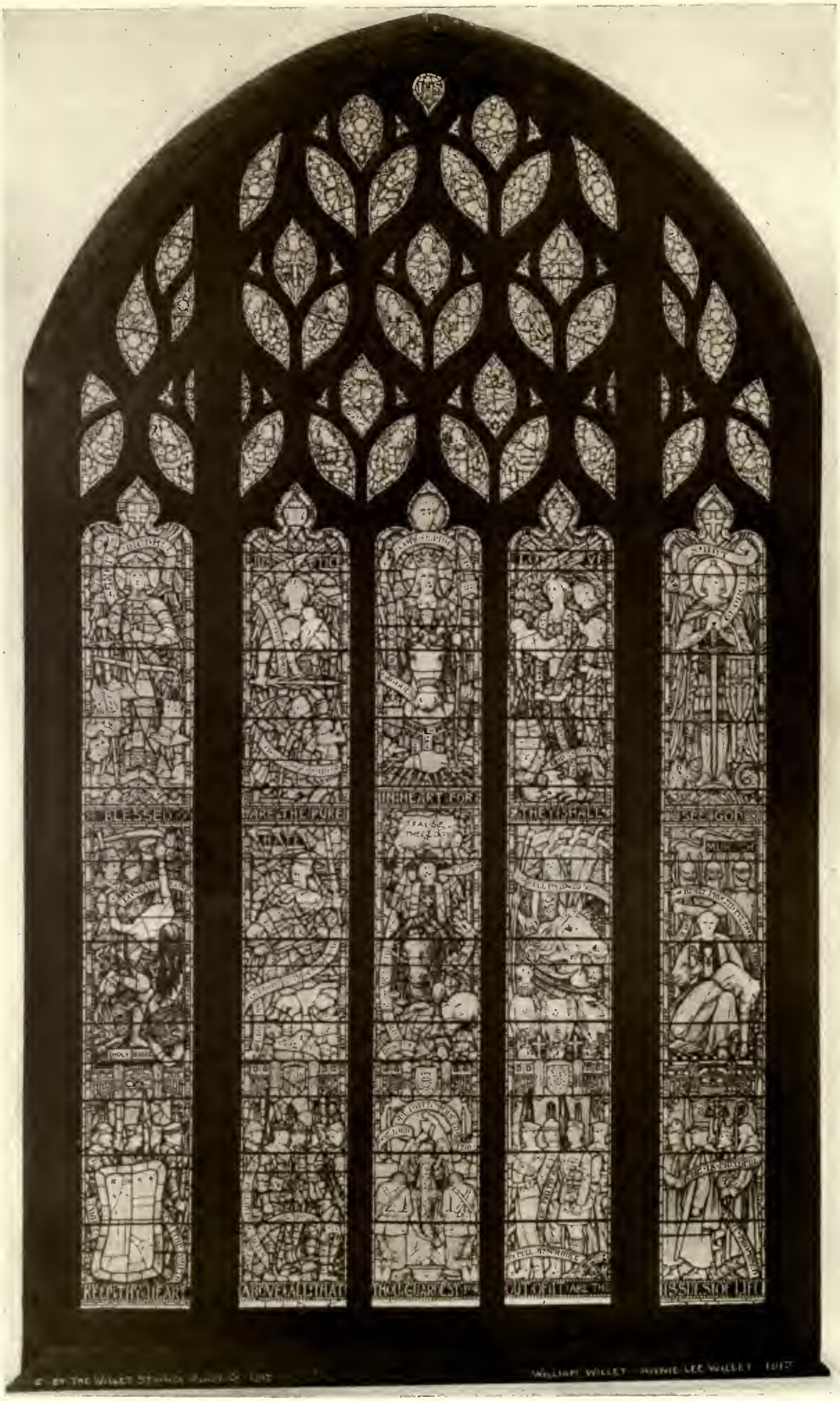
frontispiece to 14.3



THE CONQUEROR—A VICTORY WINDOW.

TRINITY PROTESTANT EPISCOPAL CHURCH, SYRACUSE, N. Y.

ARCHITECTVRE

THE PROFESSIONAL ARCHITECTURAL MONTHLY

VOL. XLI MARCH, 1920 No. 3

The Conqueror—A Victory Window

The original water-color of this Victory Window was lost in the fire that destroyed the Fine Arts Building, New York, on the opening night of the Architectural League Exhibition.

DESIGNED in 1916 by William Willet and Annie Lee Willet, and erected in 1919 as a thank offering for the safe return of her two sons by Louise L. Smith, in the Trinity Protestant Episcopal Church, Syracuse, N. Y., this window depicts the World War with Germany.

Amos (fragment). One of the clerestory windows of the U. S. Military Academy, West Point, dedicated to the memory of the departed alumni.

In the predella is shown a procession of the Allies approaching the sacrament before they enter the conflict—Belgian, French, British, Italian, Serbian, Russian, and American; soldiers, sailors, and aviators in their authentic national uniforms; suggested by an incident related of Marechal Foch. Some one asked him how the men had nerve to hold out at Verdun. He took them to a little underground hut chapel, and showed them a rude altar before a crucifixion of Christ on Calvary, saying: "This is where the men came for strength to fight and learned how to die."

In the upper tier are symbolized the four riders of the Apocalypse. In the centre the Black Horse—The Famine of the Word of God. The rider, a type of the higher-critic professor of the German Universities wearing his emperor's cross and trampling underfoot the divine Christ.

On the left is War—the rider on the Red Horse. Hate is his creed; his motto "Might is Right." The sky is aflame with liquid fire and the trumpets blast forth the warning. Beneath are victims of the U-boats, a mother's arms are holding her infant above the waves—the periscope skulking away. The scroll reads: "We have made a covenant with death, and with hell are we at agreement." To the right the Pale Horse and he that sat upon him—Death holding his scythe and encircled by demons. Beneath are three vultures, symbolizing the enemy allies, Germany, Austria, and Turkey—they perch on skulls between which are the wooden crosses that mark the field of death.

The extreme left lancet shows an Armenian martyr crucified to the burning stake, one of the eight hundred thousand Armenian women who perished rather than deny the faith and desert the Allies when offered their freedom; in exchange for non-resistance they sent not only their men but all their boys to the trenches, two and one half million dying, and by their death held off the German hordes who would otherwise have succeeded at Verdun. Lurking in the background is a German officer giving the suggestion to the Turk.

The extreme right lancet shows the murder of Edith Cavell—the desecration of the Red Cross.

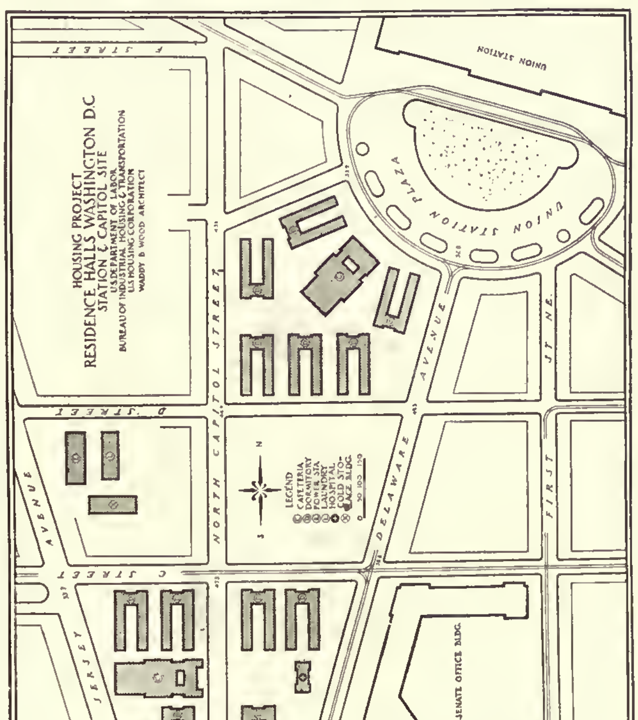
In the upper tier Heaven is typified; Christ on the White Horse bears the scroll, "In me you might have peace," while in the side lancets the strong archangels Gabriel and Raphael bring the souls of the maimed and slain children to our Lord. St. George and St. Michael weigh the souls of men—the weakest believers who pray being heavier in the scale of Heaven's justice than the most self-sufficient. The text running across the upper portion of the window is Christ's word as he drew near to Calvary, "Be of good cheer, I have overcome the world."

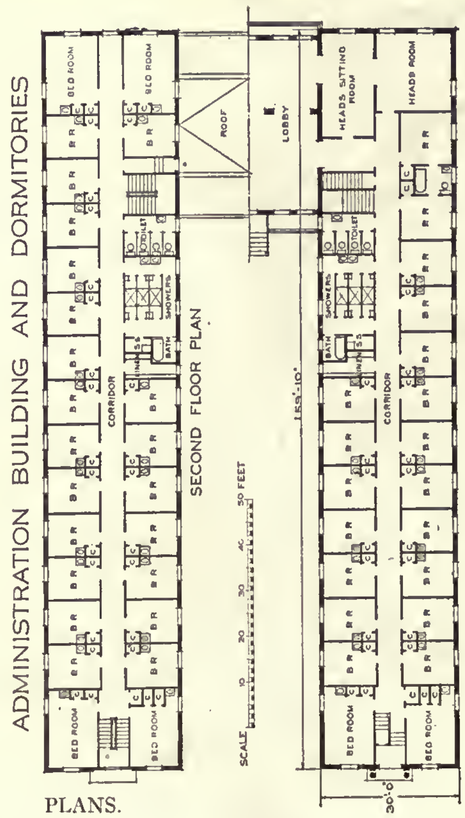
The window is carried out in the spirit of the late fifteenth-century perpendicular Gothic, and demonstrates the possibility of rendering the modern realism of the uniforms, etc., in strict conformity with the principles and traditions of the ancient art of stained glass with all its healing qualities of vibrant color and glorious harmony.

ADMINISTRATION AND DINING HALLS. Waddy B. Wood, Architect for U. S. Housing Corporation.

CAPITOL AND UNION STATION GROUPS, RESIDENCE HALLS FOR WOMEN, WASHINGTON, D. C.

INTERIOR COURT.





PLANS.

Waddy B. Wood, Architect for U. S. Housing Corporation.

CAPITOL AND UNION STATION GROUPS, RESIDENCE HALLS FOR WOMEN, WASHINGTON, D. C.

DORMITORIES.

TYPICAL BEDROOM.

Waddy B. Wood, Architect for U. S. Housing Corporation.

CAPITOL AND UNION STATION GROUPS, RESIDENCE HALLS FOR WOMEN, WASHINGTON, D. C.

COMMON ROOM.

SITTING-ROOM. Waddy B. Wood, Architect for U. S. Housing Corporation.

CAPITOL AND UNION STATION GROUPS, RESIDENCE HALLS FOR WOMEN, WASHINGTON, D. C.

The Minnesota Historical Society Building

By Stirling Horner

FOR many years the work of the Minnesota Historical Society has been hampered by the inadequacy of its quarters in the basement of the Capitol. Thousands of books and numberless pictures and museum articles have had to be stored in boxes in the sub-basement or left in the Old Capitol where they were in constant danger of destruction by fire, while members of the staff had to work in all sorts of cubby-holes and dark corners. Finally, after much earnest effort on the part of members of the society and of others who believe in the preservation of the materials for the history of the State, the legislature passed an act appropriating five hundred thousand dollars for the construction by the State board of control of a building for the society and the supreme court. This act provided for the acceptance by the State of a donation of seventy-five thousand dollars from the private funds of the society to be used in purchasing a site for the building and in equipping the part of it to be occupied by the society. The site selected had to have the approval of both the society and the board of control. Many members of the society favored the so-called Lamprey site southeast of the Capitol on the corner of Cedar Street and Central Avenue, where the building would overlook the plaza in front of the Capitol and would fit in with the plans worked out by Cass Gilbert for the development of Capitol approaches. The board of control, however, selected the Merriam site, a large tract located directly northeast of the Capitol, and the executive council of the society finally approved of the selection and paid over the money for its purchase.

Standard at entrance.

In the meantime a still more serious difficulty arose. The architect selected, Mr. Clarence H. Johnston, of St. Paul, together with members of the supreme court and the secretary of the society, visited buildings of a similar character in the neighboring States for the purpose of ascertaining what was necessary in the construction of the proposed building. After this and other investigations, it was found, from estimates made by the architect, that a building suitable and adequate for both the society and the supreme court could not be constructed within the limits of the appropriation.

The site finally chosen for the new home of the society is ideal. Flanking the Capitol on the right, it occupies an important eminence, from which a commanding view may be obtained of the city and its environs. The building may be seen to best advantage by the visitor who approaches it from the Capitol mall. The Roman Renaissance style has in this instance been reduced to its simplest elements. The strength of the principal façade, the west, resides in the simple, clear, and thoroughly monumental articulation of all its parts. The central motive, an Ionic colonnade, has a just degree of projection, and the recessed loggia with its entrance portals and windows has been so designed as to line and mass that, while sufficiently subordinated to the colonnade, it is also sufficiently emphasized for its own sake. So, likewise, the end masses with their breadth of unbroken stonework have the proper accent but do not unduly assert themselves. It might be called a long, low edifice, but the attic, looming up above the main cornice with just a suggestion of the variegated tile and immense skylight which roof the building, and the balustraded terraces flanking the main façade, provide the needed corrective. Outside the building as within, grave dignity rules, ornament being sparsely used, the little of it that is introduced being handled with severe taste. The warmth of the stone itself, the note of color delicately struck in the bronze doors of the main portal, in the window casings, and in the roof, and the vivid tints of nature in the foreground—all these make more intimate, more humanly interesting the appeal of this imposing edifice.

The architect may indeed be congratulated upon the structure which was wrought under his guidance. It will stand not alone as a monument to the pioneers of Minnesota and of the great Northwest and to its designer, but to the materials used in its construction. It is in truth a Minnesota building. The warm gray granite of which the exterior walls were built is from large quarries at Sauk Rapids. The marble of the main staircase and of the floors of the corridors and stack rooms was quarried at Kasota. Brick and clay fireproofing tile are produced at Chaska and Minneapolis respectively. The stone for the walls of the vestibule and entrance on the first floor was quarried from deposits at Frontenac.

An ideal plan is one in which utility and effect are both accounted for in such manner that the point at which the architect has changed his view-point from the one phase of his subject to the other is not apparent. It is on the virtue of such a scheme that the new home of the Minnesota Historical Society rests. This can be demonstrated in a few words. Let the layman who has little, if any, acquaintance with architectural plans as they are drawn upon paper imagine himself making a swift tour of the building from the entrance colonnade on Cedar Street to the galleries and museums which occupy the top floor. The portal itself with its colonnaded loggia is simple and stately and of majestic scale, but the actual entrance doorway is comparatively small. This central motive of the main façade is sufficiently emphasized with its simply carved stone doorway and beautifully modelled bronze doors, and a note of spaciousness, which would befit only some great exposition building or place of public entertainment, has been avoided. The entrance, in other words, is precisely the key to an institution of learning.

The quality of restraint thus encountered on the very threshold is felt throughout the building. Passing through the vestibule (103), we enter directly the vaulted entrance hall (104)—the main artery of the building. In the centre, on the east side, a generous marble staircase, with a decorative bronze rail, gives access to the stories above and below. On either side of the stairway are large, light courts which extend from the ground floor to the glass roof of the attic space, serving to light the interior rooms. The north doorway

(Continued on page 70.)

READING-ROOM.

CORRIDOR.

Clarence H. Johnston, Architect.

THE MINNESOTA HISTORICAL SOCIETY BUILDING, ST. PAUL, MINN.

opens into the main reading-room (101), a room depending largely upon carefully studied proportion and simple, unbroken wall spaces for its effectiveness. The monotony is relieved by bookshelves of oak which form a dado around the room, and by a splendid ceiling of decorative plaster, in which color is so disposed as to give beautiful play of light and shade. The delivery desk and ample card cases for the card catalogue of the library occupy the east end of the room, convenient to readers and having direct communication with the bookstacks. The room is furnished with carefully designed, harmonious furniture. Cork flooring minimizes the noise of moving occupants. Adjoining the main reading-room at the front of the building and accessible from it as well as from the corridor is the newspaper reading-room (102), which is connected by a stairway and an automatic booklift with the newspaper stacks directly below. The south pavilion, in which the auditorium was to have been located, as well as the Cedar Street front at the left of the entrance, including rooms 105–112 and 114, is, for the present, assigned to the executive offices of the State board of education.

On the second floor in the centre of the Cedar Street front is located the manuscript room (209). Adjacent to it is the superintendent's private office (208), which communicates directly with the general office (206). At the north end of the main corridor is a small waiting-room (204) for those wishing to transact business with the administrative officers of the society. Another office adjoining the general office on the north will be available for an assistant superintendent or librarian and adjacent to it on the north front is a small room (202) given over to the use of typists employed in cataloguing work. The cataloguing room (201) occupies the northeast corner. It has direct access to the stacks and is connected with the shipping and receiving room on the ground floor by an automatic electric booklift. By the same means new books, after being catalogued and classified, may be conveyed to the proper stack floor. The cataloguing-room is accessible from the main corridor through the waiting-room and is directly connected with the general office and typists room through a passage (203). The south pavilion and several rooms on the front, including rooms 211–217 and 219, are given over to various bureaus affiliated with the State department of education.

The third floor houses the extensive historical and archeological museums of the society together with its large collection of portraits and paintings. As much of this material is not suitable for permanent exhibition, large storerooms are provided in which it can be so arranged as to be available for special exhibits and for examination at any time. The south museum room (308) will probably serve on occasion as an assembly-room also until such time as space may be available for the installation of an assembly-room on the main floor. The east room (314) will be used temporarily as a map room and a workroom for the classification of the State archives, these departments having been crowded out of the second floor by the inclusion of the department of education. The small electric elevator in the corridor (317) gives direct communication to the stack room below, in which the archives are to be stored. The small offices (312, 316) flanking this gallery will be available for members of the staff. The rooms on this floor are lighted by the immense skylight which forms the upper half of the roof. Ceiling lights of syenite glass, particularly designed to diffuse light, will eliminate all glare and shadow on the gallery walls. The artificial illumination of the galleries and museums merited careful study, and so cleverly has the architect solved this problem that the visitor to the gallery in late afternoon will be unaware of the transition from natural to artificial light. Electric reflectors disposed in the attic space above the ceiling lights may be switched on in units as they are needed until full strength is reached.

The entire rear portion of the building is devoted to the main stack-room, a space eighty-two feet by twenty-nine feet and extending through four full stories from basement floor to second-story ceiling, a total height of sixty-two feet. This immense room encloses an eight-tier, enamelled steel, self-supporting bookstack which would hold, if the shelves were completely filled, 383,500 volumes. A part of this stack, however, will be used for the storage of archives. An automatic booklift stopping at each stack floor will minimize the labor incidental to the transfer of volumes from stacks to delivery desk, cataloguing-room, or shipping-room as the case may be. A small push-button elevator for the use of stack attendants and the library staff extends from the basement to the third floor, making the entire stack-room readily accessible from any floor of the building. At either end of each stack floor are small studies where the research student or others using the library for extensive study may withdraw from the confusion attendant upon the routine stack work. Several small table-tops hinged to the stack ends in the window bays on each stack floor form convenient spots for casual inspection of volumes.

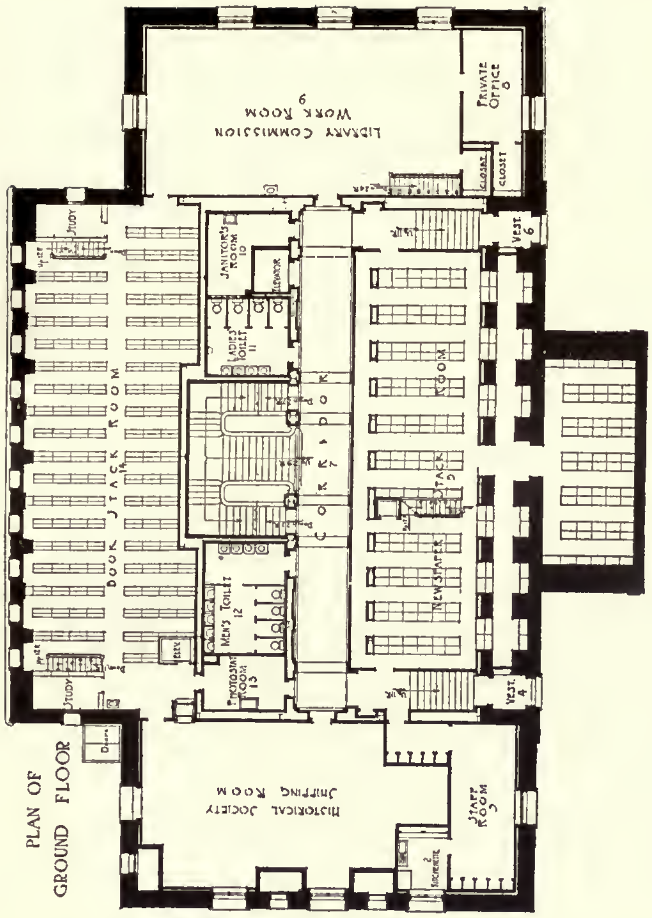
The newspaper stack (5) occupies the central portion of the Cedar Street front in the basement and ground floors. It is similar in construction to the main bookstack, is four tiers in height, and has a capacity of 16,500 bound newspaper volumes. It is directly accessible from the newspaper reading-room and from the basement and ground floor corridors.

The north pavilion of the ground floor is given over to the receiving and shipping room (1) of the historical society and a staff room (3) with kitchenette and locker rooms adjoining. In the south pavilion is the workroom (9) of the Minnesota Public Library Commission with a small private office (8) for the secretary of the commission. On the east side of the corridor immediately below the light courts are the public toilets (11, 12), a small room for the use of janitors (10), and the photostat room (13), where direct photographic reproductions of manuscripts, pictures, and even rare printed material may be made. The small entrances to the right and left of the steps leading to the main entrance will be largely used by regular habitués of the building, the elevator and main staircase being but a few steps distant from either entrance.

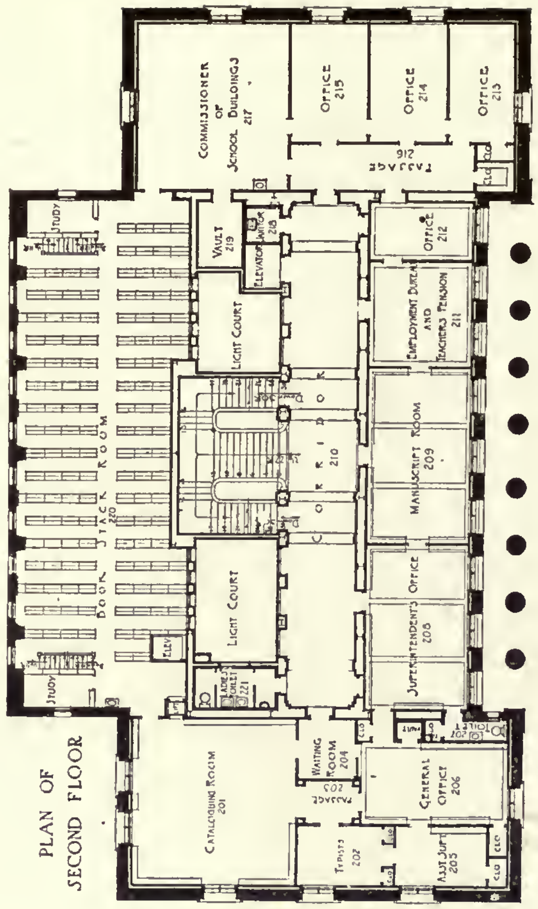
In the basement, immediately underneath the workroom of the library commission and connected with it by stairway, is the shipping-room of this department. A fortunate difference in the grades of Aurora Avenue and Central Boulevard enabled the architect so to design the service driveway in the rear of the building as to make the shipping-rooms of the historical society and the library commission, though located on different floors, readily accessible for incoming or outgoing packages.

The building is connected with the power plant of the Capitol by a concrete tunnel extending under Aurora Avenue, through which heat, light, and power are conducted to the mechanical equipment-room in the basement and thence distributed to the various parts of the structure. Six large fans furnish washed, fresh air to each room, being connected in such manner as to allow the various rooms to be heated to different temperatures as may be desired. The latest improvements in ingenious mechanical devices are provided for the convenience of the public and the staff. These include a complete system of private telephones affording communication between all departments of the society, automatic time clocks in the important rooms, and a powerful vacuum-cleaning plant to facilitate the work of the caretakers. The total cost of the work approximates $500,000.

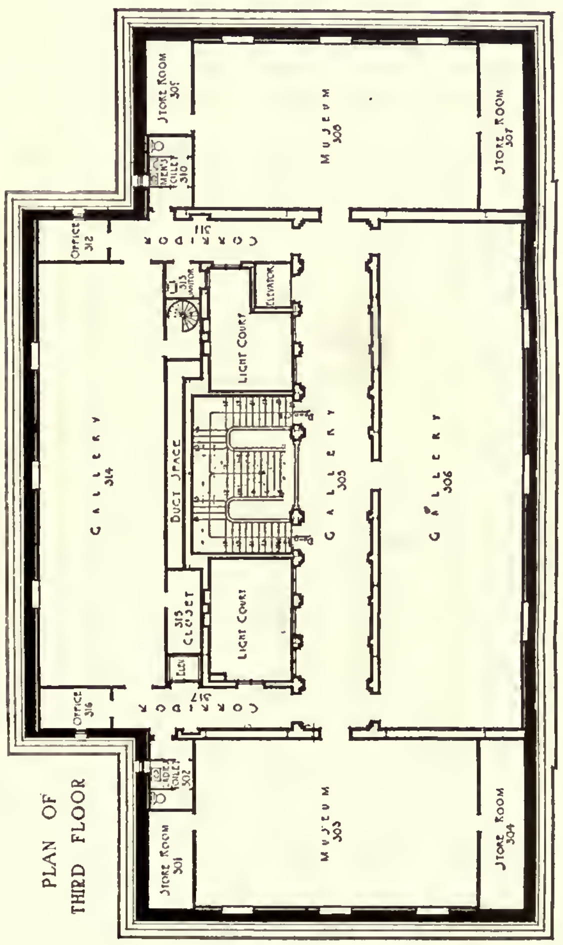
PLAN OF GROUND FLOOR

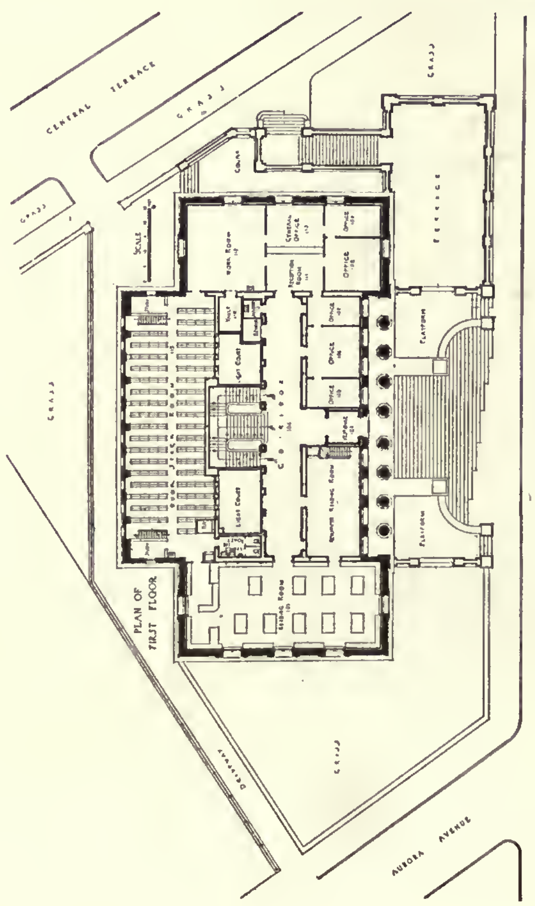


PLAN OF SECOND FLOOR



PLAN OF THIRD FLOOR



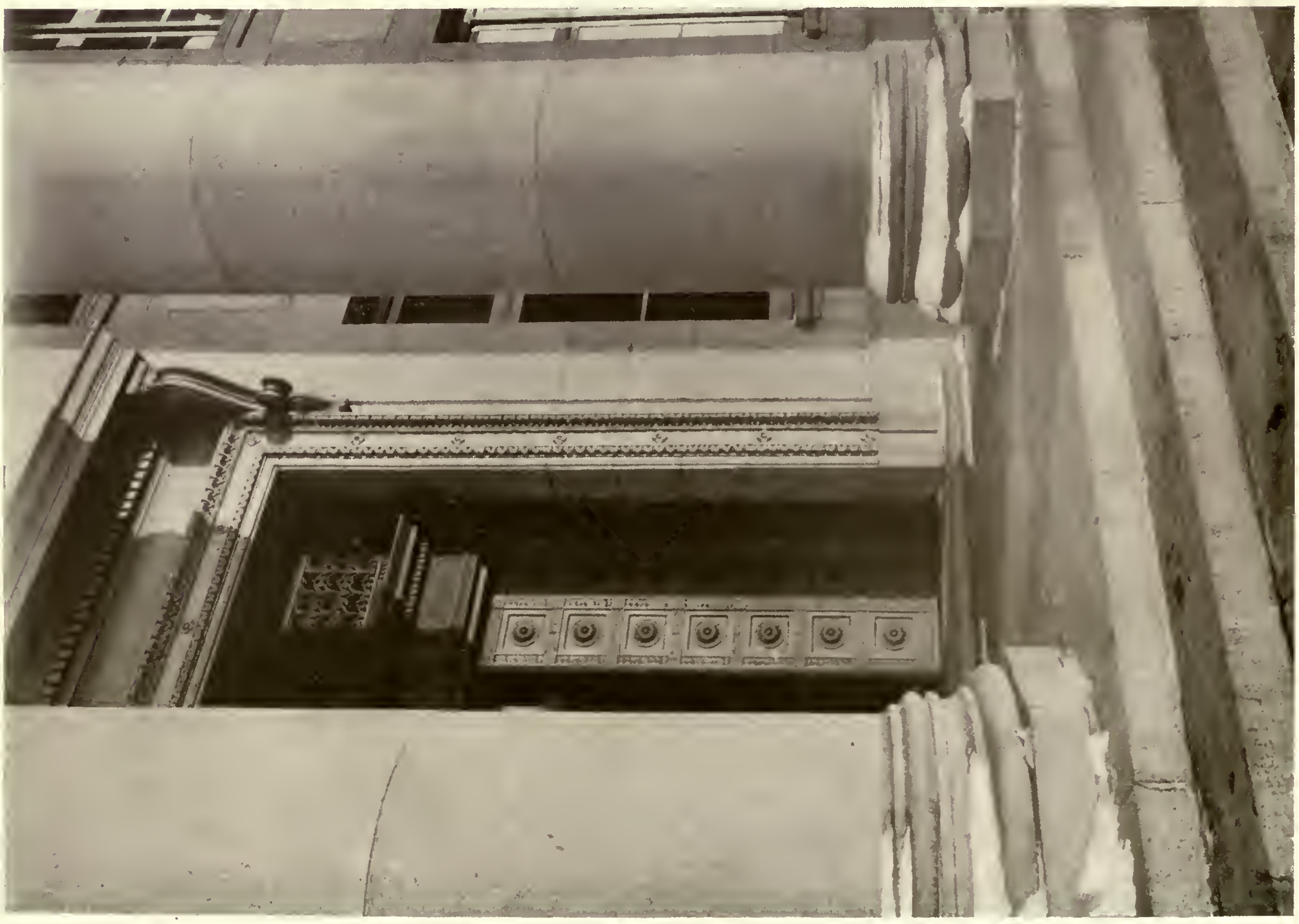


PLANS. THE MINNESOTA HISTORICAL SOCIETY BUILDING, ST. PAUL, MINN.

Clarence H. Johnston, Architect.

MAIN FLOOR CORRIDOR.

Clarence H. Johnston, Architect.



ENTRANCE.

THE MINNESOTA HISTORICAL SOCIETY BUILDING, ST. PAUL, MINN.

Editorial and Other Comment

Putting It Up to the Public

THERE are probably few ways of trying to arrive at any decision concerning art matters less fruitful than by a first appeal to the public. By this we don't mean to say that the public may not be a competent jury from the public point of view. Far be it. We only wish to point out the generally recognized fact that what is everybody's business is usually nobody's business. In art matters, at least, it does seem as if judgment should be based on some kind of standards. And by and large, the public standard is derived generally from some practitioner of the arts, or at least some patron, and in these days largely from the movies! The local sign-painter may be the country town's art critic, and, by the way, very often he has proved a mighty good one, for there are famous names in American art who painted signs and striped buggy-tops in their apprentice days. The chief trouble in the choice of the local memorial seems to come not so much from the lack of good intentions or from an altogether bad taste as from the multiplicity of bad ideas put before local committees with limited funds to spend in the form of stock monuments turned out by the hundreds.

In the recent "Exhibits in the Open Competition of Ideas for New York City's Permanent Memorial" there were many seekings for the big idea, some of them so big that they seemed preposterously disproportioned and out of key with the places they were to occupy. But on the whole the exhibit was worth while even if with comparatively few exceptions it failed to bring forth the ideas of a largely representative number of architects, sculptors, or others who occupy a leading place in the art world of the city. The net result is still to be defined, and we shall watch with particular interest the discussions that will follow and any indication of some real progress toward a dignified and worthy memorial.

We sincerely hope it will not be in the form of the "highest apartment-house in the world," even if there is in this towering idea something that touches intimately what seems to be the idea of the average New Yorker's notion of a home. There were a lot of other ideas that we hope will not materialize, for they savor too much of a selfish desire for merely local comfort and transportation, and too little of the thought of what the memorial should connote. We hope it will be something that will stir the emotions, something that will give us pause, make us stop and think of other things besides ourselves and the commonplaces and littlenesses of the average daily routine of the city man or woman. There is no evading the impression of solemnity created in visiting the tomb of Napoleon in Paris, nor standing with bared head in the place where our own Grant lies. There should be something of solemnity, of nobleness, something remindful of the dead, of their sacrifice, of the great debt to humanity they met and nobly paid.

The American Academy in Rome

THE American Academy in Rome has been established for twenty-five years, and those years have been fruitful years in the advancement of the highest ideals in the arts, in the study and advancement of the classic spirit. France has her Ecole des Beaux-Arts, her *Prix de Rome*, to which no American student may aspire, and its fame is a part of the world's knowledge—a part of the world's record in the progress of the arts. The American Academy should have and will have a place as important in our national development. A fellowship of the Academy will be the equivalent of the *Prix de Rome;* it will signify to the world that the recipient has been chosen among many, that he represents the best talent of his country. The Academy, be it understood, is not "a school," as is the Beaux-Arts. "Its beneficiaries are those who have already advanced far beyond the preliminary stage of their various callings; frequently they may be those ready to embark, or who have embarked, upon their professional careers."

The winner of the American Academy's Prize of Rome, then, has the full equivalent of what France holds out to her most brilliant students of art—and not France only, but other European nations—Germany, Spain, Great Britain, and Russia.

What is the Academy doing? Here are some of the things it is doing:

"Nobody can fully realize who does not actually go among them—whoso does will have a veritable revelation. Not merely Fellowships, but fellowship; constant discussion and criticism of each other's different lines of work; talks about how to tackle the collaborative problems set for them; a painter illustrating his ideas by modelling a figure; architects, painters, sculptors, historians, and archæologists going about together to see works of art. An architect designs and executes a fine decorative relief in color; a sculptor makes such drawings of the minute detail of classic ornament as the best architectural draftsman would be proud of; a painter discovers the wonderful picturesqueness and interest of ancient Cretan costume, and so goes to Crete, works as an archæologist, makes all sorts of notes, collects all sorts of objects, and then embarks upon a huge mural figure-painting in which he brings back to life this extraordinary, newly discovered past. They go together to Greece and all over Italy—it is human and real and vital, and what is more, it is pregnant with possibilities for the development of beauty in American art, of capacity to handle in a masterly way the tremendous problems that this growing country has in store, beyond any present conception."

In this year marking its twenty-fifth anniversary the Academy is asking for funds to carry on the work it has been doing and to endow additional fellowships that will include landscape-architecture and music. The money will be forthcoming beyond a doubt.

Not Enough Copies to Go Around

IT is with both satisfaction and regret that we ask the indulgence of some of our readers who have been unable to get the extra copies of recent numbers for which they have asked. We endeavor to print enough copies to meet all current requirements, but, as ARCHITECTURE is a magazine with a special appeal and its circulation one that is more or less limited to regular subscribers, we are not always able to anticipate unexpected demands. We printed an unusually large edition of the January number and increased the printing order for February and we hope that we shall be able to fill all requests for extra copies of that and future issues. Our old subscribers will understand, we are sure, that with the increased cost of production these days we do not feel justified in making our editions larger than the immediate demand calls for and the necessity of meeting the needs of the increasingly large number of new subscribers.

The Art Students' League Scholarships

A SCHOLARSHIP competition open to all art students in the United States, with the exception of those in New York City, will be held at the Art Students' League of New York, on March 31, 1920.

Ten scholarships will be awarded to that work showing the greatest promise. Work in any medium, from life, the antique, portrait, etching, composition, also photographs of sculpture, may be submitted. Work should be sent flat, not rolled, and should be forwarded so as to reach the League not later than March 27, and must be sent with return express or parcel post charges prepaid.

The scholarships so given will entitle the holder to free tuition in any two classes of the League during the season of 1920–1921.

The jury will consist of the following instructors of the League: George B. Bridgman, Arthur Crisp, A. Stirling Calder, Frank Vincent Dumond, Sidney Dickinson, Thomas Fogarty, Frederic R. Gruger, Robert Henri, Hayley Lever, Kenneth H. Miler, Boardman Robinson, John Sloan, Eugene Speicher, Frank Van Sloun, Mahonri Young.

All students interested are cordially invited to enter this competition.

Address all letters and packages: For Scholarship Competition, Art Students' League of New York, 215 West 57th Street, New York City.

Rome's New Suburbs

AN interesting feature of the new building programme at Rome, according to the United States trade commissioner in that city, is provision for the immediate erection of two entirely new suburbs outside of the present city limits, and for these suburbs an attractive type of small cottage has been selected which resembles American or English design more than Italian.

One of the new "garden cities," as they are called, located east of Rome, will have sufficient houses to accommodate several thousand families. More than two thousand families, including many officials and employees of the State Railway Administration, have already made application for accommodations. Every effort will be made to render the new suburbs as attractive and complete as possible. Many thousands of shade trees will be planted, and schools, churches, and other public buildings will be erected immediately. Within the city limits an extensive building programme is being carried out, the housing problem in Rome having reached an acute stage some time ago and many thousands of people living in temporary and crowded quarters.

Government Needs Draftsmen, etc.

THE United States Civil Service Commission announces that the government is in need of a large number of draftsmen of various kinds. It is stated that fully 1,000 draftsmen were appointed in the government service during the last calendar year. During this period of reconstruction technical men are especially needed. Besides draftsmen there are openings for surveyors and computers, also assistant and associate engineers, electrical, mechanical, civil, chemical, and ceramic.

Further information and application blanks may be obtained from the secretary of the U. S. Civil Service Board at Boston, New York, Philadelphia, Atlanta, Cincinnati, Chicago, St. Paul, St. Louis, New Orleans, Seattle, or San Francisco, or from the U. S. Civil Service Commission, Washington, D. C.

The Medal of Honor in Architecture

The Architectural League of New York has awarded the Medal of Honor for 1920 to the firm of Delano & Aldrich, for general work.

The work submitted to the jury included the residences of Mrs. Willard Straight, New York City, and James A. Burden, Syosset, Long Island.

ARCHITECTURE is pleased to present, in the plate section of this issue, a selection of photographs of these two residences.

Book Reviews

"THE COUNTRY LIFE, BOOK OF COTTAGES," new edition, by LAWRENCE WEAVER. Charles Scribner's Sons, New York.

Another very attractive volume by Lawrence Weaver, whose second series of "Small Country Houses of To-day" was noticed in the February number, is "The Country Life, Book of Cottages," new edition, a "review of what has been done to produce types of true cottages, excluding the country houses costing thousands which masquerade under the name of cottages." Only a few of these shown have more than eight rooms. They are essentially homes for people "of moderate means and refined taste, whose permanent home must be built with severe regard to economy." Full advantage has been taken in the building of these cottages of local material as well as a wide variety of the materials of familiar general use. Many of them are picturesque and charmingly adaptable to transplanting to an American environment. There are abundant illustrations that include floor plans and details regarding various materials.

"THE CHEAP COTTAGE AND SMALL HOUSE," by GORDON ALLEN. New and enlarged edition. Charles Scribner's Sons, New York.

By "cheapness is meant simple fitness, restraint, and perhaps efficiency, as contrasted with elaboration or unnecessary ornamentation." Mr. Allen's purpose is more to show the possibilities in the building of houses or groups of houses for the working classes and the middle classes and for the improvement of congested housing conditions that are so prevalent everywhere. Included in his discussion are such matters as "Site and Water-Supply," "Sanitary Matters and Lighting," "Materials." Among the many illustrations and plans we note those of "Cottages at Chapstow, Hampstead, Gordon Suburb, Crayford Garden Village, Houses at Gretna, Roe Green Garden Village, London County Council Cottages." Nowhere have problems of this kind been more skilfully handled than in England. This is a book based on practical service, and is full of valuable common sense suggestions that are often so notably uncommon in application. Plans and elevation are shown, and a number of plates giving the relation of buildings to particular sites.

COLOUR SCHEMES FOR THE FLOWER GARDEN, by GERTRUDE JEKYLL. Charles Scribner's Sons, New York.

The author's great book on "Garden Ornament" is known to all architects and landscape specialists as the most authoritative and complete work on the subject. In this new and revised edition of the present volume will be found practical suggestions for setting the garden palette, arranged with a consideration of seasonable succession of various plantings. The many charming illustrations from photographs of gardens together with the plot plans should make it a useful and suggestive book for the landscape architect especially.

PROGRESSIVE STEPS IN ARCHITECTURAL DRAWING, by GEORGE W. SEAMAN. ARCHITECTURAL DRAWING PLATES, by FRANKLIN GEORGE ELWOOD. The Manual Arts Press, Peoria, Ill.

Both of these books are addressed to and are for the student of architecture—and they should prove useful aids in helping the beginner to greater facility and a practical knowledge of methods in developing plans and elevations and various details, such as cornices, windows, mouldings, etc. The "Plates" present in compact form a collection of the common details or elements which compose a house.

PICTORIAL PHOTOGRAPHY IN AMERICA, 1920. Tennant and Ward, publishers.

A volume made up of pictorial prints from photographers in various parts of the country who have endeavored to render with the camera "personal impressions of nature or human life." It is the first attempt, according to Clarence H. White, president of the Pictorial Photographers of America, who writes the "Foreword" to give a comprehensive presentation of the status of pictorial photography as illustrated by the product of many of its best workers. The plates are charmingly printed and many of them show a sense of composition and the value of carefully studied light and shade.

STAIR HALL, RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK. Delano & Aldrich, Architects.

MAIN HALL, FIRST FLOOR, LOOKING TOWARD DINING-ROOM. Delano & Aldrich, Architects

RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK.

Delano & Aldrich, Architects.

DINING-ROOM, LOOKING ACROSS MAIN HALL TO RECEPTION-ROOM. RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK

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DINING-ROOM, RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK.

Delano & Aldrich, Architects.

DOOR FROM DRAWING-ROOM TO HALL, SECOND FLOOR.

RECEPTION-ROOM, FIRST FLOOR.

Delano & Aldrich, Architects.

RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK.

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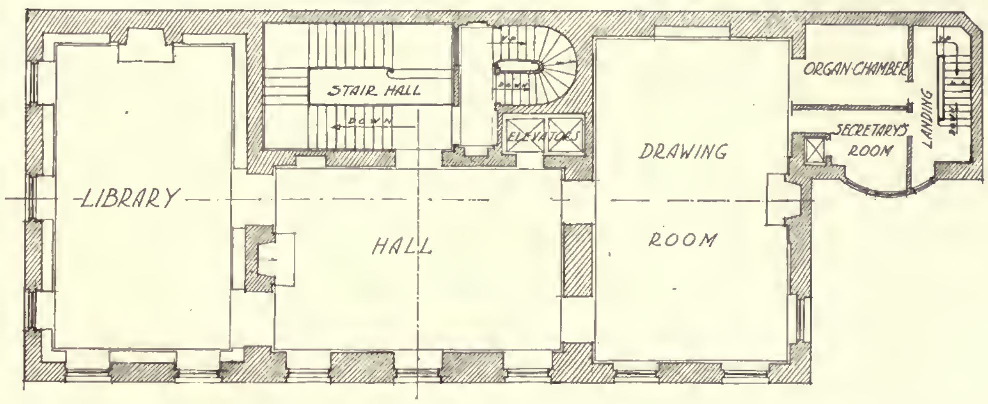
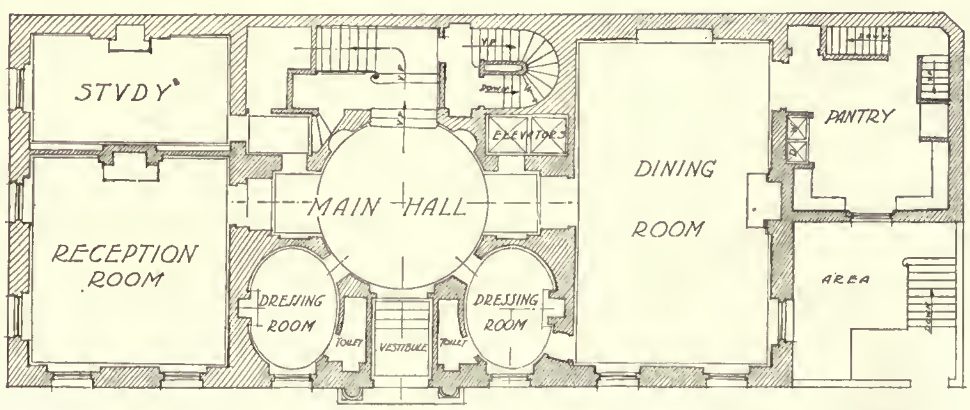
EXTERIOR.



SECOND-FLOOR PLAN.



FIRST-FLOOR PLAN. Delano & Aldrich, Architects.

RESIDENCE, MRS. WILLARD STRAIGHT, 1130 FIFTH AVENUE, NEW YORK.

GARDEN FRONT, RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND

Delano & Aldrich, Architects.

ENTRANCE FRONT, RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

Delano & Aldrich, Architects.

SIDE DOORWAY.

GARDEN DOORWAY.

Delano & Aldrich, Architects.

RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

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HALL.

ARCADE IN CONNECTING WINGS.

Delano & Aldrich, Architects.

RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

MAIN HALL.

ENTRANCE HALL.

Delano & Aldrich, Architects.

RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

DINING-ROOM.

LIVING-ROOM.

Delano & Aldrich, Architects.

RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

SITTING-ROOM.

UP-STAIRS SITTING-ROOM.

Delano & Aldrich, Architects.

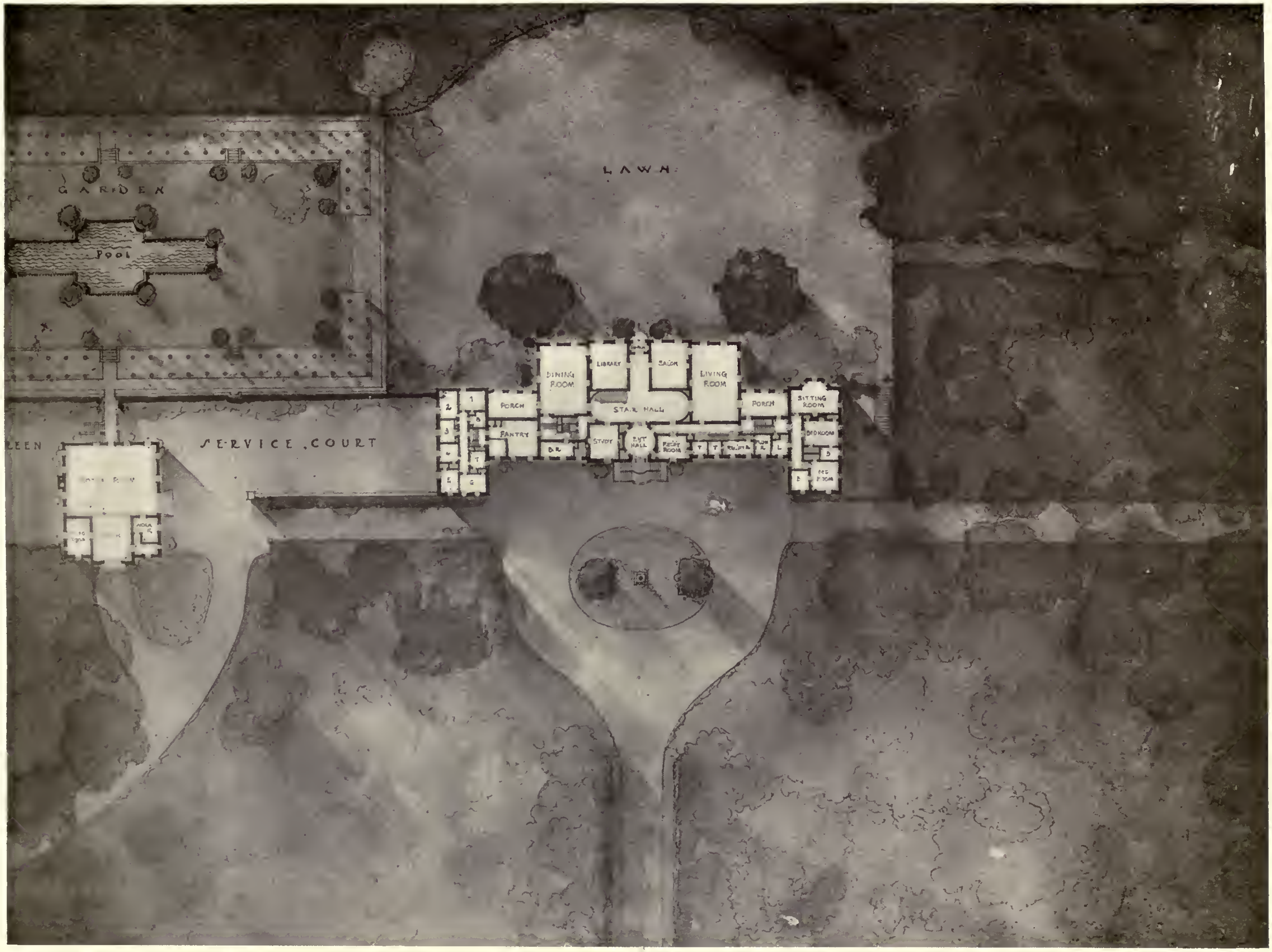
RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

BEDCHAMBER.

BEDCHAMBER.

Delano & Aldrich, Architects.

RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.



PLOT PLAN, RESIDENCE, JAMES A. BURDEN, SYOSSET, LONG ISLAND.

Delano & Aldrich, Architects.

THE MINNESOTA HISTORICAL SOCIETY BUILDING, ST. PAUL, MINN.

Clarence H. Johnston, Architect.

Romanesque Portals—Lombard and French

By C. R. Morey

THE earliest and by far the simplest account of the rise of the architecture we call Romanesque is that given by Raoul Glaber, writing in the eleventh century, who says that "about the third year after the year 1000 the holy churches were rebuilt from bottom to top in almost all the world, but especially in Italy and France." Romanesque churches were not all built "about the third year" after the millennium, but that date may serve as a *terminus a quo* for the new style of architecture, and for the extraordinary religious movement that inspired it. Due partly to the spread of the reformed Benedictine orders of Cluny and Citeaux, and in part to the springs of piety loosened at the approach of the millennium, at which time the peoples of mediæval Europe very generally expected the second coming of Christ and the end of the world, this spiritual renaissance found final expression in the twelfth century on the one hand in the Crusades, and on the other in the plastic decoration of the capitals and portals of the new churches, reviving the art of monumental sculpture in stone which had been dead for eight hundred years.

The new sculpture is quaint and bizarre, but by no means embryonic. Its beginnings are evidently already far behind it; with all its crudities there is mingled a curious authority and power. What is the secret of this fresh maturity? Where lies concealed the long artistic evolution that it presupposes? Why is it that in the very act of laughing at its absurdities we feel ourselves gripped by the realities of mediæval faith, the terror of its hell, and the ecstasy of its heaven?

Some answer may be found for these questions if we keep in mind the antithesis between what mediæval artists thought on the one hand, and their mode of expression on the other, and if we learn how in the course of time the expression, at first controlled by the thought, became more and more powerful and original until in some phases of Romanesque sculpture it gets out of hand entirely, and the thought is swamped in a burst of mediæval feeling.

Ivory plaque. Berlin Museum.

It is in the Romanesque period, in fact, that the Middle Ages first began to express itself. For centuries before this, it had expressed not itself, but antiquity. The barbarians —Goths, Lombards, Franks, and Saxons—who broke up the Roman Empire and founded the nations of mediæval Europe, became the humble pupils of the civilization which they had overthrown. They took their religion from Rome, and became converts to the Christianity which had finally prevailed throughout the Empire a century before its fall. In Rome they saw the symbol of order and reason, two qualities sadly lacking in the chaos succeeding the barbarian conquest, and the efforts which the new peoples made thereafter to stabilize the polity and thought of Europe always took the form of renewed imitation of Old Rome—*Rome la Grande*, the troubadours called it—such as the Holy Roman Empire, or the temporal supremacy of the Popes who had in the mediæval imagination succeeded to the throne of the Cæsars.

Thus the thought of the Middle Ages was not of its own thinking. When the mediæval man thought at all he thought theology, and mediæval theology up to the middle of the twelfth century, was the creation of the Latin fathers—Augustine, Ambrose, Jerome, and Gregory the Great—excerpted, annotated, rearranged, but with scarcely a jot or tittle of added original thinking during the course of five hundred years.

Now the Latin fathers, like ancient writers in general, appealed to the mind rather than to the heart, and handed on to the Middle Ages a religion that was more dogma than faith, and symbolic rather than concrete. Early, or Latin, Christianity produced many theologians but few poets. The final product of a highly intellectual civilization, Latin Christianity furnished a striking contrast to the natural concepts of new peoples, whose ideas were literal rather than abstract, and whose reactions involved the emotions rather than the mind.

The reader will no doubt welcome a concrete illustration in the midst of so much generalizing. In the Berlin Museum is an ivory plaque, carved about 400, and representing the final stage of classic style, which once formed part of a larger plaque, probably a book-cover. This original plaque was copied about 800 by a Carolingian artist, and the copy is preserved to us in the book-cover in the Bodleian Library at Oxford. The late classic ivory has still the intellectual quality of antique style; the action is clear, the figures self-poised and impersonal, with an air of dignity pervading the whole. In the copy on the other hand the figures lack dignity and poise, and can neither sit nor stand in a convincing manner. They are also too much alike to reveal the relative importance and the function of each. In short the copy is confused and unprecise; it reproduces faithfully the antique conceptions but fails to get the antique style, relapsing instead into vagueness.

Ivory book-cover. Bodleian library, Oxford.

Yet this very lack of definition has a suggestion of *feeling* about it, and here we touch upon the discrepancy already noted between the antique thought or content of mediæval art, and the expression thereof. There is already faintly visible in the Bodleian plaque the characteristic mediæval tendency to emotionalize the ideas handed down from antiquity, to poetize the dogmas and symbols of the fathers, to sing hymns where they had chanted creeds. Hence even in the Carolingian period we can see the conflict beginning between idea and expression, and already in the ninth century there is a general twofold division observable in the works of art, according as the style controls the content, or the content controls the style.

In the pen-drawings of the Utrecht Psalter, to take an extreme example, the style has run away with the subject. These pages are swept by veritable hurricanes of emotion; the figures pirouette and draperies swirl in violent reaction to the mystic phrases of the Psalms. The draftsman displays also a quaint literalness which is indispensable to such lyric expression; consider, for example, his illustration of "Awake, why sleepest Thou, O Lord," with the Lord in bed, while angels strive to rouse Him!

Other manuscripts of the Carolingian period will, on the other hand, retain a classicism that is almost Roman in its sobriety, and after the final division of Charlemagne's empire at the end of the ninth century, when France was detached and Italy and Germany together became the patrimony of the East-Frankish or German Emperors, these two extremes of mediæval style become localized in East and West, the lyric mode prevailing in France and England, while the classic manner obtained in Germany, and finally, as we shall see, made its way into the Romanesque sculpture of the North Italian Lombard school. It, too, betrays the working of the mediæval leaven, gathering all the while a crude realism that gives concrete, if sometimes comic, force to its rendition of the sacred subjects, but holding true in the main to classic sobriety and avoidance of movement.

This style, preserved in the works of the Rhenish illuminators of the tenth and eleventh centuries, emerges in North Italy at the time of the revival of sculpture, initiating what we call the Lombard Romanesque. In the reliefs which Guglielmus, the earliest of these Lombard sculptors, carved upon the façade of Modena cathedral about 1100, we find the same wavy-haired, bearded heads, the same flapper feet, the same halting action which marked the figures in the German manuscripts. Guglielmus's style is crude, his faces have lost classic proportion, and his figures have no beauty; they are rather realizations of a barbaric ideal of force, and a racial type is seen in the bulging eyes and high cheek bones. But there is still in his work a classic restraint that bespeaks its distant origin, and gives his scenes a curious effect of power.

The same latent power informs the sculpture of the second school of Lombards, presided over by Benedetto Antellami in the second half of the twelfth century. Here we find greater refinement and a heightened sense of beauty which we may attribute to the influence of France, the more so because the subjects are conceived in a French manner.

Illustrative drawing. Psalter in University library, Utrecht.

Illustrative drawing. Liber vitæ.

In Benedetto's Descent from the Cross, for example, he introduces into what would otherwise be a Byzantine composition, the novel French motif of the Church which catches the blood of Christ in her chalice, while to the right an angel pushes off the crown of the defeated Synagogue. The particular French source from which Benedetto drew is revealed by details like the "smocking" on the sleeves of the soldiers to the right of the Cross, and the very weedy acanthus scroll which forms the upper border of the panel. These features, at the time when Benedetto carved his Descent from the Cross (the last quarter of the twelfth century), were to be found together in only one school of French Romanesque, namely Provence, the old Roman Provincia, whose capital was Arles. This, the part of France nearest to Lombardy, was a very natural source for the French influence on Antellami and his school.

A late but characteristic portal of this school of Provence is that of Saint-Trophîme at Arles, familiar to Bostonians as the model of the façade of Trinity Church, at Copley Square. Here one can see the two motifs borrowed in Antellami's work, the "smocking" above the elbow of the sleeve, and the weedy acanthus with which the carvers strove to imitate the late Roman decoration which they saw about them on the ancient monuments in which Provence is so rich. They never tired of Roman ornament, using classic mouldings, modillions to support their cornices, and entablatures *en ressaut* with columns engaged, above which one sees the characteristic Roman running frieze. At Saint-Trophîme this frieze represents on the left the Elect going to Heaven, and on the right the Damned, marching away like a chain-gang to Hell. Christ sits enthroned in the tympanum, surrounded by the four beasts symbolic of the Evangelists, and below Him on the lintel are the twelve apostles. The animals that serve as pedestals are a well-known Lombard device, which shows that the masters of Provence received as well as gave in their relations to Italy, and it is probably best to consider the sculpture of Saint-Trophîme and the works of the Antellami school as belonging to a single group. Dating in the last quarter of the twelfth century, these grim and heavy figures represent a belated phase of the plastic style, if we may give that name to the classic manner whose vicissitudes we have been tracing. Plastic it is in any case, for the values obtained by these masters are all of form rather than line; movement is avoided to gain instead a rugged force.

Transfiguration. Rhenish manuscript of c. 1000.

More interesting is the history of the lyric style, with which we became acquainted in the drawings of the Utrecht Psalter. The field of its development was the West, meaning by that the territory lying in general west of a line drawn through the Meuse, the Saône and the Rhone. Here again the evolution must be traced in the illuminated manuscripts, the chief medium of early mediæval art. Thus we find it in French illumination of the tenth and eleventh centuries, but reaching its fullest development in the English drawing of the eleventh, of which a good example may be found in the Liber Vitæ written at Winchester. Nothing could be more spirited than this rendering of Saint Peter at the gates of Heaven, or of the same saint saving a soul from the devil, whose face he smashes with an enormous key, or again the angel that locks the gates of Hell.

In the early twelfth cen-

DEATH OF CAIN AND NOAH'S ARK. RELIEFS ON MODENA CATHEDRAL, BY GUGLIELMUS.

DESCENT FROM THE CROSS. RELIEF BY BENEDETTO ANTELLAMI, PARMA.

SAINT-TROPHÎME, ARLES. ENSEMBLE OF FAÇADE.

tury the style suddenly emerges in the stone sculpture of Languedoc and Burgundy. There can be no doubt that the sculptors drew from the manuscripts when one compares the pirouetting prophets of Languedoc with such figures as the angel locking the gates of Hell in the English miniature. The resemblance is not one merely of posture and clinging drapery; the sculptor paints as he carves, seeks values of line rather than of mass, and even reproduces the technique of the painter's light and shade in the nervous flying edges of his drapery.


Figure of prophet. Souillac.

The masterpiece of the school of Languedoc is the portal of the abbey-church of Moissac. Of this the portal proper dates about 1130, and the sculptures of the sides are later, done between 1130 and 1160. We thus have a work of an earlier generation than the façade of Saint-Trophîme, and one notes also the utterly different conception of ornament, the classic motifs of Provence being here replaced by decoration imitating the stucco relief of Moorish Spain. In the tympanum is the vision of the Apocalypse, with Christ in glory attended by two angels and the four Evangelistic beasts. Below and at the sides sit the four-and-twenty Elders, their heads at times nearly twisted off in the sculptor's effort to centre the interest on the figure of Christ. The sides of the portal are restored in one compartment (the Annunciation), but altogether their sculptures illustrate very well the submergence of traditional symbolism in a riot of emotional expression.

The lower right hand panel on the left side is an allegory of the sin of Unchastity (Luxury was the mediæval term), and the rest of the arcade is devoted to an exposition of Avarice. It must not be forgotten that Romanesque is a monastic art, which explains the constant singling out by the sculptors of these two themes for their graphic invectives in stone,—the brethren of the monastery must be reminded of the most deadly of the temptations which surrounded them, and in the laity must be stimulated the habit of cheerful giving to Mother Church.

So the miser sits in a chair, clutching his bag of gold and tortured by the demon that sits astride his neck, while another grinning demon urges forward a beggar. The mendicant's shrinking attitude foretells the refusal of alms, whereby the miser is enticed into deeper sin. In the upper lunette to the right we behold the miser's death chamber. His wife kneels weeping beside the bed; from his mouth a demon wrenches the manikin that represents his soul, another devil flies off with a bag of gold, and the good angel hovering above is about to turn away in disappointment. The lunette to the left is badly damaged; it represented the tortures of the unchaste and the avaricious.

The grotesque horror of these scenes is carried into the heads that ornament the angles of the arches—a grinning hag, a beast crunching a human form in its jaws, and a repulsive head with a goitre on its neck. In the frieze above further point is given to the moral of generous giving by the story of Dives and Lazarus. To the right the rich man is feasting, with Lazarus the beggar lying outside his door. The dogs are licking his sores with a realism that would be disgusting were it not so comic, and above him bends the angel that is to carry his soul to Heaven. Heaven is symbolized in Early Christian fashion by a tree, and to the left sits Father Abraham with Lazarus in his bosom, attended by a prophet who points with an unmistakable air of "I-told-you-so" to some apposite Scriptural text that once was painted on his scroll.

On the right side the panels begin with the restored Annunciation in the lower left hand corner, followed by the Visitation to the right. Over-emphasis explains the oddity of all these scenes; the prospective mothers of the Visitation betray their emotion by contortion of body and gesture, and the Wise Men in the Epiphany above hurry forward at breakneck speed to the eager Virgin and Child. In the frieze above is the Presentation, grotesque in its lyric rendering of what is essentially a solemn scene, and next to it an incident of the Flight into Egypt, drawn from the Apocryphal Gospels, which relate how the idols of the city of Heliopolis fell down at the approach of the Holy Family.

The portal of Moissac, with a change of subject to the Last Judgment, was copied at Beaulieu, which belongs architecturally to the school of Auvergne. In fact the style of Languedoc spread far beyond the borders of Languedoc proper; we find it as far north as Poitiers, in the figures on the façade of Notre-Dame-la-Grande; there are reminiscences of the style even in the sculpture of the west façade of Chartres; and a very pronounced Languedoc influence is to be seen in some of the work on a church that is essentially a product of the school of Provence, namely Saint-Gilles on the Rhone, just across from Arles. Here amid all the features characteristic of Provence, and reminding us so strongly of Saint-Trophîme, we discover the heavy Lombard figures pirouetting and twisting like the saints of Moissac. A similar mixture of the two styles may be found in the capitals from Saint-Guilhem-du-Désert, which New Yorkers may examine in Mr. George Gray Barnard's museum in the Bronx.

The style of Languedoc was thus the dominating element in the Romanesque of Southern France, save where the Lombard plastic manner had established itself in Provence. There were other local schools, such as that of Auvergne, with its peculiar five-sided lintel, and the "school" of Saintonge-Poitou, chiefly remarkable in its preference for an arcuated portal that omits the tympanum. But throughout southwestern France one finds as the twelfth century wears on a gradual adoption of the lyric style of Languedoc, while toward the north and east, with occasional echoes even in southern portals near the century's end, the sculpture reveals the more robust genius of Ile-de-France and Burgundy.

The Burgundian style has a very interesting early history, but we can here only look at it in its developed phase, which first appears at Vézelay. This is a most interesting abbey, formerly one of the richest foundations of the kingdom, and sought by pilgrims from far and wide. Founded about 860, it was only in the eleventh century that it emerged from obscurity by the fortunate chance of having secured some reputed bones of Saint Mary Magdalene. So popular did this relic make the abbey that it was chosen by Saint Bernard in 1147 as the spot where he would preach the second crusade. The portals of the church are modern,

MOISSAC, ABBEY CHURCH, PORTAL (FROM CAST).

SIDES OF PORTAL (FROM CAST).

MOISSAC, ABBEY CHURCH.

and the chief interest for us in the abbey lies in the doorway of the narthex or porch, which was finished some ten or twelve years after Saint Bernard's preaching.

No example illustrates better than Vézelay the obscurity in which the emotional style enwraps the subject, for archæologists are still at odds as to the interpretation of this famous portal. The tympanum surely represents the Sending forth of the Apostles, for this is clearly indicated by the rays of the Holy Ghost that radiate from Christ's hands to their heads. The little compartments of the archivolt are also usually interpreted in the same sense as highly imaginative renderings of the various peoples to whom the Gospel was preached. The lintel is the greatest puzzle, and we can probably do no better than to suppose, with Viollet-le-Duc, that it represents in some way the separation of the Elect from the Wicked, the good souls being shown in characteristic fashion as bringing offerings to the abbey, while the Damned are conceived in allegories—Pride mounting a horse (by means of a ladder), Discord as a pair of fighters, Anger as a quarrelling family, Calumny figured in the curious group of people with enormous ears at the extreme right of the frieze.

Vézelay, abbey church, portal (from cast).

The style of Vézelay is very close to the manuscript illumination from which it was derived, and far more so than that of Moissac. For here the drapery is done in fine lines and swirls that suggest the penman, and the sculptor takes infinite pains to get the pictorial effects of the manuscripts, as for example in the elaborate undercutting of the characteristic Burgundian double fold. He handles his stone as if it were so much black and white, with utter disregard for his material, a keen sense of the emotional value of coiling lines, and no plastic sense whatever.

The same style appears with some restraint of movement and greater exaggeration of the slim figures in the portal of the cathedral of Autun, which dates about 1140. The portal is the victim of a "restoration" of the eighteenth century, when many of the heads (notably that of Christ) were cut off so that the "barbaric" sculpture of the tympanum might be covered by an æsthetic coat of plaster, but enough is left to make the scene, for all its impossibilities, perhaps the most convincing rendering of the Last Judgment that we have in art. The sculptor has signed the work—his name was Gislibertus—and he intended to leave no doubt as to the didactic rather than æsthetic intent of his creation, for under the group of the Damned he has inscribed a Latin couplet, reading: "Let this terror terrify whoever is bound in terrestrial error, for the horror here depicted is sure witness of what shall come to pass."

Christ sits enthroned in a glory supported by four angels, of whom two are represented head downward in an effort on the part of the sculptor to give the glory a floating effect—an effect neutralized by the lower pair, who stand solidly on the ground. On the ledge beside Him sit on one side a prophet, and on the other Mary and Saint John, intercessors for the Damned. At Christ's right is the City of Heaven, with all the walls and arcades of a Romanesque town, into which an angel is "boosting" a soul through the arches of the lower story. The entry of souls into Heaven is superintended by Saint Peter, who holds an enormous key, while Saint Paul further to the right leads a throng of worshipping saints. In the lower left hand corner an angel sounds a trumpet, with tremendous effect upon the soul that cowers behind him, and another in front, who points with excited gesture at the Heavenly City. Another soul clings to the angel that is affording, in so simple and direct a fashion, the coveted entry to Heaven; and Saint Peter grasps the hand of yet another, who seems to be waiting his turn. All the souls are sexless creatures, and height is a matter of relative importance, humanity measuring half the stature of the saints, and these half that of Christ.

To the right is the Psychostasis, the Weighing of the Soul. We see an angel holding an open book, and the scales, on the beam of which is perched the soul, evidently in an agony of uncertainty as to the outcome, while in the pans below his good and evil deeds are being weighed by a devil and an angel. The good seems to triumph in spite of the efforts of the devil to pull down his side of the beam. Little spirits cower about the angel's feet; to the right a grinning fiend clutches a toad as he watches the weighing; another above him thrusts the Damned into the Pit of Hell, and from the open gate below emerges the fish-like head of a monster that vomits forth another devil, grasping in his claws a group of shuddering sinners. A trumpeting angel completes the composition.

The lintel shows us both the Resurrection of the Dead and the Separation of the Elect from the Damned. An angel on the left comforts the holy ones; another in the centre drives away the Damned with a sword. Among the Blest are two bishops and two pilgrims, with their scrips, a monastic touch in contrast to the more popular view represented by Gothic Last Judgments, wherein the abbots and bishops frequently appear among the Damned.

Ut terreat hic terror. The sculptor carved this motto on his work, and certainly departed not from it. Save for the obscure figures of the intercessors, Mary and John, there

Autun, cathedral, portal (from cast).

is scarcely a note of pity in the whole composition. Infernal hands grope for the resurrected dead, and even the Blest are shaken by the catastrophe, displaying none of that smiling complacency that marks their demeanor in the Gothic Judgments of the thirteenth century. The *Dies Iræ* of Autun is grim and terrible, a terrifying picture of eternal torment that might have embroidered the Lenten sermon of some monastic preacher.

Chartres, cathedral, details of west front.

Jesus' description of the Last Day was symbolic, a parable, and so the scene was understood throughout the course of Early Christian art. Here we see the antique conception overborne by the rising tide of barbarian emotion; the vivid horror that possessed the sculptor's mind could brook no symbolism. Concrete fact alone might serve his theme, and out of this he has constructed a vision whose sheer sincerity convinces, transcending the inadequate technique. The symbolic tradition of Christian art here breaks down; the mediæval soul found no outlet for its emotion in a parable, and must needs translate the age-old types into terms of humanity.

The process of humanizing the antique content of Christianity, initiated by such works as the Last Judgment of Autun, was carried on by the last to appear of the Romanesque schools, and the most thoughtful of them all. We have seen the work of the South and East of France; the North was slow to take up the revival, but when its contribution appeared it was nothing less than a new art, the first stage of Gothic. The builders of the twelfth century in Ile-de-France and Normandy were not satisfied with a mere remodelling of the Latin basilica, as were those of Languedoc and Burgundy; they evolved a system of building that was not only different in structural principle, but served a new æsthetic purpose. So also in the sculpture adorning these proto-Gothic cathedrals, the synthesis between mediæval content and expression was worked out to ultimate harmony, in that the content became more human, and the style more universal.

The Romanesque of Ile-de-France is really Gothic, and we have space for but one example, the west front of Chartres cathedral, whose sculptures date from about 1150. It is easy to see even in the general view of the façade the fundamental break from Romanesque; the figures are no longer appliqué upon the building, but have become an integral

CHARTRES, ENSEMBLE OF WEST FRONT.

part of the construction. Their close adherence to the lines of the cathedral lends them some of its sovereign dignity, and yet how much more winning are their faces than the savage masks of the saints and prophets of Languedoc! The art of the Middle Ages has suddenly, as it were, grown young; the angels invest the forms of childhood. Young also and intensely human is the Christ that sits in the central tympanum surrounded by His ancient symbols; the significance of the figure is found no longer in them, but comes rather from the kindly gaze that illumines the face, transforming the Judge into the Saviour of Mankind. Thus mediæval sentiment has at last come into its own; the Latin dogma that it tried to animate with pathetic exaggeration is now couched in unmistakable French. On the Christ of Chartres there falls the first sunlight of the Gothic dawn.

Princeton University.

The American Academy in Rome—Twenty-fifth Anniversary

THE history of the first twenty-five years of the life of the American Academy in Rome, a most interesting summary of which has been written by the secretary, C. Grant La Farge, is a complete justification of the vision of its founders.

"The building of the World's Fair at Chicago made a turning-point in our artistic progress so marked that it may well be termed an epoch. Its effect was profound and far-reaching, strongly influencing our subsequent work and point of view. It was the first occasion upon which there were brought together, to work for a common result, not only a number of architects, but also the practitioners of the allied arts. The lessons learned were important: the inestimable value of coherence and classic orderliness; the individual freedom given to those who accept a common restraint; greatest of all, perhaps, the meaning of *collaboration:* that the architect, the painter, the sculptor, if each is to reach his highest expression, must work all together, mind to mind and hand to hand, not as separate units fortuitously assembled, but as an intimately interwoven and mutually comprehending team—as men worked in every great age of the past to make great works of art. Perhaps the full lesson was not entirely grasped, perhaps it was too vast for immediate complete realization; but at any rate it bore some fruit promptly, and the American School of Architecture in Rome was opened in 1894. It was in the fertile brain of that most distinguished ornament of American architecture, Charles F. McKim, that the idea was born; under his fervor and enthusiasm, together with that of Daniel Burnham, that it took shape; to their unswerving devotion to this idea, their gifts to it of money and time; to their inspiring example; to the years of Frank Millet's unselfish service, ending only with his tragic death in that very service; and to the adherence of such others as La Farge and Saint-Gaudens, now gone, Mowbray, French, and Blashfield, happily still with us, that this fruition was due. Begun by two such princes of architecture as McKim and Burnham, it naturally took at first an architectural form, but the rest soon followed. In 1897 the scope was enlarged by the founding of the American Academy in Rome, for students of architecture, painting, and sculpture."

The men this institution has already sent forth, and their influence in establishing high standards and in moulding thought, both in the arts of architecture, painting, and sculpture, and in classical literature and archæology, have demonstrated its paramount importance to higher education in America.

NEW DEPARTMENTS.—The success already achieved warrants the trustees in extending the field of its activities to include the arts of musical composition and landscape architecture and in opening its doors to the women as well as the men of America.

In order to maintain the academy in its present state, and in order to insure its growth in these directions, additional endowment is necessary.

France owes her pre-eminence in arts and letters to-day to the establishment of the French Academy in Rome over two hundred years ago. Spain, England, Belgium, Austria, Germany, and Russia have followed her example.

The trustees of the American Academy turn confidently to the men and women of America, in the belief that their support of this great national and patriotic institution will not fail.

FUNDS.—Funds for the expenses of this campaign for the endowment of the American Academy in Rome have been subscribed by friends of the academy, so that every dollar received will go to the endowment fund.

The academy was in debt to the Morgan estate, $375,000. Mr. J. P. Morgan has made an offer to cancel a dollar of this debt for every dollar subscribed to the endowment up to that amount; thus every contribution will be doubled by Mr. Morgan's munificent offer.

Many universities are already contributing colleges. There should be many more to avail themselves of the privileges which such annual subscriptions give. And those privileges may be retained in perpetuity by any university which shall capitalize its subscription by making a contribution of five thousand dollars to the endowment of the academy.

Liberty Bonds will be gladly received at their face value.

Contributions to the academy may be deducted from income on tax returns.

All contributions should be made to the order of and mailed to

EDWARD P. MELLON,
Treasurer of Endowment Committee,
52 Vanderbilt Ave., New York City.

The Problem of the Small City Lot

By William Pitkin, Jr., Landscape Architect

THE development of the city lot having a frontage of approximately one hundred feet is a problem worthy of the most careful study and capable of many interesting solutions.

Too often it is a problem left partly solved or wholly unsolved by the average architect. The result is only too apparent on any of our good residential streets where well-designed houses show every evidence of having been aban-

Front, C. J. Butler house before planting.

doned by the architect after the purely architectural work was completed.

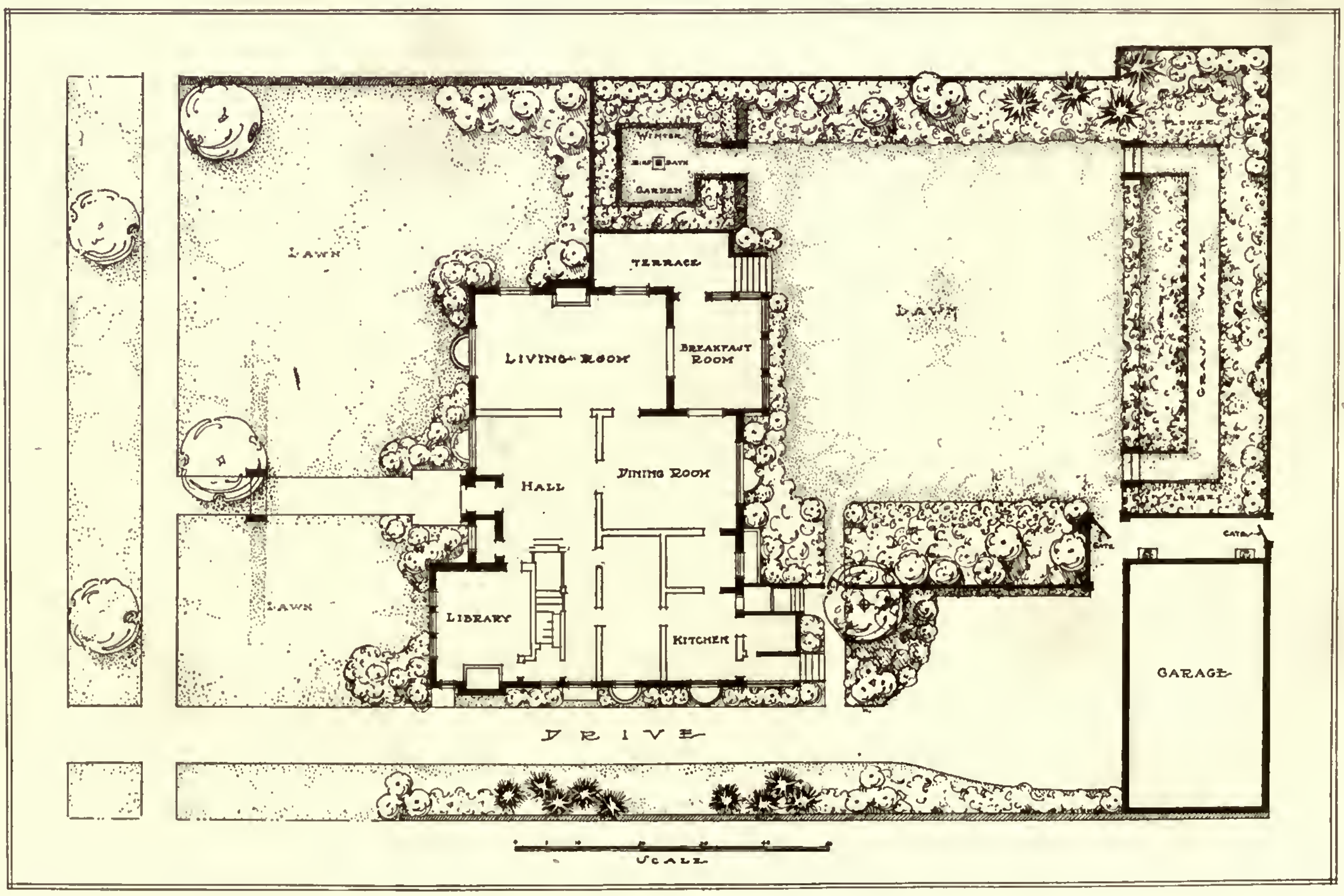
It is difficult to appreciate the reasons for this neglect

Rear, C. J. Butler garden before planting.

on the part of the architects for they are most certainly desirous of having every one of their works as successful as possible, both as a matter of pride and of good business principle.

An appropriate setting is as important to a house as to a fine jewel. And by appropriate is not meant the haphazard planting of the grounds, but a well-conceived, thoroughly-studied scheme for the layout of the entire lot. Such a scheme embraces not only the planting, but the location of the house and garage, the arrangement of walks and drive, the practical handling of such utilitarian features as laundry, yard, coal delivery, and other service items, and finally the

(*Continued on page* 88.)



Plan, house and garden, C. J. Butler, Detroit, Mich.

BUTLER

HOUSE AND SMALL CITY GARDEN. Wm. Pitkin, Jr., Landscape Architect.

C. J. BUTLER, DETROIT, MICH.

Side, C. J. Butler garden before planting.

design of the garden and its proper relation to the plan of the house.

Co-operation between architect and landscape architect is essential for the securing of such a practical, well-designed scheme. It is as foolish for the architect unfamiliar with planting material, to make the plan alone, as it is for the landscape architect to attempt the development of the lot without considering the architect, and recognizing the motives which prompt his design, and the definite effects which he is striving for.

Undoubtedly some successful city places have resulted from co-operation between architect and nurserymen, but in general this relation is unsatisfactory because the nurserymen do not understand design and have little appreciation of form which is so much more important in planting material than either color or horticultural interest.

Wherever possible the lot plan should be worked up prior to starting building operations, in order that the house plans (basement and first floor) may be studied with reference to the landscape architect's suggestions for walks, drive, service features and garden connections.

In many cases it has been impossible to carry out the ideal solution of the lot problem due to the fact that the house was set too high, or located a few feet too far one way or the other; the service portion was poorly arranged in reference to the proposed scheme, or the important windows and doors were placed in a poor relation to the garden. A very common difficulty is the location of the coal-bins on the wrong side of the house, necessitating a drive where the garden or lawn are desired.

Many very interesting lot plans may be worked out even after the house is built, which was the condition in all of the three Detroit problems illustrated in this article. However, in all of them there are difficulties which could have been overcome had the lot plan been made along with the house plans. For example, the garage turns are exceptionally poor in both the Butler and Kuhn plans, and might have been improved by a slight change in the arrangement of the garages or the service wings.

The residence of Mr. Charles J. Butler is located on a hundred-foot lot in Indian Village, Detroit, and as the photographs indicate, has houses on each side standing close to the property line.

The sun-room, dining-room, and terrace overlook the rear lawn which has been given complete privacy by a wall separating it from the street lawn, and enclosing it on the property lines. A well-designed lattice screens the service-yard and forms an interesting background for the planting against it.

Back yard garden, C. J. Butler, Detroit, Mich. Wm. Pitkin, Jr., Landscape Architect.

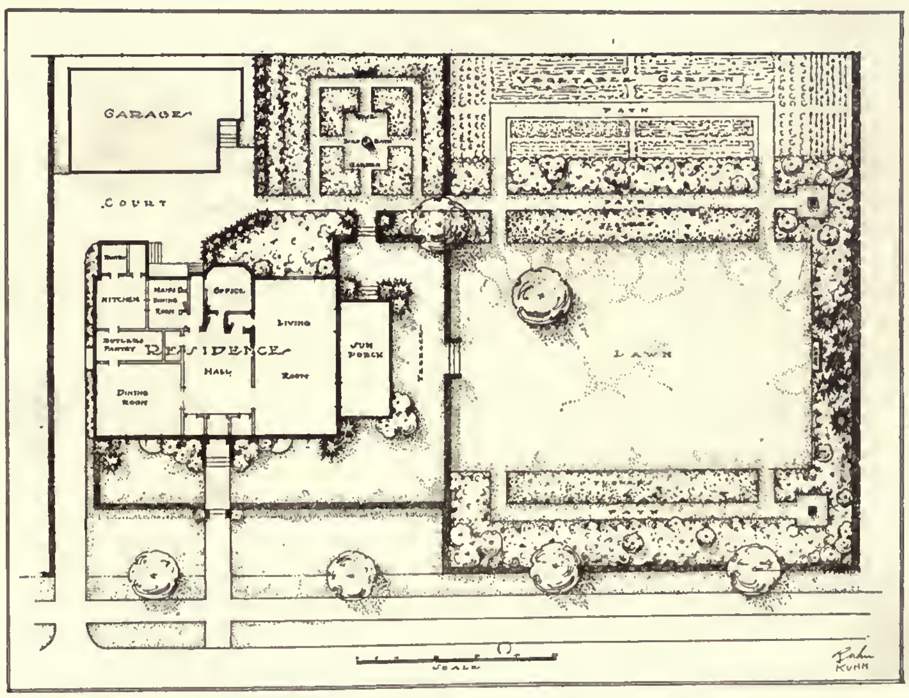
House and small city garden. Robt. Kuhn, Detroit, Mich.

In this plan, as in the two accompanying plans, it has been the intent to add apparently to the size of the property by keeping all grass areas as large as possible, and unbroken by planting. The house is large for the property, and the generous expanse of street lawn gives it a setting more in proportion to its size.

Similarly, the garden grass-plots have been made as large as possible, and the planting entirely confined to the borders, thus securing the maximum open area for play and for visual enjoyment.

The garden lawn is bordered by planting composed of flowering shrubs, hardy perennials, and a few choice evergreens for contrast of foliage and for winter value.

The cutting garden at the rear is separated by a hedge of Spirea Van Houttei which gives it a desired amount of mystery without apparently cutting down the depth of the garden as the eye carries over the hedge to the tall planting of evergreens against the wall screening the alley.



Plan, garden, Robt. Kuhn, Detroit, Mich. Wm. Pitkin, Jr., Landscape Architect.

The rose-covered arches provide interesting glimpses of the garden, and repeat the note of the lattice—all of which are painted brown.

The little winter garden is designed for intimate inspection from the living-room and terrace, and completes an evergreen composition, of which the tall cedars form the background and completely screen the service wing of the neighboring house. A marble bird-bath in the centre of the grass panel of the winter garden makes a high light in the composition and adds to the interest.

For contrast with the evergreen planting, the garden contains a few azaleas, narcissus, and Darwin tulips

Planting at main entrance, Robt. Kuhn, Detroit, Mich.

for spring flower; white phlox and lilies for summer, and white anemones for fall, all carefully limited in quantity to be in scale with its size.

The property of Mr. Robert Kuhn is very shallow, only 125 feet, but has a width of 200 feet. The house stands on the north half, leaving a generous area on the south for lawn, garden, and vegetable garden.

The plan provides a high hedge and a heavy screen of planting along the street to screen the garden, but leaves an adequate street lawn in front of the house. A low untrimmed hedge of Japanese barberry is planted on top of the 18-inch south and west terraces and gives the house a snug architectural setting.

The planting against the house and porch is composed of a very few plants carefully grouped which give the required setting as well as privacy. This garden also consists of a large central grass panel with straight lined borders of flowering perennials backed up by heavy shrub borders. The walks between flowers and shrubs are of grass and serve as practical ways of getting about, as well as forming very attractive vistas terminated by the white figures set among the planting at the south ends.

The small rose-garden has an intimate relation to the living-room and porch, and is securely enclosed by the heavy hedge of cedars on the north, and the hibiscus on the south and east. Its grass walks and panel make a good background of green for the roses. The bird-bath and garden-seat are fine Italian marble, and are worthy terminals of the two main axes.

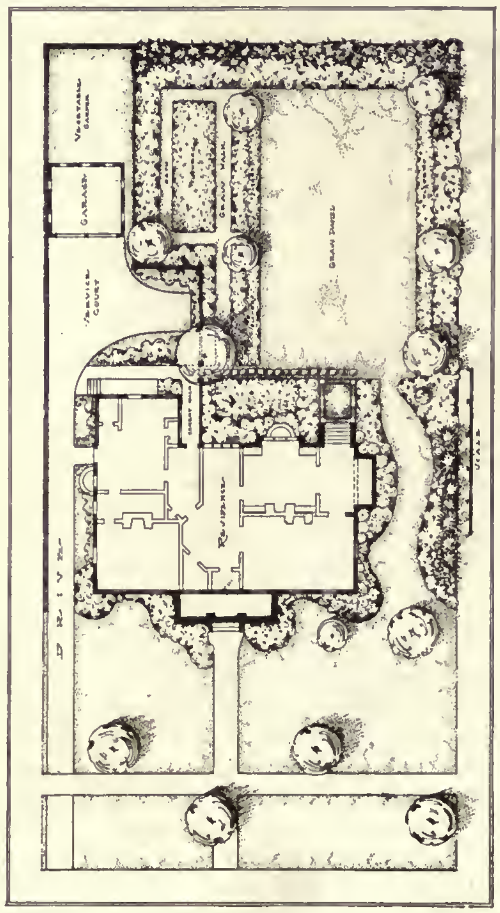
The vegetable garden, while well screened by planting is an interesting feature of the place as an excellent example of intensive farming.

(*Continued on page* 92.)

The back yard garden, Robt. Kuhn, Detroit, Mich. Wm. Pitkin, Jr., Landscape Architect.

FRONT.

HOUSE AND SMALL CITY GARDEN.



PLAN. Wm. Pitkin, Jr., Landscape Architect.

MRS. A. C. ANGELL, DETROIT, MICH.

The grounds about the residence of Mrs. A. C. Angell, also in Indian Village, Detroit, again illustrate the value of open lawn areas for a house which is very wide in proportion to the lot.

The maximum grass panel is again secured in the garden and the line of the planting borders are straight in recognition of the lines of the enclosing fences and lattice.

A little mystery is introduced by separating the panel and grass walk portion of the garden by planting of intermediate height, which also makes a frame for the view from the hall windows.

The planting against all these houses is composed of shrubs and evergreens chosen primarily for their form, either as specimens or in groups, and is arranged to recognize the architectural design, and to properly emphasize both the vertical and horizontal lines. The sky-line of the planting is considered as of great importance, and as the photographs show the masses are arranged so as to reveal the architecture instead of burying it, as is so often the case. The result is an appropriate setting into which the house fits pleasingly and harmoniously.

The use of good-sized nursery stock instead of the usual small plants is justified by the immediate effects secured, and the difference in cost is surprisingly little when the buyer is familiar with the quality of the material grown by different concerns. In the photographs shown, all the material was good sized and made a very satisfactory showing at the end of the first year, which is a result pleasing alike to client, architect, and landscape-architect.

Architects often feel that the cost of securing such a setting for their houses is out of proportion to the size of the property, but the truth is that the cost is very little, in that the work is necessarily so limited by the restricted space. On the class of city residences ordinarily built on 100-foot lots, the cost can be estimated as low as 4% of the cost of the house, and will seldom exceed 10% even for the most pretentious scheme. This will include material and labor, and the professional services of the landscape-architect.

Surely where nature has so little opportunity as on the city lot, it is doubly imperative that human skill should be employed to soften the hard conditions, and to give shade and green foliage around our homes. And to accomplish this in an orderly manner, with proper appreciation of the demands of good design, convenience and amenity, is indeed well worth the consideration of the serious architect.

Modern Building Superintendence

By David B. Emerson

CHAPTER VII

PLUMBING AND DRAINAGE

IN an earlier chapter, we mentioned that the plumber installed the soil, waste, vent, and leader lines close behind the steel erectors, so that when the frame was up and the floor slabs set, the lines were all in and most of the roughing for the fixtures was already done. All of the stacks were specified to be of galvanized wrought-iron pipe; this was done after a careful study of conditions. There is no question but that cast-iron pipe is far more corrosion-resisting than wrought iron, in fact it seems to last indefinitely under almost all conditions, but there is one great objection to cast-iron pipe, especially in tall buildings, and that is, the joints. The unequal expansion of lead and iron is something which cannot be overcome, and the joints in tall stacks of cast-iron pipe are always liable to leak, whereas the screw joints in wrought-iron pipe are steam, gas, and water tight, and under almost all conditions remain so. The only point is to be careful to get a genuine puddled wrought-iron pipe, and not a steel pipe. All of the pipe used throughout the building was standard weight lap welded pipe, and the fittings were recessed, screw jointed, galvanized cast-iron drainage fittings. The ends of all pipe were reamed out to remove the burr caused in cutting. All pipe and fittings were screwed together, and made perfectly tight without the use of red lead or pipe cement. The soil stacks were five inches in diameter, which is ample for a building of any height, and with any number of fixtures; the waste stacks for the lavatories in the offices were all three inches in diameter; and the leaders were proportioned so that they had one inch of sectional area of pipe to every two hundred and fifty square feet of roof area drained. In this instance, the area of the surface drained by each leader was about seventy-five hundred square feet, so six-inch leaders were sufficiently large for the purpose. All of the stacks were supported at their base by means of iron pipe rests placed directly under the stack, and they were supported at each floor by means of iron hangers securely fastened to the floor beams. Venting was done by the circuit system of venting, using the yoke type of vent for all batteries of fixtures in the toilet-rooms on the various floors. The vent stacks were four inches in diameter, and were carried up through the roof in all cases. The house drains and house sewers were laid with a pitch of one-half inch to each foot of horizontal run, and as the total roof area was about thirty thousand feet, two lines nine inches in diameter were required. The house drains were hung from the steel floor beams by means of heavy wrought-iron hinged pipe hangers, and where they ran under the basement floor, they were run in concrete trenches and were set upon brick piers placed every ten feet in the length of the pipes. Brass screw cap clean-outs were placed in the lines at points where they could be easily rodded to remove obstruction. The house sewers were of salt glazed earthenware pipe, ten inches in diameter, with joints made by means of oakum gaskets, and one to one portland cement mortar, and connected with the city sewers in the streets. As the plumbing fixtures in the sub-basement were located below the sewer level, a cast-iron sewage receiver was installed, fitted with a duplex ejector consisting of two centrifugal pumps operating in a dry pit, and driven by vertical electric motors mounted on the extended receiver cover, and equipped with automatic controllers operated by a simple float mechanism, which started one of the motors when the sewage reached a certain level in the receptacle. The adjustment of tappets on the float rod was such that in case of the failure of one pump to start, a further inflow of sewage would cause the other unit to start. The sewage was discharged into the receiver, forced out by the ejector, and discharged into the sewer. In case the dry pit became flooded from any cause, the ejecting pumps were fitted with auxiliary valves to pump out the pit. For the handling of seepage water, leaks, etc., a sump pit was located in the sub-basement fitted with a grated top. In this pit was installed a water ejector, fitted with a float which, when it reached a certain point due to the rise of water, automatically opened the valves in the water-supply pipe, which threw a jet of water into the exhaust line, and by creating a partial vacuum sucked out the water. The ejector, although of small size, having only a one-inch supply, would lift eight hundred gallons of water an hour on a twelve-foot head. When the lines were all in and ready for the fixtures, the system was thoroughly water tested; the testing being done in sections to avoid excessive pressure, on account of the height of the stacks. The testing was begun at the upper part of the system, and the several sections were tested down to and including the house drain. The ends of the pipe were closed with testing stoppers, and the stacks were filled from the bottom, letting the water rise slowly to the top. Any leaky joints that were found were made tight.

The water-supply was taken from the mains in both streets, so that in the event of one main being temporarily out of service, the building would not be left totally without water-supply. Each supply line was five inches in diameter, of extra heavy galvanized wrought-iron pipe; the connections to the street mains were made by means of special connections. Each line had a gate valve at the curb, with a cast-iron service box, and a T-handle operating rod, so that the supply could be cut off at the street if necessary. The supply lines were cross connected before being connected to the meter. A fish-trap was installed in the line directly in front of the meter. From the meter the lines ran to the filters, which were of the vertical pressure type, built with cast-iron shells. The filters set upon concrete bases, and had waste funnels which connected with the house drain. After leaving the filters, the house main had branches to the boiler feed-pump in sub-basement, the cold-water air-drum for supplying the lower three stories of the building, the hot-water tank which supplied the three lower floors, and to the suction tank; two other branches were connected directly to the suction pipes of the two pumps, so that in an emergency they could pump directly from the city mains. The house pumps were six stage, turbine pumps, with a capacity of one hundred and fifty gallons per minute, operated by twenty-five hp. electric motors. The suction pipes of the pumps were connected to the suction tank, and were provided with strainers at the tank to prevent foreign matter from entering the pump. The suction tank was constructed of wrought-iron plates, with the seams riveted and caulked, and had a capacity of two thousand gallons. The supply pipe to the suction tank had a reducing manifold header, fitted with four ball cocks. A two-and-one-half inch pipe was taken from the pumps up to the house tank on the roof; this tank was made of cypress, with a frost-proof cover, and had a capacity of five thousand gallons. All supply pipes to the tank were thoroughly insulated to prevent freezing. The overflow from the tank and the emptying pipe discharged onto the roof. The tank was equipped with an automatic float switch, which started the pump motors when the supply of water in the tank was lowered, and stopped them when the tank was filled again. The distributing main from the tank was carried down through the building and distributing branches were taken off at each floor to supply the fixtures on that floor. The main terminated in the basement, and was connected to the hot-water drum which supplied the upper stories of the building. The supply line had a check valve in the basement, to prevent the water from running back to the street mains. The hot-water system consisted of two steel drums fitted with a series of U bends of copper tubing, mounted in parallel, and having steam connections from an auxiliary boiler which heated the Turkish bath during the summer months, and from the main heating system during the winter months. The hot-water drums were provided with heat regulators which, when the water had reached a temperature of two hundred degrees Fahrenheit, cut off the steam supply from the coils, and as soon as the temperature of the water in the drum fell, the valve opened and the steam was again admitted. This prevented overheating the water, which causes steaming at the faucet, and the unpleasant sputtering which accompanies it. The distributing mains were taken off the distributing manifolds, and were carried through the building to supply the fixtures and had circulating pipes running back to the circulating manifolds, and then back into the drums. The hot water risers and the circulation pipes had expansion loops eight feet long, at the sixth and the thirteenth floors, to take care of the expansion and contraction of the pipes. The pipes were fastened midway between the loops and allowed to expand both upward and downward. All lines, both for hot and cold water supply, were valved, just above the manifolds, and all of the branch lines were valved so that any line or branch could be cut off without affecting the rest of the system. The valves on all vertical lines were soft seat globe valves, and gate valves were used on all horizontal lines. The ice-water system was operated by means of an automatic refrigerating machine installed in the basement and operated by an electric motor, controlled by an automatic starter with a thermostatic control. The cooling was done in a cooling tank having a capacity of seven hundred gallons, a constant level being maintained by means of a float valve. The cooling coils were so placed that the lower pipes were submerged in the water and the return circulation sprayed over the upper pipes. The thermostat, which controlled the temperature of the water, was submerged in the water, and the operation of the ammonia compressor was automatically controlled by the rise and fall of the temperature of the water. The supply to the tank was taken from the descending main from the house tank. From the cooling tank, a main supply line one and one-half inches in diameter was carried up through the building; branches were taken off at each floor to supply the offices, and the drinking fountains in the corridors on each floor. The system was arranged so that there would be no dead ends, and a circulating pipe returned the water to the cooling tank. The cooling tank and all of the pipes were insulated with cork covering made from pure granulated cork pressed into moulds, baked, and then coated with a waterproof finish. When the construction had advanced sufficiently, and the tile floors were laid, the work of installing the fixtures was commenced. The Turkish bath in the basement was fitted with the necessary shampoos, needles, showers, and hydrotherapeutic apparatus; and the building was also equipped with stand-pipes, hose-reels, fire-pumps, and other fire protective devices, all of which will be fully described in a later chapter. The water-closets in the clerks' toilet-rooms in the bank and in the general toilet-rooms throughout the building were of the suspended syphon jet wall type closets, with extended front lips. The closets were supported on cast-iron chair hangers which were set before the tile floors were laid, and the closets were bolted to them through the slabs at the back of the enclosures.

The connection between the closets and the branch soil lines was made by means of long lead bends, which gave a flexible connection between the closet and the pipe, and prevented any damage from settlement. This type of closet is undoubtedly the best for use in fireproof buildings, as all piping is kept above the floor slabs, also the closets are entirely free from the floor, so that they may be easily cleaned under. The seats were of the saddle hole, open front and back type. The flushing of the closets was done by means of push-button valves, concealed in the floor, which is one of the most satisfactory methods of flushing fixtures, as the user does not have to touch levers, push buttons or pulls with the hand. All of the urinals were of porcelain with interlocking fronts, which did away with all partitions, and made practically a single unit out of each battery of urinals. The flushing was done by means of push-button flush valves, the same as used in the water-closets. The lavatories throughout the building were of heavy vitreous china, with integral backs eight inches high, secured to the walls by means of concealed iron wall supports, and having vitreous china standards. The lavatories had "pop up" waste fittings, which are as near fool-proof as can be made. The supplies on the lavatories had crown handle, self-closing, ball-bearing basin cocks. It is always a good practice in public and semipublic buildings to use self-closing cocks, as they prevent the waste of water, also the damage which might be caused by leaving the cocks open, overflowing the basin and flooding the room. The crown handle is about the best type of cock for this class of work, as it is practically impossible to fasten it open as can be done with arm, lever, tee, or rabbit-ear handles. The ice-water cocks were of the push-button type, and were set in the backs of the lavatories, which were specially drilled to receive them. The traps for all lavatories were of the non-syphon type as the city ordinances allowed the use of approved traps of this pattern. The particular trap selected for this work had been thoroughly tested and proven satisfactory, so was installed. Non-syphon traps, which are positive in their seal, are undoubtedly far better than any system of venting as in most cases the vents get closed up at their opening, and do not work after a few months, also the venting of a large number of fixtures makes a maze of concealed pipes, which may eventually corrode out and become a nuisance instead of a benefit. All of the porcelain and vitreous ware was inspected to see that no warped, cracked, crazed, nor discolored pieces were included in the shipments, and one or two being found they were ordered sent back to the manufacturers, and perfect pieces sent to replace them. All of the brass pipe for supplies and waste was specified to be iron pipe size; that is, the diameters were to be inside diameters and not outside diameters, as is the rule with brass tubing. All were to be solid drawn tubing of the standard thickness. When the fixtures were all installed and the plumbing system was complete, the entire system was smoke tested. Smoke testing was done by closing the tops of all of the stacks at the roof, and pumping the system full of a dense pungent smoke produced by burning oakum or oily waste, and forcing it through a rubber hose into the lower part of the system. If there are any leaky or imperfect joints, or any cracks in the pipes, or fittings, or defective seals in the traps, it is easily detected by the smoke issuing from it. The system tested out perfectly and was accepted, and our work was now practically completed, except for finishing up a few items which will be taken up later.

Origin of "Watch Your Step"

FROM an analysis of nearly ten thousand accidents recently reported by manufacturers, chiefly electrical, in the United States, the highest percentage of those that occurred outside the companies' premises were attributed to slipping, tripping, and falling, hence the origin of "Watch Your Step." This means that the greatest danger lying in wait for a man in his hours of leisure is the pavement beneath his feet. The highest percentage of falls came from those occurring on the level, while others came in the following order of seriousness: from elevations, from ladders, over obstructions, on stairs, from poles, into excavations, from temporary supports, and from scaffolds.

On the companies' premises "handling material" comes first. Accidents from electric current—from shock, burns, eye-flash—rank fourth in a list of eighteen classes of accidents. Only .7 per cent of all the accidents reported were due to exhaustion from heat, which seems strange—one imagines that more suffer from heat prostration than is actually recorded. From a general consideration injuries to fingers were highest, eyes next, and ears last in a classification of thirty-five anatomical locations. From the standpoint of occupation linemen ranked first and carpenters lowest.

Perhaps the most interesting classification is that which considered the length of service. Of all the accidents reported 25.9 per cent, or the highest single percentage, had all been in the employ of the companies less than six months. Those veterans of over twenty years' service contributed only 1.1 per cent to the casualty list. To determine the seriousness of the various causes of accidents by consideration of the number only resulting from each cause is misleading. While only 8.3 per cent were injured by electric current, these accidents were responsible for over 70 per cent of the total lost time and 70 per cent of the serious and fatal accidents. The fact is, however, and it is encouraging, that 75 per cent of this class of accidents are preventable when the proper safety devices, such as enclosed switches, rubber gloves, etc., are installed, while falling will continue as long as man fails to "Watch His Step."

Indiana Limestone in the Movies

BUILDING stone may seem a cold, hard proposition, but the motion-picture camera has found human interest in the Oolitic Limestone Quarries of southern Indiana. A three-reel film which has been completed for the Indiana Limestone Quarrymen's Association by the Rothacker Film Manufacturing Company presents a novel industrial romance. It pictures the wonderful machine methods employed in quarrying and the large modern factory system used in connection with the preparation of Indiana limestone for the market.

The Story of Brick

We take pleasure in acknowledging the receipt of a very attractive and suggestively illustrated booklet, "The Story of Brick—The Permanence, Beauty and Economy of the Face Brick House." Published by The American Face Brick Association, Chicago.

Harold McGill Davis

HAROLD McGILL DAVIS was born in Jerseyville, Ill., on August 26, 1860, and was the son of Samuel W. and Mary J. McGill Davis. His early boyhood was spent in Kansas, where his father held the office of treasurer of the town of Paola, to which he was elected thirteen consecutive years. Harry, as he was called by his friends, had a public-school education, finishing in the St. Louis High School, after which he obtained the position of office boy in a lead and oil factory. While in high school, a cadet corps was organized and afterward mustered into the Second Regiment of the National Guard of Missouri. He became a second lieutenant and was a member of a picked squad which gave exhibition drills and fancy evolutions. After several years with the lead and oil company, he resigned and was appointed chief clerk of the St. Louis U. S. Assay Office, receiving the appointment from President Chester A. Arthur. A government position was too slow and uncertain for an ambitious boy, so he came to New York to study architecture. Being active in church work, he was elected president of the Brooklyn Christian Endeavor Union in 1901, an organization numbering some six thousand members, and the following year was made chairman of the printing committee in connection with the Christian Endeavor Convention, held in Madison Square Garden, with a total attendance of sixty thousand delegates. The financial panic of 1893 offered him a chance to get into the advertising profession, in which he had some experience while in St. Louis as a writer and designer. Afterward he became connected with an advertising agency, thus broadening his experience and fitting himself for his final position as manager of the advertising department of the Sprague Electric Works of the General Electric Company, which he obtained in December, 1899.

His ability as a writer and designer gave him an advantage over other solicitors which publishers were quick to recognize and resulted in the formation in leading publishing plants of what is now known as the service department.

Aside from his advertising, he frequently contributed to the papers poems, both religious and humorous, and articles of description.

An Industrial Arts Council

THE Industrial Arts Council has recently been organized to develop ways and means for establishing a practical method of educating American designers and craftsmen. At the first meeting, held in February, twenty-nine industrial, art, and educational organizations were represented by delegates. W. Frank Purdy, of the Gorham Company, was elected chairman, and John Clyde Oswald, editor of the *American Printer*, vice-chairman.

The organizations represented included: Association of National Advertisers, Architectural League of New York, Art Alliance of America, Chamber of Commerce of the State of New York, Association of Commercial Artists, Paper Cover Manufacturing Association, National Society of Craftsmen, National Society of Decorative Arts and Industries, Dress and Waist Association, National Retail Dress and Goods Association, Association of Manufacturers of Decorative Furniture, National Ornamental Glass Manufacturers Association, American Institute of Graphic Arts, Greeting Card Association, Society of Interior Decorators, Jewelry Crafts Association, National Society of Manufacturers of U. S., Millinery Chamber of Commerce, Monumental Crafts Association, Municipal Art Society, National Arts Club, Public Education Association, School Art League, School Crafts Club, Silk Association of America, Sterling Silverware Manufacturers, Society of Illustrators, Toy Manufacturers, Upholstery Association of America, and Wall Paper Manufacturers' Association of the U. S.

Mobilizing our forces is necessary, and the Industrial Arts Council can do much to bring this about. Every manufacturer should feel it his duty and his privilege to aid in this movement. Further details can be secured from the office of the Council at 10 East 47th Street.

Labor Costs

LABOR is more efficient than a good many post-war croakers make it out to be. That, at any rate, seems to be the conclusion to be drawn from recent cost computations made by the Aberthaw Construction Company.

SOME CHEERING NEWS

"It is too early to venture any broad generalizations," says Dan Patch, statistician of the company, who has been making these computations. "Yet I feel justified in saying a word of what should be encouragement to those who see only gloom in the labor situation.

"The Aberthaw Company keeps very carefully tabulated data of unit costs on different jobs. These it uses to establish averages that shall be available in checking the relative efficiency of subsequent undertakings. In figuring labor costs per unit of accomplishment, it is, of course necessary to adjust the wage rate to a common standard. Hence, the computation really expresses itself in terms of labor hours expended on a given unit.

"During the war, labor costs, both relative and absolute, went alarmingly skyward. How much of this was due to dilution of the trades through the injection of vast numbers of unskilled workers, how much to sheer war demoralization, and how much to profiteering through shirking, no man can say. The fact remains that costs were high.

"Now they are coming down again. That is to say, carpenters, masons, painters, and glaziers appear to be turning out as much work in an hour as they did before the war. In certain of our jobs, even, there are faint indications of improvement over earlier averages. To be sure, the men are not accomplishing as much in a week—even with overtime added—as they did under a longer working day: forty-eight hours have not been made as productive as were fifty-four hours. Nevertheless, there is satisfaction in possessing statistical evidence that during the hours when labor is supposed to be at work it is actually working."

HEATING WITH GAS

HOUSE heating with gas which enables the owner to heat his home automatically from October to May without any of the annoyance of attending to a furnace or boiler at a cost comparable with coal is described in detail in a special number of *The Gas Age*, 52 Vanderbilt Avenue, New York, N. Y., recently issued. Gas for fuel may be used in any standard system of heating such as steam, hot water, vapor vacuum, and warm air. Installations of each kind are described and illustrated and the accompanying data gives the necessary engineering data and costs. Often comparative costs with coal are given. In addition to this, the various systems by which gas is sold in the United States, such as block rates, secondary rates, special rates, and regular rates are described. With the exception of the latter, all make it possible to heat a house with gas as cheaply or only slightly more expensive than with coal. Installations with actual consumption figures under each method of selling gas are described and illustrated.

Necessity for Careful Chimney Construction

THE charred remains of one year's fires in the United States would line both sides of a highway 1,000 miles long, and yet 80 per cent of this is preventable, says a recent issue of the Bulletin of the State Fire Marshal of Minnesota.

A summary of the fire causes in various States shows that fires attributable to chimneys amount annually to from 10 to 26 per cent of the total number, and in winter the percentage has reached as high as 50 per cent. Especially in rural districts where there are no organized fire-fighting agencies, builders should give unusual attention to the construction of chimneys that they may be made as nearly fireproof as possible.

Chimneys should not be built on brackets; they should extend a sufficient distance above the roof, their walls should be at least eight inches thick, flues should not be less than sixty-four square inches, the flue-holes should never be filled with inflammable material, and good flue-linings of fire clay or terra-cotta should be provided. The cost of such lining in an ordinary two-story residence would be nominal.

With the present tremendous demand for new buildings and the consequent speeding up of work, especial care should be taken to prevent carelessness in chimney construction.

Along the same lines the National Fire Protective Association is pushing a vigorous campaign, emphasizing the present need of dwellings and the extreme necessity of protecting from fire the homes we already have. It advocates care about matches, smoking, lighting and heating apparatus, and gasolene, and urges a clearing out of rubbish, inspection of flues, and cleaning of chimneys, that sparks may not fall on combustible roofs.

Chicago Our Greatest Lumber Market

CHICAGO continues to maintain its position as the world's greatest lumber-distributing market, says a prominent lumberman in the Chicago *Daily News*. The year 1919 represents the most varied conditions in the history of the business. After the signing of the armistice there was a hesitancy in every line of trade, and especially in the lumber industry. March brought improvement over the sluggish demand of January and February, and as the spring advanced the shortage of homes became more apparent, and with the "Own Your Home" propaganda conducted by many agencies there came a keen demand for lumber in May, which has been increasing ever since.

The building strike during the summer resulted in a practical tie-up of all construction work. Not only did a heavy loss fall upon employees because of stoppage of wages and did the public suffer because of lack of homes, but the city witnessed the postponement, in some cases indefinitely, of construction of many manufacturing and other substantial buildings.

Prospects for a big building year in 1920 are exceptionally good, especially if the expected replenishment of cars and railroad construction by the Railroad Administration is realized. The indications are for a firm market, continues this lumber authority, adding: "When the public accepts the idea that there will be no material decline in lumber prices, and dismisses the thought that before long it may be able to build as cheaply as in pre-war days, building will not be delayed."

Large stocks are still available in the various lumber-yards of the city, and the prospects for the future are bright, both for the lumber business and for the public which is in great need of additional housing facilities.

A National Zoning Committee

A NATIONAL Zoning Committee to watch the progress of zoning throughout the country, with power to take measures to sustain building regulations, was appointed by the American City Planning Institute at its convention at Niagara Falls and Buffalo at the end of May. The committee consists of Lawson Purdy of New York, president of the National Municipal League and vice-president of the American City Planning Institute, chairman; Charles H. Cheney of San Francisco and Berkeley, California, vice-chairman; Herbert S. Swan, executive secretary of the New York Zoning Committee, secretary, 277 Broadway, New York City; Edward M. Bassett, Esq., president of the Zoning Commission of New York City; Mr. Stephens of San Francisco; Andrew Wright Crawford, Philadelphia; Doctor Robert H. Whitten, consultant of the Cleveland City Planning Commission, and Harland Bartholomew, consultant of the St. Louis City Planning Commission.

The National Zoning Committee may be consulted with regard to the form of city planning ordinances and especially with regard to measures necessary to sustain them when they have been enacted.

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Frontispiece to No 4.

YORK MINSTER, WITH CHAPTER-HOUSE.

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The English Chapter-House

From a Lecture Delivered at the Metropolitan Museum of Art, New York, January 10, 1920

By Albert C. Phelps, A.I.A.
Professor of Architecture, Cornell University

Lincoln Cathedral.

IN the English chapter-house we find some of the most excellent qualities of mediæval design and a work peculiarly and essentially English.

English architecture of the later Romanesque and early Gothic periods was strongly monastic. Influenced by Continental monastic work, it, however, developed much individuality and originality.

The early monasteries of the European continent, such as that at Montecassino in Italy, founded by Saint Benedict himself, have been greatly transformed or have utterly disappeared. The most important early document dealing exclusively with the architecture of a complete monastery is the plan of St. Gall in Switzerland, drawn in the early ninth century upon two sheets of parchment (measuring about two and one-half by three and one-half feet) and preserved in the library of the present monastery.

The chapter-house, along with the other usual features of the monastic group, was introduced into England and eventually became not only an essential part of the monasteries, but was added to nearly all the great secular cathedrals.

The original purpose of the chapter-house was to provide a meeting-place for the chapter of the monastery. Its convenience recommended it to the secular clergy and it became a common feature in the group of cathedral buildings in all parts of the kingdom. In it the meetings of the canons of the cathedral were held and secular deliberative assemblies were not excluded. Its picturesqueness and oftentimes artistic form added greatly to the architectural effect of the cathedral or abbey church to which it was attached, and in the development of its vaulting the highest type of Gothic structural art was reached.

The earliest chapter-houses of importance in England were built during the twelfth century. That at Durham was erected about 1150, but has been almost entirely reconstructed on its original lines. It terminates in an eastern apse and has simple groin-ribbed vaults about thirty-five feet in span.

The destruction of the original chapter-house at Durham is a marked instance of the unsympathetic attitude (to put it mildly) of the architect and clergy toward the preservation of these great mediæval works in the late eighteenth century.

Salisbury Cathedral chapter-house.

James Wyatt, who did so much damage at Salisbury and elsewhere in the name of restoration, declared the chapter-house at Durham to be in a ruinous condition and advised its demolition. In November, 1795, the work of destruction was begun by knocking out the keystones of the vaulting and allowing the roof to fall in. The eastern half of the building was then altogether removed and the remaining portion enclosed by a wall. Its interior was faced with lath and plaster, a plaster ceiling and a board floor being added. Fortunately, authentic records of the original appearance of the building remain in the form of drawings made in 1795 for the Society of Antiquaries, and these proved of great value in the restoration of the building late in the nineteenth century.

Gloucester Cathedral still retains its square-ended chapter-house, covered by a pointed barrel-vault with transverse ribs. The eastern bay is perpendicular, and it seems likely that the original termination was apsidal, as at Durham. Walter de Lacy was buried with great pomp in this chapter-house in 1085, at which time the building must have been practically completed.

Winchester had a rectangular chapter-house of the twelfth century measuring forty by ninety feet, of which but fragments remain. That at Canterbury was rebuilt and greatly modified in the late thirteenth century and again in the fifteenth. The interior was restored about 1897. As it stands now, it is chiefly a perpendicular structure, some thirty-five by ninety feet in plan, and has enormous windows at either end. After the Reformation it was used for a time as a sermon-house.

Bristol chapter-house is another with the oblong plan, but with groin-vaulting definitely pointed and having bays twenty-one by twenty-seven feet. The style is, of course, still the Norman Romanesque with the wall-arcades, interlacing arches, and chevron mouldings. This interior has been called by more than one competent authority "the most beautiful Norman chamber in England."

In these chapter-houses we see the widest vaulted spans of the first half of the twelfth century in England and a considerable development toward the Gothic vault of the thirteenth century.

In general, the Benedictine chapter-house, as it took form in England, was an oblong room about twice as long as wide, set parallel with the axis of the church and, as dictated by convenience with relation to the cloister, either north or south of the transept, from which it was separated by a narrow passage or chamber called a "slype." It usually terminated in an eastern apse, by the windows of which it was lighted, while the entrance from the cloister was by a great round archway flanked on either side by round-arched, double-lighted windows.

The Benedictine dormitory usually lay beyond or outside the immediate neighborhood of the transept, so that the chapter-house could rise to full height, there being no necessity for a story above to keep down its ceiling.

The Augustinians and Cistercians, however, with their stricter habit of night service, for convenience had the dormitory immediately abutting the transept, into which it descended by the night stair. So their chapter-houses, though following the traditional Benedictine position, had their western vestibules lower, so that the passageway from the dormitory might pass over them. The Benedictines of Chester adopted this arrangement in rebuilding their chapter-house in the thirteenth century, and it remains excellently preserved internally.

In the Chester chapter-house the vestibule opens directly from the north transept, without any slype, and its three aisles, each comprising three bays, are vaulted to four central piers, the ribs rising from the ground and are provided with no capitals. The triple openings into the cloister show the Norman tradition, refined and pointed, and to the east, separating the vestibule from the chapter-room, is a similar screen. This vestibule is entirely worthy of the beautiful room to which it forms the entrance and is a feature of rare distinction.

The Chester chapter-room is about thirty feet high, fifty feet long, and twenty-eight feet wide. It is vaulted in three rectangular bays, the vaulting being sharply pointed, and the ribs rest upon clustered shafts against the walls. The windows, triple lancets on the sides, completely fill the space between the piers, and five lancet windows occupy the end wall. We have then in this chapter-house at Chester a room on a smaller scale, it is true, but quite as completely Gothic in the application of structural principles as its contemporary, the celebrated Saint Chapelle of Paris. Indeed, these two rooms illustrate most vividly the contrast between the English and the Gallic ideals; the one broad, comparatively low and sturdy, in spite of the suppression of the wall surface; the other light, lofty, brilliant, almost sprightly in its expression.

But it was in the hands of the Cistercians that the chapter-house had its most English development. All of their monasteries being abbeys, with a system of visitation from the mother house to the daughters, considerable ac-

Salisbury Cathedral chapter-house porch.

Salisbury Cathedral roof of chapter-house.

commodation was needed for their assemblages. In the north of England, especially, rooms of great dignity were built with triple aisles of three or four bays. Few of these rectangular Cistercian chapter-houses remain, except in scanty ruins.

Furness Abbey in Westmoreland, just south of Carlisle, is a fine example of what was one of the most extensive establishments of the sort in England. The abbey was at one time exceedingly rich and the abbot exercised almost regal sway over the surrounding country. The ruins of the early English chapter-house with its entrance are especially fine. Built after the church, when the austerities of the first Cistercian style had been tempered by the passion for building, it had steep four-part vaults upon slender clustered piers, which, with their delicate carving and elaborate mouldings, represent the earliest advance of the rich North England Gothic.

Many chapter-houses of this same type were built, following the Romanesque disposition as it had been at Bristol. Later in the thirteenth century this aisled planning of the chapter-house was taken south to Netley.

But generally, except in the Yorkshire district, the earliest Cistercian houses seem to have followed the Benedictine arrangement of a plain rectangular vaulted room—square-ended, however, instead of apsed.

In the west there arose another very distinctive form, seemingly in Cistercian hands, although the earliest example known is at Worcester, built about 1140. Here the chapter-house is circular internally, externally a decagon, nearly sixty feet in diameter, and is vaulted with ten ribs to a central pier. Originally the building was circular externally, but about 1400 the exterior was refaced, made decagonal, and provided with angle buttresses, the better to resist the thrust of the vault.

Margam Abbey in South Wales, built by the Cistercians about 1147 and now in ruins, had a chapter-house circular internally and twelve-sided without. It was about fifty feet in diameter and had twelve main vaulting ribs radiating from a central pier.

In the thirteenth century the idea of the polygonal chapter-house passed to the secular canons at Lincoln, where the ten-sided building, about sixty feet across, may possibly have been laid out by St. Hugh before 1200, though vaulted some thirty years later, when the deeply projecting flying buttresses that gave it so distinctive an exterior were added. With its accompanying arcaded passage this secular chapter-house of Lincoln Cathedral is to be regarded as a great chamber of state, a palatial appendage designed to enhance collegiate dignity and make it compete with monastic importance, and as such Lincoln seems to have led the way.

At Beverly Minster, about 1230, what was apparently the first octagon was built, which thereafter remained the accepted type of plan. There it was in two stories and, although now entirely destroyed, its office of state and distinction is to be seen in the elegant staircase that led from the north side of the canons' choir. The structure was, however, comparatively small, being but about thirty-one feet in diameter.

At Lichfield, about 1240, a chapter-house was built in the form of an elongated octagon, twenty-eight by forty feet, with a central pier to support the vault. The scheme is interesting, but not altogether happy, and apparently the experiment was not repeated. Above the chapter-room is a low chamber that now serves as a library. What its original purpose was is not certainly known.

The chapter-house at Westminster is in the form of a

Wells Cathedral chapter-house.

state apartment, octagonal, some sixty-two feet in diameter. It was built about 1250, superseding the original Benedictine hall and one side of the old penthouse cloister, the king requiring it to be designed magnificently as an adjunct for his palace as well as for the uses of the monastery, and from the time of its erection till 1282 it served as the official meeting-place of the House of Commons.

This chapter-house, like that at Lincoln, is provided with flying buttresses, which, however, project less widely.

Salisbury, too, although of secular foundation, received the idea and added a splendid cloister as well as a chapter-house; the latter being built about 1260. This is octagonal with a central pier and is about the same size as the chapter-house at Westminster (about sixty-two feet in diameter). Salisbury has less of the English power as seen in the chapter-house of Lincoln, but internally the charm is fully that of Westminster.

In the spandrils of the arcade of the chapter-house beneath the windows is a very remarkable series of bas-reliefs representing the Creation and Early History of Man, according to the Biblical account, Scenes from the Life of Joseph, etc. Although considerably restored, they retain much of the naïve quality of the early mediæval sculpture and are greatly superior to the mass of contemporaneous English work.

The chapter-house of Wells Cathedral was erected between 1260 and 1290. It, too, is octagonal and is about fifty-six feet in diameter. It is built in two stories on the north side of the cathedral, the cloister being on the south side. The upper room, which is the hall of state, is reached by a monumental staircase. Approaching Wells chapter-house, we find that it is an ideal building of its class, exhibiting the essence and quality of the English Gothic style. The under croft or crypt served as a treasury, where the vestments, ornaments, registers, and other precious things, both of the bishop and chapter, were kept. Passing into the upper hall from the picturesque staircase, we note how its canopied arcades, wide windows with the lancet traceries of central England, and richly ribbed vault sum up the tendencies of the central phase of English Gothic.

The octagonal chapter-house built in connection with the old cathedral of St. Paul's, London, was in two stories and was approached from the upper floor of a two-storied cloister. It is said to have been about forty feet in diameter and its vault was supported by the usual central pier.

This chapter-house was modified considerably in the Perpendicular period and was destroyed by the great London fire of the seventeenth century.

Elgin Cathedral in Scotland had an unusually beautiful octagonal chapter-house, built about 1280. While it displayed the national characteristics in tracery and decorative detail, its general composition followed English models.

The chapter-houses in connection with Southwell Minster and York Cathedral are the only polygonal structures of this class to be built without a central support. The one at Southwell was erected about 1280 and is octagonal in plan, measuring thirty-five feet in diameter.

Although less grand than Lincoln, Westminster, and Salisbury, it is especially charming in its decorative detail. Naturalism is perhaps pushed further than is desirable in architectural ornament, but the work is still spontaneous and some of it is not lacking in functional expression.

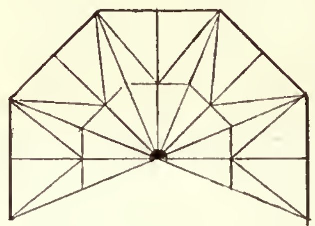
The chapter-house at York, begun in 1290, may be looked upon as the culmination of the polygonal structure. It is octagonal, nearly sixty feet in internal diameter, and with no central pier to support its vaulting.

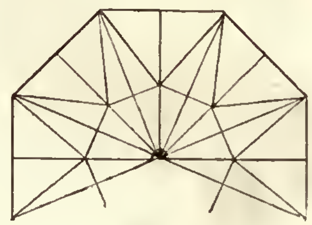
The result is a spacious interior of great dignity. The tracery and canopy details, although lacking the great charm of Wells, are effective, and the structural logic approaches that of the best French work.

The vault, which approximates more closely than any other Gothic effort outside of Italy and Spain to a real dome, arouses admiration, but æsthetically is perhaps less satisfying than some of the earlier examples where the central pier is retained. And, although the fact that reasons of economy and speed led the architect to employ timber rather than stone for his vault has offended some critics of sensitive taste, there is no mechanical reason why masonry might not be substituted.

The chapter-room is approached by a fine vestibule, and, in spite of minor defects, York chapter-house in picturesqueness of massing and in spaciousness and dignity is unsurpassed. Unlike most of the English chapter-houses, York still retains much of its splendid mediæval window-glass.

It may be of interest to consider the two lines of reasoning followed in the treatment of the polygonal vault with the central pier as employed in the chapter-houses.





In the one the vault was assumed to span from the sides of the polygon to the central pier; in the other from the angles to the pier. The former appears at first to be the more natural, but has the disadvantages of breaking the principal side of the vaulting compartment that rises from the corners into a resalient angle, and also making the main ribs from these angles across to the central pier in half their length transverse ribs and in the other diagonals; and of making one half represent a receding and the other a projecting angle, while the angle ribs of the outer half meet the transverse ribs of the inner half of the vault. The outer vault is cloistered, the inner groined.

These objections are entirely obviated by supposing the main vaults to run directly from the angle to the pier. In either case the ridge that surrounds that half of the vault which springs from the central pier takes the form of an inner octagon. In the first case the sides of this are parallel to the walls, while in the second they take an intermediate direction, the angles of the inner octagon being opposite the centres of the outer one. The vaulting compartments that rise from the angles of the great octagon are exactly like those that rise from the central pier, and the ribs that rise from the angles to the pier are throughout transverse ribs, while the angle ribs from each side regularly meet one another.

This latter method of vaulting was the one adopted in nearly all the finer structures, as Westminster, Salisbury, Lincoln, and Wells, while at York the inner octagon is parallel with the outer one, but the difficulties are avoided by dispensing with the central pier.

I think most of us will agree with Sir Gilbert Scott, who declared that few forms in any style of architecture present such beauties as an octagon vaulted in this manner.

(*Continued on page* 102.)

WELLS CATHEDRAL, SHOWING CHAPTER-HOUSE.

WORCESTER CATHEDRAL, RUINS OF GREAT HALL. CHAPTER-HOUSE AT RIGHT.

(*Continued from page* 100.)

Although built as adjuncts of greater structures, and in a measure overshadowed by the greater glories of the churches to which these chapter-houses are attached, there is a unity and directness of purpose about them rarely found in the larger buildings. And in spite of the fact that some of them, such as Lincoln, Westminster, and Salisbury, have been so far subjected to restoration as to lose much of their ancient charm, there is still in the character of this broad English designing evidence of the native vigor of the middle thirteenth-century ideal.

England has produced greater structural works and more imposing architectural monuments, but nothing more unique and spontaneous than her chapter-houses.

Big Building Has Right of Way

A Forecast for 1920

By Perley F. Ayer

Chief Planner for the Aberthew Construction Company

RECESSIONS in business, with accompanying recessions in prices, have recently been predicted in some quarters. Hope has been expressed of sagging demand for building materials and labor, with consequent reduced costs of construction, for whose advent owners are being advised to wait.

If, however, the figures recording past experiences are to be trusted, such advice is pretty poor; unless, indeed, owners are prepared to put their plans in their pockets, to be kept there not for two months but for two years. In short, 1920 promises to be, both relatively and absolutely, the greatest building period that the United States has ever known.

History has a way of repeating itself. The volume of contracts let in the early months of any one year constitutes a pretty reliable index of the total volume that will be booked during the entire twelve months. The F. W. Dodge reports issued for that part of the United States east of the Missouri and north of the Ohio Rivers record the percentage of the year's contracts which have been awarded in each month of the twelve during the past ten years, 1910–1919. They are as follows:

January	5.4 per cent	July	9.7 per cent
February	5.7 per cent	August	9.3 per cent
March	7.2 per cent	September	8.1 per cent
April	8.6 per cent	October	10.0 per cent
May	9.6 per cent	November	7.7 per cent
June	11.9 per cent	December	6.6 per cent

If these percentages hold, as they should, during the coming months the Dodge reports for January should supply the prophetic finger with which to write in advance the total for 1920.

It so happens that January's awarded contracts are reported at $235,000,000. In order to keep on the side of conservatism, let it be assumed that this will prove to be 6.5 per cent of the year's total, rather than the 5.4 per cent of the ten-year average. The result still indicates that the stupendous sum of $3,620,000,000 is to be spent on construction during 1920.

To be sure, these billions of dollars are really billions of fifty-cent pieces, and offer no immediate basis for comparison with the actual volume of construction in previous years. But, again, the Dodge reports come to the rescue with a table showing increase in building costs since 1910. Setting the costs of 1910 at 100 per cent, the Dodge table shows unchanging percentages through 1915. In subsequent years the climb proceeds as follows:

1916	117 per cent
1917	139 per cent
1918	159 per cent
1919	190 per cent

Brought to a common denominator of dollar-value building, volume since 1915 would appear thus:

	VALUE IN DOLLARS	DISCOUNT VALUE, OR TRUE VOLUME
1915	$ 940,090,000	$ 940,090,000
1916	1,356,990,000	1,158,000,000
1917	1,618,157,000	1,165,000,000
1918	1,689,242,000	1,055,000,000
1919	2,559,625,000	1,350,000,000
1920*	3,620,000,000	1,905,000,000

The upshot of these figures is that instead of approaching a recession in building we are, apparently, on the verge of a construction demand 40 per cent in excess of anything previously encountered.

Whether or not this volume of construction will be accomplished is a question whose answer is to be found not at all in pressure of demand, but exclusively in means of supply. Here exists a serious problem. During 1919 the shortage of materials and the uncertainty of their delivery, the insufficiency of labor, and the disorganization of transportation constituted the most serious impediments to the fulfilment of contracts within reasonable limits of time and price.

There is no sufficient reason to anticipate improvement in any of these particulars during 1920. A good many organizations, already creaking under existing strains, are likely to crack under the added burdens which will begin to blossom with the spring, and will grow and ripen with the expanding year. Not all projects launched will be brought to a triumphant conclusion.

In so far as these notes constitute a warning, however, they are not to be interpreted as a warning against undertaking building in general, but only against attempting certain kinds.

* Potential business based on January awards.

Colors Employed in Egyptian, Greek, and Gothic Architecture

By Albert M. Kreider

THE Egyptians were a people highly civilized, skilled in all the arts as far back as 6000 B. C., particularly in the employment of colors in architecture. They used various colors, such as red, yellow, blue, green, and white to decorate their monuments. Long-disused types of capital were revived and others greatly elaborated; and the symmetry rather Greek than Egyptian. With the exception of a few useful vaulted structures, all Egyptian architecture was based on the principle of the lintel. Artistic splendor depended upon the use of painted and carved pictures and the decorative treatment of piers and columns produced in halls like those of Karnak, of the Ramesseum, or of Denderah, having a stupendous effect by their height, massiveness, number, and colored decorations. The simplest piers were plain shifts; others, more elaborate, had lotus flowers or heads of Hathor carved upon them. Every part of the column was richly decorated in color. Lotus leaves or petals swathed the swelling lower part of the shaft, which elsewhere was covered with bands of carved pictures and hieroglyphics. The capital was similarly covered with carved and painted ornament, usually of lotus flowers, or leaves and papyrus.

The Greek mind, compared with the Egyptian, was more highly intellectual, full of logic and symmetry, and the communication of the Greeks with the Egyptians may have induced them to imitate the latter in the application of colors to ornaments. It seems to be a taste for colors and not the intention of rendering the different parts of a building more distinct from each other and substituting painted ornaments for ornaments in relief. The fact that Greek temples were colored on the exterior was a remarkable discovery, for the application of colors to their external decoration seemed to be rejected entirely.

It has been proven after many years of debating that all these parts, so severe and dignified in their simplicity of form, received a rich decoration of color. It is impossible at this day not to admit that it was among these people that the alliance of colors with architecture was made, and at a period when monuments were erected in the best style; while the precise shades and tones employed cannot be predicted with certainty, it is established that triglyphs were painted blue and the metopes red, and all the mouldings were decorated with leaf ornaments such as "egg and darts" and frets in red, green, blue, and gold.

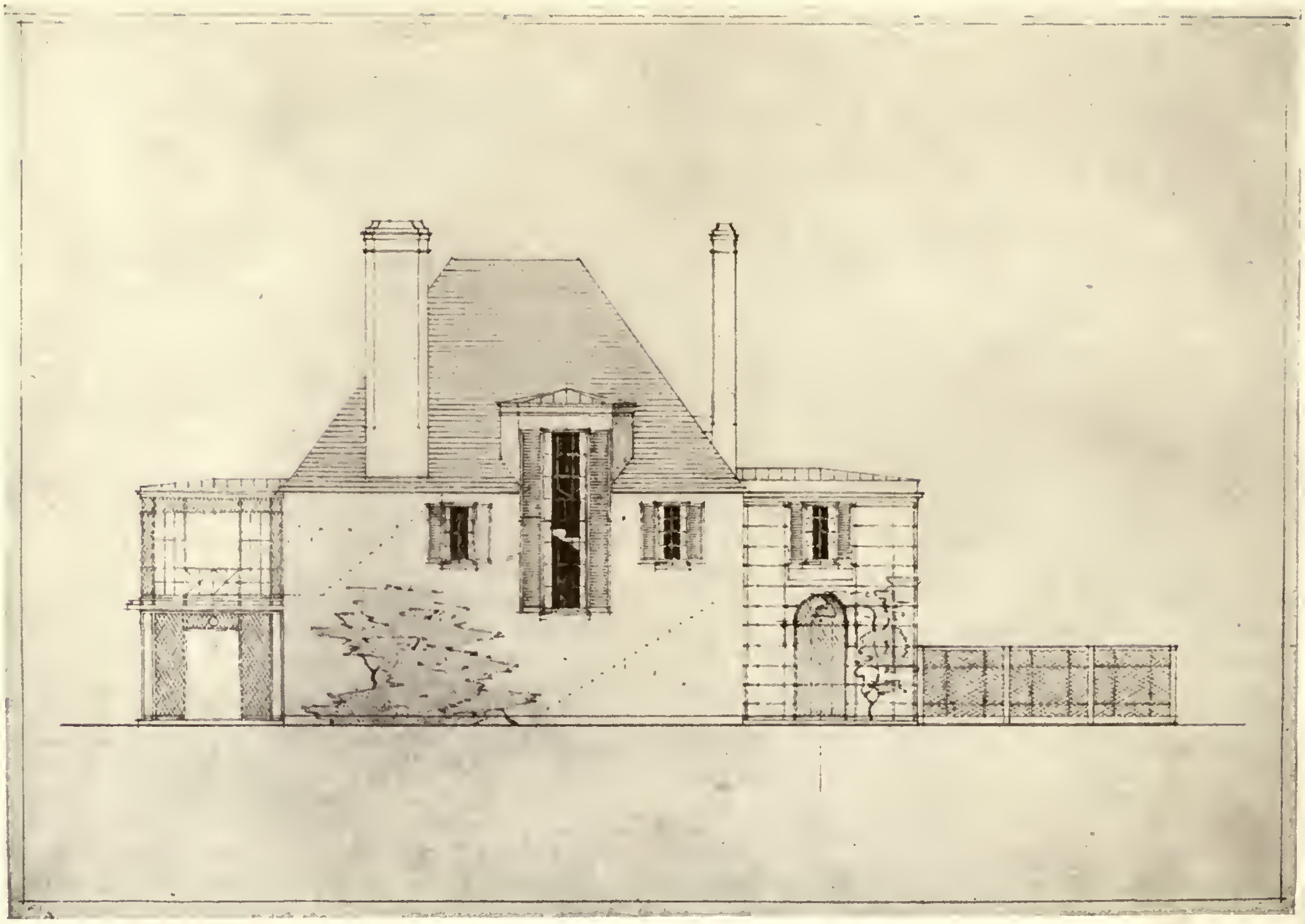
The walls and columns were also colored, probably with pale tints of yellow or buff to reduce the glare of fresh marble or the stucco-covered surfaces of masonry. The outlines against the sky in the clear Greek atmosphere, the Greek temple must have presented a rich aspect of sparkling gayety. In fact, the ruins of colored temples that were discovered by the excavations made in Greece, Italy, and Sicily have this characteristic in a remarkable degree. In the colored drawings of Greek monuments which you may have seen, you may not only notice the number of colors employed in these monuments—white, black, red, yellow, green, and blue—but also the use which has been made of them under the relation of variety and purity of tint, of distinct view of the parts, and of the harmony of the whole.

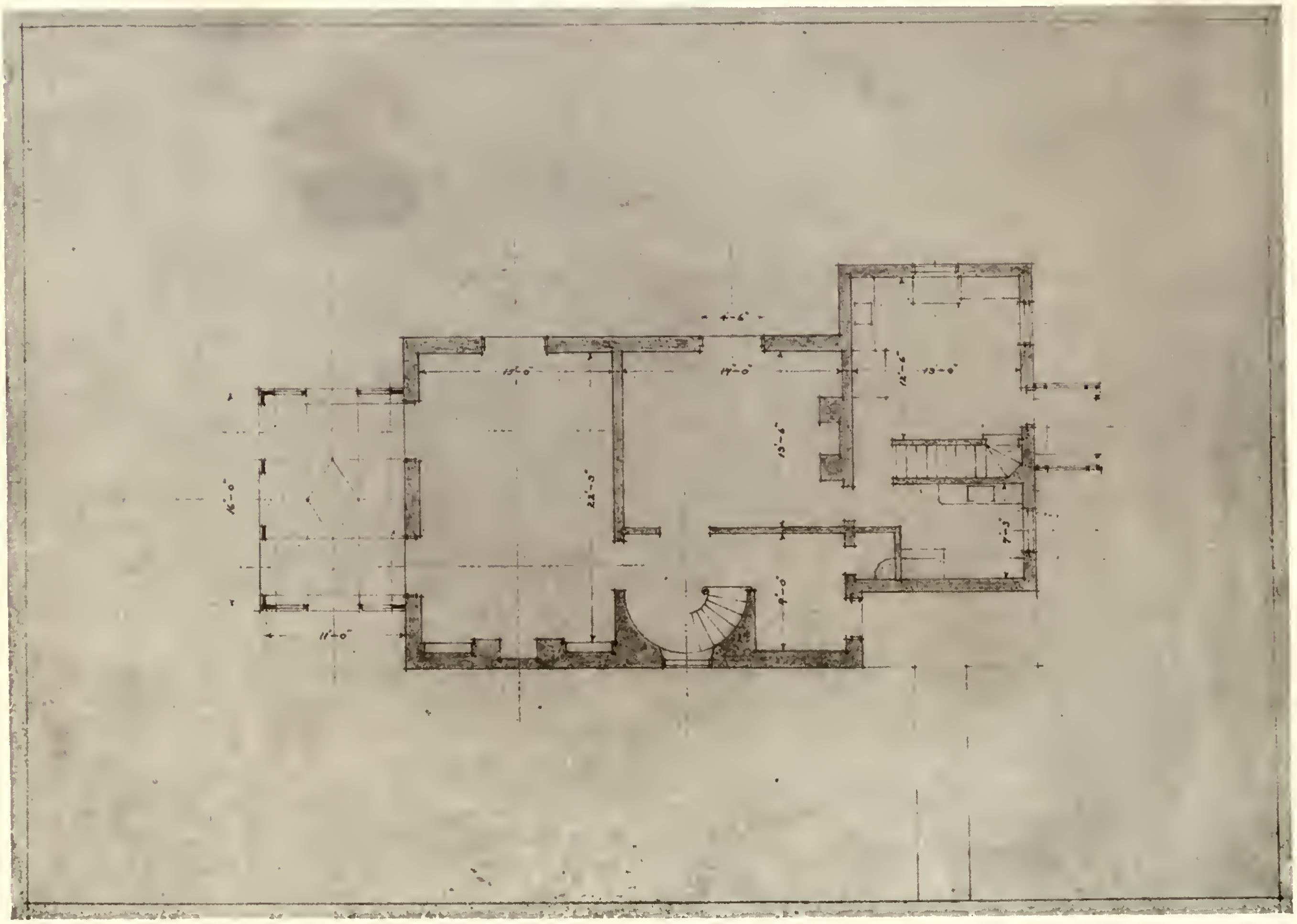
For instance, the principal lines, as the fillets of the architecture and of the cornice, are red; the mutules blue, and their guttæ white; the triglyphs blue, their channels black, and their gutter white; and the more extended parts of the frieze and the cornice, as well as the architrave, are of light yellow. We see that the greater part of the principal lines is indicated by a brilliant red, and the association of blue with black in the triglyphs and their channels formed a harmonious and distinct union of the neighboring parts; also light yellow, the dominant color, produced a much better effect than if the most intense or sombre colors had predominated. After all, the colors were distributed in the most intelligent manner possible, without being motley. It presented a variety and lightness in the tints with easy separation of parts.

In the great Gothic churches, color has rarely been employed on the exterior, except in a few cases, and always without injury to the general harmony and in a restrained manner. The color in the niches and on porches were of very little importance in this point of view, and in almost every case it was added long after the erection of the structure on which it is found. One thing to be admired in these vast edifices is the art or luck with which they have succeeded without color, having recourse to architecture and sculpture only in presenting to the exterior of the structure a variety which in no respect destroys the imposing and natural effect of the whole.

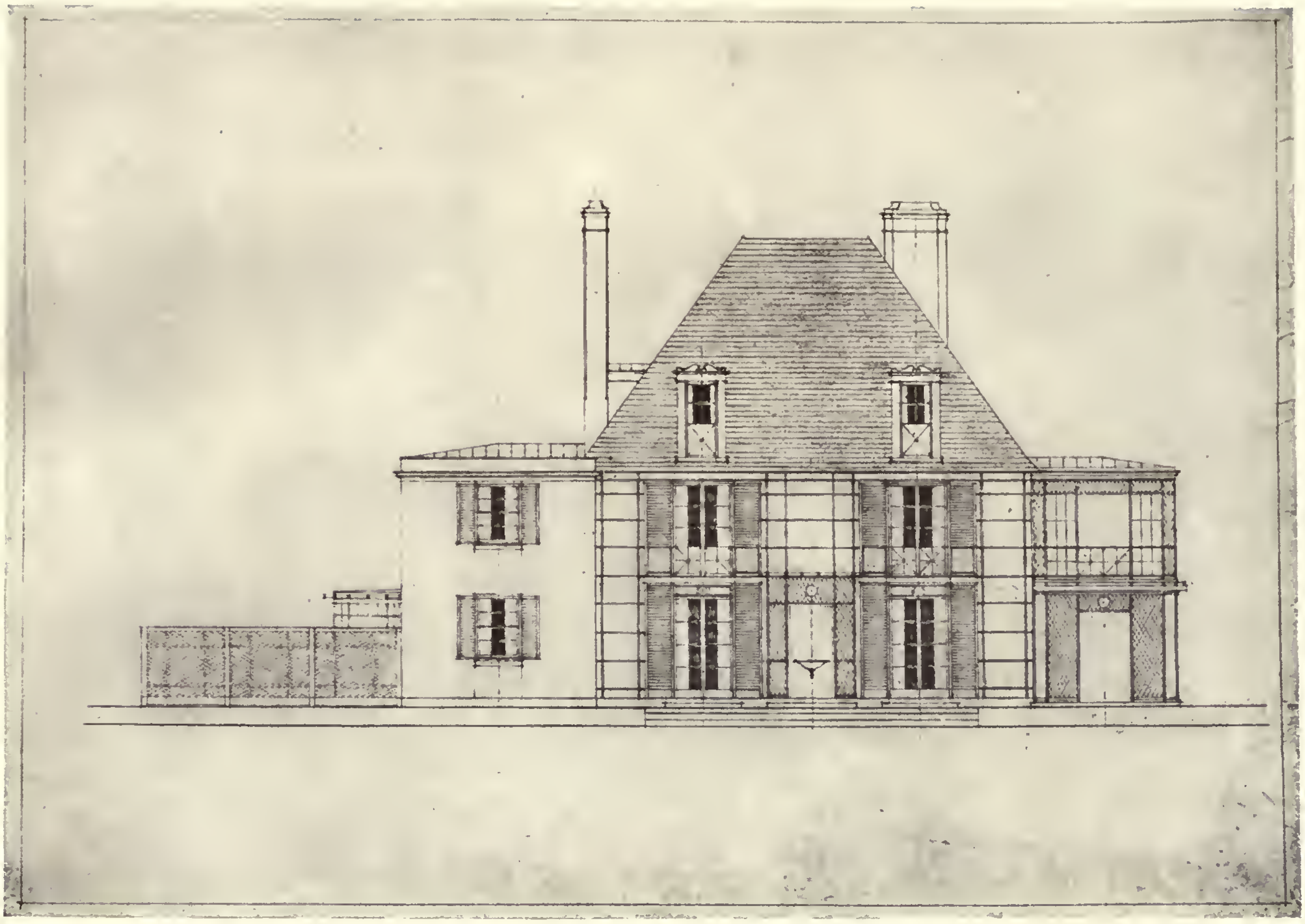
Speaking now of the interior of these churches, the ethereal colors of stained windows will complete the enjoyments which seem to strengthen the power of religious sentiment in all those who enter these edifices to impart their prayers to God.

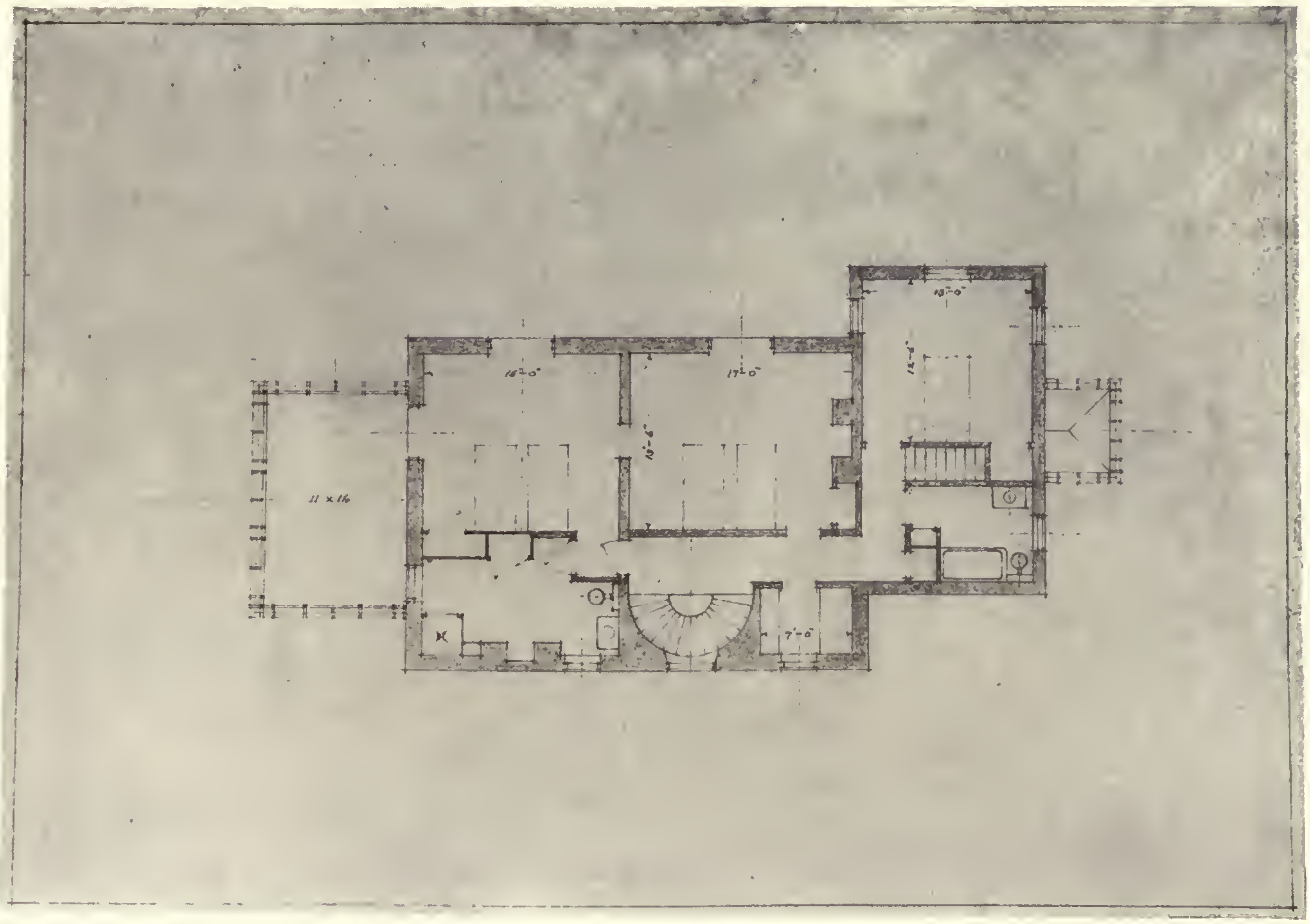
An author of a work full of research, whom I have in mind, thinks that the ceilings of Gothic churches ought to represent the celestial vault, and be painted blue, studded with gilt stars. It is a fact that painting has, from the very beginning, really concurred with architecture, and even with painted sculpture in the interior decoration of Gothic churches; it was only on the system of flat tints and in a secondary degree from the time it was decided to use windows of stained glass; for not any painting that was applied upon an opaque body, such as stone, wood, etc., could sustain itself beside the brilliant colored light transmitted by the glass. According to the rules of chiaroscuro, if this painting had been graduated, all its merit would have disappeared for want of crystal and white light, the one kind suitable for illuminating it. As an effect of harmony, one might say that the vicinity of stained glass requires painting on the contiguous walls. Without deciding altogether in favor of the negative, I confess that after reflecting upon the deep impressions that you receive in great Gothic churches, where the walls present only the simple effects of light and shade upon a uniform surface of stone, when there are no colors except those transmitted by the stained glass, I will say that the sight of more varied effects would have appeared to me an error against the principle of good quality. This opinion was especially strengthened after seeing the fine vault of the ancient cathedral at Rheims, which had been painted for the coronation of Charles X. It was a field of blue, sprinkled with fleurs-de-lis. This beautiful example leaves a deep impression on you.





DESIGN FOR HOUSE AT GERMANTOWN, PA. Edmund B. Gilchrist, Architect.





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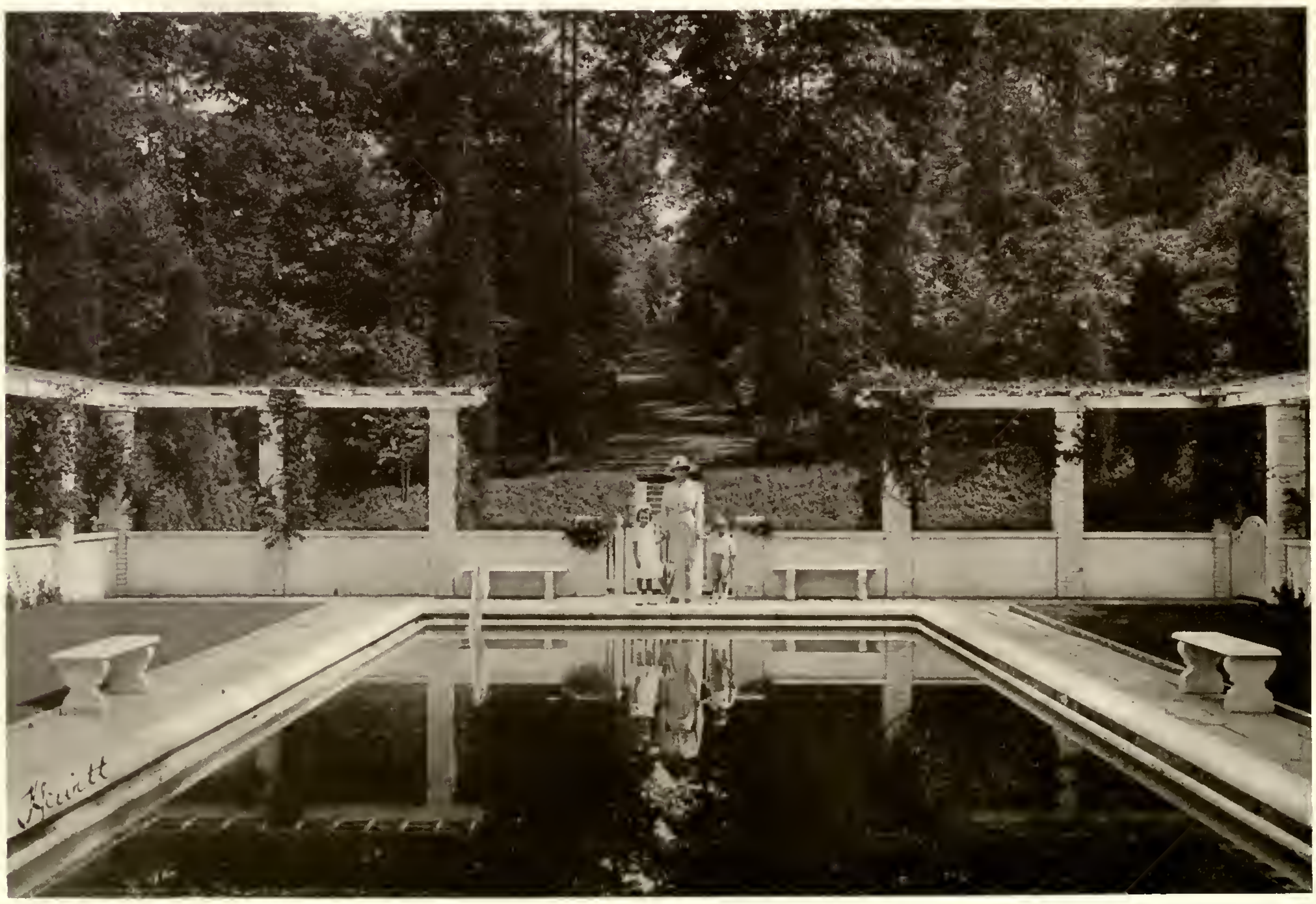


SWIMMING-POOL FOR ROBERT E. BREWSTER, AT MT. KISCO, N. Y. Delano & Aldrich, Architects.

Editorial and Other Comment

Our Architecture as History

NONE of the arts are more closely identified and expressive of the civilizations that gave them birth than architecture. It needs no words to suggest the significance of Greek culture as manifested in the Parthenon, nor is there any doubt of the character of the races that built the pyramids and the great Egyptian temples. In England and France the cathedral builders wrote the thoughts of the times in the wonderful and beautiful structures that have made Gothic a symbol of worship and a manifestation of the spiritual mood of the time. The marvellous church of St. Sophia at Constantinople embodied the best culture of the East when Byzantium was a world power, and so on through the whole gamut of the ages.

What will the future generations think of the American architecture of our time? How will they relate it to our civilization, how interpret the meaning of the sky-scraper in terms of human endeavor and thought. Will our steel cages last long enough to become historic exhibits? Our Georgian or Colonial period will have become a thing of the past, for the old houses are now fast disappearing and there is nothing so individual and distinctive to take their place. There will be little doubt of a realization of the fact that in our cities we lived and worked as bees in the hive. Some of our great business palaces will show how crowded we were in working hours, and that some of them must have held the population of a small city. There will be manifest the need of building toward the sky in lieu of the obvious lack of space for basic expansion, and as we look upon the great blocks of the pyramids, the columns of Luxor, so maybe will the future at our high buildings. They will wonder at the skill and splendid courage, the enterprise, the daring and assurance that made them possible, even if only here and there they find notable evidences of the things that are called art, the refining arrangement even of big things, design in keeping with the money lavished and the opportunities offered to men of genius. It would be interesting to read their comment on such structures, say, as the Flat Iron Building, when they come to discover the great masses of steel at the angles that were put in it to enable it to resist the tremendous strains to which it must be subjected. We shall be thought of at least as a people of wonderful engineering knowledge and commercial enterprise. Our high buildings and the remains of the great bridges throughout the country will leave no doubt of this.

Without a Home

WE have been writing from time to time of housing conditions. As a matter of fact, the subject has long since passed the theoretical stages, the state of discussion in general terms. There is no more vital topic before us, nor one that calls for a more immediate practical solution. Our cities have grown in population with tremendous strides, while the building of places where people may live has been at a standstill. The result is a constant advancement in rentals with an equally constant inability on the part of hundreds to meet these advances. The owner of property is governed by the demand and rents his space to the highest bidder. The tenant who for years has met his obligations, who has remained in spite of the offer of other agents of newer and better quarters at a like or even a less rental, receives no more consideration than the tenant of yesterday. Pay the advance or get out is the answer. This condition has ceased to be one of merely ordinary business. In many cases it has and will continue to create a state bordering on panic. Thousands who are employed in our cities whose incomes are fixed are unable to meet the competition of those who have made money by the war, and they are confronted with the fate of those subject peoples who have been driven from their homes by a marching horde of conquerors.

We present the following significant figures compiled by Mr. Wharton Clay, Commissioner of the Associated Metal Lath Manufacturers:

"With a conservative estimate of 27,900,000 families in 1925 the great housing shortage will continue unless building in all parts of the country increases to an extent unparalleled in the history of the construction business.

"If only the current number of homes are constructed each year for the next five years 409,500 homes must be built, and the congestion will reach 129.6 families per hundred homes or 2 families in every fourth house.

"Merely to keep up with the increasing number of families and in no way alleviate the present congestion 2,139,000 homes have to be constructed before 1926, while a return to the pre-war conditions of 115 families per 100 homes means the building of 3,340,000 dwellings in that period. When it is considered that in a town of 25,000 this construction programme means 475 and 750 homes in five years respectively, the stability of the building industry becomes apparent.

"The following table shows how, for the last three decades, the number of families in the country has exceeded the number of dwellings:

	FAMILIES	DWELLINGS
1890	12,690,152	11,483,318
1900	16,187,715	14,430,145
1910	20,255,555	17,895,845
1915	22,786,499	19,853,517
1916	23,292,887	20,263,051
1917	23,799,275	20,672,051
1918	24,305,662	20,808,562
1919	24,872,051	20,829,039
1920	25,319,443	20,900,000

Concrete Housing

THE recent National Conference on Concrete Construction in Chicago brought out a great deal of helpful and practical discussion. None of the papers read seems to us more to the point from the architect's point of view than that by Irving K. Pond. There is no question of the almost immeasurable usefulness of concrete construction.

"My first item of advice, if I may be permitted to offer advice to a body of men interested in the development of or handling a comparatively new and altogether worthy building material, is to treat the product with respect, to shun and scorn imitations, to recognize limitations, which attach to all materials, as well as to all men, and to work within those limitations. This is not saying that because a thing has been done, and frequently and appropriately done, in one material it shall not be done in another or a new material which may be employed with equal propriety; however, the new material should not employ forms which are purely distinctive of the old, but should develop forms which inherently characterize the new.

We are of the opinion that there are few better ways of quickly meeting some of the present housing needs, than by a wide use of concrete. With an architect to design and give attractive form to the houses that may be constructed, there are charming possibilities. In France they are building some most attractive little houses of concrete slabs, some of them with surprising rapidity—a matter of only two or three days.

Concrete is a material which lends itself to many kinds of manipulation. It can be cast, poured, pressed, assembled in the shop or on the job; it can be applied in liquid or in solid form to the work immediately in hand. So many are the possible methods of its application—such a diversity of means may be employed toward its legitimate ends, that some of its enthusiastic sponsors see in it a panacea for structural ills and possibly for æsthetic building ills, a substitute for all previously employed building materials—excepting, possibly, door hinges—and a perfect end in itself."

Beaux-Arts Institute of Design

Free courses in instruction in architectural design, sculpture in all its branches, mural paintings, and interior decoration. In the course of architectural design, there is a registration fee of $2.00 per annum required; in the other courses there are no fees of any kind.

PURPOSES OF THE INSTITUTE

To furnish instruction in the arts of design at a minimum cost to students. To bring art students under the criticism of artists who are engaged in active practice. To carry students beyond the academic study of the arts into the province of their application and practice. To bring about co-operation among the various art schools of the country. For this purpose it is desired that students, whether studying at other art or architectural schools, or organized in clubs or working independently, take part in the competitive work laid out for them, and that the instructors of such classes take part in the juries of award. To provide young artists of proved talent with studios and materials to perfect their art. To allow art students to study throughout the year uninterrupted by holidays. To provide young artists of proved talent with studios and materials to perfect their art.

Circulars of information may be had by addressing the Institute at 126 East 75th St., New York.

Book Reviews

"A HISTORY OF THE METROPOLITAN MUSEUM OF ART." Published by the Museum.

"The History of the Metropolitan Museum of Art," written by Miss Winifred E. Howe, is a volume of medium octavo size with xvi+361 pages, and numerous portraits, views of buildings, plans, and facsimiles. It contains, besides the history proper, an introductory note by the president, Robert W. de Forest, and an Introduction on the Early Institutions of Art in New York, including the American Academy of the Fine Arts (1802–1841); the New York Historical Society (established in 1804); the National Academy of Design (established in 1826); the Apollo Association (1839–1853); the New York Gallery of the Fine Arts (1844–1858); the Cooper Union (chartered in 1859); and several institutions of minor importance, such as the American Museum of John Scudder, Peale's Museum, Browere's Gallery of Busts and Statues, Old Paff's Gallery, John Vanderlyn's Panoramas, the Old Sketch Club, the Düsseldorf Gallery, and the Crystal Palace Exhibition.

The history proper is divided into seven chapters dealing in order with the period of organization, from 1869–1871, the Museum in the Dodworth Building during the years 1871–1873, in the Douglas Mansion from 1873–1879, the first years in Central Park from 1880 to 1888, the first addition to the Park building, 1888 to 1894, and its continued extension in 1895 to 1905, and the period under the presidency of J. Pierpont Morgan beginning in 1905.

"To write the life story of an institution requires exercise of that bravery which is proverbially assumed to be especially favored by fortune. Biography has the prop at least of some one striking personality with which to support the interest, too often limp and apathetic, of the general public, but the long corporate existence of an institution, though it may plead with any individual a precarious infancy and a youth of noble struggle, demands a special talent in its historian if the narrative is to win deserved recognition. Such sympathy and understanding are brought by Miss Winifred E. Howe to her 'History of the Metropolitan Museum of Art' (the Metropolitan Musuem of Art, New York). She has added further a chapter on the art institutions in old New York, which, as it were, gives the reader the ancestral tree of this now famous gallery."

"MODERN FARM BUILDING." New and enlarged edition. By ALFRED HOPKINS, A.A.I.A. Robert M. McBride & Co., New York.

Mr. Hopkins needs no introduction to architects or any qualified comment upon either his authority or his wide and special knowledge of his subject. He has specialized in this field for a number of years, and his book is the outcome of practical experience as well as a theoretical knowledge of architecture. The volume includes farm buildings from the smallest establishment to that of the large estates. All types of construction are shown and buildings for various kinds of stock. It is up-to-date and in keeping with the best modern ideas of farm management.

"ESTIMATING CONCRETE BUILDINGS." By CLAYTON W. MAYERS. Published by The Aberthaw Construction Co.

Estimating the cost of constructing concrete buildings is a process concerning which most architects, engineers, and contractors have still much to learn. Indeed, in so far as is known Mr. Mayers' modest volume is the first to be published on this subject.

Pioneer though it is, "Estimating Concrete Buildings" is an extemely clear and well-arranged treatise. Starting with the most elementary considerations, it explains each successive step in estimating a building, part by part. The sum of the parts constitutes a complete estimate, which is reproduced in facsimile. An additional section discusses methods of establishing unit costs.

"A HISTORY OF EVERY-DAY THINGS IN ENGLAND. DONE IN TWO PARTS OF WHICH THIS IS THE SECOND. 1500–1799." Written and Illustrated by MARJORIE and C. H. B. QUENNELL. Charles Scribner's Sons, New York. London, B. T. Batsford.

Primarily written for young people, this interesting book contains much information both entertaining and instructive for grown-ups. It has a good deal to say about the development of architecture and the customs and ways of living of the people who lived in the types of buildings shown, and there are a series of drawings that give details of the development of ships from the time of the Mediterranean galley to the days of the famous tea-clippers. The plates of costumes should prove of value to those interested in designing clothes of a particular period. The book contains the kind of every-day information that is often difficult to find with an admirable series of line drawings that add much to its usefulness and interest. Both of these volumes contain many architectural drawings and details of household furniture. They take one into the homes of the people from the time of Elizabeth to the Georgian period.

MANTEL AND FIREPLACE IN LOBBY, JOHN LEVY GALLERIES, 559 FIFTH AVENUE, NEW YORK. Rouse & Goldstone, Architects.

MR. LEVY'S OFFICE, JOHN LEVY GALLERIES, 559 FIFTH AVENUE, NEW YORK.

Rouse & Goldstone, Architects.

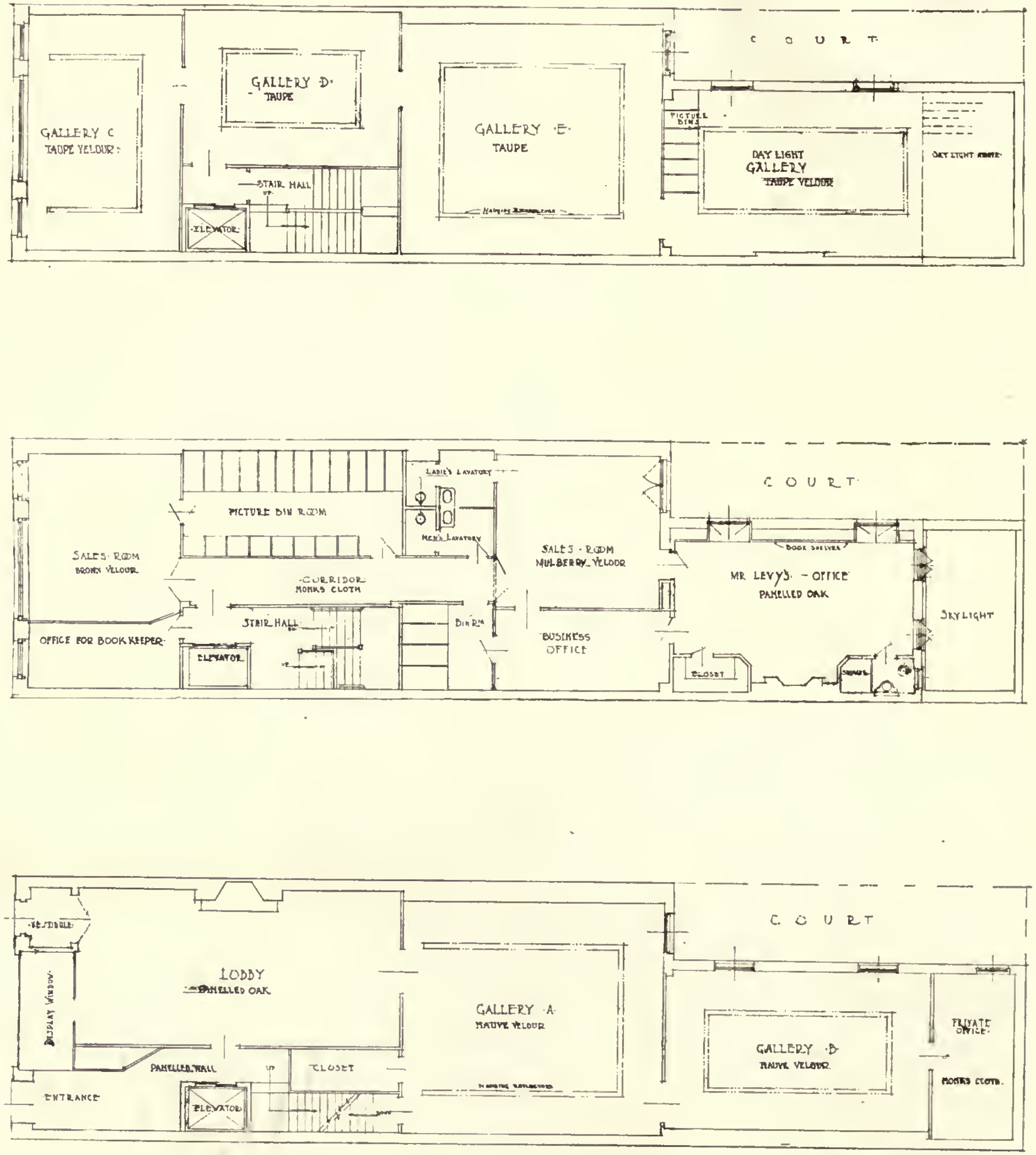
LOBBY.

TYPICAL PICTURE GALLERY.

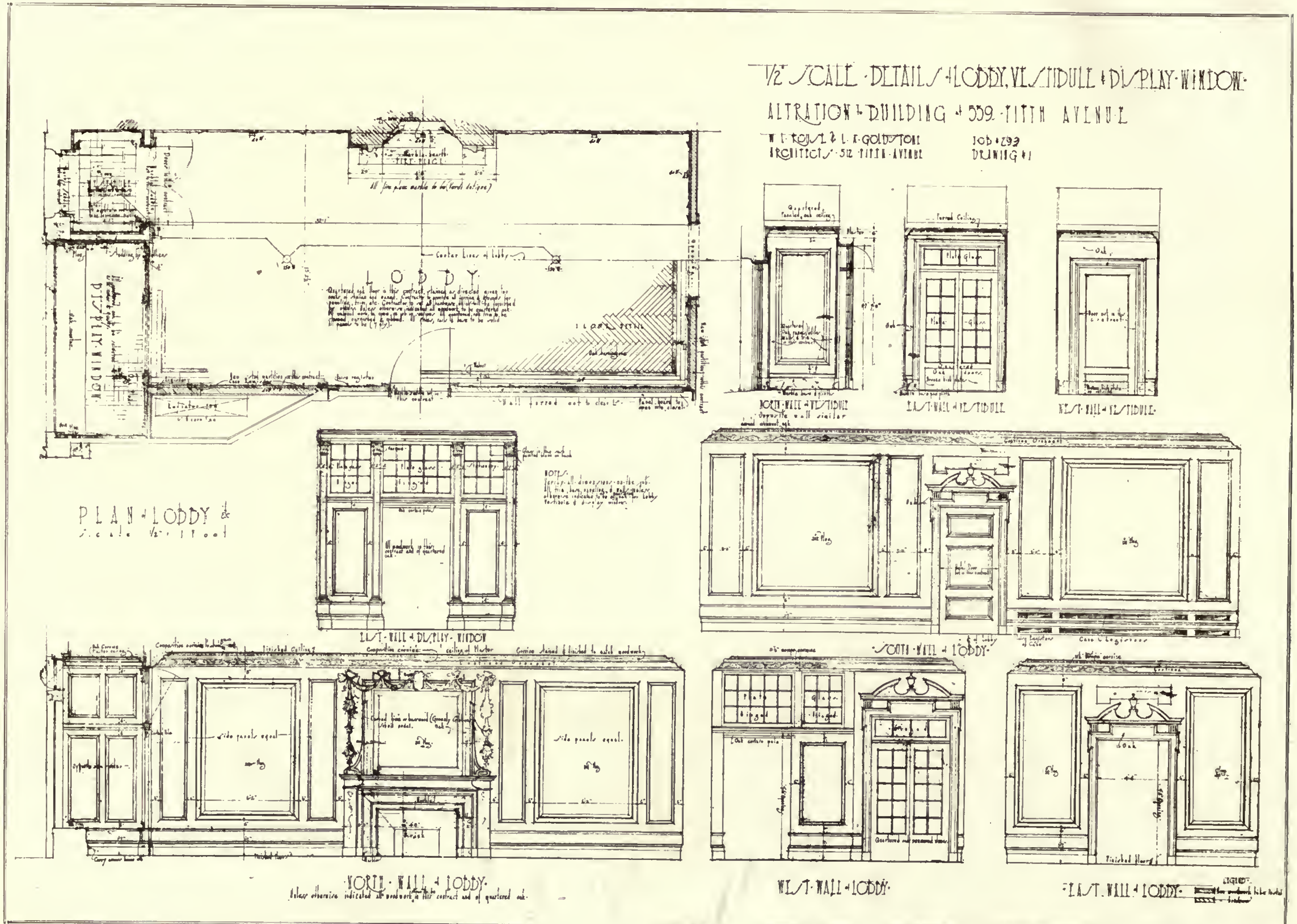
Rouse & Goldstone, Architects.

JOHN LEVY GALLERIES, 559 FIFTH AVENUE, NEW YORK.

ALTERATION, EXTERIOR, 559 FIFTH AVENUE, NEW YORK. Taylor & Levi, Architects.



PLANS OF JOHN LEVY GALLERIES, 559 FIFTH AVENUE, NEW YORK Rouse & Goldstone, Architects.



JOHN LEVY GALLERIES, 559 FIFTH AVENUE, NEW YORK.

Rouse & Goldstone, Architects.

GARDEN FRONT, HOUSE, EGERTON L. WINTHROP, SYOSSET, LONG ISLAND.

Delano & Aldrich, Architects.

ENTRANCE FRONT.

GARDEN.

Delano & Aldrich, Architects.

HOUSE, EGERTON L. WINTHROP, SYOSSET, LONG ISLAND.

LIBRARY.

DRAWING-ROOM.

Delano & Aldrich, Architects.

HOUSE, EGERTON L. WINTHROP, SYOSSET, LONG ISLAND.

LIBRARY.

HOUSE, EGERTON L. WINTHROP, SYOSSET, LONG ISLAND.

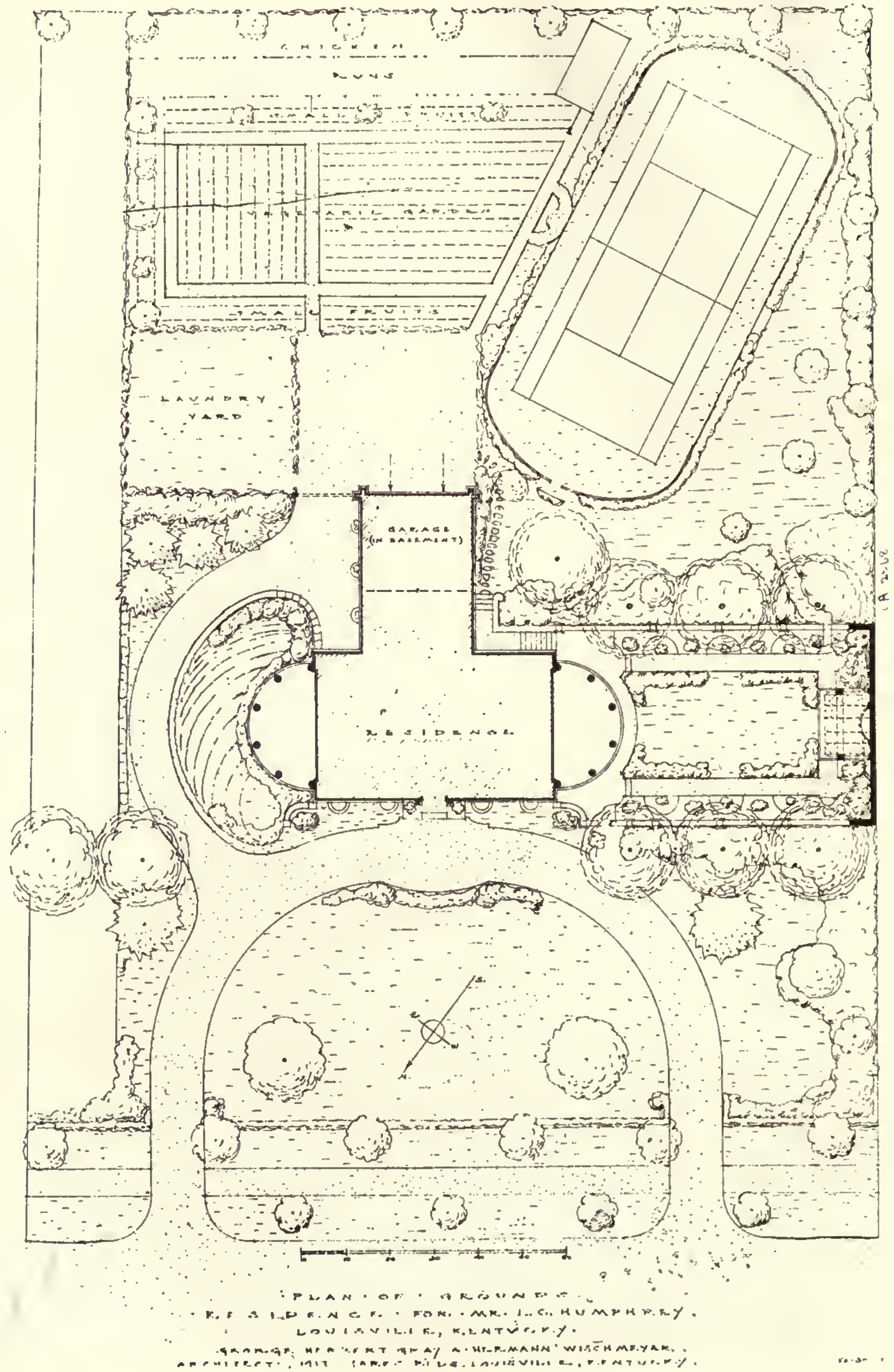
Delano & Aldrich, Architects.

RESIDENCE, LEWIS C. HUMPHREY, LOUISVILLE, KY.

George Herbert Gray, Herman Wischmeyer, Architects.

RECEPTION HALL.

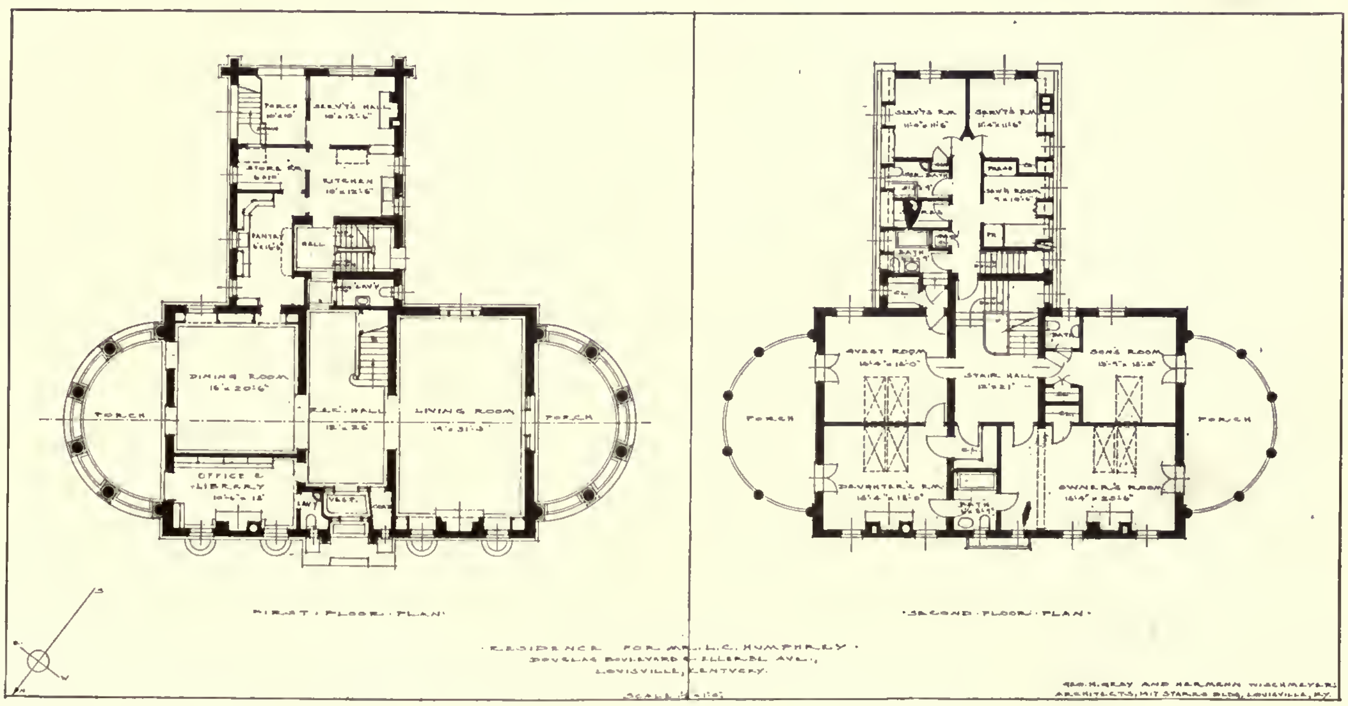
DINING-ROOM.



RESIDENCE, LEWIS C. HUMPHREY, LOUISVILLE, KY.

George Herbert Gray, Herman Wischmeyer, Architects.

OFFICE AND LIBRARY.



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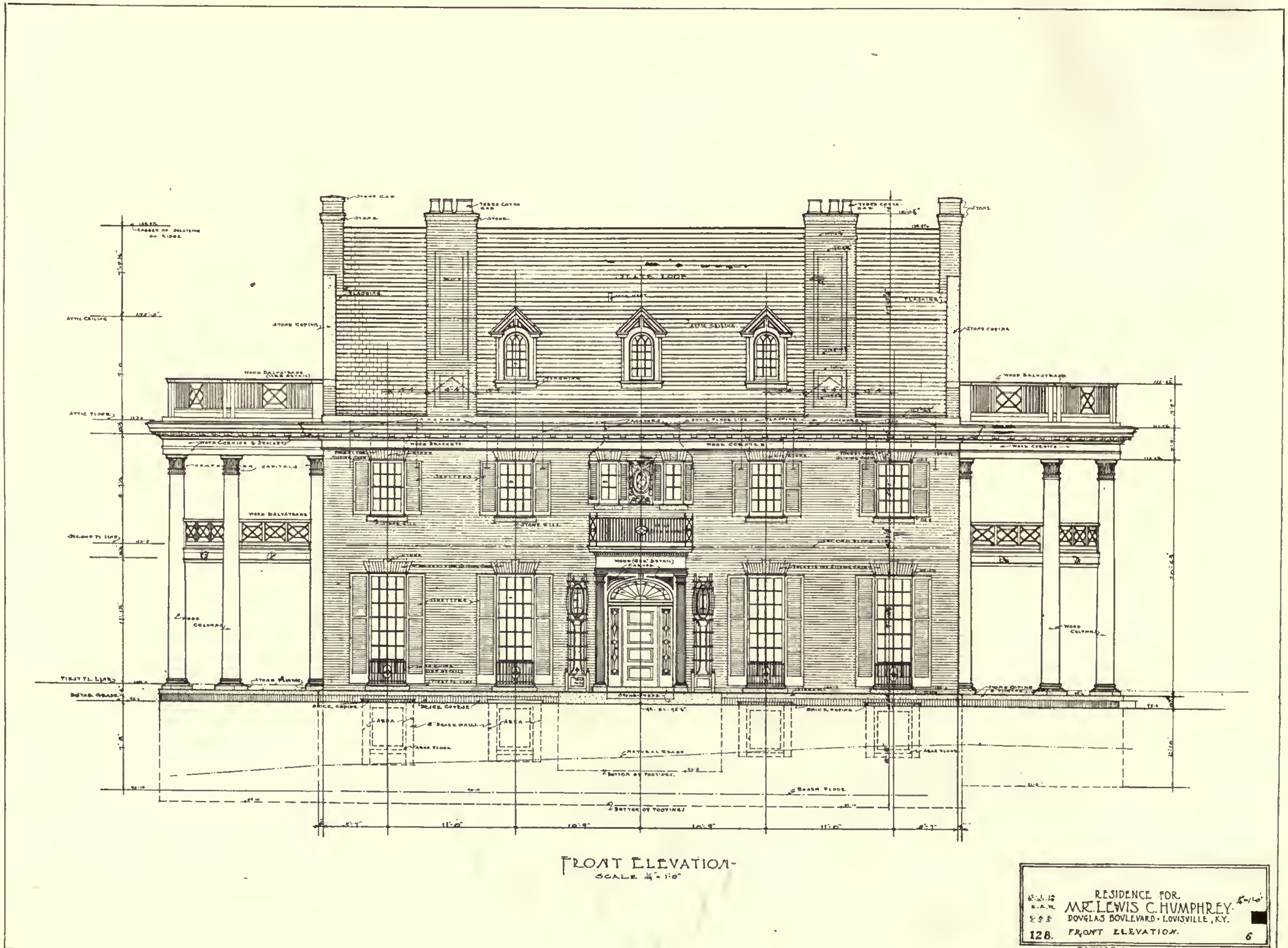
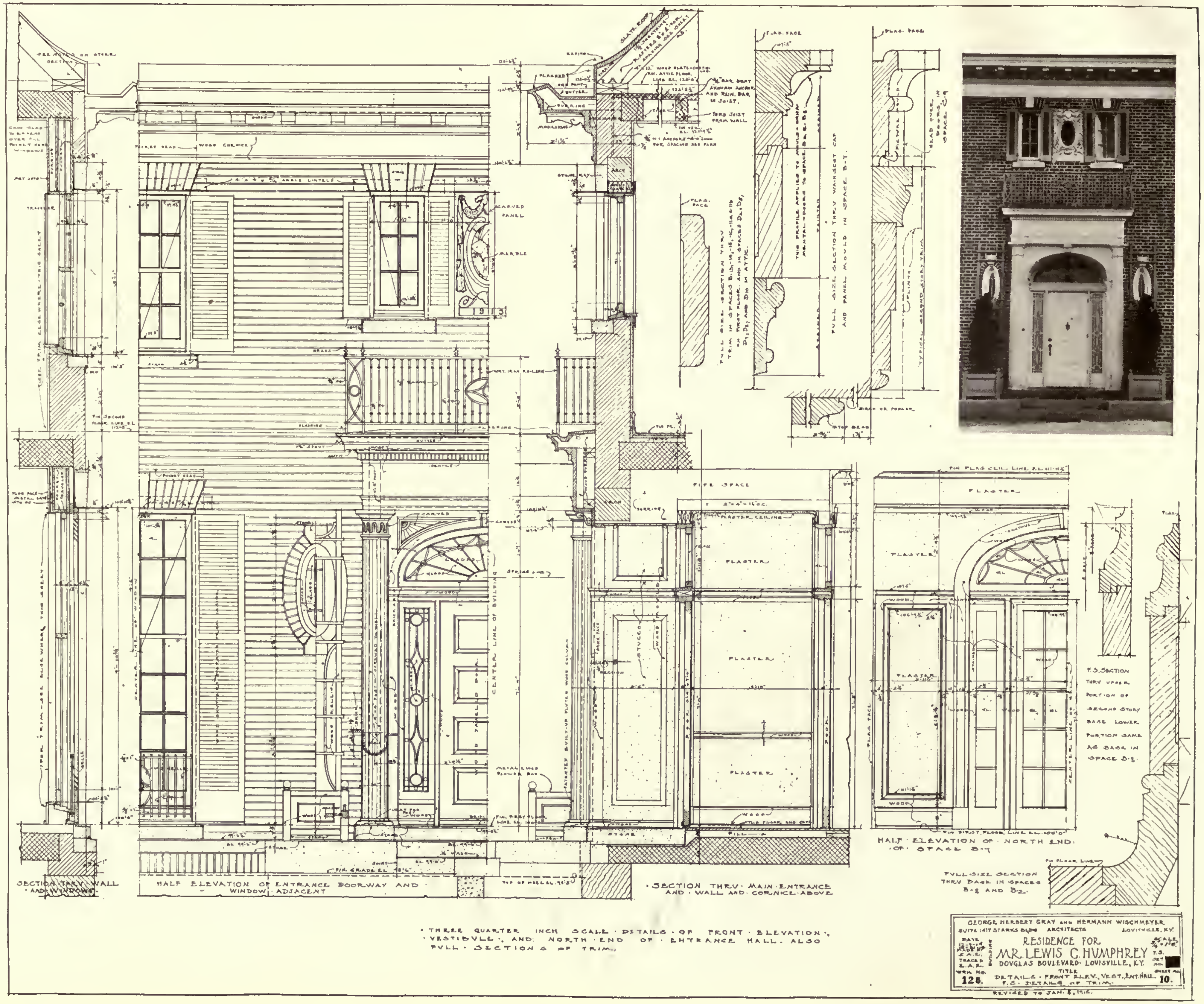


George Herbert Gray, Herman Wischmeyer, Architects.



George Herbert Gray, Herman Wischmeyer. Architects.

NEW OFFICES, W. R. GRACE & CO., LIMA, PERU.

James Wm. O'Connor, Architect.

DETAIL OF FAÇADE.

GENERAL OFFICE.

James Wm. O'Connor, Architect.

NEW OFFICES, W. R. GRACE & CO., LIMA, PERU.

New Offices of W. R. Grace & Co., Lima, Peru

James Wm. O'Connor, Architect

THIS is the first steel-frame building to be erected in Lima, and also the first building having modern equipment in the way of plumbing fixtures and fittings, the concealing of all telephone and lighting wires in conduits, and the electrical operation of clocks from a central master clock. The construction work was done largely under pioneering conditions, and the men employed were for the most part untrained Cholo Indian laborers. All of the material was delivered at the site in three-mule two-wheeled carts, and this transportation system leaves quite a little to be desired. However, the work was carried through successfully, and as a result Lima has made a long step forward toward good architecture and permanent construction.

Main entrance to new offices, W. R. Grace & Co., Lima, Peru.

The exterior, which is reminiscent of the French Renaissance, has been executed in granite and white cement stucco, the granite having come from the nearby quarries of Amancaes, and conveys at once a dignified and massive appearance. The iron and bronze work of the doors and window grilles, all of which was made in New York City, are particularly pleasing.

The arrangement of the interior consists of a large general office, which is entered directly from the street. The office is 120 feet long, 70 feet wide, and 40 feet from floor to ceiling. In it are located the cash and cable departments directly opposite the entrance, the steamship, executive and indent departments to the left, and the general merchandise and engineering departments to the right. This room is in the Tuscan order, and its great size and the harmony of its design and color make it very impressive. The ceiling, which is of stucco heavily ornamented, is supported by eight columns. The columns and walls are of Caen Stone Cement. Between the columns the ceiling is carried up twelve feet above the general level in a farola that is surrounded with windows, giving light and ventilation. The cash and cable department enclosure is of Botticino marble, and the balustrade surrounding the public waiting space is of the same. The floor is of pink Tennessee marble tile, excepting that portion occupied by the cash and cable departments, which is of cork tile. This general office is virtually a copy of the main room of the Grace office, Hanover Square, New York City.

Directly below the cash department are two vaults, each of which has a heavy manganese steel, fire-proof door. The walls of these vaults are of massive concrete heavily embedded with steel rails and bars. At the left of the main office is a two-story section containing, on the ground floor, the manager's private office, the board room, and the mail department, and on the upper floor, the mail-order, sample, and catalogue rooms.

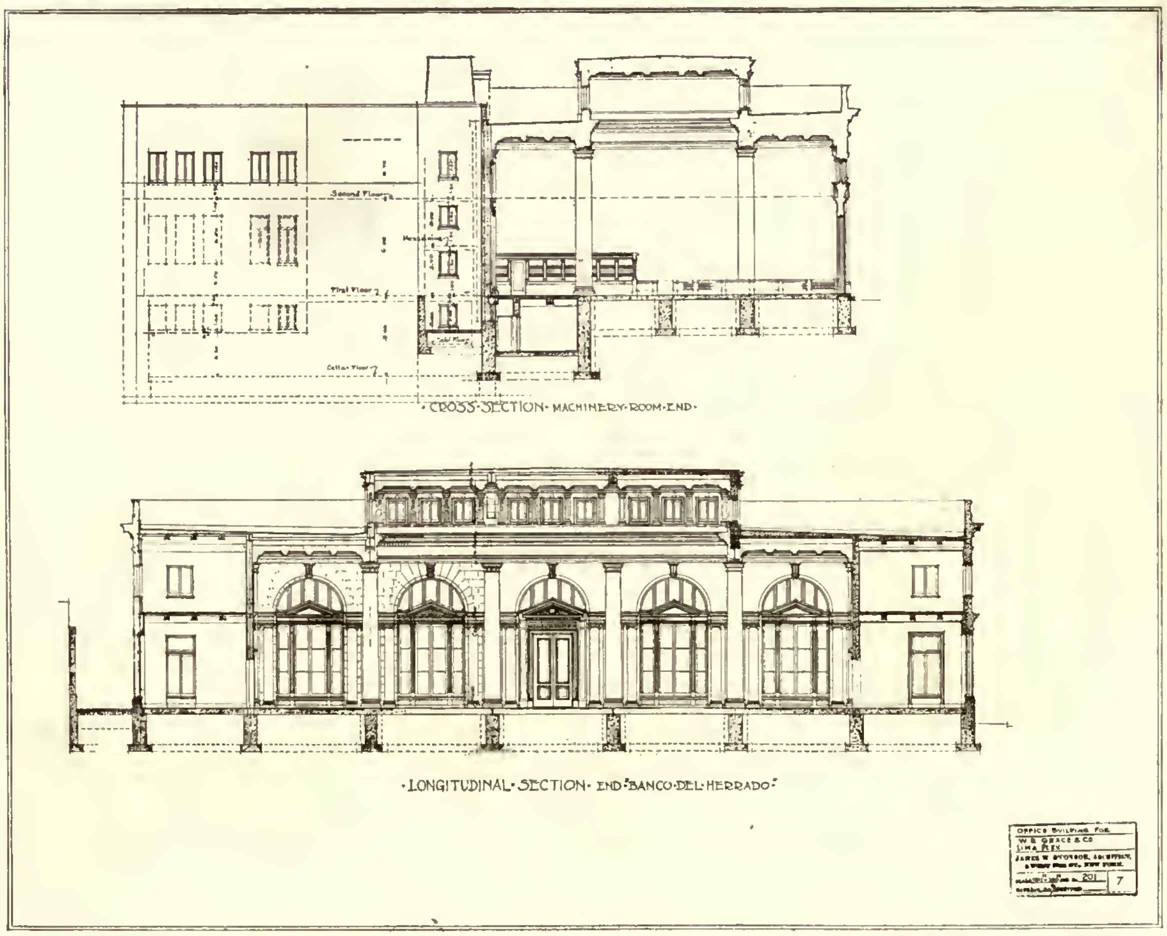
The basement is served by an electrically operated elevator, which has a lifting capacity of 3,000 pounds. The roof is finished with an impermeable felt and asphalt composition, and forms an attractive promenade. From it can be obtained an excellent view of the city of Lima, and also in the distance the Pacific Ocean.

The general appointments and equipment of the building are modern in every detail. Every office room is equipped with an electric clock, each of which is operated from a master clock located in the mail room. There are ten secondary clocks and with this system a uniform time is maintained throughout the building. The central telephone switchboard is also located in the mail room, which thus becomes the centre of all mail, telephone and time communication.

The furniture throughout the building is finished to the color of mahogany, and has been purchased or especially designed. In this way there is uniformity of equipment throughout. The desks, tables, and cabinets are all of Nicaragua cedar and have been made in Lima factories.

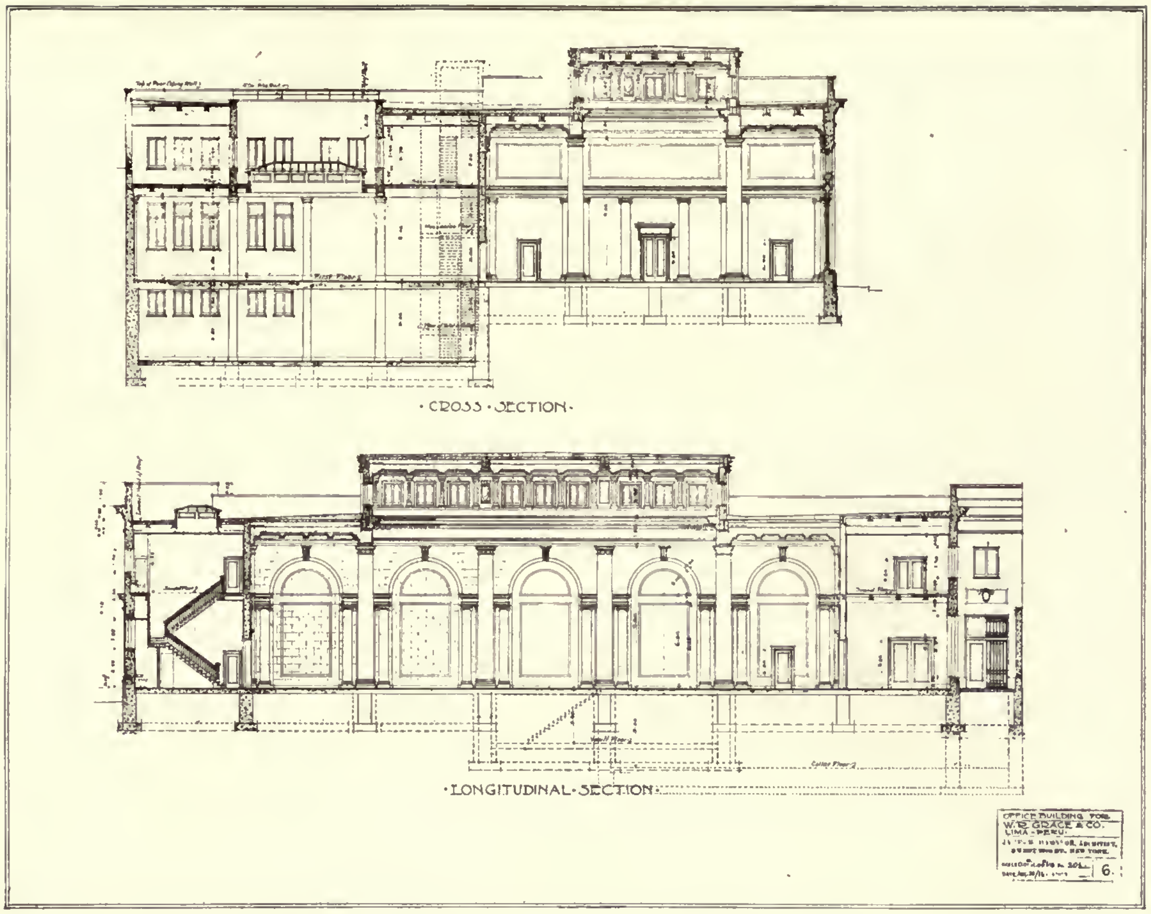
The floors of all the offices, except the main office, are covered with a heavy battleship linoleum, a material which is very resilient and comfortable to walk upon, and which silences all footsteps.

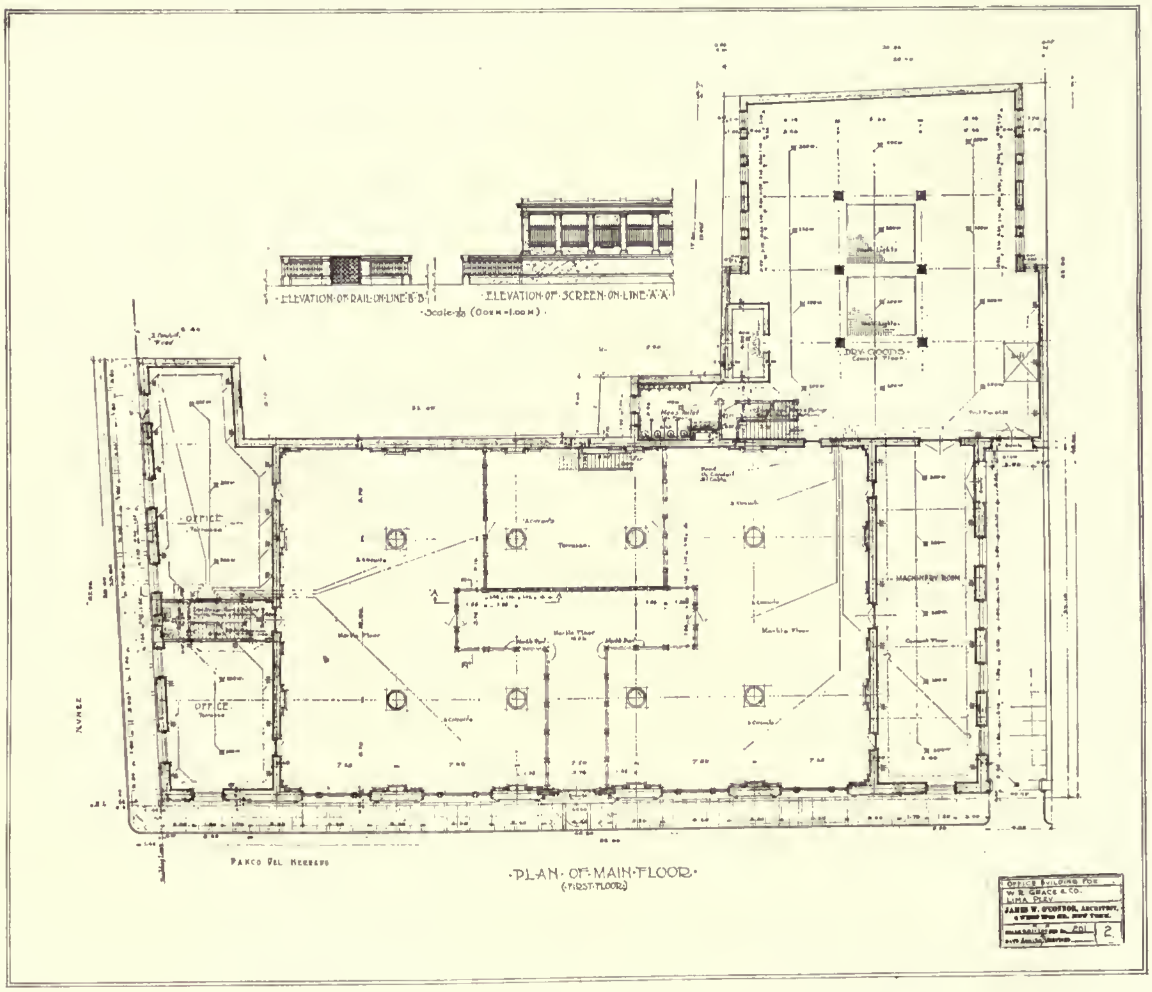
Work of construction was begun on December 11, 1916. The erection of the steel frame began March 16 and was finished June 15, 1917. The building was completed March 1, 1919. The frame of the building consists of structural steel columns and beams, and the walls, floors, and roof are reinforced concrete. The architect is Mr. James W. O'Connor, of New York, and the resident engineer in charge of the construction is Mr. F. Lynn Palmer, also of New York.



James Wm. O'Connor, Architect.

ELEVATION AND LONGITUDINAL SECTION, NEW OFFICES, W. R. GRACE & CO., LIMA, PERU.





James Wm. O'Connor, Architect.

SECTIONS AND PLAN, NEW OFFICES, W. R. GRACE & CO., LIMA, PERU.

An Accounting System for an Architect's Office

By H. P. Van Arsdall

Of Samuel Hannaford & Sons, Architects, Cincinnati, Ohio

FOR a great many years the architectural profession has been groping in the dark, and endeavoring to find some logical and accurate method of keeping accounts. The writer, after ten years' experience, has attempted to formulate a system which, he believes, will be accurate and simple.

The architectural business is operated somewhat on similar lines to a doctor's or a lawyer's office—it is strictly a professional service. It contemplates the furnishing of plans and specifications and the supervision of the actual construction of buildings. Frequently no supervision is performed. This especially applies to out-of-town work.

The American Institute of Architects has established a scale of fees to which we are obliged to strictly adhere. These fees are charged, regardless of whether or not we make or lose money on a particular job. The fee is a percentage, based upon the cost of the completed structure. There are cases where a flat charge is made for consulting service.

Unfortunately, plans and specifications are frequently made for a proposed building, and, on account of some unforeseen obstacle, the work is abandoned. In this case it becomes necessary to charge your client for the cost of preparing the drawings, plus a reasonable margin of profit. Often this leads to serious controversy, due to the inefficient cost system that is now in vogue, and it has been this, more than anything else, that has led the writer to devise the following system of accounting.

It might be well to mention the fact that the great majority of architects have kept their records on the Receipt and Disbursement basis. This system is entirely inadequate, and violates all principles of accounting.

The general records, as designed, contemplate keeping the books on the so-called Accrual System.

The following Classification of Accounts is recommended for a small or large office. It can be expanded or contracted in order to meet individual needs.

CLASSIFICATION OF ACCOUNTS

1. Assets:
    - 11. Fixed Assets:
        - 111. Office Furniture and Fixtures.
        - 112. Books.
        - 113.
        - 114.
        - 115.
    - 12. Current Assets:
        - 121. Imprest Fund.
        - 122. Cash in Bank.
        - 123. Accounts Receivable. (Controlling.)
            - A.
            - B.
            - C.
        - 124. Sundry Debtors. (Controlling.)
            - A.
            - B.
            - C.
        - 125. Investment. (Bonds.)
        - 126. Materials and Supplies on hand.
            - 1261. Printing and Stationery Materials.
            - 1262. Drawing Materials.
        - 127.
        - 128.
        - 129.
    - 13. Prepaid Accounts:
        - 131. Prepaid Insurance.
        - 132. Advances.
    - 14. Working:
        - 141. Work in Process. (Controlling.)
        - 142.
        - 143.
    - 15. Expenses:
        - 151. Drafting-room Salaries. (To be distributed.)
        - 152. Engineering Expense. (To be distributed.)
        - 153. Superintendents' Salaries. (To be distributed.)
        - 154. Undistributed Expense. (Overhead.) (Accounts 151, 152, 153, and 154 are all controlling accounts.)
            - 1541. Non-chargeable time of principal.
            - 1542. Non-chargeable time of Draftsmen.
            - 1543. Non-chargeable time of Engineers.
            - 1544. Non-chargeable time of Superintendent.
            - 1545. Overtime allowance.
            - 1546. Lost time, vacations, etc.
            - 1547. Office Salaries. (Controlling.)
                - A.
                - B.
                - C.
            - 1548. Rent.
            - 1549. Printing and Stationery.
            - 1550. Drawing Material.
            - 1551. Telephone and Telegraph.
            - 1552. Membership and Dues.
            - 1553. Donations.
            - 1554. Light.
            - 1555. Insurance.
            - 1556. Travelling.
            - 1557. Periodicals.
            - 1558. Legal and Accounting.
            - 1559. Taxes.
            - 1560. Depreciation of Equipment.
            - 1561. Bad Debts.
            - 1562. Miscellaneous Office.
2. Liabilities:
    - 21. Fixed Liabilities:
    - 22. Current Liabilities:
        - 221. Accounts Payable.
        - 222. Notes Payable.
        - 223. Salaries Payable.
        - 224. Sundry Creditors. (Controlling.)
        - 225. Variations and Undistributed Expense.
        - 226. Reserve for Depreciation.
        - 227. Reserve for Bad Debts.
        - 228. Accrued Expenses.
        - 229. Reserve for Lost Time, Vacations, etc.
3. Proprietary Interest:
    - 31. Capital Investment. (Controlling.)
        - A.
        - B.
    - 32. Surplus.
    - 33. Profit and Loss.
4. Operation Profit and Loss:
    - 41. Cost of Completed Work. (Controlling.)
        - A.
        - B.
        - C.
    - 42. Fees.
5. Incidental Profit and Loss:
    - 51. Incidental Income.
    - 52. Incidental Expense.
        - 521. Interest.
        - 522.

In order to more fully explain the working of this Accounting System, the writer feels that it is necessary to state the nature and purpose of all accounts under the Classification.

1. Assets.—Asset Accounts represent values owned.
    - 11. Fixed Assets.—Fixed Assets are properties owned that are necessary in the operation of the business. These assets, of course, are not to be sold. The subsidiary accounts under Fixed Assets are:
        - 111. Office Furniture and Fixtures.

112. Books.

To these accounts is charged all new equipment and books that are purchased and have a life beyond one year's time. These accounts should be depreciated quarterly, and the depreciation figured on a 10 per cent annual basis. At no time should you reduce the original book value of the asset, but on your balance-sheet deduct the allowance for depreciation in order that the original value will not be disturbed until it is completely wiped out.

12. CURRENT ASSETS.—Current Assets represent values owned that are constantly changing in value. The following accounts come under Current Assets:

121. Imprest Fund.

At the beginning of operation this account is debited with a certain sum (say, $25.00), and cash credited. This sum is placed in the cash box and is to be used for paying small current bills. When the fund is nearly consumed a check is drawn for the amount of bills paid during the period, restoring the fund to its original amount, and the various bills are charged to their proper accounts.

122. CASH IN BANK.—Cash in Bank should represent at all times the amount of cash owned (not including Imprest Fund). All cash receipts should be deposited in the Bank, intact, and all disbursements made by check.

123. ACCOUNTS RECEIVABLE.—This is a controlling account and receives only the monthly totals from the Journal. The subsidiary accounts controlled by Accounts Receivable represents all moneys owing by clients. When these accounts are debited with fees, Account No. 42 should be credited.

Advances paid out for clients in the way of Building and Water permits, etc., are to be charged direct to these accounts.

124. SUNDRY DEBTORS.—This is a controlling account. The accounts that are controlled are the Drawing accounts of firm members and other accounts of this nature.

125. INVESTMENTS.—This account shows at all times any Bonds, Stocks, etc., owned by the firm. It is credited when the Stocks, Bonds, etc., are sold.

126. MATERIALS AND SUPPLIES ON HAND.—This account is charged with all materials and supplies purchased, and is credited monthly with all supplies used. The corresponding charge is made to one of the various expense accounts.

13. PREPAID ACCOUNTS.—The subsidiary accounts are such items as:

131. PREPAID INSURANCE.—This account is charged with all insurance premiums paid during the year and credited monthly with $\frac{1}{12}$ of the total, and the corresponding charge is made to Account 1555.

14. WORKING ASSETS.—This account represents the work passing through the office. The subsidiary account is:

141. WORK IN PROCESS.—To it is charged all Drafting-room expense, Engineering and Superintendents' time, and the total of the undistributed expense. This is taken from the Time Distribution Sheet and Overhead Distribution, monthly. When work is completed, this account is credited and cost of completed work debited.

15. EXPENSES.—The subsidiary accounts are:

151. DRAFTING-ROOM SALARIES ACCOUNT.—This account is charged with all Drafting-room salaries, and at the end of the month is credited, and the amounts debited to proper jobs in Work in Process.

152. ENGINEERING EXPENSE.—This is treated the same as Account 151.

153. SUPERINTENDENTS' SALARIES.—This is treated the same as Account 151.

154. UNDISTRIBUTED EXPENSE.—This account controls the following subsidiary accounts:

1541. NON-CHARGEABLE TIME OF PRINCIPAL.—All time of firm members, not actually chargeable to jobs, is debited to this account.

1542. NON-CHARGEABLE TIME OF DRAFTSMEN.

1543. NON-CHARGEABLE TIME OF ENGINEERS.

1544. NON-CHARGEABLE TIME OF SUPERINTENDENTS.

These three accounts are treated the same as Account 1541.

1545. OVERTIME ALLOWANCE.—To this is charged any increased rate of pay that is paid to draftsmen on account of overtime work. It is not just that any particular job should be burdened with this expense on account of it having been the particular job to rush through the office.

1546. LOST TIME, VACATIONS, ETC.—(Draftsmen, Engineers and Superintendents.)

This account is debited monthly with $\frac{1}{12}$ of the annual amount set up in Reserve Account (229). A Reserve account for Lost Time, vacations, etc., will be set up, and the accrued expense shown as a credit each month and the same amount should be debited to this account.

When the actual money is paid out for the lost time, cash is credited, and the Reserve Account debited.

1547. OFFICE SALARIES.—This account is charged with the Salaries of the principal, the office business manager, stenographer, and office boy.

1548. RENT.—This is paid monthly and is charged as a regular monthly expense. Credit cash and debit rent when it is paid.

1549. PRINTING AND STATIONERY.—Charge this account each month with the amount of materials used and credit Account 1261.

1550. DRAWING MATERIAL.—Treat same as Account 1549.

1551. TELEPHONE AND TELEGRAPH.—Treat same as Account 1548.

1552. MEMBERSHIP AND DUES.—This account is charged with all dues, membership fees, etc. If any one month should be overly burdened, then a prepaid account should be set up and the expense distributed over the twelve months.

1553. DONATIONS.—Treat same as Account 1548.

1554. LIGHT.—Treat same as Account 1548.

1555. INSURANCE.—This account is charged monthly with $\frac{1}{12}$ of the total prepaid insurance and credit is made to Prepaid Insurance Account.

1556. TRAVELLING.—Debit this account with all Travelling expenses, when it is not directly chargeable to a job.

1557. PERIODICALS.—Debit with all magazines, papers, etc.

1558. LEGAL AND ACCOUNTING.—Charge with all attorney and accountant fees.

1559. TAXES.—An architect's taxes are usually small, and it is not necessary to distribute the sum over the entire year. When taxes are paid, debit this account and credit cash.

1560. DEPRECIATION OF EQUIPMENT.—Debit this account, monthly, with $\frac{1}{12}$ of depreciation charge and credit the Reserve Account.

1561. BAD DEBTS.—Handle same as Account 1560.

1562. MISCELLANEOUS, OFFICE.—Expenses of all other kinds are charged to this account (small).

2. LIABILITIES.—Liabilities are all values owed.

21. FIXED LIABILITIES.—Liabilities of a fixed nature, only, are credited to this account. Ordinarily, an architect has no fixed Liabilities, unless they have issued bonds or stocks.

22. CURRENT LIABILITIES.—These are Liabilities that are alive, and are constantly changing in value. This is a controlling account, and has the following subsidiary accounts:

221. ACCOUNTS PAYABLE.—All accounts due and payable are credited to this account.

222. NOTES PAYABLE.—Treat same as Account 221.

223. SALARIES PAYABLE.—This account will be credited at time of closing books or when the end of the month falls in the middle of the week, with all accrued salaries up to date. When salaries are paid, cash is credited and this account debited.

224. SUNDRY CREDITORS.—This account will be credited with all items not included under Accounts Payable.

225. VARIATIONS AND UNDISTRIBUTED EXPENSE.—Any balance at end of period remaining in Account 154, is absorbed by this Account.

226. RESERVE FOR DEPRECIATION.—This account is credited monthly with the regular amounts of depreciation fixed upon.

227. RESERVE FOR BAD DEBTS.—This account is credited with the approximate or estimated allowance for bad debts and is charged monthly.

228. ACCRUED EXPENSES.—At the end of any accounting period, any expenses not as yet paid, but accrued, are credited to this account.

229. RESERVE FOR LOST TIME, VACATIONS, ETC.—This account is credited monthly with $\frac{1}{12}$ of the annual estimated lost time, etc., and the corresponding debit made to Account 1546.

3. PROPRIETARY INTEREST.—This account represents the net worth of the business. The subsidiary accounts are as follows:

31. CAPITAL INVESTMENT.—This is a controlling account, and has the following subsidiary accounts in alphabetical order, which show the original investment at start of business and represents the amounts paid in by the firm members.

32. SURPLUS.—All profit or loss at end of year is debited or credited to this account, as the case may be. Any dividends paid are debited to this account.

33. PROFIT AND LOSS.—All trading or operating accounts are closed into this account at the closing period, or once a year.

4. OPERATION—PROFIT AND LOSS.—This is a controlling account and has the following subsidiary accounts:

41. COST OF COMPLETED WORK.—This account is also a controlling account, and controls all jobs that have been completed. These are listed in alphabetical order, and on the completion of any job, Work in Process is credited and this account debited.

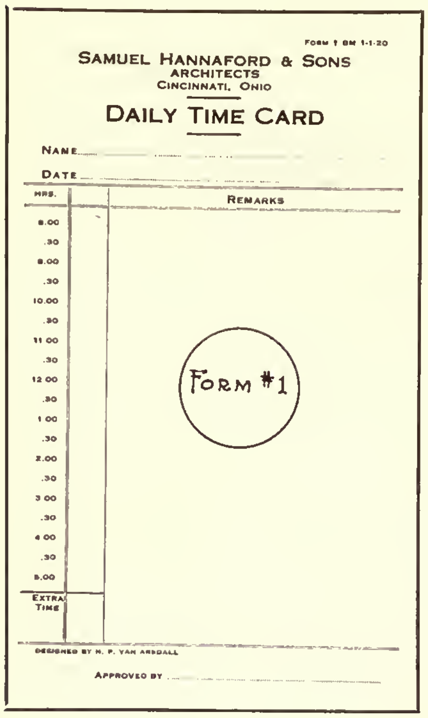
42. FEES.—When Accounts Receivable is debited with a fee, this account is credited.

5. Incidental Profit and Loss.—This is also a controlling account, and has the following subsidiary accounts:

51. Incidental Income.—This account records any earnings received outside of the regular order of business, such as money paid for renting a portion of the office to an outside person.

52. Incidental Expense.—This is a controlling account and has the following subsidiary accounts:

521. Interest.—This account is debited with any interest paid out. Interest cannot be charged as an Overhead Expense, as it shows that your collection department has been lax and sufficient funds have not been provided. It, therefore, becomes an Incidental Expense.



The forms presented for the proper operation of the system are designed to show the distribution of productive time spent on individual engagements.

The procedure is as follows:

The daily time-card (Form No. 1) is arranged in half-hour divisions, and it is a simple matter for a draftsman to indicate on the card just what particular work is performed during the day. A white card is used for productive work, and a blue card for non-productive work. It is not necessary, but advisable, that a separate card be used for each job worked on during the day, since this permits of the filing of all cards together that show time for one job. Cards are gathered up daily and are entered on the monthly individual time summaries (Form No. 2).

On Form No. 2, time for the various jobs that have been worked on during the month is listed in the columns indicated. Also, all the time that is non-chargeable to jobs is listed, and at the end of the month the total hours for each job is inserted in the "Total Hours" column, and the adjoining Amount Column contains the cost in dollars.

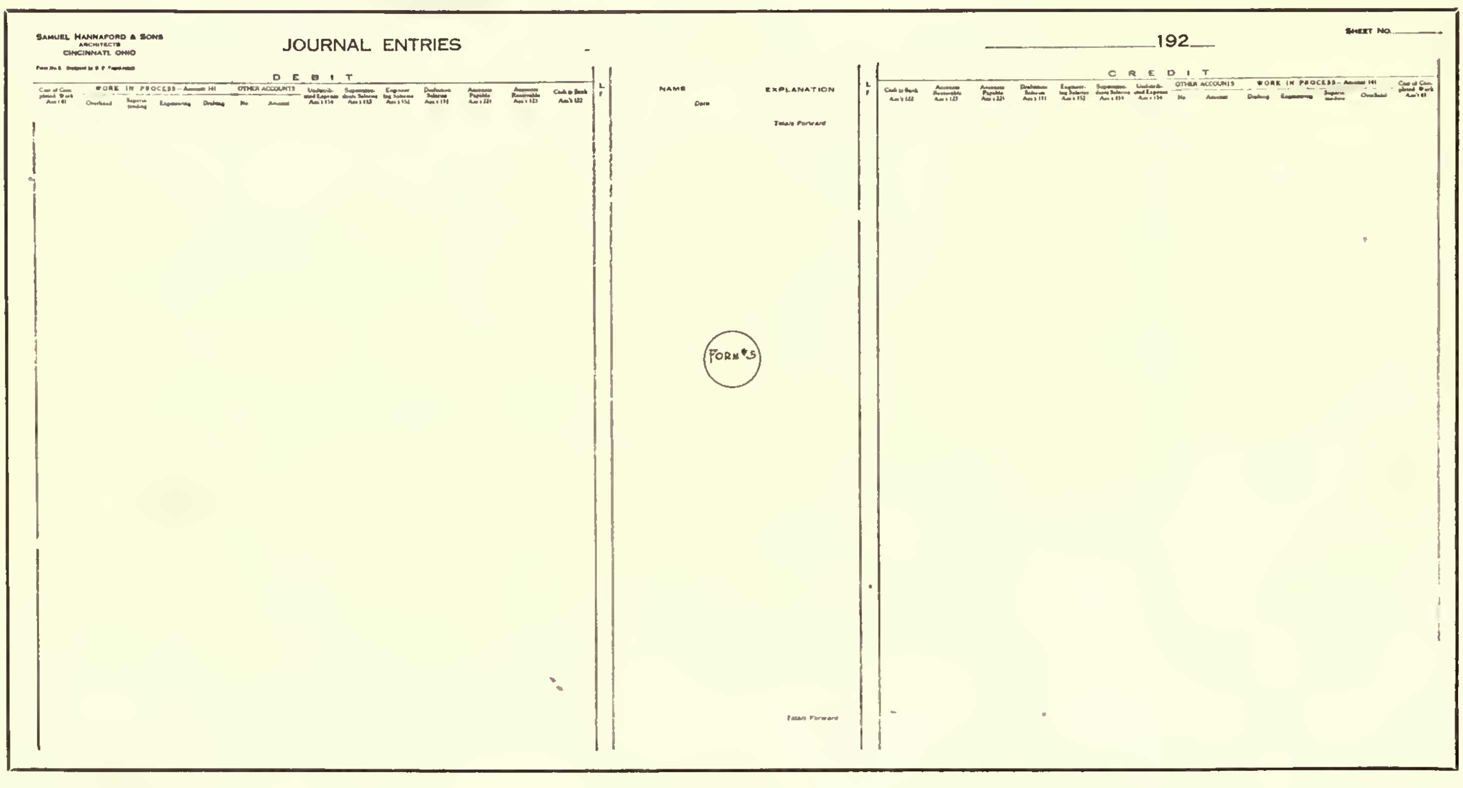
The monthly time summary for each employee is then taken and distributed on the Time Distribution Sheet (Form No. 3) to the proper jobs. You will note there is a space for each employee's account number (the account number is used instead of writing out the name), and just below it, in the corresponding column, is the total time, in dollars, for the month, opposite its particular job. The horizontal extension of this time is placed in drafting, engineering and superintending, or non-chargeable time space, as provided. These totals are then debited to Work in Process and Undistributed Expense, respectively.

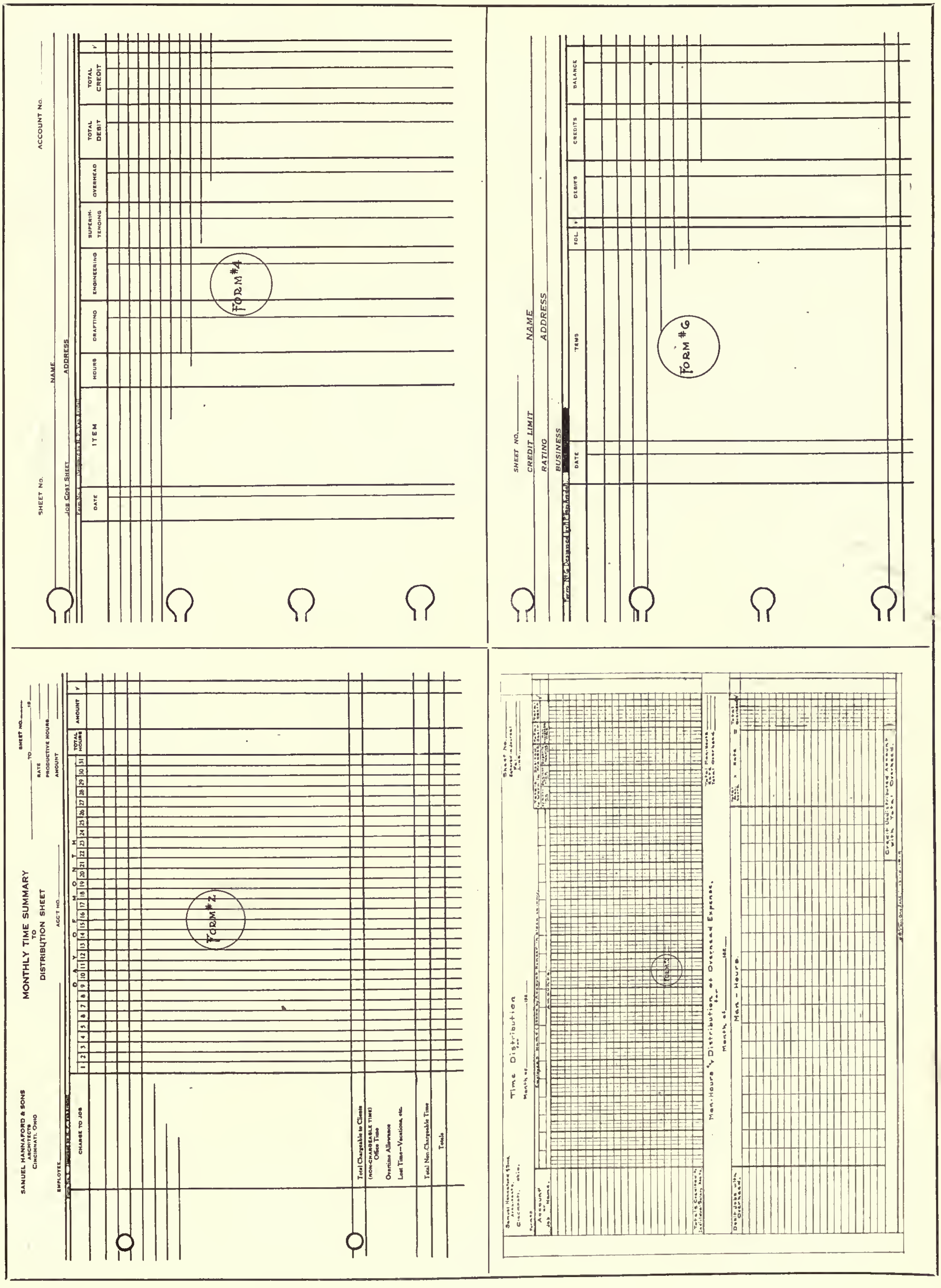
At the bottom of the Time Distribution Sheet the totals of the individual columns under employees' names are credited to the individual salaries accounts. This is done on account of charging the regular pay-roll to Salary Accounts in the ledger. When this is done it becomes necessary to credit these accounts and place these salaries into Work in Process. The reason for this is to have a record showing all salaries paid. You then enter on the journal (Form No. 5) the charges to Work in Process and charges to non-chargeable time, and credit the Individual Salary accounts.

You are now ready to distribute the Overhead Expense (Form No. 3). Since the man-hour basis for distribution is being used, we enter productive time opposite the various jobs in the columns for the various employees, and carry the total horizontally over its proper space on the right-hand side of the sheet. Since we know the total productive man-hours for the month, and the overhead for the month, the rate can be found by dividing the total man-hours into the total overhead.

When the rate has been determined, this figure is used

(*Continued on page* 116.)





FORMS 2, 3, 4, 6, ACCOUNTING SYSTEM FOR ARCHITECT'S OFFICE.

(*Continued from page* 114.)

for arriving at the overhead for each particular job during the month. Entries are then made to the journal and the various jobs charged. The total of the overhead column is then credited to Undistributed Expense, which places all of your time and overhead during the month in the proper Work in Process account.

In designing the Journal it was thought best to use one book instead of having separate journals for cash receipts, cash disbursements, and so on.

You will note that all accounts that are used frequently have been allotted special columns. Those that are infrequently used will be handled through the Other Accounts column, and be designated by their proper numbers. The necessary columns have been provided for work in process, and a single column for Cost of Completed Work.

The other forms, No. 4 and No. 6, are self-explanatory, and need no further discussion.

The forms as shown are bound in books and filed as follows:

Form No. 1, the Daily Time Cards, are filed in medium weight envelopes 5 inches by 7¼ inches. These are placed in the ordinary standard alphabetical wood file-case.

Forms No. 2 are kept in a loose-leaf binder 9 inches by 11½ inches.

Form No. 3, Time Distribution Sheet, may be folded and kept in any available file, where they are safe from fire.

Form No. 4, Job Cost Sheet, and Form No. 6, Ledger Page, compose one book, and are bound in a single binder. This binder is loose leaf, size 8 inches by 11½ inches.

Form No. 5, Journal, is a regular bound book, size 14¼ inches by 15½ inches.

The measurements given are the over-all dimensions of the binders containing the pages.

Announcements

W. R. Hill, manager of Builders' Hardware Sales for the Yale & Towne Manufacturing Company, of Stamford, Connecticut, resigned his position with that company on March 1. Mr. Hill is taking up a new line of work, in charge of sales and advertising for the Isko Company, of Chicago, Illinois. In his new field he is undertaking a line of work in which he has long been interested. The Isko Company manufacture electrically driven and automatically controlled refrigerating machines for domestic and commercial use.

Frederick Meisler has opened an office on Washington Avenue, Little Ferry, New Jersey, to practise architecture. Manufacturers' samples and catalogues requested.

The firm of Nolan & Torre, architects and engineers, with offices in the Hennen Building, New Orleans, have recently opened a branch office in Jennings, Louisiana, with C. Sedgwick Moss in charge.

Cyrus Thurston Johnston, mechanical and electrical engineer, eldest son of Clarence H. Johnston, architect, died at his home in St. Paul, Wednesday, February 25, after a brief illness. Mr. Johnston was a graduate of the Massachusetts Institute of Technology, class of '09, and at the time of his death had entire charge of the heating, plumbing, and ventilating work in his father's office. His career was one of brilliant promise, and his untimely passing is lamented by a host of friends.

J. L. Theo. Tillack, architect, wishes to announce that he has opened an office in the McFadden Building, Hackensack, N. J., and will be pleased to receive literature, samples, etc.

W. Whitehill, architect, announces the removal of his office to 12 Elm Street, New York City.

Edgar and Verna Cook Salomonsky beg to announce that they have opened offices for the practise of architecture at 368 Lexington Avenue, New York.

Changes in Personnel at Square D Company.—Several additions and changes in the sales and advertising departments of the Square D Company of Detroit, Michigan, became effective February 1. E. A. Printz, formerly district sales manager of the Chicago territory, was made sales manager, A MacLachlan continuing in the capacity of secretary and director of distribution. D. M. Stone, formerly district sales manager of the Pittsburgh territory, was made district sales manager of the Detroit territory. J. A. Jaques, formerly in charge of the New York territory as district sales manager, was given the district sales managership of the Pittsburgh territory, and H. W. Spahn, district sales manager of the Buffalo territory, was placed in charge of New York. D. H. Colcord, formerly of the department of publicity of the Westinghouse Air Brake Company of Pittsburgh, was appointed director of research engineering.

Not raising prices but increasing production is the way the Batchelder-Wilson Co., tile manufacturers of California, believe is the right way to meet present conditions.

"We invite your attention to our catalogue and price list as something unique in the present era of price raising. We have made no change in our prices, with one or two minor exceptions, from the lists established in 1918. This applies to both plain material and catalogue pieces.

"We have as many plausible excuses for raising the price of our product as any other industry. We have been steadily advancing our wage scale during the past year and a half; our raw materials and new equipment subject us to increased costs of production; our factory is crowded to the roof with orders.

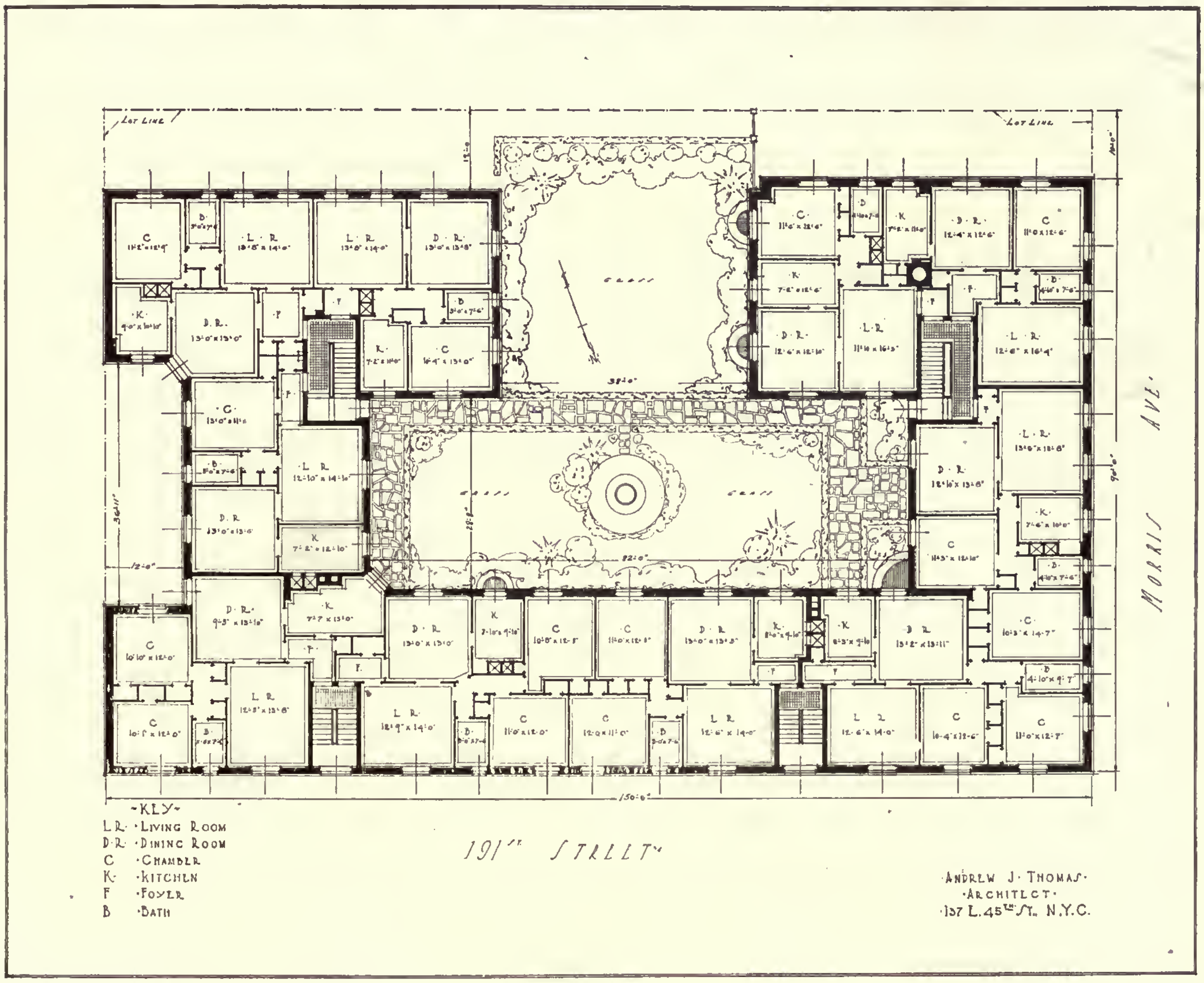
"We are meeting these increased costs by the construction of a plant, new from end to end, designed to fit the requirements peculiar to our work. In the planning and building of this plant we have given much thought to the articulation of our various processes, to the installation of labor-saving devices, and to the elimination of wastes in both management and production."

The following recent changes have been made in the organization of the Western Electric Company:

M. A. Buehler, formerly sales manager at the Omaha house, has been made sales manager at the Minneapolis office. Mr. Buehler joined the Western Electric Company's organization in the early part of 1915 and became sales manager at Omaha during the fall of 1917.

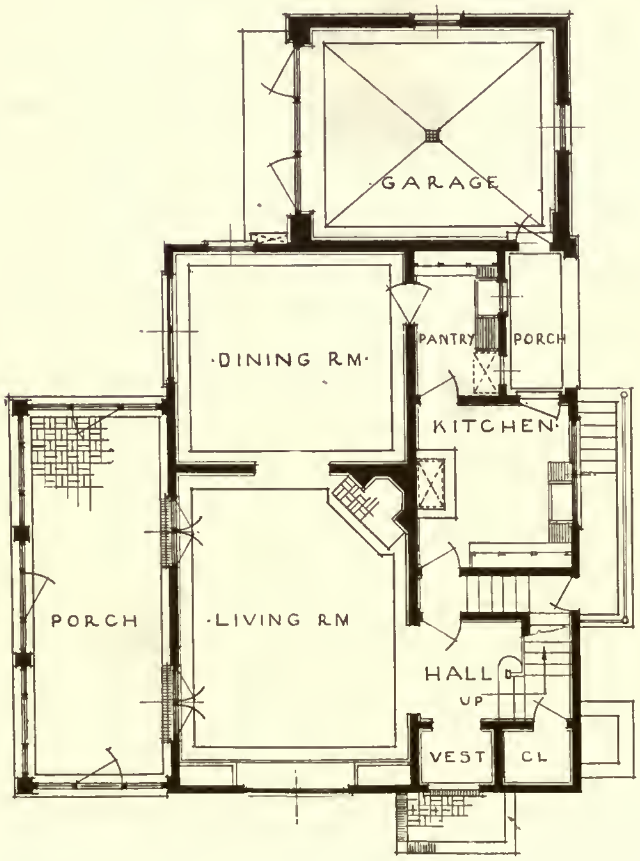
Eliot Lum has been promoted to the position of sales manager at the Omaha office, to succeed Mr. Buehler. Mr. Lum entered the employ of the Western Electric Company as a student in the educational courses in 1905, directly after his graduation from college. In 1907 he became a member of the Telephone Engineering Department at Chicago, and in 1909 was transferred to the sales department of the Minneapolis house, joining the Omaha organization in the same capacity in the winter of 1912.

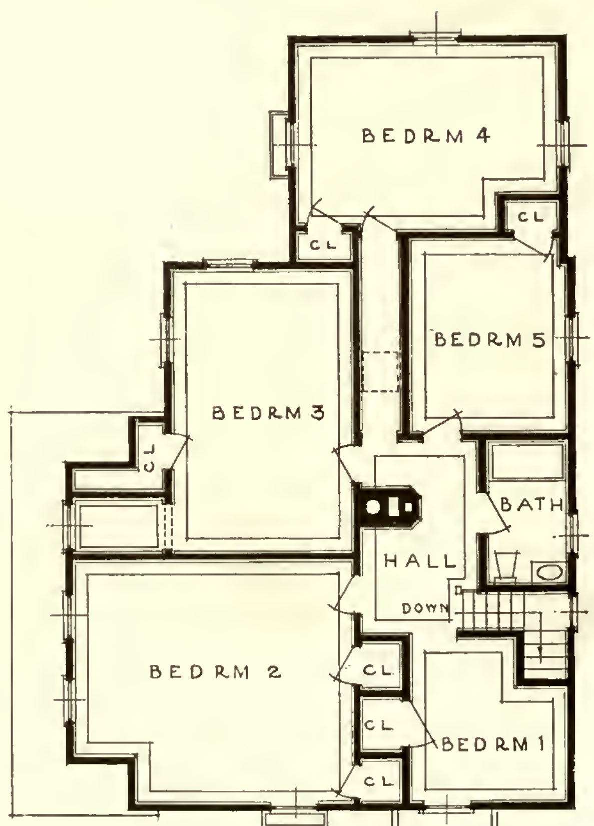
(*Continued on page* 126.)



DESIGNS FOR MODEL TENEMENT. Andrew J. Thomas, Architect.

One of the interesting plans of the year is the five-story tenement-house which is from designs by Andrew J. Thomas, architect, and is now about to be constructed at the southeast corner of Morris Avenue and 191st Street, Bronx, by Henry F. Keil, owner. This plan is unique in many respects, not the least of which is that only about sixty-two per cent of the ground area of the plot is covered with the structure. This is far short of the legal maximum, and still the tenants will obtain larger, lighter, and better-ventilated rooms than are to be found in houses which cover a larger ground space.





HOUSE AND PLANS, J. B. QUINN, FIELDSTON, RIVERDALE-ON-HUDSON, N. Y. Dwight James Baum, Architect.

DETAILS, HOUSE, J. B. QUINN, FIELDSTON, RIVERDALE-ON-HUDSON, N. Y.

Dwight James Baum, Architect.

Modern Building Superintendence

By David B. Emerson

CHAPTER VIII

ELECTRIC WIRING AND ELEVATORS

THE electric wiring conduit was installed as soon as the reinforcing for the floor slabs was in place, and before the concrete was poured. This included the conduit for telephone, bell wiring, vault signals, fire alarms, etc., as well as that for the light wiring. All of the conduit was galvanized mild, steel tubing, which was especially selected with reference to the uniformity of thickness, and each length was required to have the manufacturer's name stamped in the metal and to bear the underwriter's label. No conduit smaller than ⅝-inch inside diameter was allowed to be used. We were particularly careful to check up all of the dimensions on the plans, to be sure that all of the ceiling outlets were properly located in their relation to the rooms in which they were to occur, and that the conduit for wall brackets and switches would come in the partitions instead of out in the rooms, as sometimes happens. All cutting of conduit was done with hack saws, and after it was threaded it was reamed out to remove all burr caused by the cutting.

Bends and offsets in the conduit were avoided as much as possible, and no bends were allowed which had an inside radius of less than 3½ inches. Once or twice we found the electricians bending pipes in a vise; this was ordered stopped at once, and the crushed pipe was ordered to be removed from the building, and all bending of conduit was thereafter done by means of the conduit bending machines and hickeys, which were provided for that purpose. All conduit was put together by means of standard couplings, no running threads being allowed, and where standard couplings could not be used condulet unions were required to be used, and all joints were made tight with white lead. All mains were run in the pipe shaft which was provided for that purpose, and they were secured to the steel beams by means of pipe straps.

Distributing panels were located on each floor, and the conduit runs all started at the panels and had junction or pull boxes located where necessary. Panels were of black enamelled slate, with thirty ampere knife switches and enclosed fuses mounted in two vertical rows, and cross connected by means of metal strips to polished copper bus-bars running up the centre of the panel. These bus-bars were fitted with lugs at their ends, to which the mains were connected. Panel was surrounded with a one-half-inch thick slate frame, or barrier, with opening through which the circuit wires passed to connect with the branch switches. The panels were mounted in cabinet boxes, made from one piece of No. 10 gauge sheet steel, lapped and riveted at the four corners, with a ¾-inch flange turned inwardly all around the outside edge. The cabinet boxes had a 4-inch gutter space, in which the circuit wires were carried from the switches to the ends of the conduit, which terminated in the boxes. The boxes had No. 10 gauge steel doors, lined with slate, and provided with locks to prevent unauthorized persons tampering with the fuses or switches.

The junction, outlet, and switch boxes were of galvanized pressed steel, No. 14 gauge, with knockouts to provide holes for the entrance of conduits. Conduit was secured to the boxes by means of lock nuts and bushings. All of the outlets for lighting fixtures were fitted with insulated fixture studs of malleable iron to screw into the boxes, and the large fixtures in the main corridor had fixture hangers which were independent of the box. All conduit was properly grounded. Grounding was done by bonding all of the separate sections of conduit together, and then grounding the entire system to the water supply on the street side of the meter. This was done by means of grounding clamps, secured to the pipes, and ground wires attached to these clamps. The ground wires were of copper No. 10 B. & S. gauge, where the largest wire contained in the conduit was not greater than No. 0 B. & S. gauge, and No. 4 B. & S. gauge when the largest wire contained in conduit was greater than No. 0 B. & S. gauge. The grounded pipes were carefully cleaned of all rust, scale, etc., at the point of attachment before putting on the ground clamps. The conduit for telephone wires was installed on all floors, running from each office to the pipe shaft, up which the telephone company was to run its cables. Also conduit was run under the floors in the various offices with wall outlet, so that bell wiring might be installed by the tenants as desired. The conduit for the vault signals and the vault lighting was installed in the walls of the bank and safe-deposit vaults before the concrete was poured. All of the conduit were plugged as soon as they were installed, to prevent water or dirt entering them during the progress of the work before the wires were drawn.

The current furnished by the local lighting company was, as is almost universal throughout the country, alternating current: 220 volt, three phase, sixty cycle, for power, and 110–220 volt, single phase, for lighting; wired three wires 220 volts on positive and negative and 110 volts on the neutral. Two services were provided, one for the lighting circuits and the other for the power circuits. The transformer vault was constructed entirely of brick and concrete, with a ventilator through the sidewalk, and provided with a tin-covered fireproof door large enough to take transformers through in case of renewals. Iron sleeves were built into the walls for the conduit to pass through. The feeders were run from the transformers to the switchboard, which was located in the basement in close proximity to the pumps, etc., and handy to the boiler-room, so that the mechanical control was well centralized. The switchboard was made up in two units, one for the lighting circuits and the other for the power circuits.

The switchboard was placed so as to reduce the danger of communicating fire to any combustible material to a minimum. It was set out three feet from the wall, so as to be thoroughly accessible from the back, and was designed so that the top of the board was three feet below the ceiling. The board was made up of marbleized slate, one and one-half inches thick. Slate was carefully examined to see that it was entirely free from metallic veins, which might cause short circuits and other trouble. It was mounted in a pipe frame, which was securely fastened to the floor, and braced back to the wall by means of pipe braces, which held it perfectly rigid. The meters were mounted on the switchboard, and it was equipped with all the necessary main switches and circuit switches. All of the switches were three pole knife switches. Light outlets were located on each board, so that the instrument might be plainly seen at all times.

As direct current was required for the motors for the passenger elevators, two motor generator sets, one light and one heavy, for rectifying the current were provided. They were located in the basement convenient to the switchboard, and the feeders were run to them and then run up to the pent-houses on the roof, where the elevator machinery was located. As the freight elevator and sidewalk hoist used alternating current, the feeders were run directly from the switchboard to the motor outlet for these machines. Feeders were also run from the power switchboard to all of the other motor outlets, and terminated in the starting-boxes which were provided for each motor.

The building now being almost completed, and all constructive work finished, the wires were drawn into the conduit. All wire was the best quality annealed copper wire, tinned, insulated with a 30 to 33 per cent rubber covering, and then covered with a protecting braid. No wire smaller than No. 14 B. & S. gauge was allowed to be used, and all wire of No. 8 B. & S. gauge or larger was required to be stranded. All splices in wire were made in the outlet boxes. The splicing was done by stripping the insulation and braid off the ends of the wires, scraping them clean, and twisting the ends together, making them mechanically and electrically secure without the use of solder, then they were soldered for protection from corrosion, and thoroughly taped with rubber and friction tape. The stranded wire was connected by means of solderless cable connectors and then covered with an insulation equal in thickness to that on the wires. The fire-alarm system was included in the equipment of the building. Fire-alarm boxes were finished in fire-alarm red and bronze, of the break-glass type, and were located in the corridors on every floor. They were connected to the city fire-alarm system by the fire department.

When the interior finish had been put up and the finished floors were laid, the switches, base receptacles, and floor receptacles were installed. The switches in the corridors and other parts of the building which were open to the public were lock switches; all other switches were three-way or single-pole tumbler switches. The outlets for the base receptacles were wired for a capacity of 300 watts, and the receptacles were of the double type, so that two plugs could be inserted and two fixtures served. The floor boxes were of the water-tight, adjustable type, with galvanized cast-iron box bodies fitted with rubber gaskets and water-tight brass covers. When the installation of the wires was entirely completed, each circuit was tested out with a meggar. The testing was done by connecting a wire on one side of the circuit to the binding-post of the meggar, marked "Line," and with another piece of wire connecting a water pipe to the "Earth" binding-post of the meggar, then turning the generator handle on the meggar, and the resistance of the insulation in ohms was shown on the dial of the instrument. The resistance, in all cases, was found to meet with the requirements of the National Electric Code and the city rules, and the system was accepted.

An intercommunicating telephone system, arranged for selective ringing and selective talking, was installed in the bank. It was equipped with an automatic switchboard, with stations located in the offices, safe-deposit vaults, and all cages and desks throughout the banking room. The wiring for the telephone system was run in conduits, as before stated, and the wires were stranded cables containing one pair of No. 22 B. & S. gauge conductors and one pair of No. 16 B. & S. gauge conductors for talking and ringing batteries respectively. Each pair of wires was twisted and all wires were twisted around each other to eliminate cross talk and induction noises. The wires were of annealed copper, insulated with silk and covered with beeswax as a moisture repellant, and then covered with a lead sheath $\frac{1}{64}$-inch thick; and each pair of wires was of a different color so as to be easily distinguished. The cables were fanned out and properly laced in an orderly manner and secured to the connecting terminals, one of which was provided for each wire. The batteries were storage batteries, equipped with an automatic charging device, taking current from the light service. The bank and safe-deposit vault were wired for an electric-alarm service, which will be described in the coming chapter.

The building had twelve passenger elevators of the one-to-one gearless traction type, one freight elevator of the single screw, worm-geared traction type, and an electric sidewalk hoist running from the sub-basement to the sidewalk. The passenger elevators had a speed of 450 feet per minute for the local cars, and 600 feet per minute for the express cars. The freight elevator had a speed of 350 feet per minute and a lifting capacity of 4,000 pounds, and ran from the sub-basement to the roof.

The machinery for both the passenger and freight elevators was located in the pent-houses on the roof, directly over the cars, with a clearance of eight feet between the supporting beams and the top of the cars. The machines for the passenger elevators consisted essentially of the motor, the traction driving-sheave, and the magnetically released spring applied brake, grouped together and mounted on a continuous heavy cast-iron bed. The motors were slow speed, shunt-wound motors, specially designed for this service, the brake-pulleys and driving-sheaves were mounted on the armature-shafts which were of high tensile steel and supported the loads. The controllers were located as close to the machines as possible, but allowing enough space between them to work around them.

The machine for the freight elevator was of an entirely different type, having a multi-groove driving-sheave and a non-vibrating idler; the car and counter-balance weight hanging directly from the driving-sheave. Drive was obtained by means of right and left hand worm-gears, coupled directly to the electric motor, running submerged in oil, and meshing with two large gear wheels which mesh with each other, thus giving a three-point drive. Machine was also provided with extra gears, which doubled the lifting capacity and at the same time reduced the speed to one-half, to be used when required for lifting safes or other heavy loads. Heavy iron clips were fastened to the main guides at each floor, which, when tightened up, held the car level at the floor when taking on or taking off heavy loads. The cast-iron brackets for supporting the guides for cars and counter-weights were put in place as soon as the steel frame was erected, and the guides were then installed. The main guides were planed steel, tees, $5 \times 3\frac{1}{2} \times \frac{5}{8}$ inches, reinforced with 7-inch channels, bolted to the tees every six feet by means of two $\frac{5}{8}$-inch tap bolts. The ends of the tees were tongued and grooved to form matched joints. The counter-weight drives were $3\frac{1}{2} \times 2\frac{7}{16} \times \frac{5}{8}$-inch tees.

The passenger elevators had steel pans at the foot of the shaft, giving a clearance of eight feet at the bottom, with oil cushion buffers, one under the car and one under the counter-weight, which were arranged to bring either the car or the counter-weight to a gradual positive stop through the displacement of the oil in the buffers. The car slings, which are the frames holding the cars, were made up of structural steel channels, reinforced with steel gusset plates.

(*Continued on page* 124.)

The Roslyn Memorial Building

THROUGHOUT the length and breadth of the country memorials in honor of the dead of the recent war are in contemplation, or in process of erection, and the most popular and practical form which these memorials have taken is based upon the community building idea, which has acquired such a firm hold on the popular imagination, and has been found particularly suitable to local needs in our cities, towns, and villages.

The Roslyn Memorial Building is of this type. Planned to conform to the requirements set forth by the committee in charge of the erection of this structure, it is designed in the style of architecture strongly influenced by the local Colonial type.

The site of this memorial is centrally located on a prominent thoroughfare of the town, the land sloping sharply from the street. At the rear end of this property is an existing building which has been used as a Neighborhood House, and it is to be used in connection with the new building.

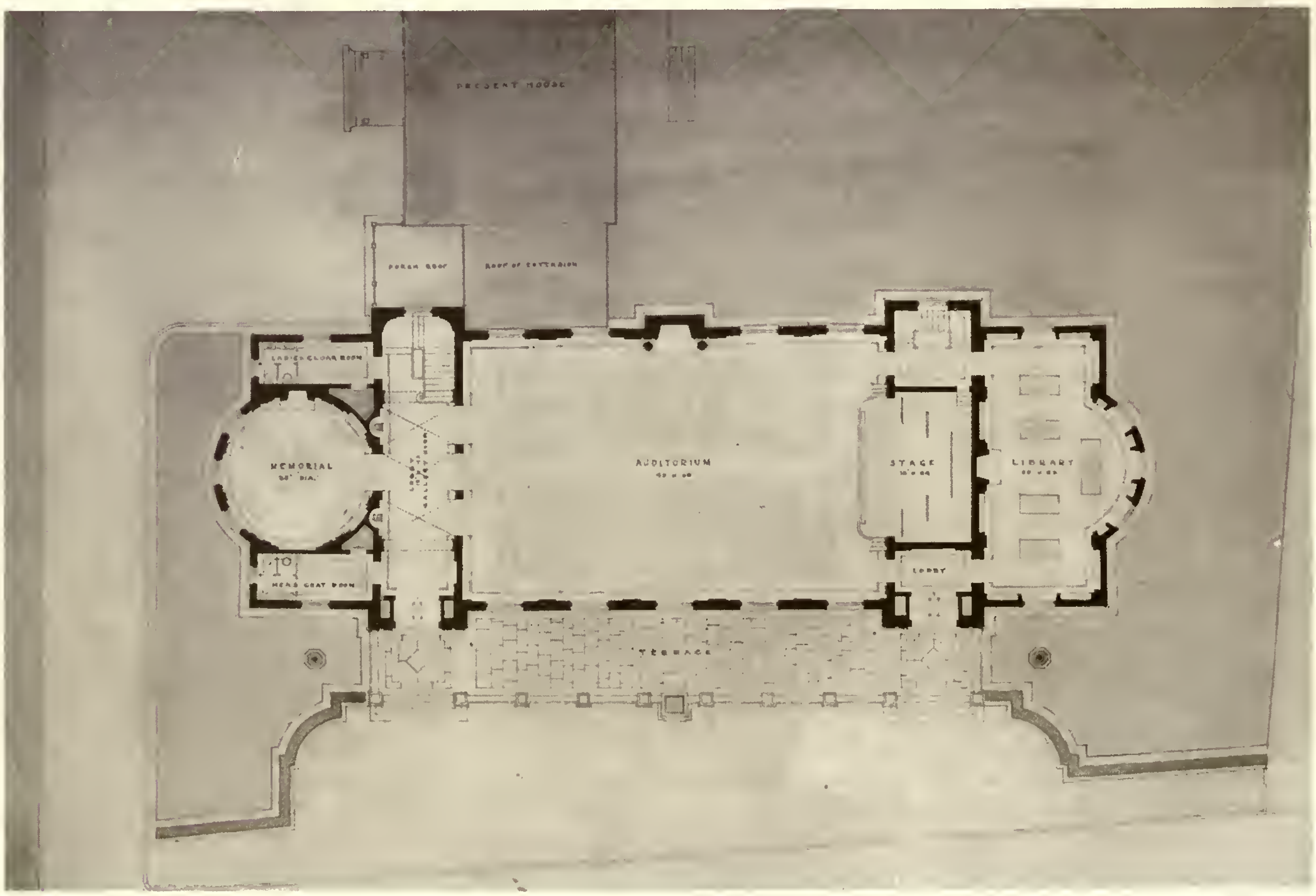
To effect properly this combination, we have placed the memorial building with its length parallel to the street, in such a position that with a small addition to the Neighborhood House, the two buildings are joined at the basement level.

In this manner the new building forms a screen to this annex, which is to be used for administration purposes, heating-plant, and kitchen service, for such entertainments as may be held from time to time in the memorial building. The main auditorium is placed in the centre with large windows on both sides, giving excellent ventilation as well as permitting a very rapid emptying of the building upon the terrace side, on which these windows open. At one end of the auditorium has been placed a modern stage, with direct connections to the dressing-rooms below, and with an easy access to the library, which adjoins; this permits a speaker to reach the stage quickly and without discomfort. At the other end of the hall is a staircase, giving access to a balcony above, and to the meeting-rooms in the basement. This hall opens into the memorial room itself, with its two flanking coat-rooms or offices, as well as giving the main public access to the auditorium. The memorial itself is a circular room on the walls of which can be placed memorial tablets and a repository for articles typical of a war museum. In the basement ample light is obtained for reading-rooms, bowling alleys, dressing-rooms, etc., this entire space being available for this purpose owing to the heating plant and its accessories having been installed in the annex building.

The interior will be treated in the simplest type of Colonial architecture, depending rather on form and color for its interest than on ornament.

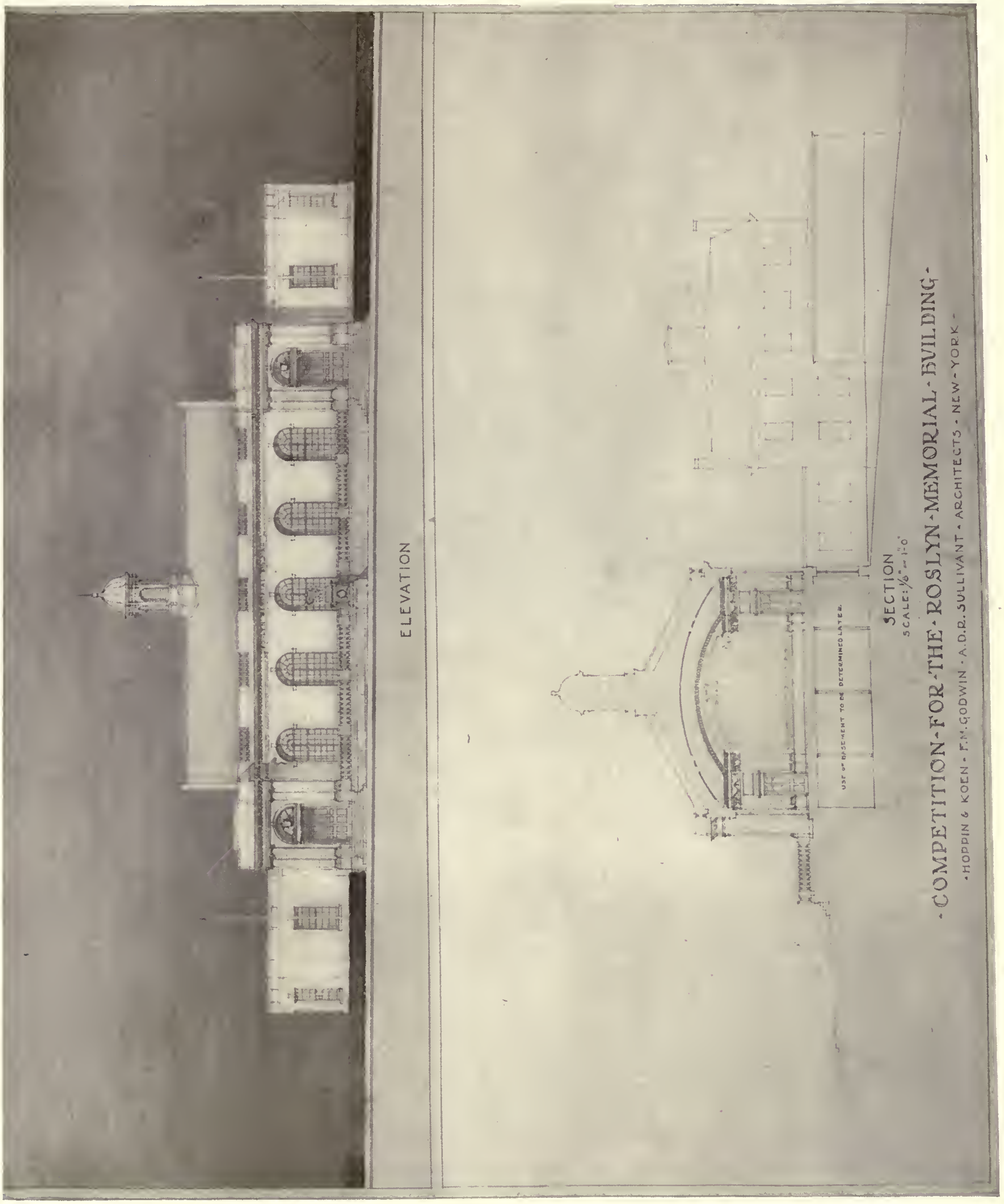
The auditorium has been designed with a large fireplace, and so arranged that the formality of an auditorium can be removed to give the aspect of a social living-room, and it can be also adapted for athletic sports in the way of basket-ball and such interior games.

It is proposed to build the building of brick, trimmed with limestone.



Competition for Roslyn Memorial.

Hoppin & Koen, F. M. Godwin, A. D. R. Sullivant, Architects.


ELEVATION
USE OF BASEMENT TO BE DETERMINED LATER
SECTION
SCALE: 1/8" = 1'-0"
· COMPETITION · FOR · THE · ROSLYN · MEMORIAL · BUILDING ·
· HOPPIN & KOEN · F. M. GODWIN · A. D. R. SULLIVANT · ARCHITECTS · NEW · YORK ·

(*Continued from page* 121.)

The platform set in the slings and consisted of angle-iron frames, with wood filler pieces 1¾ inches thick, and a ⅞-inch maple underfloor; the under sides of platforms were covered with No. 18 gauge sheet metal for fire protection. The passenger cars were made of furniture grade sheet steel, panelled, with grill work on top; all enamelled to match the steel trim used throughout the building. The floors in the car were of cork tile.

The hoisting cables were a six-strand, nineteen-wire, mild steel hoisting rope, made especially for use on traction elevators, where, on account of the quick starting and stopping, a stronger and lighter rope is required, and it is also more flexible to the strand for double wrapping. The cars were suspended from one end of the cables and the counter-weights from the other end; they passed partially around the driving-sheave, continued around the idler leading sheaves, thence again around the driving-sheave, thus making a complete loop around the sheaves. The hitches on the car and counter-weight cables were of the self-adjusting type, with a thimble rod for each cable, at the end of which was an adjustable socket which turned with the twisting of the rope and prevented the loosening of strands. The cables were babbitted into the sockets. Each car was equipped with a compensating rope device consisting of a sliding sheave frame in the bottom of the pit, around which travelled the compensating rope, which ran from the body of the car to the under side of the counter-weight frame; the object of this being to cancel the weight of the hoist on the long hoist in a high building. This does away with the rattling chain which we all know so well.

The counter-weight frames were composed of two channels riveted together by means of steel plates, the weights being of cast iron, so formed as to set into the flanges of the channels, and tied together by means of ¾-inch steel rods. Counter-weight screens were placed at the top and bottom of the shafts; they were eight feet high, made up of steel plates and angles, and bolted to the counter-weight guides. Each car and counter-weight had four self-adjusting guide-shoes, two at the top and two at the bottom, having bronze gibs or shoes, which were held close against the face rail by means of heavy springs, thus eliminating the wear on the body of the main guide-shoes. On each of the top guide-shoes was fastened a positive type lubricator, consisting of an aluminum box that fitted snugly around the face of the guides. This box being filled with oil, lubricates the guides by the action of a felt-wick feed. This does automatically what formerly had to be done by hand, and saves the old tedious job of greasing slides, and also allows the use of oil instead of grease for a lubricant, with the consequent cleanliness. The safeties were located on the safety channels under the cars, and were of the wedge-clamp type and were operated by a two-ball governor, which was set to a variation of five degrees above and below the car speed. These governors were located at the top of the hatch, and acted in the same manner as the common type of engine governor; when the balls fly out from excessive speed the governor rope is tripped, releasing the drum which controls the action of the wedges, which sets the clamps on the guide-rails.

The operating switches in the cars were of two-speed regulation, and had approximately six contacts, three to each side; two of these are for the common feed to the car switch, two for the reversing switch, and two for the fast and slow speed switch. In addition, the cases of the car switches were equipped with a rack emergency device, operated by a hand wheel, in case of the switch becoming inoperative. A complete signal service was installed in the cars and on the floors, the controlling mechanism of which was located in the pent-house on the roof, a motor generating set being provided there for rectifying the current. "Up" and "down" push-buttons were conveniently located on each floor; a signal light in the car was lighted a floor and a half in advance of the car's arrival at the landing at which the button was pushed. In addition, the pressure of the push-button caused the signal light in front of the approaching car to be lighted, and show which car would serve the passenger. The passenger signal was lighted three floors in advance of the car's arrival, which gives the passenger time to reach the proper doorway before the car arrives. Both of the signals are automatically extinguished when the car reaches the floor from which the call was made.

There was a transfer switch located in each car, so that if the car was loaded to capacity the operator could transfer the signal to the next approaching car, and the passenger would not have to press the button the second time. The cars were also equipped with illuminated thresholds, which contained two tubular electric-lights, the lights showing through a number of glass lenses inserted in the top and front of the platforms, the current for the lights being taken from the lighting fixtures in the cars. The sidewalk hoist was a drum-type worm-geared machine, with a speed of 50 feet per minute, and 3,000 pounds lifting capacity, operated by means of a hand rope. The car has an overhead frame for opening the sidewalk doors, and an automatic bell signal to warn persons standing on the sidewalk doors of the approach of the car.

When the installation of the elevators was completed and ready for acceptance, they were thoroughly tested out by the elevator company's representatives in our presence to see if they came up to the requirements of the specifications. The first test which was made was to see if the car would lift a specified load at the specified speed. One of the speed points was marked six feet above the bottom landing, the other about six feet below the top landing; a piece of paper was fastened at each point and the distance between the points was carefully measured. Then the car was started from the first floor with the speed load, and the time required for the car floor to pass the speed mark was noted with a stop watch. This determined whether the speed-load duty had been fulfilled. Then the maximum load was placed on the car, and the speed was taken as before. The cars were required to lift the maximum load at a speed within 30 per cent of the speed specified in connection with the speed load. With the maximum load on the car the speed up and down was taken to see that the down speed did not exceed the up speed by more than 15 per cent, with the controller in full-speed position.

After each test the motors were examined to see that they had not heated, and that all parts of the machine were working smoothly. We rode up and down in each car, and saw that there was no objectionable side or end play on the cars nor any disagreeable grinding of the cars and counter-weights. The drop test not being practicable, speed tests were made by speeding up the motors by inserting resistance in series with the shunt field. A hand rheostat of a capacity to carry the current, and connected in series with the shunt field, was employed, starting up the machine with all the resistance in this rheostat cut out. The resistance in the shunt-field circuit was cut in and increased the motor speed sufficiently to trip the governors which operated the safeties. The automatic terminal-stop mechanism was tested by running the cars at full speed into both limits of travel with the controller held over to full-speed position. All of these tests having proved satisfactory, the elevators were then put in charge of the regular operators and the service in the building was commenced.

BUNGALOW FOR GEORGE C. ST. JOHN, WALLINGFORD, CONN. Francis Waterman, Architect.

(*Continued from page* 116.)

The Portland Cement Association announces the opening of a new Association office in Portland, Oregon, at 146 Fifth Street, with Hans Mumm, Jr., as district engineer in charge, effective March 1, 1920.

Since 1903 Mr. Mumm has been engaged in various engineering work in Washington, having been county engineer of Snohomish County from 1912 to 1915, and the year following city engineer of Everett, Washington. Mr. Mumm joined the staff of the Portland Cement Association in 1916, since which time he has been identified with Association work in Washington.

Among the claims for the Vortex mechanical painter are: (1) carrying a greater volume of paint per minute, due to the fact that it is not finely sprayed but applied in a relatively heavy liquid jet; (2) better penetration of rough surfaces; (3) an efficient brushing action by the air jet which makes it possible to cover completely and smoothly with a single coat; and (4) dispensing with scaffolding very largely by use of a twelve-foot arm when desired. There is also the important advantage of having a powerful air jet at the painter's command for cleaning of dirty surfaces. Its efficiency in reaching crevices and out-of-the-way corners is considerably greater than that of the hand-painter's cleaning implements, the wire brush, putty-knife, and cloth.

Liquid Asphalt.—The Par-Lock process, which utilizes gun-driven liquid asphalt as a means of sealing voids in concrete and masonry surfaces, has been in use for seven years, during the last five years of which period it has been regarded by its sponsors as beyond the tentative stage of development. It has been employed on many large construction jobs, besides scores of smaller ones. Yet, on account of a rather diverse field of usefulness and broad claims of excellence, there has been confusion in the minds of many engineers and architects as to its exact function and advantages.

In the first place, it is necessary to distinguish between Par-Lock as a preparation of walls to be plastered and Par-Lock as a waterproofing. Yet, this distinction must again be qualified by the clear stipulation that every application of Par-Lock is a waterproofing. A basic claim for merit as a preparation for plastering is the fact that it protects the plastering from water or dampness that might otherwise enter through the ceiling or wall to which it is applied. Entirely apart from its plastering function, Par-Lock offers a specification for practically every waterproofing and dampproofing purpose with distinct claims of advantage in relation to each.

The competition arranged by the Chicago Brick Exchange awarded the following prizes:

The first prize ($150) was won by Fred M. Hodgdon, of Coolidge & Hodgdon, 134 South La Salle Street.

The second prize ($100) was won by George Lloyd Barnum, 4846 Hutchinson Street.

The third prize ($50) was won by Willard G. Searles, Ravinia, Illinois.

The judges were: Mr. Charles S. Frost, Mr. Emery B. Jackson, Mr. I. K. Pond, and Mr. Howard Shaw.

The object of the competition was to produce a design which when built will result in a worthy display of Dearborn brick.

We have received from Redfield & Fisher, the well-known advertising agents, a loose-leafed album containing illustrations of recent work by Delano & Aldrich, New York. The purpose of the album is to show the instalments by the Lorillard Refrigerator Co.

The Advance in Building Materials Costs

WITH a big building programme projected for 1920 the price of building materials is of paramount importance. On a basis of 1907 prices as 100 per cent, we give a table of percentages of wholesale prices compiled from figures of the United States Bureau of Labor Statistics, from which may be seen the net increase in the prices of lumber and building materials.

Labor is shown to have increased 156 per cent above the average price of 1907, whereas all commodities increased 166 per cent during the same period.

At the time of the signing of the armistice the War Industries Board showed an average mill price for lumber in the United States which was only 56 per cent higher than the average price for the first nine months of 1907. Hemlock was 60 per cent higher; yellow pine, 61 per cent; plain oak, 74 per cent; Douglas fir, 41 per cent. During the same period —from 1907 to November, 1918—Portland cement had increased 71 per cent; common brick, 98 per cent; lime, 115 per cent.

For Fire Prevention

A RESOLUTION passed by the Ohio Builders Supply Association at the convention held at Columbus, Ohio, January, 1920.

Whereas, the housing shortage in the United States creates a serious situation, and

Whereas, the fire losses reported in 1917 to the National Board of Fire Underwriters amounted to $66,166,420 in 232,021 residences, and

Whereas, the cost of material and labor is constantly mounting so that individual losses are likely to be greater year by year, cutting down our national resources to a tremendous extent, and aggravating the housing situation to an unnecessary dregree,

Be It Therefore Resolved, That this association go on record as to the necessity of giving more adequate fire protection to the combustible members of residences;

Be It Further Resolved, That each member of this association be requested to advise prospective owners of the situation and furnish full information as to the best available methods of protecting such structures.

The International Jury of Award for the Carnegie Institute Exhibition

JOHN W. BEATTY, director of the Department of Fine Arts, Carnegie Institute, Pittsburgh, announces the following International Jury of Award for the Nineteenth International Exhibition which opens on April 29:

Among the eminent men elected this year to serve as members of the jury are Julius Olsson from England; André Dauchez from France, who has received the gold medal at the Carnegie Institute; and eight men from America who are nationally famous. Emil Carlsen is an American of Danish birth, who is recognized as one of the able contemporary painters. Bruce Crane, whose "November Hills," now in the Permanent Collection, was awarded the third medal in 1909, like Carlsen, comes to Pittsburgh for the first time. Charles H. Davis has already served eight times on the jury and is represented in the Permanent Collection. Charles Hawthorne, Edward W. Redfield, W. L. Lathrop, Gardner Symons, and Edmund C. Tarbell have served on previous juries. Under an established rule the director is president of the jury.

1726

Frontispiece to No. 5

GENERAL VIEW OF CAPITOL PARK
HARRISBURG PA.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLI MAY, 1920 NO. 5

Capitol Park, Harrisburg, Pa.

Arnold W. Brunner, Architect

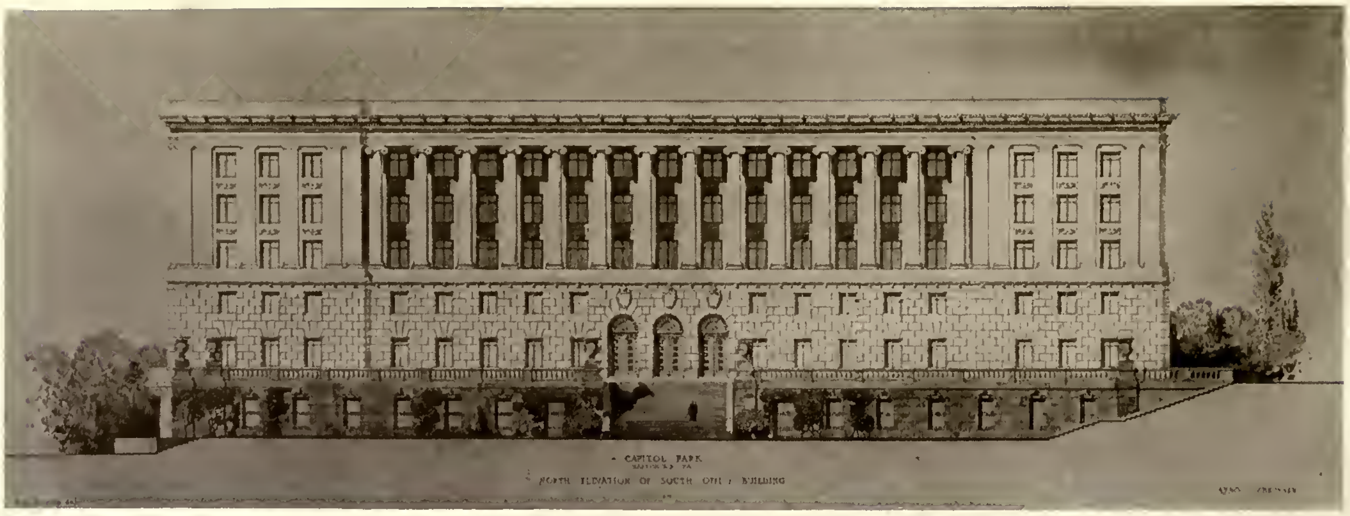
THE determination to make our capital cities notable and dignified is unfortunately not a nation-wide characteristic, which is a pity, for with half the public spirit of ancient Athens any one of them could achieve wonders.

Nowhere has there been evinced a greater harmony of ideals of city and State than in this great Commonwealth of Pennsylvania. The city of Harrisburg is exceptional. It has shown the most admirable public spirit. Its parks, water-front, and other manifestations of civic pride are well known, and when the enlargement of Capitol Park was determined on and twenty-eight acres were added to it (making it forty-three in all) it was always with a desire to have the city share in the benefit of the new improvements.

Accordingly, in designing the group of buildings, which, in connection with the Capitol will be required to house the growing activities of the State, care has been taken to make their street façades and attendant landscaping present an attractive appearance to the city on all sides.

Little thought had been given to the eastern front of the Capitol, facing as it did a neglected neighborhood of mean streets, but in the new order of things what had formerly been its back door will now become the garden front. It will face a wide terrace surrounding three sides of a forecourt 500 feet wide. This will be paved with marble, fringed with foliage, and will contain two monumental fountains. On the north and south terraces are to be placed buildings

East view of Capitol as it looked three years ago.



North elevation of south office-building.

so designed that they will be practically detached wings of the Capitol, and which with their connecting terraces will contain over 450,000 square feet of office space, a fair provision for future growth. Farther to the east are two other buildings, one to contain the laboratories of the various State departments, and the other for the use of the educational division.

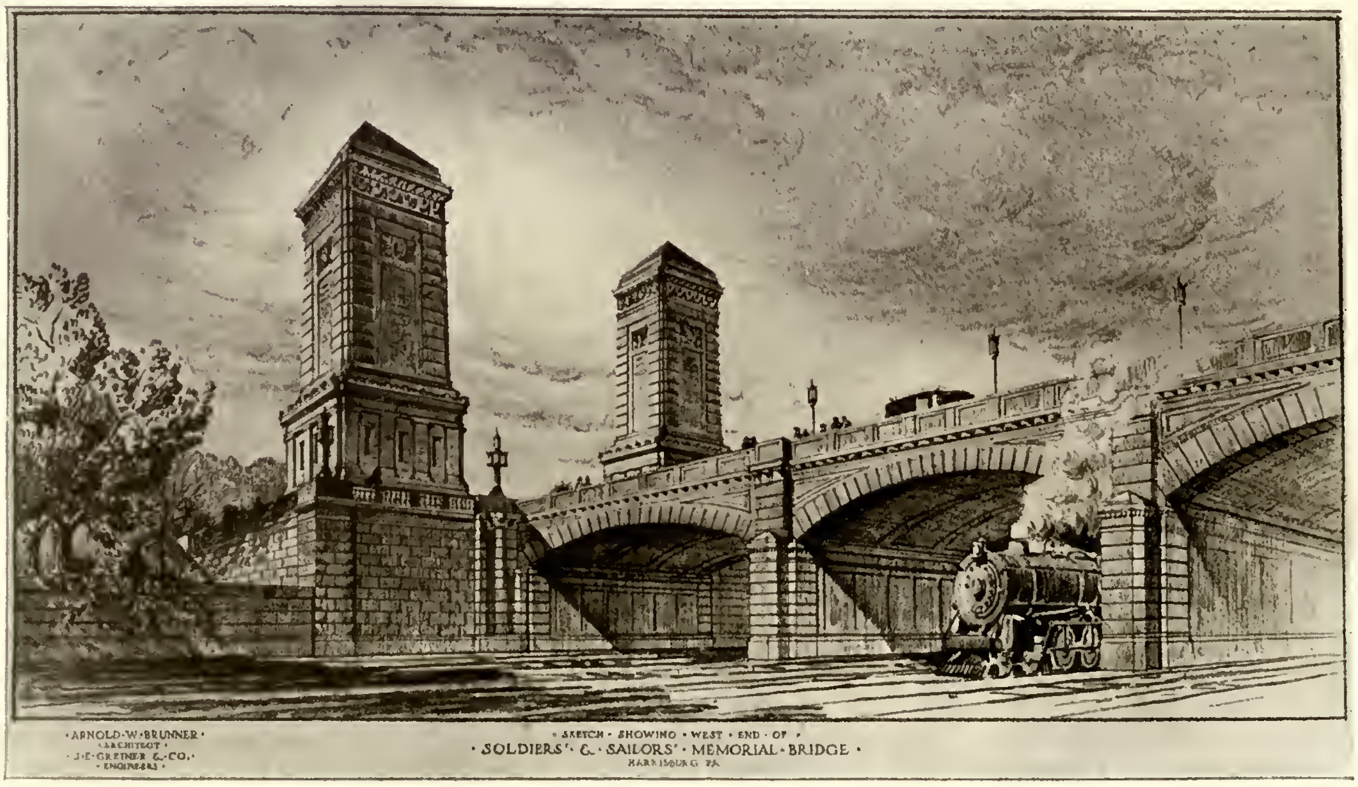
The space between these buildings is so divided that the broad tapis vert in the middle is bordered on each side by four rows of trees. They terminate in a formal plaza which connects the streets that bound the park and forms the approach to the Memorial Bridge.

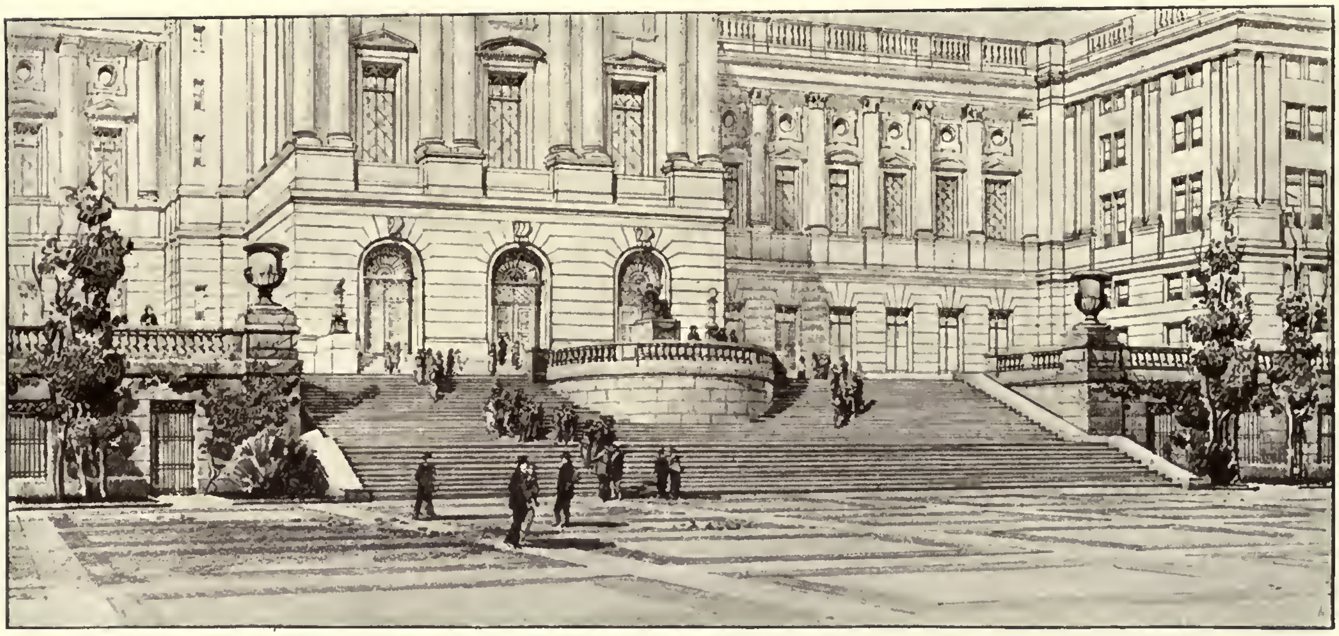
Under the wise guidance and with the unfailing support of the Board of Public Grounds and Buildings, composed of Governor Sproul, General Charles A. Snyder, and Mr. Harmon M. Kephart, it has been decided to make all the new buildings of an architectural character which, while harmonizing with the Capitol, will by their simplicity emphasize it and lead up to its graceful dome as the centre of the composition. The fine majesty of simple things appeals to the board and I cannot be too grateful for their constant encouragement.

It requires but little imagination to visualize the broad forecourt thronged with people, some on the upper terraces looking down on the splashing fountains, or perhaps all assembled to celebrate a special festival or national event. I believe that this will truly become a public forum.

The dominant idea in the design of the Capitol Park has been to make it not only stately and beautiful, but useful for the people. Under the great rows of trees which in time will meet overhead, and provide grateful shade, will be gravel walks, seats, and small fountains—real playgrounds for the children and for us grown-ups.

The inspiration of the French palaces and gardens —those wondrous pleasure-houses for kings—has been sought, their graceful design reverently studied, their successful treatment and combination of formal and informal landscaping, but always with the endeavor to





Main steps from forecourt to east entrance of Capitol.

adapt their beautiful forms to the wants of the American public.

Here are places set aside for statues so that our distinguished men may be properly honored. Too often we find our bronze heroes tucked away in odd corners and left to the birds and the dust.

The bridge is to be a memorial to the soldiers and sailors of Pennsylvania who took part in the great war, and accordingly the two pylons which mark its approach are symbolic, one of the army and one of the navy, and they are to contain vaulted marble chambers in which will be inscribed the names of these gallant men.

Built of enduring granite the bridge will span the railroad-tracks, cross the valley, and reach the summit of a hill exactly half a mile away. It will be treated monumentally in the same spirit as the Capitol group and will virtually form an extension of State Street one and one-half miles long from the great eastern approach of the Capitol to the banks of the Susquehanna River.

Harrisburg, wishing to mark the city terminus of the Memorial Bridge, in other words, to receive it with some appreciation, has determined to erect at this spot a monument in memory of her soldiers and sailors. This memorial will consist of a simple curved seat on a raised platform at one end of a formal garden. The central feature silhouetted against the morning sky will be a flagpole with a richly ornamented bronze base. From this high point will float the American flag. Long after these days of stress and strain, of trouble and conflict, it will stand as a lasting memorial to the stability of our ideals—our government—our country.

The two office-buildings have each approximately a ground area of 90 x 300 feet. The forecourt bordered by the Capitol terraces is 300 x 500 feet. The educational building and laboratory building are each 80 x 440 feet, the former having a projecting wing containing a large auditorium. The design, which includes the formal rows of trees bordering a sunken lawn 500 feet in length, also includes a certain amount of informal landscaping and to a certain extent continues the treatment of the small piece of ground now known as Capitol Park.

Photograph of model, Capitol Park, Harrisburg, Pa.

Sculpture in Landscape Architecture

Illustrations from "The Gardens of Italy," edited by Arthur T. Bolton (see page 138), and the author's photographs

By Fletcher Steele

SCULPTURE has been the decoration par excellence of landscape architecture since the earliest times.

In Egypt the glaring avenue of sphinxes connecting the temples of Luxor and Karnak rivalled the mysterious immensities of the dark temples themselves. The Acropolis at Athens was arranged to give far view of the Athene Promachos. The groves where Plato walked and the mystic grottos of the oracles were peopled with statues gleaming through the shadow.

Villa Balbianello, Lake Como. F. S.

Rome and all her civilization was crowded with sculpture. From the remains at Pompeii we can reconstruct the private gardens of the imperial age. Statues everywhere personified the gods, the legends, and the household traditions. They were used to mark the axes, to fill in the interspacing of colonnades, to mark the portals and the accent in hedges and gardens. In strength of mass, marked light and shade, and lively silhouette, ancient sculpture proves that it was not the work of the studio, but designed largely out-of-doors, where these qualities are of fundamental importance.

Fifteenth-century study of the pagan world resulted in the supreme period of garden-building in Italy. Underlying conditions of geography and climate were identical with those of ancient Rome. The apparatus of horticulture was very little changed. Italy is a dry country and has no such variety of plant life as is found farther north in Europe. For the most part the Italian gardener relied on the ilex, the cypress, the sycamore tree, with boxwood, laurel, orange, and lemon for lower growth. Each forms a dense mat of flat rich color and casts dark, definite shadows. The Italian has never been absorbed in variety of horticultural effects. He has treated plant life as an almost architectural material, offering bold forms, masses of simple green, and marked light and shade. He has been concerned in adapting the irregular topography, largely by means of architectural devices, to the use and enjoyment of his peculiar civilization.

Villa D'Este. The Fountain of the Dragons, on the main axis of the gardens.

In the early, simple days, walls, terraces, and steps (which have been inevitable throughout the agricultural history of Italy) were left without ornamentation. With the revival of interest in Roman sculpture and the flowering of the new architecture came the embellishment of the gardens. Carved antique fragments were gathered together and arrayed on balustrades, walls, in grottos and niches, wherever place could be found. But an innate sense of design directed that the sculpture could best be displayed through its incorporation in the architectural background. Good taste required that the decorative detail, which it thus became, should be subordinated to the impression of the whole.

The Villa Albani is the best existing example of an Italian garden designed properly to exhibit a collection of sculpture. To be sure, it was built late, but it displays very well the principles which did not change. On the southwest side is a detail which illustrated the use of plants for walls and the application of sculptured ornament. A long line of columns is backed by a cypress hedge, which is kept carefully clipped to the height of the abacus. A row of busts surmounting the columns stands boldly against the sky, accenting the hedge mass at regular intervals. Here and there a statue in line with the columns, between which it is placed, occupies a recess in the green, which serves to throw into sharp relief every detail of the sculpture. In order to leave no loose edges, hedge and sculpture are separated from a broad walk by a low-clipped box edging. A few plants fill in the narrow border and at various times during the year a touch of brilliant color is introduced by flowering plants in pots. The free-growing roses and vines soften the stiff architectural lines and masses of hedge and column. Horticulture is distinctly subordinate, but it is indispensable. An admirable effect is produced with the utmost restraint in the use of material.

The taste for sculpture in gardens, which was created by the use of antique fragments, could by no means be satisfied with the limited material provided by excavation. As the gardens multiplied, it was necessary to find modern carving for their embellish-

The cypress hedge, Villa Albani, Rome.

ment. Great sculptors were not averse to turning their hand to garden ornaments, as witness Gian Bologna's fountain on the little island of the Boboli Gardens and the fountain at Petraja by Il Tribolo. The occasional masterpieces were, however, exceptions to the general rule.

Possibly because the quantity of statues and sculptured ornament necessary was far beyond the productive powers of the great artists, probably because the cost of fine work would have been prohibitive, but little of the great volume of Italian garden sculpture was beautiful in detail. Much of it is downright ugly. It was vulgar in conception, crude in execution, and a caricature of man and beast in many instances. Men's muscles bulged like water-blisters, women's drapery seems blown by a high wind. All was exuberant, ridiculous, yet strangely satisfying.

The upper garden of the Villa Farnese at Caprarola offers a typical illustration. A broad terrace laid out in parterres is enclosed by a retaining wall from which rises a series of gigantic Hermes, each supporting a huge flower-pot, nonchalant as if it were the latest fashion in top hats. At the corners they are seemingly busy in conversation. Others have the expression of society on parade. They are amusing, but without exception they are gross in idea and execution. On either side of the steps leading down from this terrace are fat stone horses which have all the appearance of being rags and sawdust for children's playthings. The fountain, which breaks out from the terrace wall, is flanked by huge stone giants so badly out of drawing that one would expect better things from a first-year art student. Nevertheless, the whole is replete with charm and gayety. It has all the virtues and faults of a stage-setting, frozen into stone.

Recumbent giants, modelled with brutal coarseness in stone, were a favorite subject of Italian gardens. It can be safely stated that they are always good ornaments and bad sculpture. Famous examples are to be seen lounging against the stairs of the Senate in the Campidoglio at Rome, or built into the retaining wall leading up to the bosquet at the Villa Lante. They are incorporated into the architecture, and, while it would be far-fetched to state that they were consciously used to reinforce the strength of retaining walls, it is nevertheless true that they commonly serve just such a function. But their grossness is not peculiar to them. It is a common quality of all garden sculpture of the period.

As if grossness and bad drawing were not enough, we find exaggerated posture and extravagant detail. Arms and legs are flung about recklessly. Draperies, fruit, dogs, poles, lumps of hair, etc., were used profusely. There is confusion and awkwardness in consequence. On the other hand, there is conspicuous play of light and shadow which tells at a distance from which the details sink into insignificance. Moreover, such treatment adds notably to the vivacity of silhouette.

The Italians continually played with their sculpture to get interesting effects with silhouettes. They had a pretty trick of using sky, sea, or distance as a background. Examples are to be found in almost any garden, such as the Villa Falconieri (Frascati), Villa Palmieri, near Florence, Villa Balbianello and Isola Bella of the Italian lakes. In such a position it was obvious that the chief value of the sculpture lay in its interesting outline, as any object ordinarily looks flat and black against the light. Recognition of this fact came to a logical conclusion in the sculptured fountain of the courtyard in the Palazzo del Commune at Viterbo. The fountain was placed next the outer balustrade, which was at the top of a steep descent. The rampant lions, which form the chief decoration, are seen only against the sky from one angle. They are cut out flat, with only the slightest bas-relief modelling on the inner side. They depend entirely on their silhouette for their interest.

There would be no end to the enumeration of the individual demerits of Italian garden sculpture. The climax was probably reached in the cascade at the Villa Garzoni. All the sculpture is annually whitewashed to force the contrast. Two enormous female giants facing each other (thus reversing the usual positions) are surprised by a third lady some fifteen feet high, playfully fluttering down with the apparent object of squirting water on her neighbors. Lower down four gigantic buzzards, preposterously ugly, are scrambling around the artificial rock work. Here, if anywhere, the sense of play overstepped itself. After the first gasp of astonishment, it would be difficult to imagine any pleasant sensation they could stimulate. And this can be attributed to the fact that they are quite without any marked architectural relationship with wall or platform. The birds in the Fountain of the Dragons at the Villa d'Este, Tivoli, are not less extravagant in themselves. But, owing to careful grouping around the great central water-jet, they serve an architectural purpose and satisfy the eye.


West side of the parterre of the Casino at Caprarola.

What conclusions can we draw from the qualities of Italian Renaissance garden sculpture? Manifestly its faults did not belong to all the sculpture of the period. More noble ideas were never conceived nor was work ever more delicately executed than by the sculptors of the Italian Renaissance for the embellishment of architectural interiors. We must conclude that the triviality of idea was intentional, and the faults, if not encouraged, were forgotten in insistence on the decorative qualities; furthermore, that these decorative qualities depend on elements which are not necessarily required for sculpture ornamenting architectural interiors. "There is such a thing as deliberate ugliness: or, rather, a great designer will deliberately forego accepted forms of beauty in order to drive home other effects which are more important for his purpose" (Sir Reginald Blomfield).

Sculpture in Italian gardens is one of its chief charms. It is designed carefully to emphasize the architecture of which it often forms a part. It is effective when seen from a distance, whether considered as harmonizing and enriching the structure or in contrast with the strong green of tree or shadow behind it, against sea or sky. It is strong, even coarse in mass; it has vigorous light and shadow, a marked and generally crisp silhouette and color which is like the architectural detail and in contrast with the background. It has exaggerations which are toned down by distance and the large scale of nature.

The Renaissance in France did not come as a revival under local conditions identical with the past. France did not have its abundant relics of Roman schemes, its poverty of horticultural background and arid climate, its sudden irregularity of topography, and its myriad fragments of ancient carving. There was a chasm between the civilization of Rome and that of the French Renaissance. While France had a superb tradition in sculptural ornament, inherited from the Gothic builders, sculpture was not a natural embellishment of French gardens. In the illustrations of the Grimani Breviary, of "The Romaunt of the Rose," in the British Museum, and of other mediæval illustrations of contemporaneous gardens, the only carving is found on the simple fountains. The garden architecture, where it was not a sternly undecorated part of the larger fortifications in which the garden was set, consisted of wood trellis and fence, straightforward pool or brick garden-seat, none of which showed any ambitious attempt at ornament.

Moreover, the earliest records show a greater interest in horticulture for its own sake. The climate was better fitted to the easy cultivation of the wide range of plant life naturally found in France. An impetus was given the development of horticulture when the French Crusaders brought back seeds and cuttings from the Near East. And history shows everywhere that a strong interest in horticulture means a corresponding lack of concern for the architectural elements of garden design. When the French began to build great châteaux and huge formal parterres, laid out in colored stones and sand, surrounded and crossed by clipped tunnels, and walls of foliage, horticulture was more or less forgotten in the new passion for ostentation and pageantry, but it continued to play a greater part than was ever the case in Italy.

The fountain below the parterre of the Casino at Caprarola.

For the most part the ground was flat or only slightly undulating. Parterres were laid out on formal lines in intricate patterns. Substantial walls of great length became one of the conspicuous features of French garden design. The mediæval courtyard fountain was glorified and became the central feature of early French parterres. One looks in vain, however, to find examples of the common use of garden sculpture in the early Renaissance. Formally clipped bushes and trees were employed to mark salient points of the design, where in Italian parterres the points of emphasis would be made with sculpture.

Toward the end of the first period of the French Renaissance, sculpture began to play a strong part in the embellishment of buildings, and soon thereafter in garden walls. The walls of the great court at Château Richelieu and the retaining wall of the parterre of the ducs de Lorraine at Nancy are in point. But it would appear that a large use of sculpture in gardens was the innovation of Le Nôtre. In all his later designs sculpture played an important part, culminating in his great achievement at Versailles. It is at Versailles that one can best study the French use of garden sculpture.

The architectural feeling of French gardens lay in their grandiose symmetrical design rather than in the architectural embellishment, important as that is. The walls were considerable in themselves, but they did not assume the dominant place that they occupied in the gardens of Italy. While sculpture was used in some profusion with walls, the result was more to enrich the architectural detail than to decorate the garden as a whole. The effect of sculpture was more considerable where used in connection with water-basins and fountains. In this case each unit was conspicuously isolated and the sculptured groups were well arranged. Le Nôtre materially enriched the general effect when he placed series of great marble vases and statues against a clipped background of tall trees, following an inspiration which may well have come from Italy. The difference in national treatment lies in the much larger proportionate importance of massive foliage and flat lawns in France.

Except for the adaptation of sculpture to much larger elements of design, no new principle was established, although sculpture may be said to have lost its place as part of the structure to become merely ornament. In two ways, however, Le Nôtre did use sculpture in a new fashion. He commonly made a statue the terminus of long paths through the forest which were without architectural character beyond the fact that they were straight; and he took occasion to break the monotonous sky-line of his flat parterres by putting isolated statues at important places in the beds and lawns.

It would appear that Le Nôtre thoroughly understood the necessary qualities of out-of-door sculpture. For the


St. Peter s from the carriage-drive.

most part what was done under his oversight was fairly strong in massing, and had vigorous lights and shadows. Harmony and contrast of color were well treated. Bronze groups around the basins in the upper terrace at Versailles between the sky-blue sheets of water and immense paths of light-colored sand, stood out as sharply as spots of ink on white paper. Statues harmonize in color with the walls they decorate. Where they are to be seen against a background of foliage they are white. Where bronze was used on green lawns or against green backgrounds, he isolated the sculpture in each case by a strongly marked architectural setting.

While, because of the magnitude of French gardens, sculpture did not take the important place that it assumed in Italy, inversely each statue, standing almost alone, became of more interest as a detail. Le Nôtre understood this and as a result the sculpture of his gardens had an elegance and finish that have never been excelled. In Italy the general standard was never approached. Each group is a masterpiece fit for the garden of Le Roi Soleil.

Sophistication was necessary to this result. Everything was in good scale. There were no recumbent giants in France. On the other hand, the sculpture lost in spontaneity and gayety all that it gained in correctness. There was no joking, no personal vulgarity in the great French gardens —all was impersonal and serene. The sculpture had all the qualities of the place. It was effective, beautiful, and cold.

England is the true home of horticulture. It has a great variety of plant life and an ideal climate for luxuriant growth. While her people have long understood how to build stately, architecture and the fine arts have never been the chief preoccupation of English people. Sculpture has been almost conspicuous by its absence from the public mind. Most of the good sculpture which has been put up during the last few hundred years has been imposed from above. As far back as the time of Henry VIII, the king imported sculptors from Italy. This was done in France, too, but there the people were able to continue the cunning taught by Italy. In England this does not appear to have been the case. While noble monuments have been erected by Englishmen, they appear to have been more the result of serious thought and hard work than superabundant facility in design.

Terraces and walls were commonly used in Renaissance English gardens with great ingenuity and charm, but where in Italy they would have been surmounted with carved balustrades and fantastic statues, in England they were crowned with strange designs in strap work or biblical quotations carved in huge letters. In place of the statues they built endless stone balls, pinnacles, and other geometric contrivances.

The gardens had their parterres, their tunnels through horn beam, and their trellises, as well as their walls; but while the Italians and the French were contented with designs in colored glass and sand, outlined with clipped box edging, the English protested against such absurdities as early as the sixteenth century. Their parterres were planted with varieties of trees, shrubs, and plants. Where the French used potted orange and lemon trees and geometrically clipped shrubs to emphasize important lines and spots of the garden design as the Italians used sculpture, the English went much farther than the French. They made whole gardens of strangely sculptured bushes and trees. Both in the gardens and as a background a world of living plants in luxuriant variety and color subordinated all other decoration to itself.

Englishmen were always travellers, however, and they were charmed with what they saw in France and Italy. They brought back with them ideas for many a so-called Italian house and garden in the British Isles. What is more, they imported quantities of sculpture and decorative material for these same gardens. Set down in England it has occasionally been used with great propriety and charm, but in order to be successful the sculpture required a restraint in the use of plant material which was almost beyond the power of an Englishman. Often it was placed where it had to compete in interest with strange shapes in topiary, bright spots of garden color, various forms of bush and tree, until it is but one of many features to attract the eye. Sometimes, to be sure, it was used in wall and ramp in the Italian fashion, and it is usually most satisfactory when so placed, but there is no tradition or innate sense of fitness urging an Englishman to follow such a scheme.

Where there were few bits of sculpture the gardener wished to make the most of what he had. Consequently he grasped at Le Nôtre's plan of terminating a long vista made by trees or shrubs or bushes with a bit of sculpture.

The foreign innovations aroused a certain emulation at home. There was a demand for garden sculpture from those who could not send abroad. At least this is the first solution that occurs to mind for the lead figures that are so commonly found in English gardens. Lead was a cheap material in those days and easy to handle. Given a proper model, or even the memory of some neighbor's Diana or Bacchante, the ingenious Englishman, with a taste for gimcracks, could mould and pound the malleable lead into very reasonable and entertaining sculptured forms. With his own knowledge of the material which has long been more


Fountain, Palazzo del Commune, Viterbo. F. S.

common in England than elsewhere, he went ahead on his own account. We find all sorts of basins, tanks, gods, and slaves, and later, shepherdesses and their swains, in homely English lead. Occasionally the modelling was well done. More often it was crude and heavy.

While the Englishman is serious, at the same time he will have his occasional joke. In this case his instinct led him aright in joking with his garden sculpture. On the whole, English lead work is jolly and quaint. It fulfils the requirements of strong mass and interesting silhouette. It has good shadows, but little high light, owing to the dull color of the material. For the same reason it fails to harmonize with the architectural material or contrast with a background of foliage. But it does very well at the head of a flight of steps or isolated in parterre or courtyard. In a garden where horticulture occupies first place, yet where the architecture must be softened and embellished, where economy rather than ostentation, where homeliness rather than elegance is the end in view, lead is well fitted to be the material for the sculpture of gardens.

In America there is almost no garden sculpture, and what one sees is rarely satisfactory. We have inherited the best architecture in the world. We have come into possession of much of the best painting and other fine art of the past. Why are our gardens so far behind in this matter of sculpture?

One reason is certainly the cost. We have seen that in Italy, owing to the crudeness of the work, the garden sculpture cannot have been a great element in the cost of the gardens. In France sculpture was very fine but it was only found in the gardens of the kings and the rich nobility. In England, while some expensive foreign statuary was imported, the common material was inexpensive lead, beaten out for the most part by local craftsmen. In America, if we cannot buy the most expensive, we will have nothing. As the expense of a single statue of any size from the most reasonable sculptor could not well be less than a thousand dollars, and one statue goes nowhere in garden decoration, the cost is apt to become, in this country, a very heavy item.

Second, our sculptors all work in studios rather than out of doors, and their work has qualities of elegance and finish which make it interesting as a detail, but quite ineffective from a distance. Strength in mass is not a characteristic of modern American sculpture. Most of the figures are so thin that they look stringy from even a short distance. This means no strong light and shadow. Good silhouettes are going out of fashion with the modern craze for the archaic. Much of the modern sculpture is as out of place as the Venus de Milo in a garden setting. Happily there are certain marked exceptions such as the "Girl Playing with Gazelles," by Paul Manship. While lacking size, this group certainly has, to a degree which has never been excelled, an interesting silhouette. One should place it against sea or sky.

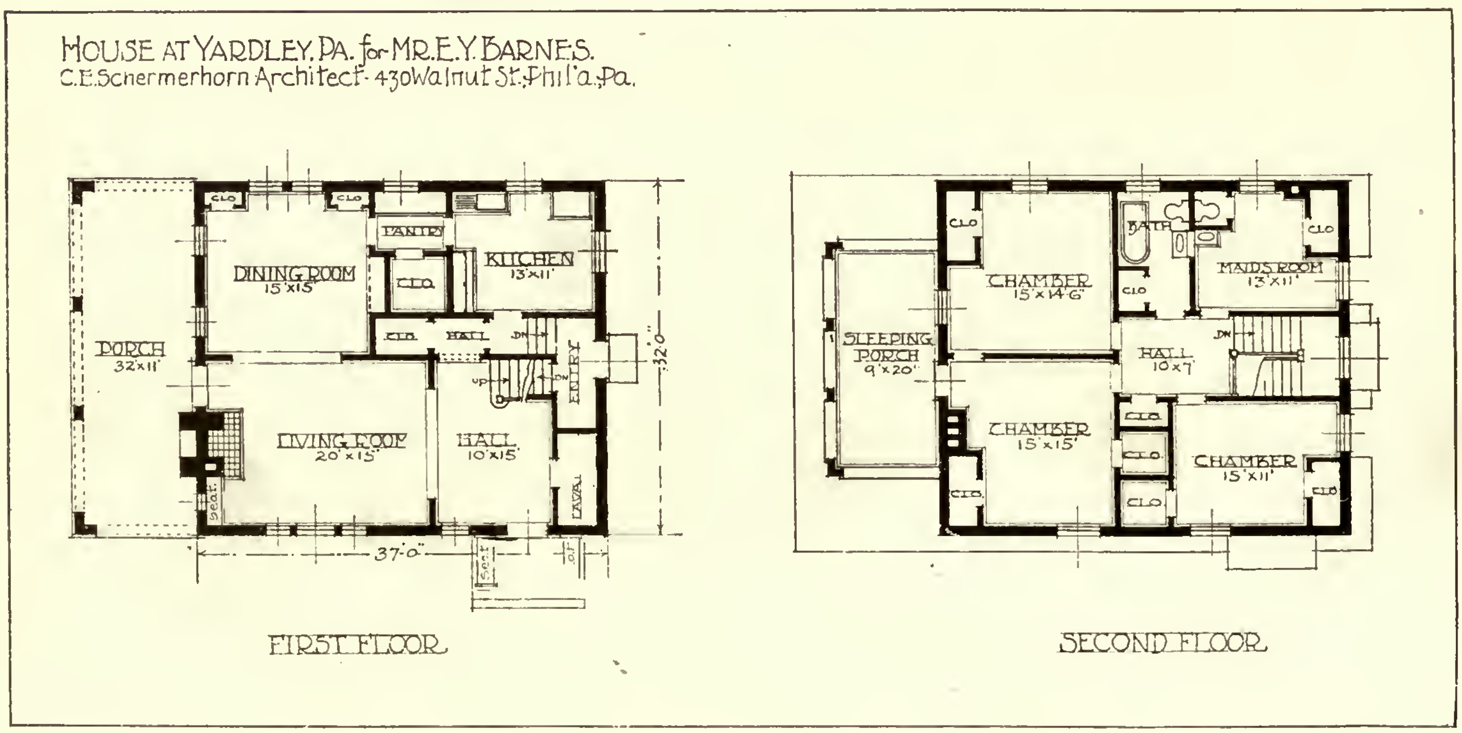
Lastly, there is little satisfaction in the color of modern garden sculpture. It is rarely to be found in marble or the rougher stones which would make it properly harmonious with any architectural setting. Probably the reason is the extreme delicacy, not to say attenuation, of the detail, which makes it inappropriate to stone, except for an interior situation. Ordinarily modern garden sculpture is in bronze, which floods the exhibitions. This is satisfactory in the intimate detail of small gardens, but will not hold its own against foliage from any distance. Certainly it does not serve to embellish the architecture of a garden that is not specially made to provide a setting for it.

Until our sculptors will get out of their studios to work, and provide themselves with walls and balustrades whereon to see the effect of what they do, not as an exhibition piece, but as the detail of a larger scheme, we shall not be able to give sculpture the place which it deserves in landscape architecture.

Model for a House at Pasadena, Cal.

Reginald Johnson, Architect

Clients of Mr. Reginald Johnson, the well-known California architect, whose office is in Pasadena, have no difficulty in understanding the plans that he submits. Instead of showing them merely a perspective drawing, Mr. Johnson submits a clay model of the proposed home as it will appear in its landscape environment. The model illustrated is of a $250,000 home to be erected on Orange Grove Boulevard in that city.


HOUSE AT YARDLEY, PA. for MR. E. Y. BARNES.
C. E. Schermerhorn Architect - 430 Walnut St. Phil'a, Pa.
PORCH 32'x11'
DINING ROOM 15'x15'
PANTRY
KITCHEN 13'x11'
CLO.
HALL
ENTRY
LIVING ROOM 20'x15'
HALL 10'x15'
LAVA.
seat
37'-0"
32'-0"
FIRST FLOOR
SLEEPING PORCH 9'x20'
CHAMBER 15'x14'6"
BATH
MAIDS ROOM 13'x11'
HALL 10'x7'
CHAMBER 15'x15'
CHAMBER 15'x11'
SECOND FLOOR

Editorial and Other Comment

Brass Tacks—Plus

HAS there ever been any great achievement in the arts, in fact in anything that has pushed the earth along a little bit, without a motive power above the idea of mere gain? Even with riches beckoning somewhere in the offing, hasn't the big idea, the creative impulse, the glow of a possible achievement, the sense of power in the mere idea, been the plus quantity that has driven the brass tacks home?

We have had a great awakening, to be sure, and the sound of the hammer on the brass-tacks idea makes a great noise in the land. The sound is that of the hammer of Thor and it has become the tocsin of discontent, unrest, and greed.

The old slogan of art for art's sake is not quite dead, but it seems to be slowly dying, dying peacefully, still believing that there is no art, no ideal, no aspiration worth a drachma, a farthing, we'd better say a copper cent, that is not at the outset based on the cost plus contract.

The cost we'll put in the years of study and work and aspiration, the nervous force, the temperament, the personality, the education. These things have no real fact and figure value unless we compile statistics of the time spent in preparation measured in days' wages.

From certain comments of the day we opine that the education of the architect has been for these many years started on a foundation of the plus quantity, when, of course, according to the new idea it should have begun on pay-dirt or certainly upon a preliminary foundation of brass tacks. The times have changed since Pericles was a power in the land where rose the Parthenon, since Rome was built, since Bramante and Michael Angelo and Leonardo lived, since Inigo Jones and Wren gave England a great name in architecture. And we'll name no names, but there are some of our readers who will think of names even in our own land—where brass tacks are said to be the only fitting fasteners worth a thought—that live in memory first of all by their plus value.

All of which savors of the old-fashioned, the out-of-date, the inconsequential shadow of forgotten dreams. It is to laugh! But in dwelling on such things let it be understood that we are not harking back to a spineless idea of art for art's sake as a shallow excuse for dilettanteism, formless and futile dreaming. Quite the contrary, we want to see a right and proper and substantial use of brass tacks, but they'll never hold anything together for very long without the plus element.

In these words by Mr. Frederick L. Ackerman, there is a hopeful suggestion:

It was "suggested that the profit motive and art were not congenial bed-fellows—this was said with respect to the production of art by professionals. Why does not this thought apply to the entire field of industry? The most vital art the world has ever known arose out of a system of industry uncontaminated by the profit motive. And this suggests that the most direct way to arrive at a peaceful condition in industry would be to seek a return to that state of industry in which the creative impulses of the worker and the instinct of workmanship could express themselves without repression. Such a change cannot be arranged overnight—but that should not stand against it as a goal of endeavor."

The New School of Architecture at Princeton

IT is something of an event in our architectural history to have added to its educational resources the traditions and power and high purposes of such a time-honored institution in the arts as Princeton University.

There never was a time when such a school could be added with the prospect of more usefulness to the country. An era of unprecedented building is before us, building that may either express the utter materialistic mood of the times, or the old traditions based on sound scholarship and the humanities in general.

Princeton has never lacked in an appreciation of the great needs of manliness united with high purposes, scholarship as a preparation for the realities of every-day living. Here men are made ready for men's work when duty calls, when the student may be, in time of great need, transformed into the best of soldiers. All over the land none were quicker to respond to the call to arms than were the young men of Princeton and our other universities. They are taught the lesson of service, of self-discipline, the lesson of readiness to meet emergencies, not only with ideals but with force, sheer physical vigor, an all-around use of mind and body when the occasion calls. Never was a time when there was greater need of trained minds, of minds with a worthy purpose united with a knowledge adequate to meet the demands of the times, minds trained for specific accomplishment, whether the training comes from the university or is found in the hard school of life itself.

"The new lines" upon which the Princeton School of Architecture is based are clearly expressed in the following extract from the announcement:

"As a result of careful and studied growth, there is now established in Princeton University a thoroughly equipped School of Architecture, which, while embodying all the fundamentals of architectural study, is conceived along new lines. It proposes to build its architectural work upon the required basis of a Princeton Bachelor of Arts degree. With this in view, the School has been established as a branch of the Department of Art and Archæology, and is designed primarily to co-ordinate the undergraduate studies of the men electing this department who look forward to architecture as a profession, to graduate them with the Bachelor of Arts degree in four years, and to fit them for the professional degree in architecture in two additional years. While based upon a thorough undergraduate preparation in the history of art, the school is open to students graduating or transferring from other colleges and universities, if they have complied, or are willing to comply, with the requirements of Princeton University as described in a later paragraph.

"The chief considerations which have led to the establishment of a School of Arch'tecture at Princeton are:

"First.—The conviction that a completely rounded college course is an invaluable asset to the successful architect. This is the belief of a number of distinguished architects who have been consulted and who agree that an architectural school which seeks to produce only the highest type of architect should require candidates for its degree first to secure a Bachelor's degree at the end of four years of liberal training in the broader educational subjects such as ancient and modern languages, history, literature, economics, and mathematics.

"Second.—The fact that architecture is first an art and secondly a science, and should be taught primarily as an art. The technical aspects of the profession, such as business administration, safe and durable construction, and civic building regulations, while having their necessary place in the training of an architect and their due consideration in the Pr'nceton course, can best be learned by actual practice in an architect's office. The architects who have won the most lasting renown are those who have been the greatest artists, men with the power to design buildings which are lastingly beautiful. The Princeton School therefore proposes to emphasize above all else the artistic knowledge and inspiration which are the foundations of good design.

"Third.—The belief that the adequately trained architect must not only know and thoroughly appreciate the historical development of architecture, but must realize, through historical study, the extent to which the other arts, until modern times, have been the handmaids of architecture. There is a growing sentiment on the part of critics and successful architects that the architectural-school graduate is often insufficiently acquainted with the allied arts of sculpture and painting, and the co-ordination of all the arts. The Princeton School proposes to require its students to be systematically trained in the history and appreciation of the allied arts. With a staff of critics and specialists in historical art already in the Department of Art and Archæology, the school can give this training, in connection with the requirements for the Bachelor's degree, without increasing the number of years for the degree in architecture.

"Fourth.—In consideration of the fact that the architectural preparation offered by the school is linked with the requirements of a Bachelor's degree, Princeton University will award, not another Bachelor's degree (Bachelor of Architecture), as is done in most other architectural schools, but the degree of Master of Fine Arts, to be acquired in a minimum of two years of graduate work after the Bachelor's degree has been obtained."

The New York State Association of Architects Legislative Committee for 1920

Mr. Thomas F. Gleason, *Chairman*, Albany, N. Y.; Mr. John H. Scheier, New York City (reappointed); Mr. Alexander Selkirk, Albany, N. Y.; Mr. Robert North, Buffalo, N. Y.; Mr. Edward Loth, Troy, N. Y.; Mr. Edward S. Gordon, Rochester, N. Y.; Mr. Frederick H. Gouge, Utica, N. Y.; Mr. Gordon Wright, Syracuse, N. Y.; Mr. Harry Haskell, Elmira, N. Y.; Mr. Carl C. Tallman, Auburn, N. Y.; Mr. Harry R. Tiffany, Binghamton, N. Y.; Mr. Addison F. Lansing, Watertown, N. Y.

Book Reviews

THE GARDENS OF ITALY, with Historical and Descriptive Notes, by E. MARCH PHILLIPS. Edited by ARTHUR T. BOLTON, F.S.A., F.R.I.B. Containing nearly 500 illustrations. Charles Scribner's Sons, New York.

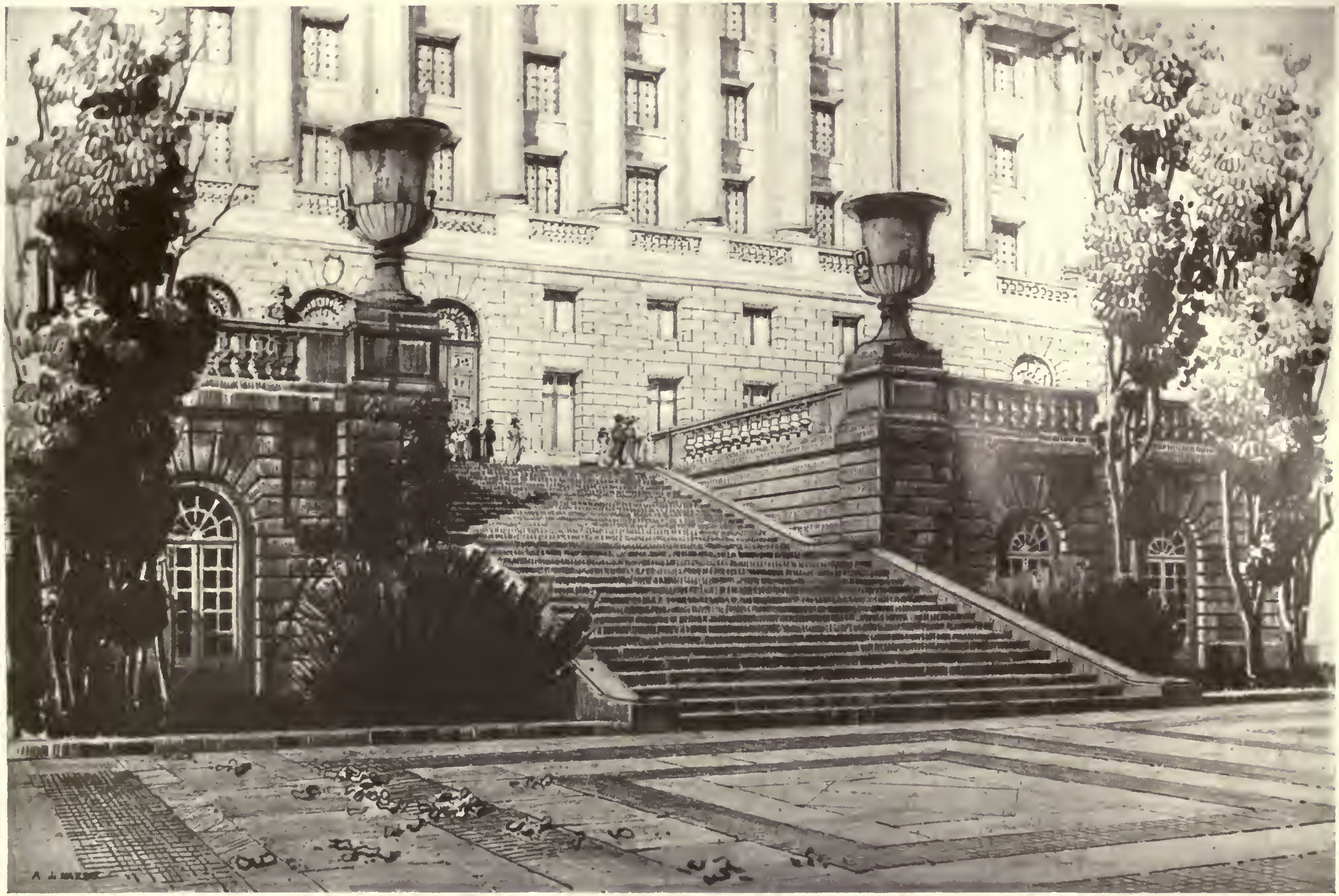
Based on the incomparable collection of beautiful photographs made by the late Charles Latham, this new and revised edition with its many additions of new photographs and old plans and the admirable historical and descriptive notes by E. March Phillips, provides the most complete exposition of an enticing subject. The world owes a great debt to these wonderful gardens of Italy, their influence has pervaded and stimulated the development of the formal garden everywhere. For the architect both the gardens and their architecture are perennial sources of inspiration and suggestion, and for the lay reader they offer the charm of designed use of places of natural beauty and the traditions they revive of the past. The notes by Miss Phillips are full of interesting historic lore, of references to great personalities identified with Rome, with poets and scholars, great men of the church. It is a book that architects will feel they need, a book that the lay reader will look upon as a collection of beautiful pictures surrounded by a text that has the fascination of old romance. In his preface Mr. Bolton says:

"When I set out before the Great War to prepare a new edition of 'The Gardens of Italy' it was with no calculated intention of doing more than a little revision and expansion. The interest of the subject has proved so great, however, that the present volume is, for all practical purposes, a new book. The magnificent series of photographs taken by the late Charles Latham has been retained, save for the elimination of a few subjects of minor interest, and about a hundred and fifty new photographs have been added to make the series of villas and gardens more comprehensive. Miss Evelyn March Phillips's original text, with its valuable historical notes and the delightfully told stories of the people who lived in these old palaces and gardens, has been retained as far as possible. My work has been to add architectural notes throughout, to enlarge considerably the sections relating to the Roman and Florentine examples, to write entirely new chapters on the villas and gardens of Venetia, the lake district, and Genoa, to contribute a general introduction, and, not least important, to gather together a valuable series of plans. For these I have drawn freely on various sources, including Gauthier and Reinhardt for Genoa, and Percier et Fontaine for Rome. Although the garden plans by the latter, now reproduced, were made as long ago as 1809, they are in general so clear and correct that I thought it better to give them in their original state. Those which I checked on the spot did not show differences of such importance as to make it necessary to alter the originals. They contain in some instances restorations which Percier et Fontaine thought were justified to complete the original schemes. In some cases, *e. g.*, the Palatine Hill, the drawings by these authors are all that now remain, and their labors in recording these old gardens deserve our warmest recognition."

PROPORTIONAL FORM, FURTHER STUDIES IN THE SCIENCE OF BEAUTY, BEING SUPPLEMENTAL TO THOSE SET FORTH IN "NATURE'S HARMONIC UNITY." By SAMUEL COLMAN, N. A. and C. ARTHUR COAN, LL.B., authors of "Nature's Harmonic Unity," etc. The drawings and correlating descriptions are by MR. COLMAN. The text and mathematics are by MR. COAN. G. P. Putnam's Sons.

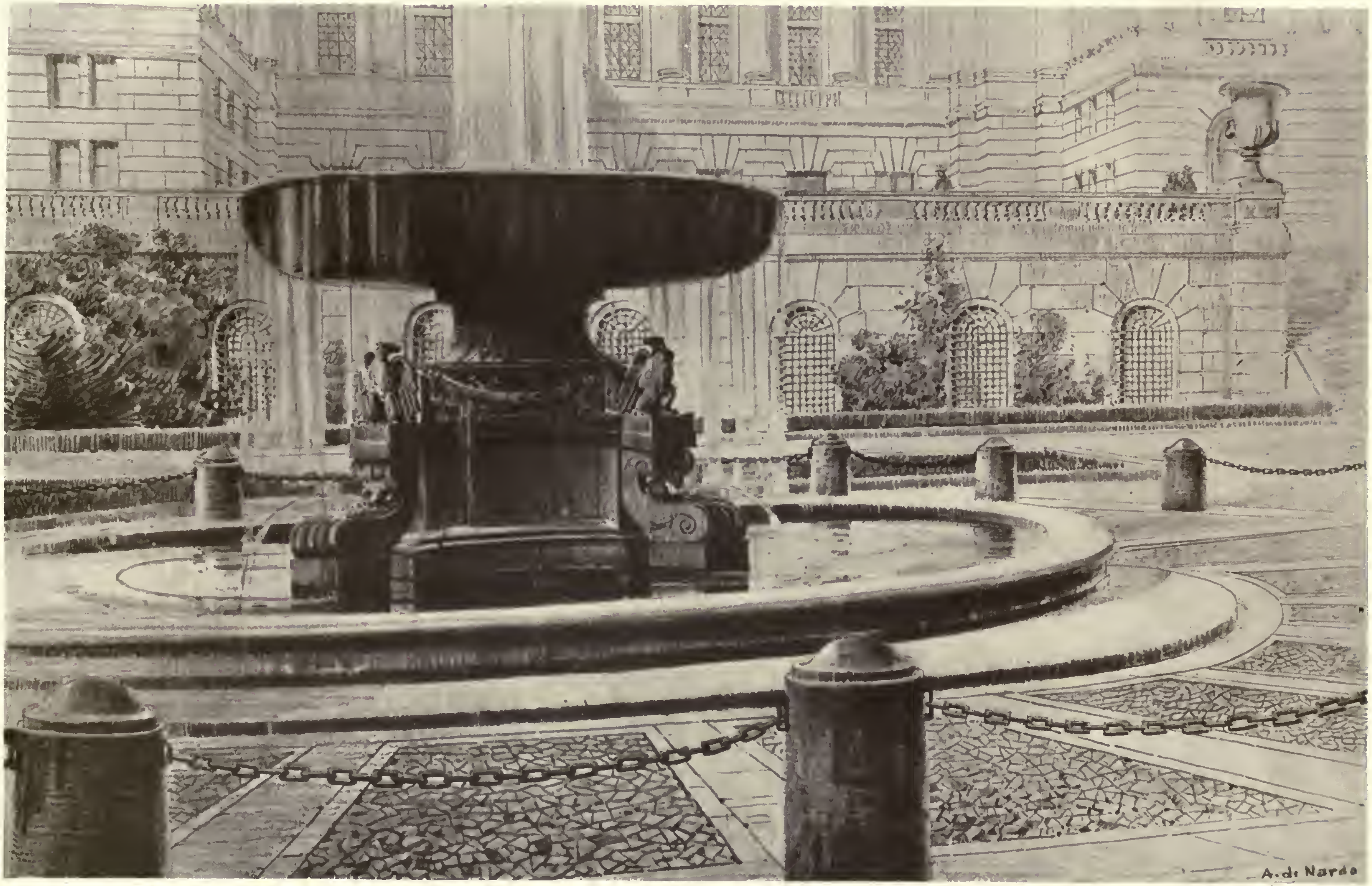
We have listened with rapt attention to Mr. Hambidge expounding his theories of the beginning of the laws of design in nature, and we know that he is a great prophet and original among those who are able to follow him around in his whirling squares. In the present volume we are led directly to nature as the source of art with "the Tetragon Family and Pentagon Family in constant evidence" and while it is clear that the ancients laid out temples and carved monuments and wrought metals on lines which indicate that they followed the indices of Nature's mode, it is unnecessary to presuppose that those ancients understood or pretended to understand at all why nature did these things. In vast degree we do not understand their point ourselves to-day.

We commend most highly as of great value in the systematizing of every architect's office records "LANDSCAPE ARCHITECTURE; A Comprehensive Classification Scheme for Books, Plans, Photographs, Notes, and Other Collected Material with Combined Alphabetic Topic Index and List of Subject Headings," by Henry Vincent Hubbard, Assistant Professor of Landscape Architecture at Harvard University, and Theodore Kimball, Librarian of the School of Landscape Architecture. Paper covers. The Harvard University Press, Cambridge.



TERRACE AND OFFICE-BUILDING FROM FORECOURT, PENNSYLVANIA STATE CAPITOL PARK, HARRISBURG, PA.

Arnold W. Brunner, Architect.



SKETCH OF FOUNTAIN IN FORECOURT, PENNSYLVANIA STATE CAPITOL PARK, HARRISBURG, PA.

Arnold W. Brunner, Architect.

ENTRANCE VESTIBULE, OFFICE OF WELLES BOSWORTH, 527 FIFTH AVENUE, NEW YORK. Welles Bosworth, Architect.

MANTEL, MR. BOSWORTH'S LIBRARY. Welles Bosworth, Architect.

OFFICE OF WELLES BOSWORTH, 527 FIFTH AVENUE, NEW YORK.

MR. BOSWORTH'S LIBRARY AND WORKROOM.

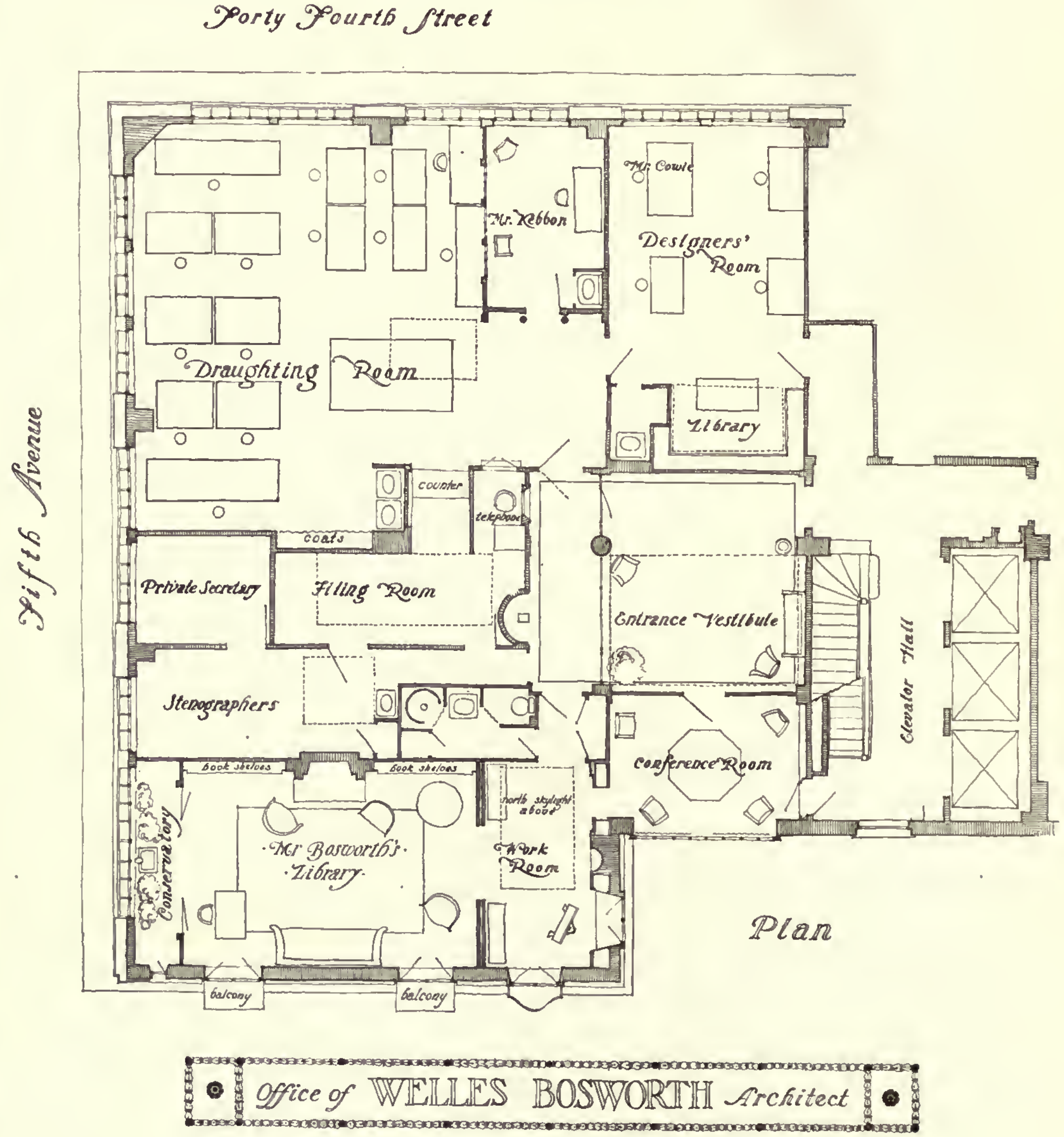
LIBRARY CONSERVATORY.

Welles Bosworth, Architect.

OFFICE OF WELLES BOSWORTH, 527 FIFTH AVENUE, NEW YORK.

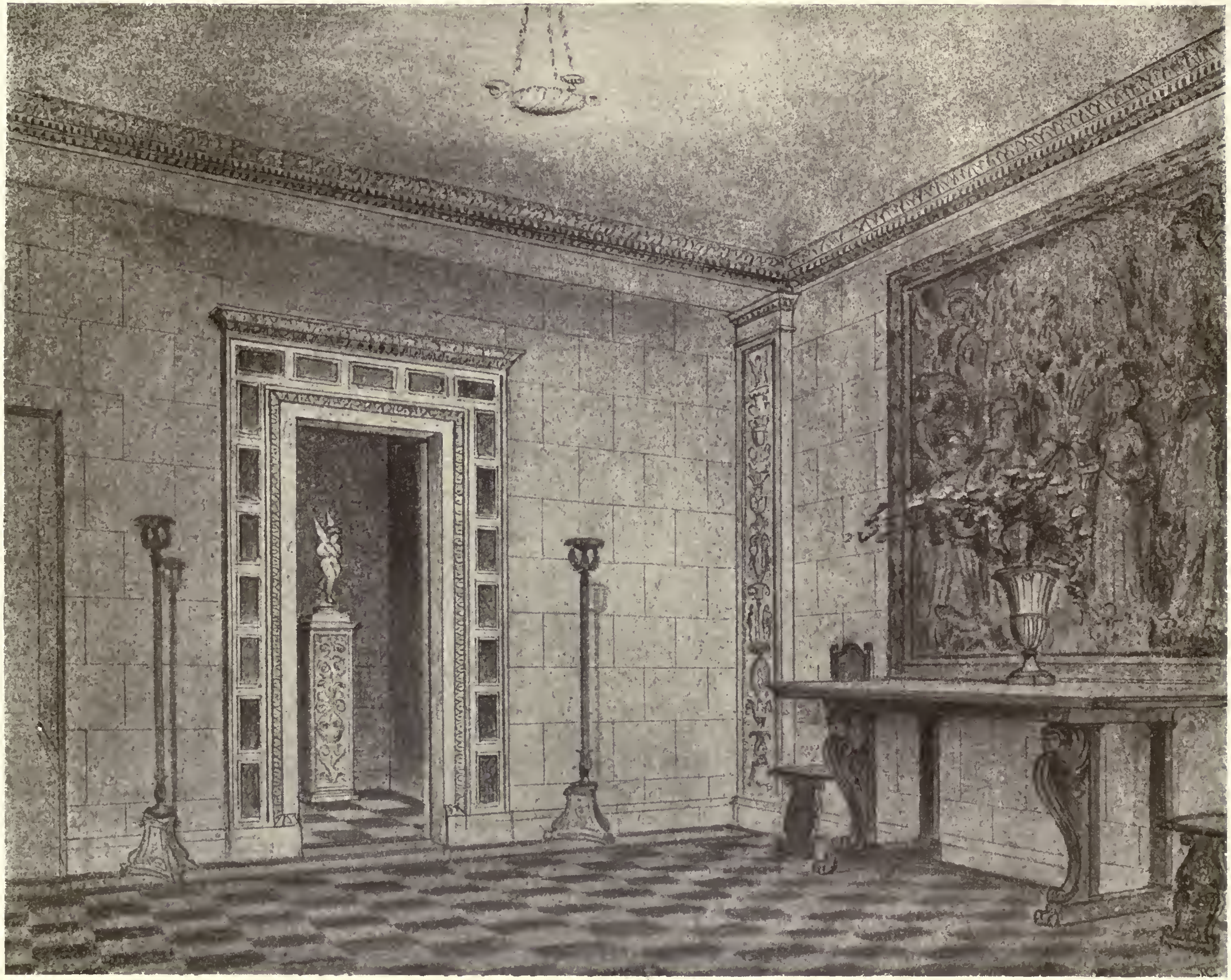
CORNER IN VESTIBULE.

CONFERENCE-ROOM.



Welles Bosworth, Architect.

OFFICE OF WELLES BOSWORTH, 527 FIFTH AVENUE, NEW YORK.

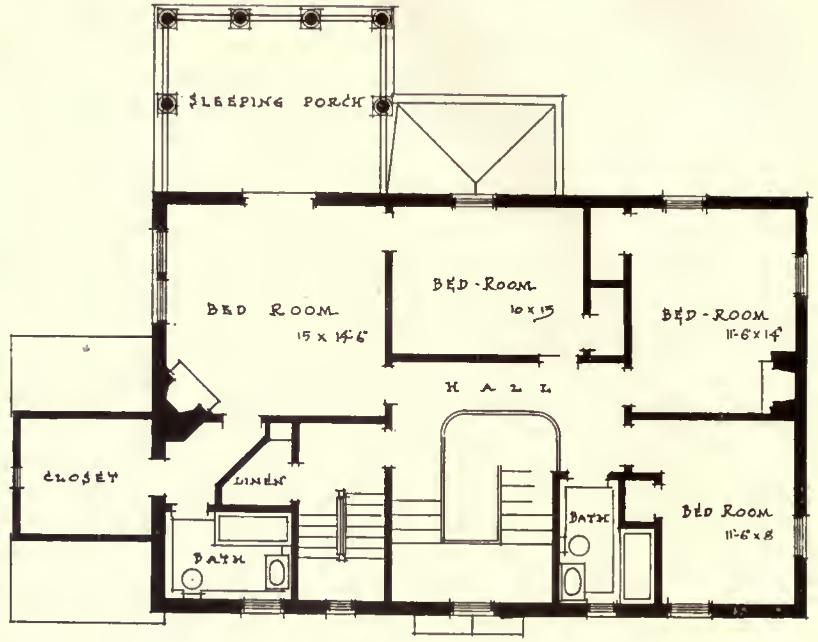


ENTRANCE-HALL, APARTMENT, 270 PARK AVENUE, NEW YORK.

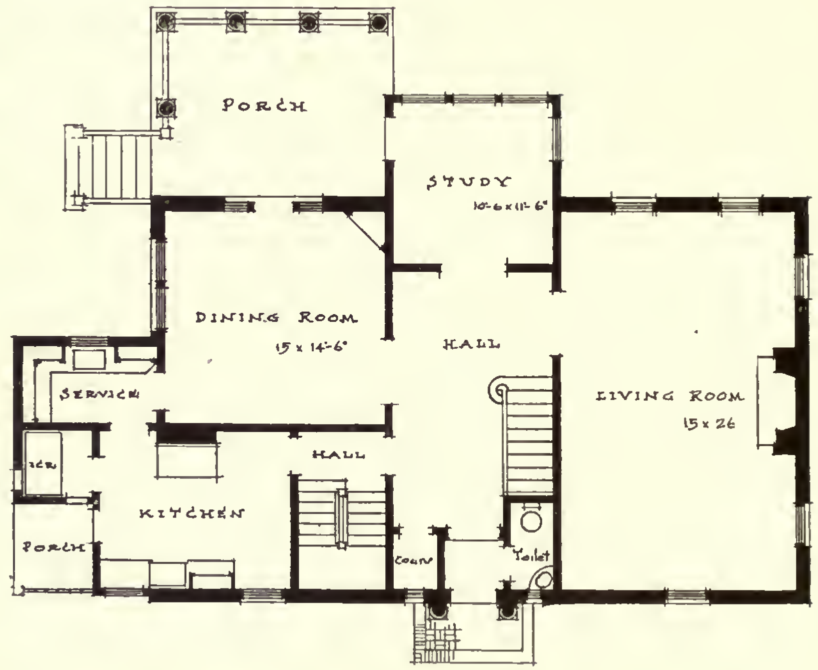
Welles Bosworth, Architect.

RESIDENCE, P. R. JAMESON, ROCHESTER, N. Y.

Clement R. Newkirk, Architect.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

MAIN ENTRANCE, RESIDENCE, P. R. JAMESON, ROCHESTER, N. Y.

Clement R. Newkirk, Architect.

FRONT·ENTRANCE·DOOR

RESIDENCE
FOR
MR. P. R. JAMESON,
ROCHESTER, N.Y.
CLEMENT R. NEWKIRK
ARCHITECT
ROCHESTER, N.Y.

DINING-ROOM.

HALL AND STAIRWAY.

Clement R. Newkirk, Architect.

RESIDENCE, P. R. JAMESON, ROCHESTER, N. Y.

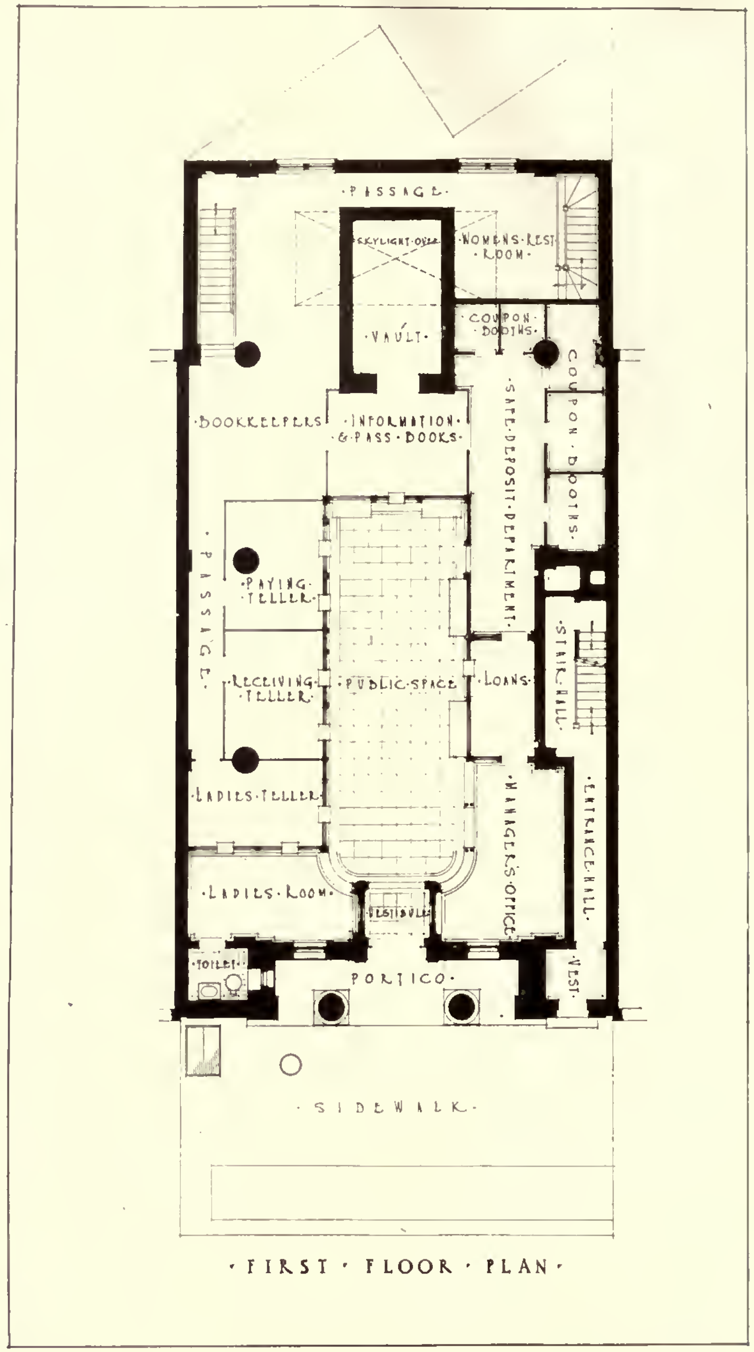
THE PEOPLES TRUST CO. BUILDING, BROOKLYN, N. Y.

Ludlow & Peabody, Architects.

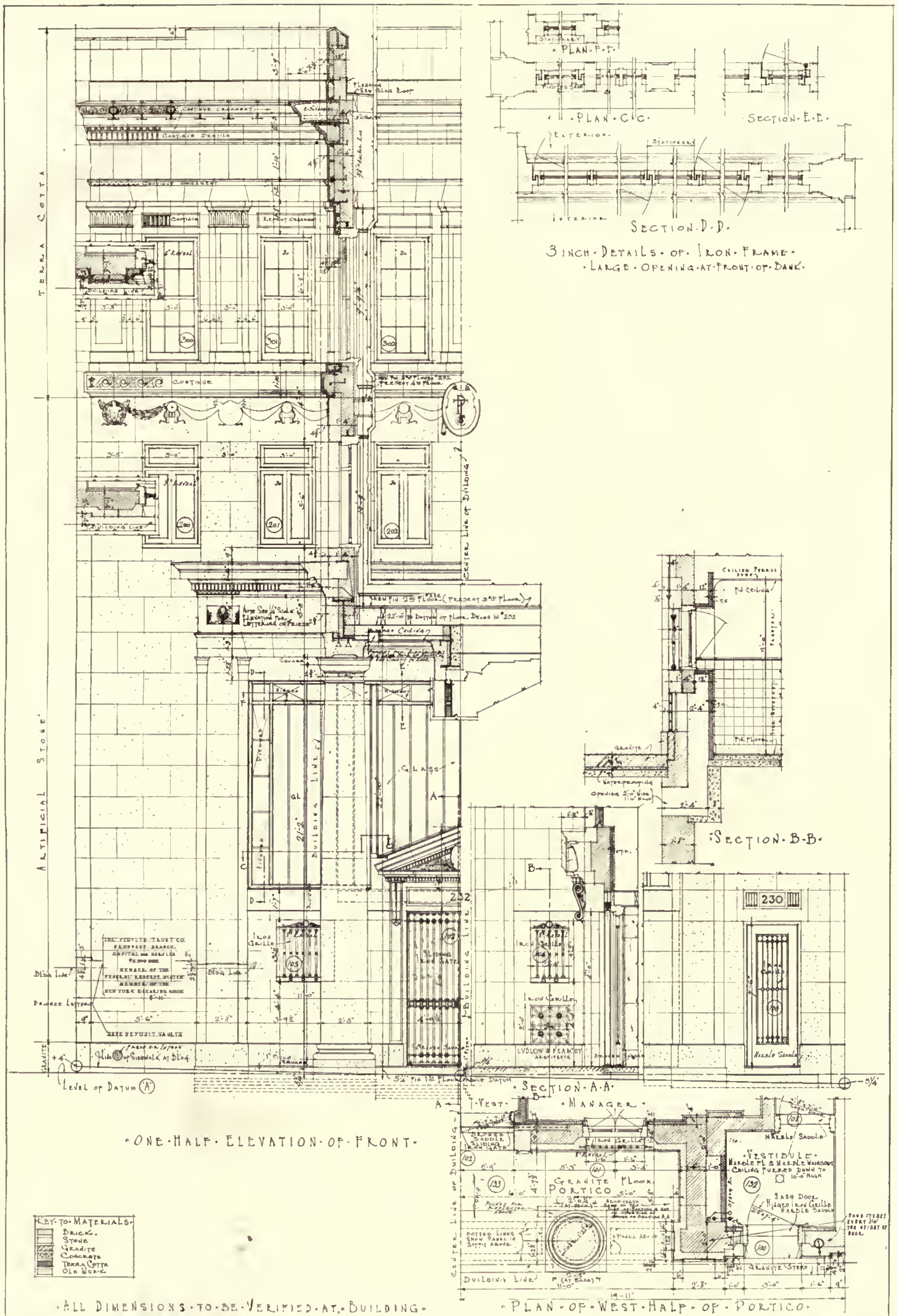
BANKING-ROOM, THE PEOPLES TRUST CO. BUILDING, BROOKLYN, N. Y.

Ludlow & Peabody, Architects.

PORTICO, THE PEOPLES TRUST CO. BUILDING, BROOKLYN, N. Y.



Ludlow & Peabody, Architects.



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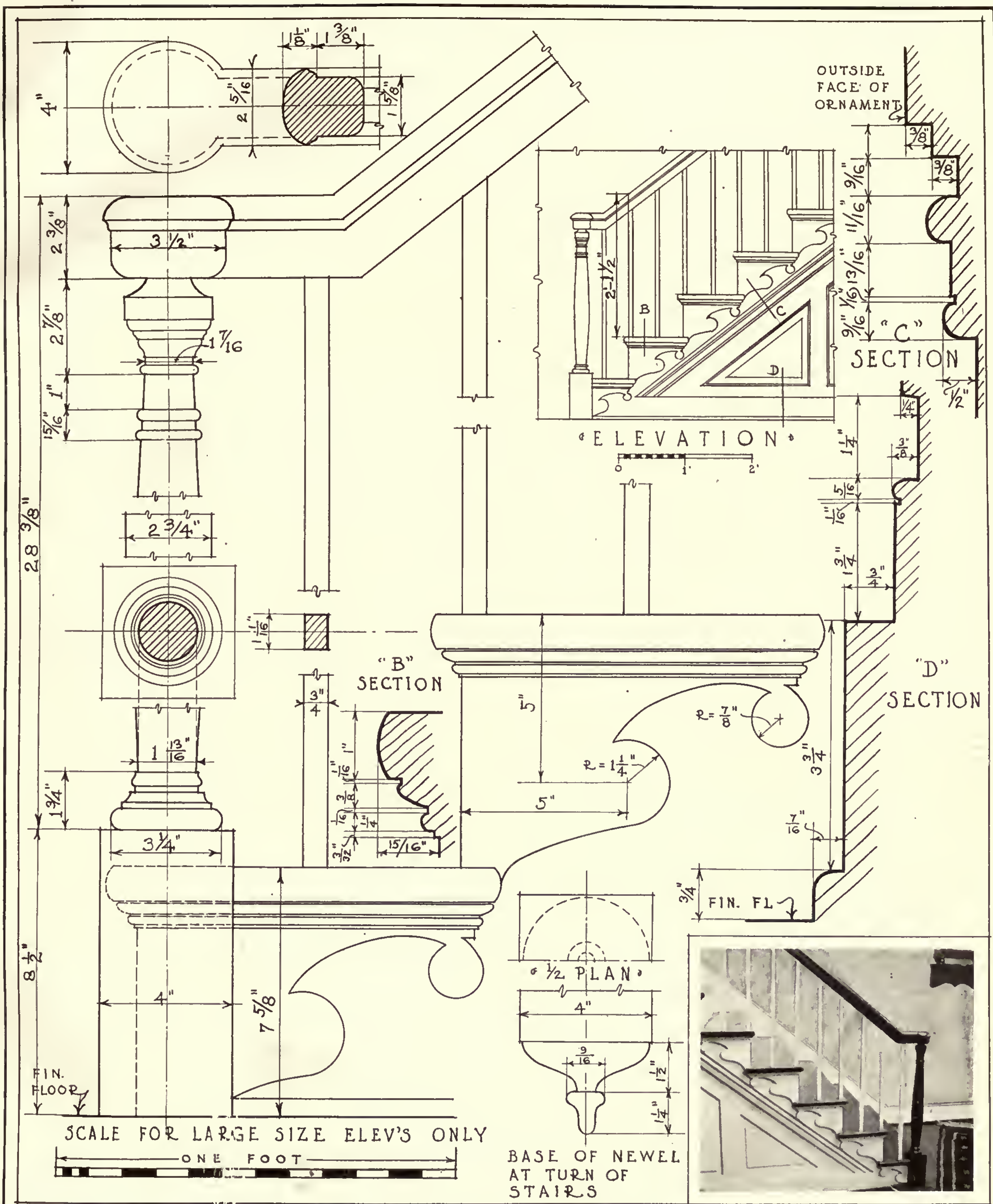
230 & 232 · FLATBUSH · AVE · BROOKLYN · N · Y ·

LUDLOW AND PEABODY
ARCHITECTS
ONE HUNDRED ONE PARK
AVENUE · NEW YORK CITY



EARLY COLONIAL ARCHITECTURE OF THE OHIO VALLEY

STAIRWAY IN AN OLD RESIDENCE CIRCLEVILLE OHIO

MEASURED & DRAWN BY Daniel W. Weiny

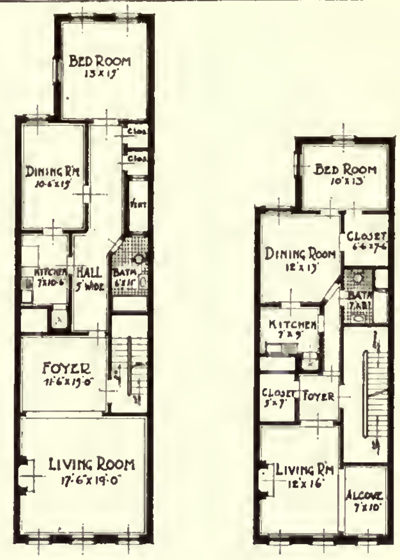
Alterations to City Buildings, Shops, Studios, and Apartments

THE continued and increasing necessity for saving old or existing buildings makes the publication of such alterations of great interest to members of the profession who are called upon for this class of work. There are many special and profitable opportunities in this field of work, and the result promises to be a decided improvement of

421–431 Park Avenue (before alteration).

both our domestic and commercial architecture—we have gone forward since the brownstone period.

In New York City many buildings have been reclaimed and there is an ever-increasing demand for remodelled shops, studios, and apartments. The owner finds it a good investment, the architect is able to plan with much freedom from the ordinary building restrictions applied to new construction, and tenants compete for leases.



SCALE - ONE INCH EQUALS EIGHT FEET

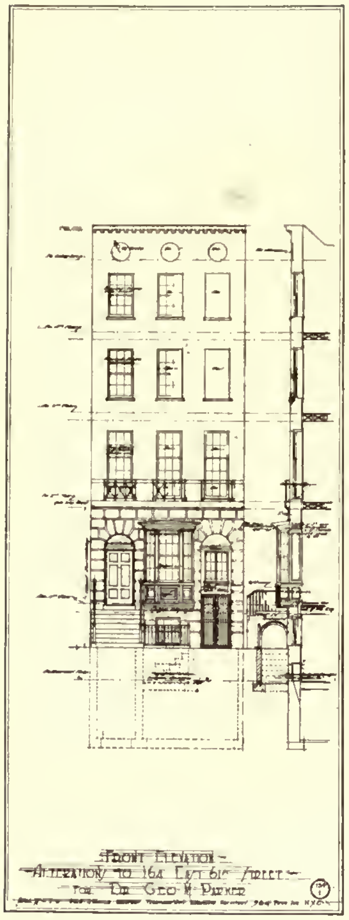
TYPICAL-APARTMENT-LAYOUTS
421-431 - PARK AVE

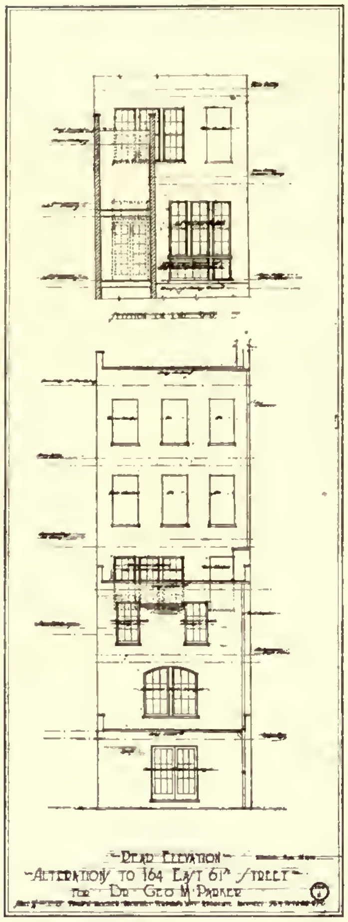
Nos. 421–431 Park Avenue were six old brownstone houses which were occupied as ordinary boarding-houses. The architects simply cleaned them out, kept as many partitions as possible, replastered, installing new plumbing, heating, and electric work, refloored and decorated, and put them in livable condition.

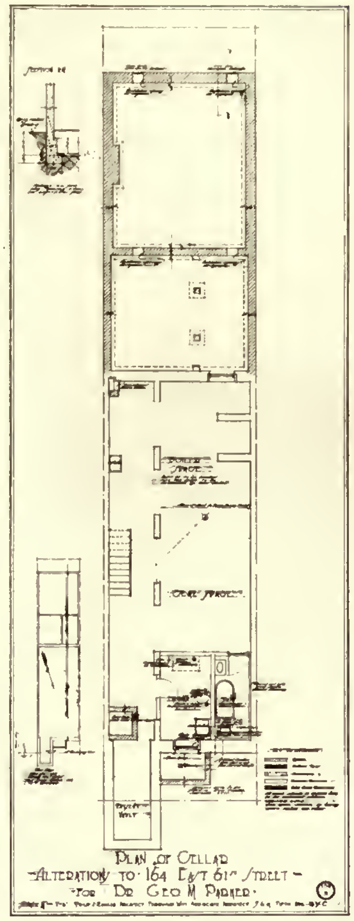
No. 164 East 61st Street is a 20-foot wide, four-story and basement, brownstone house. The upper three floors are being remodelled as per the plans, providing for one

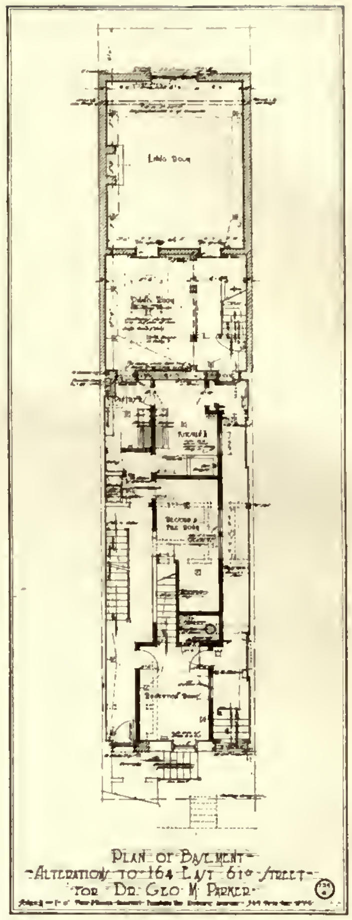
(*Continued on page* 141.)

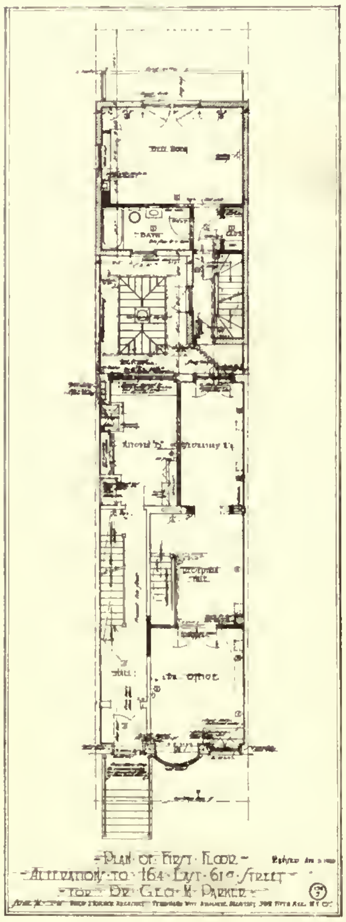
421–431 Park Avenue, New York (alteration). Shops and apartments. Casale & Witt, Architects.

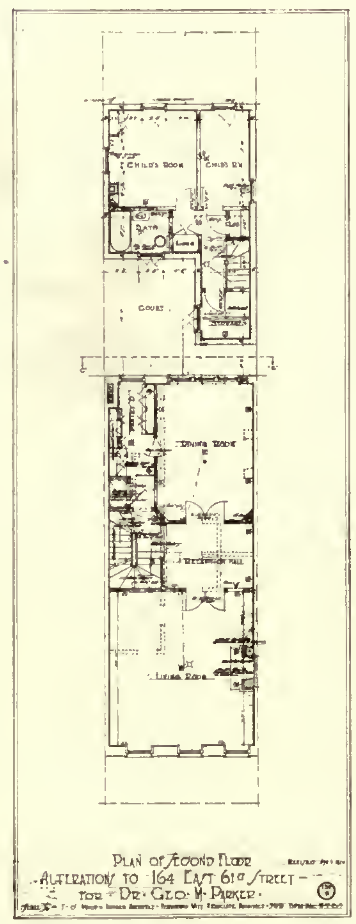


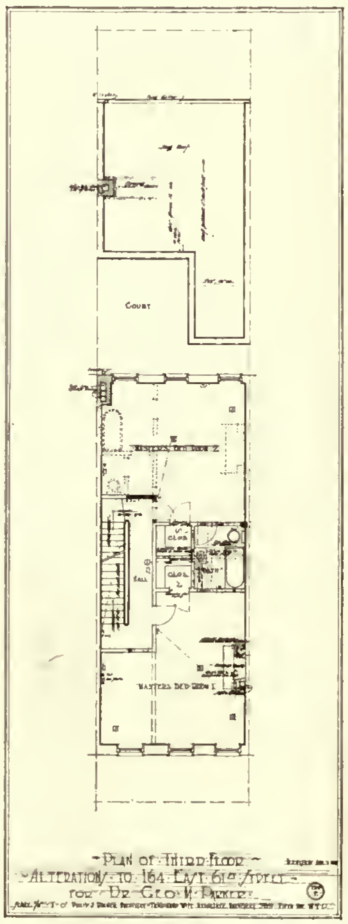


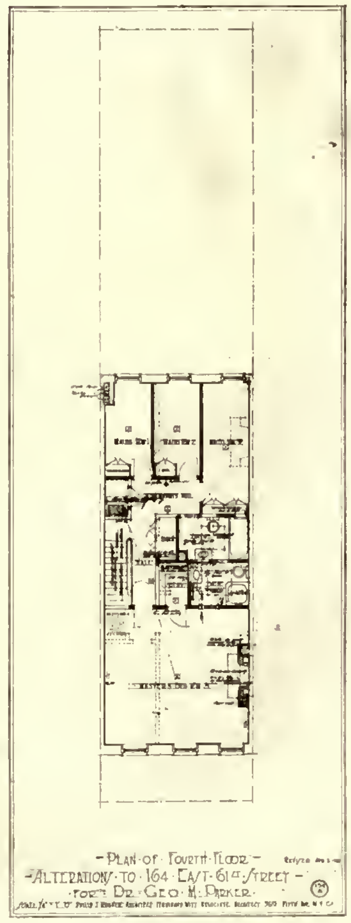












ALTERATION OF CITY HOUSE, 164 EAST 61ST STREET, NEW YORK. Philip J. Rocker and Ferdinand Witt, Architects.

(*Continued from page* 139)

apartment, using the old brownstone stoop as a separate entrance, which eliminates the necessity of any service to this tenant, excepting for heat and hot water, which the owner, who occupies the basement and parlor floors, has to provide for his own use anyway.

A new American basement entrance provides access to

Interior of shop, A. Sulka & Co., 512 Fifth Avenue, New York.

the basement and parlor floor, which apartment is occupied by the owner. In the cellar of the building there is a laundry, heating-plant, storage-rooms, and the like.

Taking the interest on the owner's investment, his taxes, insurance, coal, and the expense in running the furnace, there is an amount equal to about $4,200 a year. The upper apartment has been leased for five years on a basis of $5,000 per year; therefore, the owner, who has the

Show-case and woodwork, Sulka shop.
Alfred Freeman, Architect of Interior.

entire basement and parlor floor and the extension in the yard, gets rent free and a profit of $800 a year for five years.

Three shops (offices above), 512 Fifth Avenue, New York (alteration). Rouse & Goldstone, Architects.

SHOPS AND STUDIOS, 7 EAST 55TH STREET, NEW YORK.
(ALTERATION)

H. JAECKEL & SONS, FIFTH AVENUE, NEW YORK.
(ALTERATION) Starrett & Van Vleck, Architects.

8 AND 10 EAST 48TH STREET, NEW YORK.
(ALTERATION) Blum & Blum, Architects.

22 EAST 48TH STREET, NEW YORK.
(ALTERATION) Wm. Edgar Moran, Architect.

Building Prospects in Chicago

YE editor has made a canvass of many of the architects' offices in Chicago in order to secure at first hand reliable data as to what might be expected in the way of building construction in Chicago the coming season.

The result of the investigation has convinced him that if all the work now being planned by Chicago architects is actually let within the next ninety days, that it will require the entire building industry of Chicago at least three years to complete same.

Building costs are continually advancing, and in some cases stocks are almost entirely depleted. Recently, material advances have been made for steel, timber, and lumber, boilers, radiation and steam-fitting supplies, plumbing goods and supplies, glass, roofing materials, brick, cement, sand, gravel, lime, and in fact it would be difficult to name a single item entering into a completed structure that has not advanced in price during the past three months.

The prospects are for further material advances in certain lines, and within a few weeks it will not be a question of price, but, can the goods be secured at any price?

The result of this situation will be that there will probably be but few of the cheaper apartment buildings, bungalows, and cottages built in the next few years—at least not until there has become such an acute shortage of housing that the present renting schedules are increased at least 60 per cent. A careful check was recently made on the net income which could be secured from a modern three or six apartment building containing five and six room apartments that three years ago rented for from $40 to $50 per month, and it was found that due to the increase in taxes, cost of coal, upkeep, as well as construction costs, that such apartment buildings could not be constructed and rented at a profit unless the rents were advanced to from $85 to $100 per month. A similar condition is found in connection with office-building construction in Chicago to-day. There is not a single desirable office for rent in the entire loop. Agents of many office-buildings have practically doubled their rents, but until rents further advance, there will be no incentive for large investors to construct office-buildings. About the only investment building which at present construction costs may possibly show a profit is the construction of the highest grade apartment hotels and theatres, and large industrial work, which must be built in any event and irrespective of costs. In connection with the growth of industrial building, it might be noted that very much of the present increase is caused by the absolute necessity of increasing the working space in factories to make up for the reduction in output due in many cases to the unionizing of industry and the substitution of a 44-hour week for the 56-hour week, in order to secure the same output.

There is to-day in Chicago a most serious shortage of not only skilled mechanics but of building laborers. Some of this can be traced to the labor turnover which occurred shortly after the beginning of the war when the government concentrated its large building programme in the East, and thousands of Chicago mechanics were attracted to the East by the offers not only of increased pay but of all the overtime they wished to put in. Many of these mechanics are still in the East, and notwithstanding the fact, as the editor is creditably advised, in many of the Eastern centres there is a large surplusage of labor in all lines, yet for some reason this class of labor is not returning to the Western centres as rapidly as might be hoped for.

Having in mind all of the foregoing, it is the editor's prediction that building costs in Chicago and vicinity will, during the next four months, show a further advance of at least 20 per cent to 35 per cent and that before this time has elapsed, owners will be asking, not what certain materials are worth, or what price may be asked for same, but, can they be secured at all?

Bulletin Illinois Society of Architects. F. E. Davidson, Editor.

Federal Loan Banks to Aid Home Builders

THE next Congress will be asked to enact legislation necessary to the establishment of a system of Federal Home Loan Banks. A tentative bill has been prepared and has been mailed to all officers and committees of the United States League of Building Associations, and copies can be obtained from the Division of Public Works and Construction Developments of the United States Department of Labor.

In its campaign to stimulate building activities the United States Department of Labor, in January, invited representatives of the United States League of Building Associations to a conference in Washington for a discussion of ways and means of increasing the usefulness of the building and loan associations. It was realized that these associations played an important part in the home-building activities of the nation, and it was the hope of the Department of Labor that their field of usefulness might be enlarged. Out of this conference came the movement in favor of a national system of Home Loan Banks through which these associations might rediscount their securities and make available for further loans a greater portion of their assets.

The chief work of the building and loan associations is lending money to home builders. Association representatives, in the Washington conference, suggested that Congress enact a law, permitting these associations to organize regional banks, capitalized by the associations and operated by them under government supervision. The purpose of this was to provide a regional bank which would perform for building associations a service similar to that performed by the Federal Reserve Bank for the commercial banks, and by the Federal Land Bank for the National Farm Loan Association.

Owing to the congestion in important legislative matters in the last Congress it was impossible to obtain consideration for the Federal Home Loan Bank project. The building and loan associations, working in harmony with the aims of the Department of Labor in its campaigns for the revival of building and construction activities, now have drafted a tentative bill which, with such revisions as may be considered prudent, will be introduced in the next Congress with the influence of the national and state organizations of building and loan associations behind it.

Per Capita Consumption of Lumber

The per capita consumption of lumber is greatest in the newer States, such as Montana, according to R. C. Bryant, Industrial Examiner for the U. S. Forest Service, in a recent bulletin. Montana had a per capita consumption in 1915 of 1,234 board feet, whereas those States having a large percentage of urban population show a lower rate of consumption. For instance, in 1915 the consumption in New York State was 206 board feet, and in Pennsylvania 293 board feet. It is quite probable that the unusual building activity this year, especially in dwellings, will raise the per capita consumption for 1919 even in the older States.

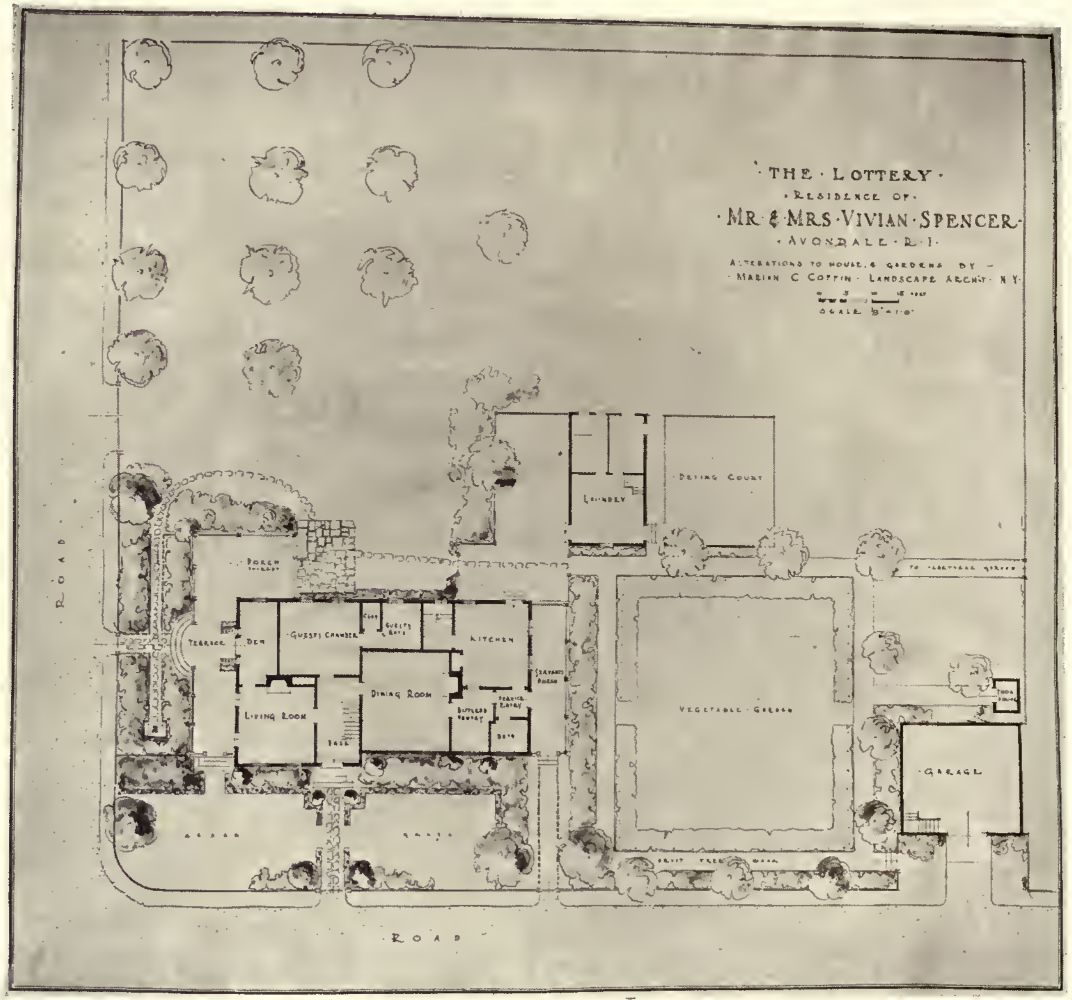
HOUSE AND GARDEN (ALTERATION), MR. AND MRS. VIVIAN SPENCER, AVONDALE, R. I.

Marian C. Coffin, Landscape-Architect.

HOUSE BEFORE ALTERATION.

HOUSE BEFORE ALTERATION.

ENTRANCE DOORWAY (ALTERATION).



Marian C. Coffin, Landscape-Architect.

HOUSE AND GARDEN, MR. AND MRS. VIVIAN SPENCER, AVONDALE, R. I.

Notes on Engineering Units for Architects

By DeWitt C. Pond, M.A.

IN articles published under the general heading of "Engineering for Architects," which appeared in ARCHITECTURE from time to time, the practical application of general engineering principles was given. There was not, however, a very comprehensive discussion of the principles involved and the reader was sometimes forced to determine the reason for certain calculations without much help from the text. It is the object of this article to enumerate certain of the fundamental principles underlying any engineering calculation which an architect would have to make.

In the first place, a word which occurs constantly in all engineering calculations is "moment." Almost all engineering calculations are based upon the finding of moments, but there is very little real understanding of what this word means. The moment is the unit by which a tendency to revolve around a point is determined. In exactly the same manner that a foot is used to determine a lineal dimension the moment is used to measure a revolving tendency. Obviously this tendency depends on two things: the first is the force used to produce revolution and the second is the distance from the centre at which this force acts. A moment, then, must take these two things into consideration—that is, force and distance. This is a peculiarity of satisfactory to look upon a moment as a *tendency* than as a product of multiplication.

To come to practical facts, let it be assumed in Figure I that the centre of gravity of the weight (W) is ten feet from the edge of the platform, and that the weight itself equals 100 pounds. If we suppose that the plank has no weight, then the tendency to produce rotation about the point (a) will be measured in terms of the distance, ten feet, and weight, one hundred pounds, and will be one thousand foot-pounds. In other words, the tendency to produce rotation is shown by the weight multiplied by a distance and the *unit* of measurement is one in which weight and distance are shown or the "foot-pound."

Very often beginners will attempt to measure moments in units of force only, or in units of distance alone. This is as incorrect as it would be to measure miles in units of liquid measure, such as quarts, or to measure money in units of lineal measure, such as feet. Each particular type of measurement has its particular units of measurement and the moment is a unit in which both distance and weight appear. A moment may be measured in inch-pounds or foot-pounds, inch-tons or foot-tons, but both inches or feet and pounds or tons must appear in the unit.

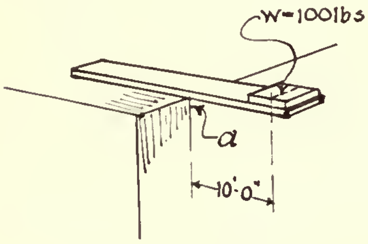


FIGURE 1

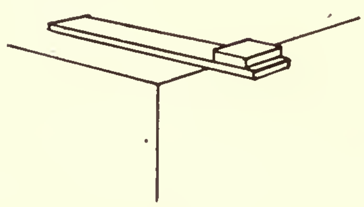


FIGURE II

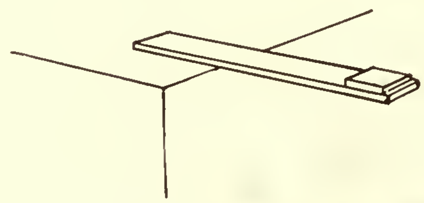


FIGURE III

this particular unit. The foot measures simply distance; the pound simply measures weight; but the moment must measure both weight and distance.

Suppose a plank is shoved out from a platform so that one end projects out in space. This projecting end is then a cantilever. Suppose a weight were placed at the end of this cantilever as shown in Figure I. It is obvious that the ability of the weight to cause the cantilever to fall depends on two things: first, the weight itself; and, second, the distance that it is pushed out into space. If either is great enough the cantilever will revolve around the edge of the platform and eventually fall.

In Figure II is shown a cantilever projecting only a very short distance beyond the edge of the platform, but a heavy enough weight may be imposed upon it to cause it to tip up or revolve about the edge of the platform. In Figure III the same plank is shown projecting at a comparatively large distance but with a small weight, and this would cause the plank to revolve. Therefore it is obvious that these two things—weight and distance—must be considered when it comes to the question of moments. The word moment may be defined as follows: "A tendency to produce rotation about a point which is measured in terms of force and distance." In the language of the unacademic student a moment is "force times distance," and this is accurate enough if it is thoroughly understood, but it is much more

This is apparent enough when a simple cantilever is shown, such as in Figures I, II, and III, but it becomes difficult to understand when simple beams are shown or it is a question of footings where seemingly no cantilever exists, and where actually it is sometimes difficult to determine just what moment it is required to find.

Investigating a case of a simple beam as shown in Figure IV it will be noticed here that the plank instead of being shoved out from the platform and overhanging the edge is not resting between two supports. This is called a simple

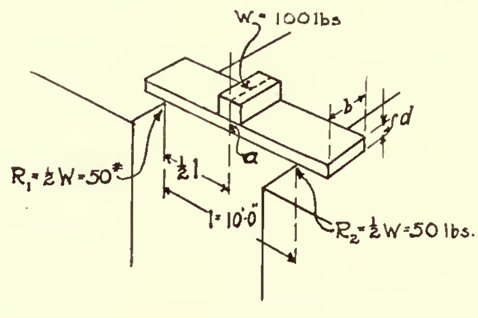


FIGURE IV

beam. This load will be called a concentrated load, although strictly it is spread over a certain amount of space, and therefore might be considered a uniform load. However, it extends over such a small amount, that it will be treated as though it were a concentrated load, with its weight concentrated at the centre of gravity as shown in the figure.

The length of the span is noted in the figure as l and the distance from the point of support to the centre of the load is known as $\frac{1}{2}l$. Now, it is obvious that if the load (W) were large enough it would cause the plank to break by bending the plank until it was fractured. It will be noted that it is the *bending* that causes the breaking of the beam, and in order to produce bending there must be a moment.

If a casual observer were asked what broke the beam he would say the load, and of course actually this is true, but the engineer would claim that the load itself could not have broken the beam unless the span were so great that a sufficient moment would have been set up. This is apparent when Figure V is observed, in which the same load and the same plank are involved but the supports are so near together that there is not a sufficiently great tendency toward bending to cause the plank to fail. It is obvious then that the clear span between the supports is a very important factor, and this span and the load together must be taken into consideration when the failure of the beam is to be considered. When the question of bending is involved we must consider moments because moments are the units by which bending—or the tendency revolving about a point—is measured. What moments, therefore, exist which will tend to bend the beam in Figure IV until it will break? To the layman the only load that is acting upon the plank is that shown as W in the figure, but actually two more loads are acting. These two are at the points of support. These must act with an upward force to support the beam or else the beam will fall. This is sometimes a hard point for the layman to grasp—he cannot see that an immovable object such as a floor or a platform can exert an upward pressure. He would understand this, however, should he fall from any height upon the floor or the platform. The sensation which he would receive would be the same as if the floor or platform had come up and struck him. In other words, the floor exerted an upward force sufficient to produce somewhat unpleasant sensations. In the same way the supports at each end of the plank would exert upward pressure and the total amount of upward pressure exerted by both supports would equal the total downward pressure caused by the load itself (W). Of course, if the load is directly in the middle, as shown in Figure IV, then each support will bear an equal part of the load. If the load were moved, as in Figure VI, nearer one support than the other, then the support to which it is nearer will have to carry the greater part of the load. The method of determining the proportionate amount of the load carried by supports when the load is not directly in the middle will be given later. It is sufficient for the time being to realize that each support exerts an upward pressure.

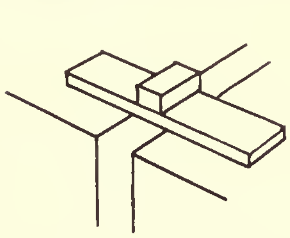


FIGURE V

It is obvious that the point at which the beam will fail will be directly under the load. As the beam fails by bending the moment must be set up and in this case the moment is set up about the point a. In other words, it must be a force exerted on the beam some distance away from a which would cause a moment. Obviously the only force that could be exerted would be the force of either one of the two supports. As the condition in Figure IV shows that the supports are exerting equal pressure, it does not make much difference which force we select as the one causing bending around a.

Let us assume that the left support is the one. It is obvious that this support will exert an upward pressure equal to one-half the load W. This, then, is the force. The distance is equal to $\frac{1}{2}l$, therefore the load which will cause the bending and cause the beam to fall would be $\frac{1}{2}W$ multiplied by $\frac{1}{2}l$ or $\frac{1}{4}Wl$.

This is purely theoretical and it may be well to illustrate the condition by actual figures. Supposing the load (W) is equal to 100 pounds, and suppose the span (l) is equal to 10 feet, or 120 inches. Without the slightest hesitation the reader will naturally assume that the load at each support will be 50 pounds. The moment then around the point a will be equal to 50 pounds multiplied by a distance equal to one-half of the span, or 60 inches, which will be equal to 3000 inch-pounds. The same result could be obtained by substitution in the formula given above, if we assume that M represents the moment. This formula will read: M equals $\frac{1}{4}Wl$, and by substitution we can find that M will equal $\frac{1}{4}$ multiplied by W (100 pounds) and multiplied by l (120 inches), or $\frac{1}{4} \times 100 \times 120 = 3000$ inch-pounds.

Now that the moment has been obtained the question naturally arises: "What is the reason for performing all this work?" The answer is that we must determine a resisting moment which the beam itself will set up which will cause it to withstand the moment caused by the load. For the present discussion it will simply be stated that the resisting moment of a simple rectangular wood beam is given by the formula $M = S \times \frac{1}{6}bd^2$, in which S is the strength of wood, b is the breadth of the beam, and d is the depth. In this case the moment set up by the external force is 3000 inch-pounds. The resisting moment of the beam must be equal to this. The tensile strength of the wood will be taken as 1200 pounds and the only unknown quantity will be the breadth and depth of the wood beam. It will be necessary to assume one of these factors, and so we will consider that the plank is one foot wide, and b will be equal to 12 inches. Then it is only necessary to find how thick the beam has to be. Substituting in the formula, we have 3000 inch-pounds equals $12{,}000 \times \frac{1}{6} \times 12 \times d^2$, or by cancellation and transposing we find that d^2 is equal to 3000 divided by 2400, or equals $1\frac{1}{4}$ inches; d is then equal to 1.12 inches. Of course, no beam comes exactly $1\frac{1}{8}$ inches thick, so the chances are a 2-inch plank would be selected in order to carry this load.

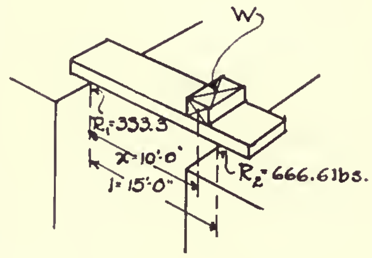


FIGURE VI

Another step in the study of moments is taken when it is necessary to determine the upward reaction, or the force, at the ends of a simple beam. Figure IV shows the beam with the load exactly in the centre, and it is a simple matter to assume that both of the reactions—the upward loads at the points of support—will be equal. Figure VI shows a different condition, and it is apparent from the figure that the reaction at the right-hand end of the beam will be greater than that at the left-hand end. In other words, if this beam is being carried by two men, the man holding the

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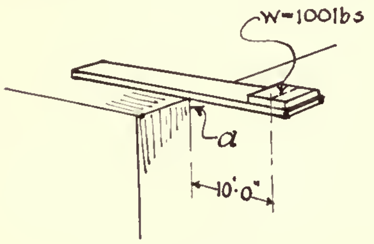

FIGURE I

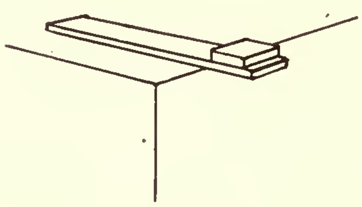

FIGURE II

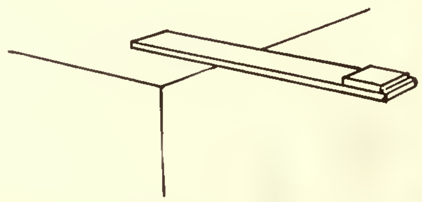

FIGURE III

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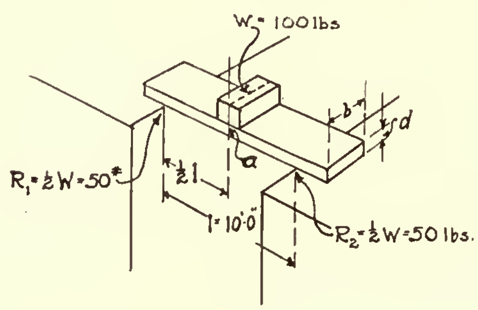


FIGURE IV

beam. This load will be called a concentrated load, although strictly it is spread over a certain amount of space, and therefore might be considered a uniform load. However, it extends over such a small amount, that it will be treated as though it were a concentrated load, with its weight concentrated at the centre of gravity as shown in the figure.

The length of the span is noted in the figure as l and the distance from the point of support to the centre of the load is known as $\frac{1}{2}l$. Now, it is obvious that if the load (W) were large enough it would cause the plank to break by bending the plank until it was fractured. It will be noted that it is the *bending* that causes the breaking of the beam, and in order to produce bending there must be a moment.

If a casual observer were asked what broke the beam he would say the load, and of course actually this is true, but the engineer would claim that the load itself could not have broken the beam unless the span were so great that a sufficient moment would have been set up. This is apparent when Figure V is observed, in which the same load and the same plank are involved but the supports are so near together that there is not a sufficiently great tendency toward bending to cause the plank to fail. It is obvious then that the clear span between the supports is a very important factor, and this span and the load together must be taken into consideration when the failure of the beam is to be considered. When the question of bending is involved we must consider moments because moments are the units by which bending—or the tendency revolving about a point—is measured. What moments, therefore, exist which will tend to bend the beam in Figure IV until it will break? To the layman the only load that is acting upon the plank is that shown as W in the figure, but actually two more loads are acting. These two are at the points of support. These must act with an upward force to support the beam or else the beam will fall. This is sometimes a hard point for the layman to grasp—he cannot see that an immovable object such as a floor or a platform can exert an upward pressure. He would understand this, however, should he fall from any height upon the floor or the platform. The sensation which he would receive would be the same as if the floor or platform had come up and struck him. In other words, the floor exerted an upward force sufficient to produce somewhat unpleasant sensations. In the same way the supports at each end of the plank would exert upward pressure and the total amount of upward pressure exerted by both supports would equal the total downward pressure caused by the load itself (W). Of course, if the load is directly in the middle, as shown in Figure IV, then each support will bear an equal part of the load. If the load were moved, as in Figure VI, nearer one support than the other, then the support to which it is nearer will have to carry the greater part of the load. The method of determining the proportionate amount of the load carried by supports when the load is not directly in the middle will be given later. It is sufficient for the time being to realize that each support exerts an upward pressure.

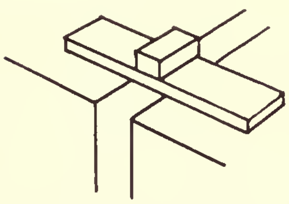


FIGURE V

It is obvious that the point at which the beam will fail will be directly under the load. As the beam fails by bending the moment must be set up and in this case the moment is set up about the point *a*. In other words, it must be a force exerted on the beam some distance away from *a* which would cause a moment. Obviously the only force that could be exerted would be the force of either one of the two supports. As the condition in Figure IV shows that the supports are exerting equal pressure, it does not make much difference which force we select as the one causing bending around *a*.

Let us assume that the left support is the one. It is obvious that this support will exert an upward pressure equal to one-half the load W. This, then, is the force. The distance is equal to $\frac{1}{2}l$, therefore the load which will cause the bending and cause the beam to fall would be $\frac{1}{2}W$ multiplied by $\frac{1}{2}l$ or $\frac{1}{4}Wl$.

This is purely theoretical and it may be well to illustrate the condition by actual figures. Supposing the load (W) is equal to 100 pounds, and suppose the span (l) is equal to 10 feet, or 120 inches. Without the slightest hesitation the reader will naturally assume that the load at each support will be 50 pounds. The moment then around the point *a* will be equal to 50 pounds multiplied by a distance equal to one-half of the span, or 60 inches, which will be equal to 3000 inch-pounds. The same result could be obtained by substitution in the formula given above, if we assume that M represents the moment. This formula will read: M equals $\frac{1}{4}Wl$, and by substitution we can find that M will equal $\frac{1}{4}$ multiplied by W (100 pounds) and multiplied by l (120 inches), or $\frac{1}{4} \times 100 \times 120 = 3000$ inch-pounds.

Now that the moment has been obtained the question naturally arises: "What is the reason for performing all this work?" The answer is that we must determine a resisting moment which the beam itself will set up which will cause it to withstand the moment caused by the load. For the present discussion it will simply be stated that the resisting moment of a simple rectangular wood beam is given by the formula $M = S \times \frac{1}{6}bd^2$, in which S is the strength of wood, b is the breadth of the beam, and d is the depth. In this case the moment set up by the external force is 3000 inch-pounds. The resisting moment of the beam must be equal to this. The tensile strength of the wood will be taken as 1200 pounds and the only unknown quantity will be the breadth and depth of the wood beam. It will be necessary to assume one of these factors, and so we will consider that the plank is one foot wide, and b will be equal to 12 inches. Then it is only necessary to find how thick the beam has to be. Substituting in the formula, we have 3000 inch-pounds equals $12{,}000 \times \frac{1}{6} \times 12 \times d^2$, or by cancellation and transposing we find that d^2 is equal to 3000 divided by 2400, or equals $1\frac{1}{4}$ inches; d is then equal to 1.12 inches. Of course, no beam comes exactly $1\frac{1}{8}$ inches thick, so the chances are a 2-inch plank would be selected in order to carry this load.

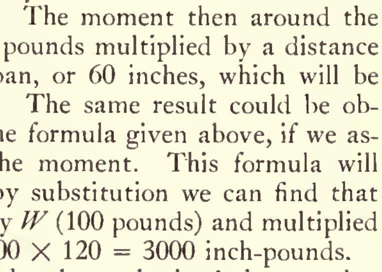


FIGURE VI

Another step in the study of moments is taken when it is necessary to determine the upward reaction, or the force, at the ends of a simple beam. Figure IV shows the beam with the load exactly in the centre, and it is a simple matter to assume that both of the reactions—the upward loads at the points of support—will be equal. Figure VI shows a different condition, and it is apparent from the figure that the reaction at the right-hand end of the beam will be greater than that at the left-hand end. In other words, if this beam is being carried by two men, the man holding the right-hand end would have a heavier load to carry than the man holding the left-hand end. For engineering purposes it is absolutely necessary to determine accurately just how much of the load is supported at each end, and in all calculations where concentrated loads or unsymmetric uniform loads are involved the first step is the determination of the reaction. Here again the method employed involves the use of moments. In the example before, in which we determined the thickness of the wood plank, the centre of the moment was taken as directly under the centre of the con-

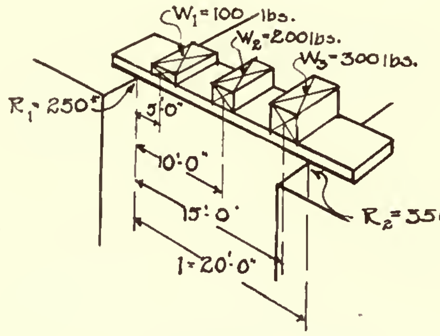


FIGURE VII

centrated load (see *a*, Figure IV). When it is necessary to determine the exact loads at the points of support, then the centres of the moments are taken at either point of support. Suppose, as in Figure VI, it is necessary to determine the load at the right-hand end of the beam. Then the centre of moments is taken at the *left-hand* end of the beam. The moment caused by the load W around the point R—left-hand support—will be equal to the force times the distance from this point. The force is W, the distance x, as shown in the figure. The moment then equals Wx.

An investigation of Figure VI would show that if the beam were not supported at R_2 this moment (Wx) would cause the beam to revolve around the point R_1. Actually, the beam remains stationary and this is due to the fact that at R_2 an upward load is applied, which, multiplied by the distance (l) will produce a moment equal and opposite to Wx. An equation might be written as follows: $Wx = R_2l$. l is usually known, as this is the span of the beam; W and x are also usually known, as these are the actual conditions of the loading. The load of a brick wall weighing 1000 pounds might be imposed upon a beam ten feet from the left support. The span of the beam might be 15 feet. The unknown quantity would then be R_2, and by substituting in the formula above this could be determined.

$$Wx = R_2l.$$

Substituting: $$1000 \text{ lbs.} \times 10 = R_2 \times 15$$
$$10{,}000 = 15R_2$$
$$666.6 = R_2.$$

In order to determine the load at R_1, a reverse process is necessary. The centre of the moment is then taken around the *right* support (R_2) and x becomes 5 feet. Then, by substituting in the formula, the equation becomes:

$$Wx = R_1l.$$

Substituting: $$1000 \text{ lbs.} \times 5 = R_1 \times 15$$
$$5000 = 15R_1$$
$$333.3 = R_1.$$

This last equation is very seldom used except as a check, for it can be seen that if R_1 is added to R_2 the sum will equal 1000 pounds, which is equal to the load (W). It is only necessary, therefore, when R_2 is determined, to subtract this sum from the load and the answer will be equal to R_1. This is apparent if one should consider that the load (W) is carried on a plank between two men. The two men will not carry any more between them than the actual load on the plank. One may carry more than the other, but the total upward pressure exerted by both men will be no greater and no less than the downward load.

The problems given so far have been extremely simple, but they could be expanded in such a manner as to present many complications.

In Figure VII several loads are shown designated as W_1 (100 lbs.), W_2 (200 lbs.), W_3 (300 lbs.), at distances of five, ten, and fifteen feet from R_1. The span is given as twenty feet. The method of determining R_2, then, is as follows:

$$\begin{array}{rcl} 100 \times 5 & = & 500 \\ 200 \times 10 & = & 2000 \\ 300 \times 15 & = & 4500 \\ \hline 600 & & 7000 \end{array}$$

Total moment around R_1 is 7000 foot-pounds.

This must equal the moment caused by R_2 around R_1, and the formula $R_2 \times l = 7000$ foot-pounds can be used. l is known as the span, which is 20 feet. The only unknown quantity will be R_2, which can be found by dividing 7000 by 20, which will give 350 pounds. This is the load at the right-hand support. The load at the left-hand support can be found by simply subtracting 350 pounds from 600 pounds—the total load—and the answer will be 250 pounds. This can be checked by reversing the moments as given in the first example. The calculation is given below:

$$\begin{array}{rcl} 300 \times 5 & = & 1500 \\ 200 \times 10 & = & 2000 \\ 100 \times 15 & = & 1500 \\ \hline & & 5000 \\ 5000 \div 20 & = & 250 \end{array}$$

These examples are given simply to illustrate what is ment by the term "moment." It may seem that the author is spending a considerable amount of time on this particular subject, but the understanding of moments and what they measure formulates a basis for all engineering calculations. For this reason the author has gone into the subject at length.

Competition for the Remodelling of a New York City Tenement Block

Under the Auspices of the Joint Legislative Committee on Housing and the Reconstruction Commission of the State of New York

PROBLEM

The remodelling of a characteristic old tenement block in the city of New York, so as to make it a decent place to live in. The object of the competition is twofold: first, to find the best method of improving living conditions in the old-law tenements without entirely destroying the buildings; second, to find a plan of remodelling that will encourage such alterations by the demonstration of its economic wisdom and the value that will come from the improvement. The relation of costs to results obtained will be a predominating factor in determining the judgment.

The purpose of the competition is to find solutions that will be applicable not only to the block which is the subject of the study but also to similar blocks throughout the city. It is a competition of ideas as well as design.

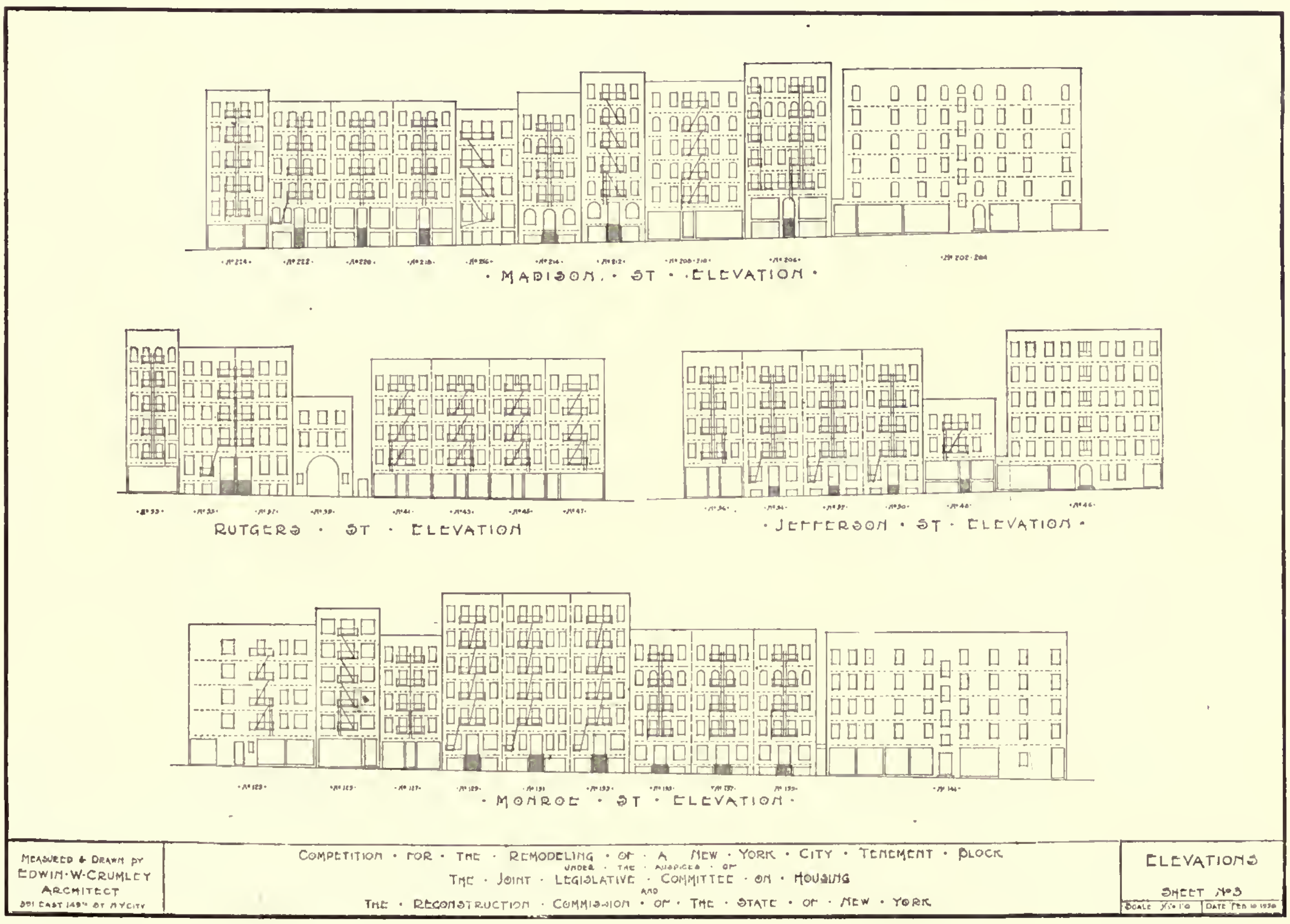
THE remodelling of one house in a bad environment is of little value. The improvement of a group of tenements is of real value. But the solution of the problem of the block as a whole would be of the maximum value to the tenants and owners of each house, to the neighborhood and to the community as a whole. Competitors may, however, decide what size units, what type and size of tenement, apartments, rooms, courts, and yards will give the proper environment for decent living and at the same time the most practical result as to plan, management, and financing. These should not fall below the standard of the Tenement House Law in regard to sanitation, lighting, ventilation, and safety. However, the competitor should be guided by the spirit, not the letter, of the law.

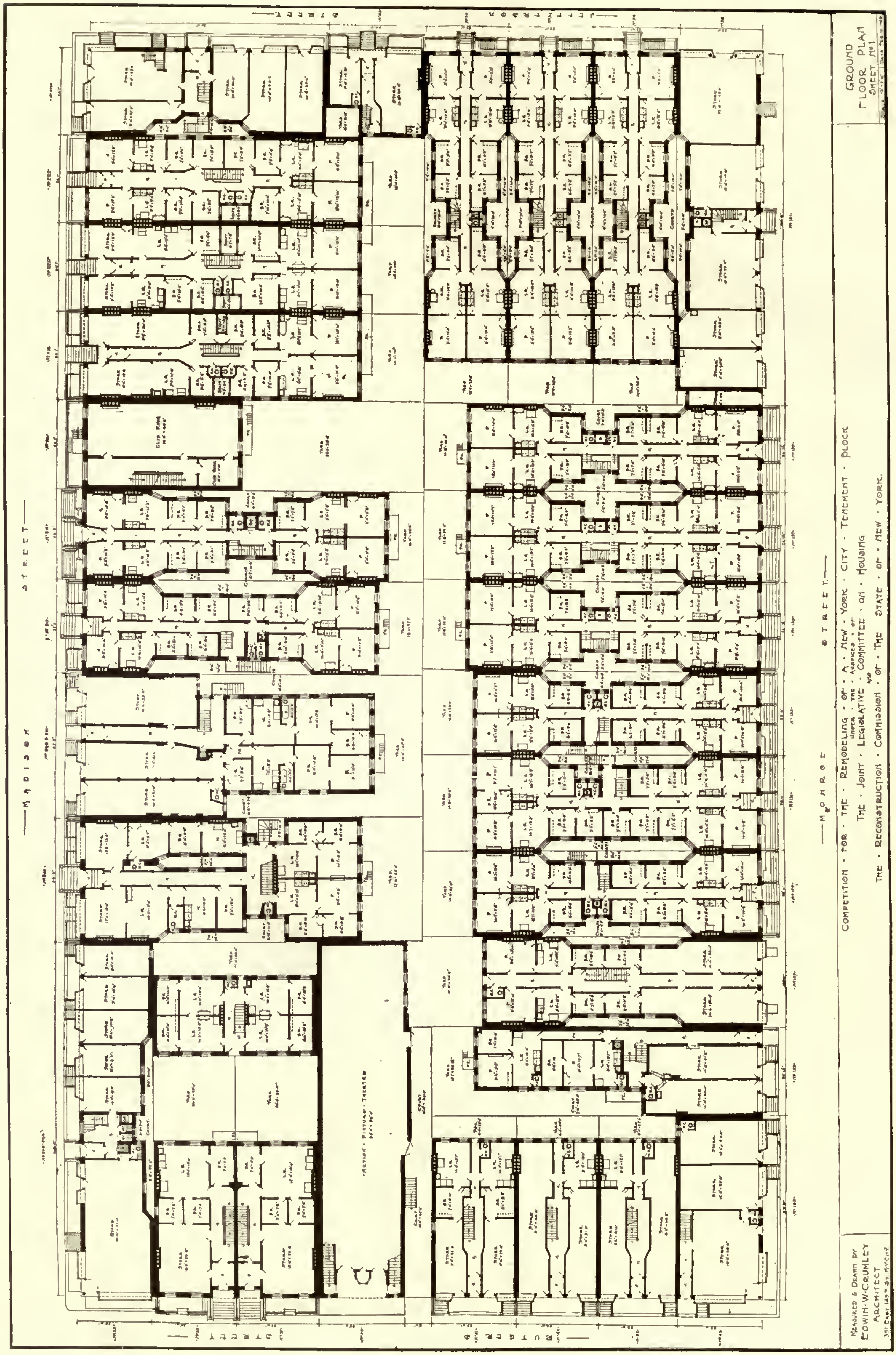
For the purpose of this study, the block bounded by Rutgers, Madison, Jefferson, and Monroe Streets, on the lower east side of Manhattan, has been chosen. Living conditions in this block are not the worst in the city. Conditions here are characteristic of those to be found in hundreds of other blocks throughout New York.

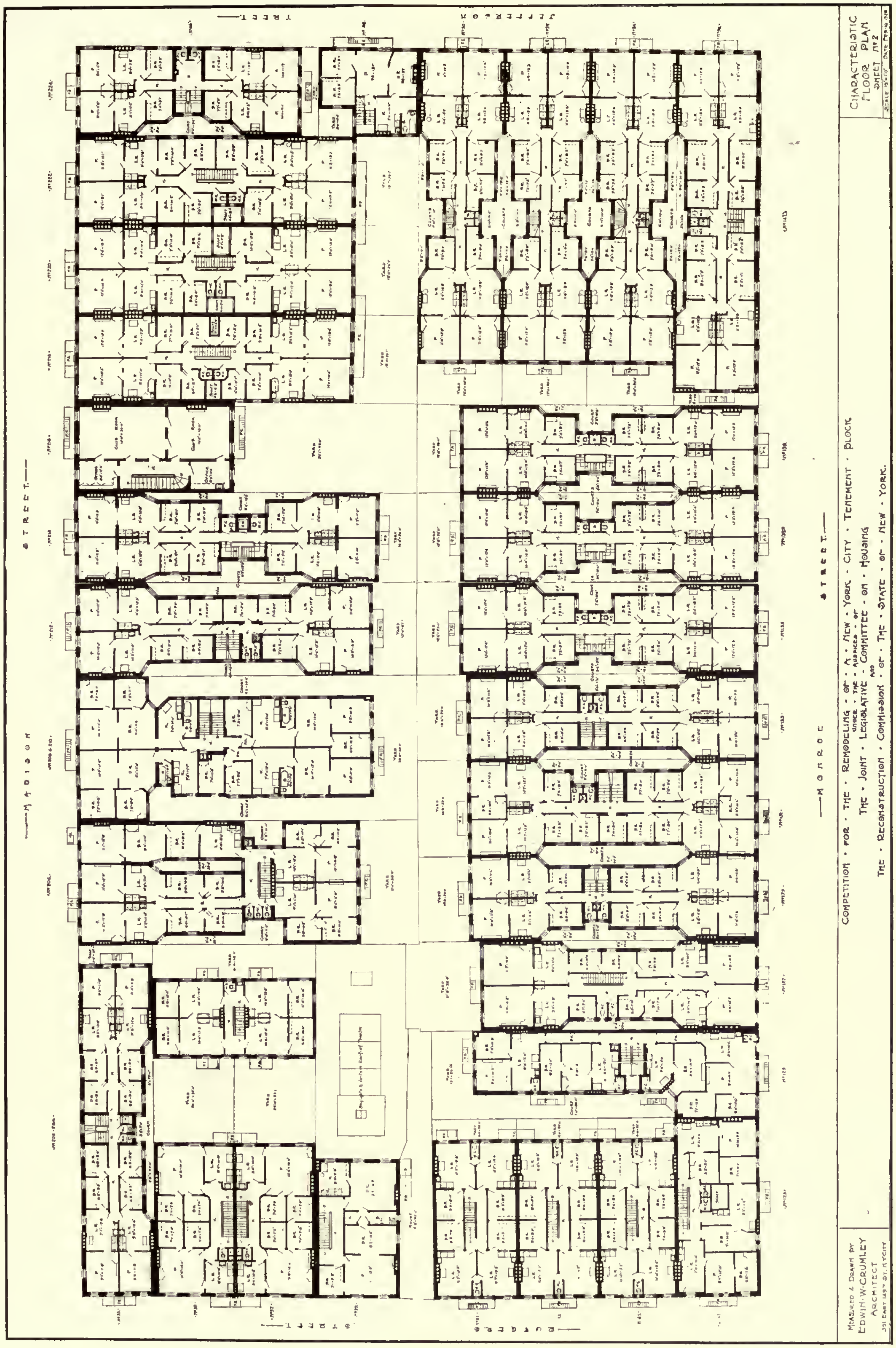
Drawings Supplied to Competitors.—The following drawings are supplied to competitors:

Two plans of the block, one of the ground floor, the other of a characteristic floor of apartments and the elevations on the four street fronts. The plans are drawn at the scale of 1/8 inch equals 1 foot, the elevations at the scale of 1/16 inch equals 1 foot. They show all walls, windows, doors, plumbing fixtures. They were made from careful measurements taken at the buildings during the last few months. They show the present actual conditions. The characteristic floor plan represents in most cases the top

(*Continued on page* 152.)




GROUND FLOOR PLAN SHEET No 1
COMPETITION · FOR · THE · REMODELING · OF · A · NEW · YORK · CITY · TENEMENT · BLOCK
UNDER THE AUSPICES OF
THE · JOINT · LEGISLATIVE · COMMITTEE · ON · HOUSING
AND
THE · RECONSTRUCTION · COMMISSION · OF · THE · STATE · OF · NEW · YORK.
MADISON STREET
MONROE STREET
RUTGERS STREET
JEFFERSON STREET
EDWIN · W · CRUMLEY
ARCHITECT


CHARACTERISTIC FLOOR PLAN SHEET No 2
COMPETITION · FOR · THE · REMODELING · OF · A · NEW · YORK · CITY · TENEMENT · BLOCK
UNDER · THE · AUSPICES · OF
THE · JOINT · LEGISLATIVE · COMMITTEE · ON · HOUSING
AND
THE · RECONSTRUCTION · COMMISSION · OF · THE · STATE · OF · NEW · YORK.
MEASURED & DRAWN BY
EDWIN·W·CRUMLEY
ARCHITECT
MADISON STREET
MONROE STREET
JEFFERSON STREET
RUTGERS STREET

(*Continued from page* 149.)

story. Conditions on other floors, excepting the first floor, are similar, if not identical. All competitors should inspect the block which is the subject of this study. Detailed information in regard to the various buildings will be found in addenda No. 1 at the end of the programme.

Drawings Required.—The following two drawings are required: A plan of the first floor and a plan of a characteristic floor, both after the proposed alterations have been made. These are to be drawn to the same scale as the plans supplied to competitors (1/8 inch equals 1 foot). All walls are to be outlined and all plumbing fixtures, stairs, fire-escapes, dumb-waiters, etc., are to be drawn in solid black-ink lines. All old walls which are preserved are to be filled in solid with black ink and all new walls are to be hatched with black-ink lines. Old walls which are to be destroyed shall not be indicated. No rendering of washes, either colored, black, or gray, and no use of diluted-ink lines will be permitted.

These two drawings, which are *the only drawings required*, will be the same size, have the same borders, and the same title as the two plans supplied to competitors. They will be (1) on white paper, (2) on tracing-paper mounted on cardboard, or (3) on tracing-linen.

Additional Drawing.—One and only one other drawing may be submitted at the discretion of the competitor. It will be the same size, have the same border and the same title as sheet 3 (elevations) supplied to competitors. It shall consist of a bird's-eye view of the whole or part of the development. The purpose of this drawing is to illustrate the competitor's scheme in as far as it cannot be expressed in plans. It will be judged on the merit of the idea, not on the merit of the execution of the drawing. It must be drawn in solid black lines without rendering of washes of any kind and presented on the same type of paper or linen as that used for the plans.

No other drawings will be permitted.

Drawings may be mounted on cardboard of the same size as drawings, in which case they must be delivered flat, or they may be rolled. They must not be creased or folded. They must be in condition and of such character as to permit their reproduction.

Description Required.—In addition to the drawing each competitor is *required* to submit a description. This should be concise and as short as the proper treatment of the subject will permit. It should contain at least the following:

(1) An explanation of the advantage of his solution from the point of view of the tenants, owners, the community, and the State.

(2) The proposed methods of carrying out the alteration—in small or large units, by individual owners, groups of owners, assistance of the local community, city, or State.

(3) A brief description of materials, type of lighting, plumbing, heating, to be used in alteration.

(4) Any proposed scheme of management. This includes care of houses, heating, lighting, rentals, as well as any common facilities for the use of more than one family or one house.

(5) Comparisons of existing and altered block. (*a*) Number of apartments. (*b*) Number of rooms. (*c*) Conveniences. (*d*) Sanitation and ventilation. (*e*) Rental values.

Marking Drawings and Description.—Drawings and description are to be marked with an emblem.

The description is to be placed in a sealed envelope marked on the outside with the same emblem.

These shall be accompanied by a sealed opaque envelope containing a card on which shall be the name and address of the competitor or competitors. The exterior of the envelope shall be marked with the same emblem.

Date of Closing of Competition.—All drawings and descriptions must be delivered at Room 302, Hall of Records, New York City, at or before 1 o'clock on June 15, 1920.

To Whom Competition Is Open.—The competition is open to any person or persons.

Prizes.—Two prizes of $1,000 each; four prizes of $500 each; four prizes of $250 each.

The jury may decline to award any or all prizes, in case it decides that drawings submitted do not fulfil the conditions of the competition or do not warrant the awards.

Publication of Drawings.—The jury shall have the right of publishing or exhibiting any drawing or description that may be submitted.

Jury.—The judges of the competition will be the following: Mr. Allan Robinson, Mr. Alfred E. Marling, Mr. Edgar A. Levy, Hon. Frank Mann, Tenement House Commissioner, Mr. Clarence S. Stein, Senator Charles C. Lockwood, Senator John J. Dunnigan, Mr. Andrew J. Thomas, Mr. Burt Fenner, Mr. Robert D. Kohn, Miss Lillian Wald, Mr. Alexander M. Bing.

Reaching the Architect by Advertising

By Stowe Phelps, A.I.A.

Introductory.—This article is written primarily to tell the advertiser how to reach the architect with his advertising, for that is presumably what he is trying to do when he sends him catalogues, samples, folders, etc., all of which have cost considerable money.

No one wants to waste money in his business, so why waste so much in advertising, which is part of his business?

In my opinion, about 1 per cent, or possibly 2 per cent, of the advertising that goes to architects is in good and effective form, about 25 per cent is fairly good, and the rest varies from that to nearly zero as regards its value.

The following suggestions are offered only as general principles, of necessity, and cannot apply to all cases, for the advertising of a copper nail will naturally be different from a line of hardware or plumbing fixtures.

The amount of money allotted to advertising will naturally govern the form of advertising, but if proper care and thought are given a great deal can be accomplished with a small outlay; certainly a great deal more than is often accomplished with a large expenditure.

Modifications also may have to be made to reach the general public, but this article is dealing only with reaching the architect.

Advertising for magazines is quite a different proposition, and will be mentioned below under a separate heading.

The word catalogue will be used in this article to include all forms of advertising matter such as pamphlets, folders, brochures, monographs, reports, etc.

Size.—The first thing to decide is the size, which, in most cases, should not be larger than the standard commercial letter-paper size (about 8½ x 11 inches), whether in book form, pamphlet, or folder. If in folder form, do not get it too small, as it is easily mislaid or lost. A very convenient size is that of the ordinary book, about 5 x 7½ inches or 5½ x 8 inches.

The size of all advertising of a firm, company, individual, etc., should always be the same. This refers to the area of the page and not to the thickness or number of pages.

Binding.—If the thickness of the catalogue approaches the size of a book, it would be well to consider the advisability of binding it in boards, as such a binding will last longer than a paper binding, though in most cases a heavy paper binding is all that is necessary.

Serial Advertising.—When it is considered advantageous to send out advertising matter in serial issues, or in separate folders, at various times, such advertising matter should be of the same size, each separate issue bound up (and not folded), and then punched so that they can all be bound together into one volume as fast as received.

Some firms issue binders to hold their various issues, which is a very good idea. Such a binder should have the name of the firm and the name of the article advertised, trade-mark, etc., on the back, if possible.

Color.—The color or colors of the cover of the catalogue should always be the same.

If colored ink is used for the printing, always keep the same color.

If more than one color is used, always keep the same combination of colors.

Can you imagine Woolworth or the United Cigar Stores Company or Childs' Restaurants painting the outside of their stores anything but their well-known colors?

Trade-Marks, etc. — Adopt a distinctive trade-mark, monogram, or device, and put it prominently on the outside of the cover where it will easily catch the eye; also on the back edge of the catalogue if there is room.

The device of the United Cigar Stores is universally known and recognized.

The name of the article, if it has a name, should be *entirely* different from all names of similar articles and short and easy to remember.

Slogans.—Get a good slogan if possible and display it prominently with the trade-mark or device.

A few years ago it was difficult to say "Good morning" to a friend without adding: "Have you used Pears' soap?"

Names and Addresses.—The article advertised and the name of the advertiser together with the address should be plainly printed *on the cover*, and especially so if no trade-mark or device is being featured.

If the catalogue is thick enough, be sure and print your name on the back edge so it will be readily seen when standing on the shelf; also put on the name of the article advertised, such as "Smith & Jones, Paints & Varnishes," or "Commonwealth" Ranges, etc.

Numbering Catalogues.—Catalogues should be given a serial number or letter.

It is also advisable to put on the date of issue. Any possible disadvantages are more than outweighed by the advantages.

Also, this makes it easy to discard the older edition, thereby oftentimes avoiding mistakes.

Size of Type.—The size of type in the body of the printed matter should be large enough to be easily read by the average person.

This applies to all the essential or important information and statements.

Footnotes, explanations, and other unessential matter can go in smaller type.

Arrangement of Printed Matter.—This is of the utmost importance and will, of course, vary greatly with the article which is being pushed into the limelight.

The general principles of arrangement are as follows: All information contained in the catalogue should be divided into subjects and each subject into as many paragraphs as necessary.

Every subject (and every paragraph, if possible) should have a heading, title, subheading, etc., printed in bold-face type or in such other manner as to easily attract attention and catch the eye, so that it will not be necessary to read through a paragraph to find out what it is about.

Information can be divided into such subjects as "Construction," "Advantages," "Points of Superiority," "Cost," "Covering Capacity," "Uses," "What It Does," "How Used," "Architects Who Have Specified It," "Satisfied Owners," "Prominent Buildings Where Used," "Guarantee," and (most important of all, perhaps) "Specifications."

Illustrations, diagrams, etc., are always good, as are also tables of weights, sizes, capacities, and other information which will interest the architect and give him information he wants without writing or telephoning for it.

Many architects come from Missouri.

Points of Superiority.—The points of superiority, or why the advertised article is better than similar articles, is a subject that is seldom developed at all, and in fact is oftentimes entirely omitted.

Some advertisers seem to shy at this idea on the ground that they are knocking their competitors, but there is no reason for this. If your product is superior, don't hesitate to say so, but also don't fail to state *why* it is superior.

Guarantees.—There is scarcely a word in the English language that ought to mean so much and in reality means so little as "Guarantee."

It is probably safe to say that not 1 per cent of the "Guarantees" amounts to a row of pins from the standpoint of the architect or of the owner, but perhaps the architect and the owner are expecting too much.

One common form is, that a manufactured article is guaranteed to be perfect, and that any defective parts will be replaced free of cost. This means that the manufacturer will furnish free of cost a new part, but the owner has to pay the cost of replacing, so it often happens that while it may cost the manufacturer a dollar or two, it may cost the owner fifty or a hundred times as much for replacement.

Under these conditions, what is the real value of the guarantee? Virtually nothing. A real guarantee would include the cost of replacement.

The point is this: If the manufacturer really has faith in the article he is selling, he ought to stand back of it with a real guarantee.

Specifications.—Specifications are extremely important and should *always* be included where possible.

They should be worded in such a way that they can be copied into the architect's specifications and *not* in an indefinite form (as is often done). For example: "In order to get the best results, Jones Paints should always be specified."

Write the specifications, if possible, so that they can be copied into the architect's specifications, and be sure that they are explicit and complete, so that when the architect has followed your information there will be no mistakes, and nothing left out which will cause trouble and very probably an extra.

A method, easy for the architect and therefore excellent for the advertiser, is to publish a complete specification and then explain that all the architect has to do is to say: "Such and such work is to be done according to 'Jones Method No. L,' or 'Smith's Standard Specification B,'" which saves copying a long specification.

Give specifications to cover every possible case.

If the material cannot be used under certain conditions or in connection with certain other materials, attention should be called to the fact.

If certain preparation by other trades is required, such requirements should be carefully and minutely noted.

Samples.—While the question of samples for the architect does not come properly within the scope of this article, a word may be said in regard to them, as in many cases they are closely related to the printed advertising.

Every sample should have attached to it *securely* a label or tag giving the name and address of the manufacturer; also address of the branch office or name and address of the agent to whom inquiries should be directed, if there is an agent nearer to the architect than the home office.

The name of the article should be accurately and completely given, the date, also as much complete information as possible, including a specification if there is room.

Many samples left in architects' offices are not properly labelled, with the result that they fail in their mission and are often thrown away because the architect does not know what they are or from whom they came.

Telephone Numbers.—If there is an agent in a city, the name of the concern should be listed in the local telephone directory, and not the name of the agent.

If the John Doe Paint Company of Chicago, for instance, has an agent in New York by the name of Richard Roe, it is unlikely that the architect will remember Richard Roe, by name, and the extra cost of listing the John Doe Paint Company will be money well spent.

Telephone numbers should also be put on letter-heads, cards of representatives, catalogues, etc., so as to make everything as easy as possible for the architect.

Magazine Advertising.—Magazine advertising is very important and must be carefully planned and studied to get results.

It is also a difficult problem, as the space is limited in comparison with a catalogue, and the copy must appeal to the layman as well as to the architect.

With these limitations and conditions the subject must be presented on principles entirely different from those described above.

The form of the advertisement will vary greatly, depending whether or not it is to appear in an architectural magazine, where it will be read by the architect as well as the man on the street, or in the non-technical magazine or paper, where no attempt can be made to reach the architect as such.

Considering first the architectural magazine; this is principally read by the architect, so the advertisement must be prepared primarily for him.

The copy should undoubtedly contain an illustration.

If the subject is difficult or uninteresting to illustrate (such as a brand of cement or iron pipe or a system of waterproofing), the best thing to do is to show a picture of some important or attractive building where the material has been used.

This will not only catch the eye but will show that some architect specified it in this building, and it follows that the name of the building and the names and addresses of the owner, architect, and contractor should be given.

It would be well to add a short list of about half a dozen buildings with the names and addresses of owners, architects, and builders, all of which will show the company the advertised article keeps. The persons' names can also be readily referred to if desired.

If the space will permit, further information should be given; selecting, of course, the most important points.

A short statement of the "Uses," "Costs," "Points of Superiority," etc., can well be included, for such information is valuable.

Provided the "Specification" is not too long to insert, put it in by all means.

When it comes to the *non-technical* or *popular magazine*, it is quite a different story, for here the appeal is to be made to the layman, whose point of view is very different probably from that of the architect.

In this case the illustration is still very important, but its character can perhaps be changed with advantage.

A thirty-story office-building to show where a particular make of radiator was used will catch the eye of the architect, but for the general public (which means both men and women) a little "human interest stuff" (as the news reporters call it) should be introduced and a picture of the happy family, father, mother, and the curly headed children, all basking in the warmth of the above-mentioned radiator, with a raging blizzard visible through the window, will be much more effective than the office-building.

After this, if space permits, put in general information about "Uses," "Costs," "Points of Superiority," etc., but worded to mean something to the average intellect.

In Conclusion.—The above remarks may be summed up as follows:

Make things as complete and explicit and easy for the architect as possible by making your advertising in the architectural magazines clear and definite and attractive and your catalogues of convenient size, easily recognizable, full of exact information well arranged. In this way you will reach the architect and then—let nature take its course.

Modern Building Superintendence

By David B. Emerson

CHAPTER IX
BANK VAULTS AND FIXTURES

WHILE the work which has been described in the preceding chapters was going on, the work of installing the bank vaults, counters, and screens was progressing rapidly. The concrete foundations and walls of the safe-deposit and bank vaults was poured with the other concrete. The vaults were designed by a vault engineer, and the construction was superintended by him, but in his absence we were intrusted with the supervision of the work, and acted in concert with him at all times. The walls, floors, and roof of the vaults were constructed of concrete, with rail reinforcement, as described in Chapter II. It was intended to render the vault as nearly fire, burglar, and mob proof as was possible.

In the larger cities the danger from burglars has been reduced to a minimum by efficient police protection and private watch systems. Also, the famous old-time cracksmen of the "Shang" Draper and "Jimmie" Hope type have been entirely supplanted by the "yegg," who preys upon the small-town banks, so that the greatest danger which may have to be combated in any of the larger cities is the one of mob violence, more than that of the night prowlers, so that the vaults must be made to withstand all manner of onslaughts by high explosives, drilling, the oxyacetylene blast, blau-gas cutter burner, or the electric arc, which may any one or more be used. And, although the burglar risk is reduced greatly, still "eternal vigilance is the price of safety"; and burglaries still continue to occur in all of the larger cities, and corporations and firms handling large sums of money have their safes blown open, or ripped open, quite regularly between Saturday night and Monday morning, so bank equipment must still be calculated to withstand the attack of burglars as well as that of the mob.

The vaults were lined on all four sides and the top and bottom with plates four inches thick, made up of layers of electric-furnace abrasive grains, combined with iron, which had been proven to be as nearly drill and cutter burner proof as any material could be, having a greater resistance than laminated plates, or any other form of lining at present known. The doors were single straight flange doors, thirty inches thick. The joints between the door and the jambs were carefully and accurately ground, so as to make a positive mechanical seal. The doors were built up of a composite construction. The outer shell was of cast low steel, inside of which was a concrete section, which was reinforced with jail rods, which were saw-proof and file-proof. The bars were set both horizontally and vertically, four rows of bars being used. Inside of this was a six-inch tool and cutter burner, resisting plate, of the same material as was used for the lining of the vaults. This plate had a one-inch layer of one-half inch abrasive grains on each face, and a two-inch layer of one-inch grains through the middle. On the inside of this section was a facing of laminated steel construction on which was mounted the cast steel bolt frame, the bolt mechanism, and the time locks, which were located in a centre drum, housed in a steel case, and having a cover door. The doors were hung on crane hinges, with wheel-operated-pressure mechanism.

The combination locks and the bolt-throwing mechanism was located on the jambs of the doors. All of the mechanism, bolts, etc., was draw-filed steel. The combination-lock dial was set on the pressure mechanism housing on the door-jamb, and had a steel cylinder set anglewise and provided with an oval glass window, set eight inches from the illuminated stationary dial, provided with two revolving pointers, each of which was connected with the combination locks.

Lowering platforms with controlling hand-wheels were placed in front of the doors, so that a level passage could be had into the vaults. The vaults were also provided with emergency doors of a smaller size, but of equally efficient construction, which were to be used in case of lock-ins or other emergencies, but in no way affecting the security of the vaults. The bank vault was fitted up with steel security and coin lockers, with steel doors fitted with two combination locks. The safe-deposit vault was fitted up with safe-deposit boxes, the minimum size having a unit width of five and one-half inches and an outside depth of twenty-six inches.

The boxes were fitted with locks which were provided with a guard key, which was in charge of the custodian, and was common to all of the locks in a series; each lock also had its individual key, which fitted only its own lock, and differed from every other key in the series, these keys being known as the change keys. Before the change key could be inserted, or used in its lock, the guard mechanism had to be unlocked by means of the guard key in charge of the custodian. The safe-deposit vault was provided with a bronze day gate, which had a latch lock which could be opened only by means of a key.

A bed of cement mortar one inch thick, trowel-smoothed, was laid over the floors of the vaults. On this was laid a finished floor of cork tile six inches by twelve inches, one-half inch thick. On account of its resilient quality, and its comparative noiselessness, this makes an admirable floor for vaults. The vaults were wired for lighting, telephone, and electric fans, all of the wiring being permanent and built into the walls, floor, and ceiling as the vaults were being constructed.

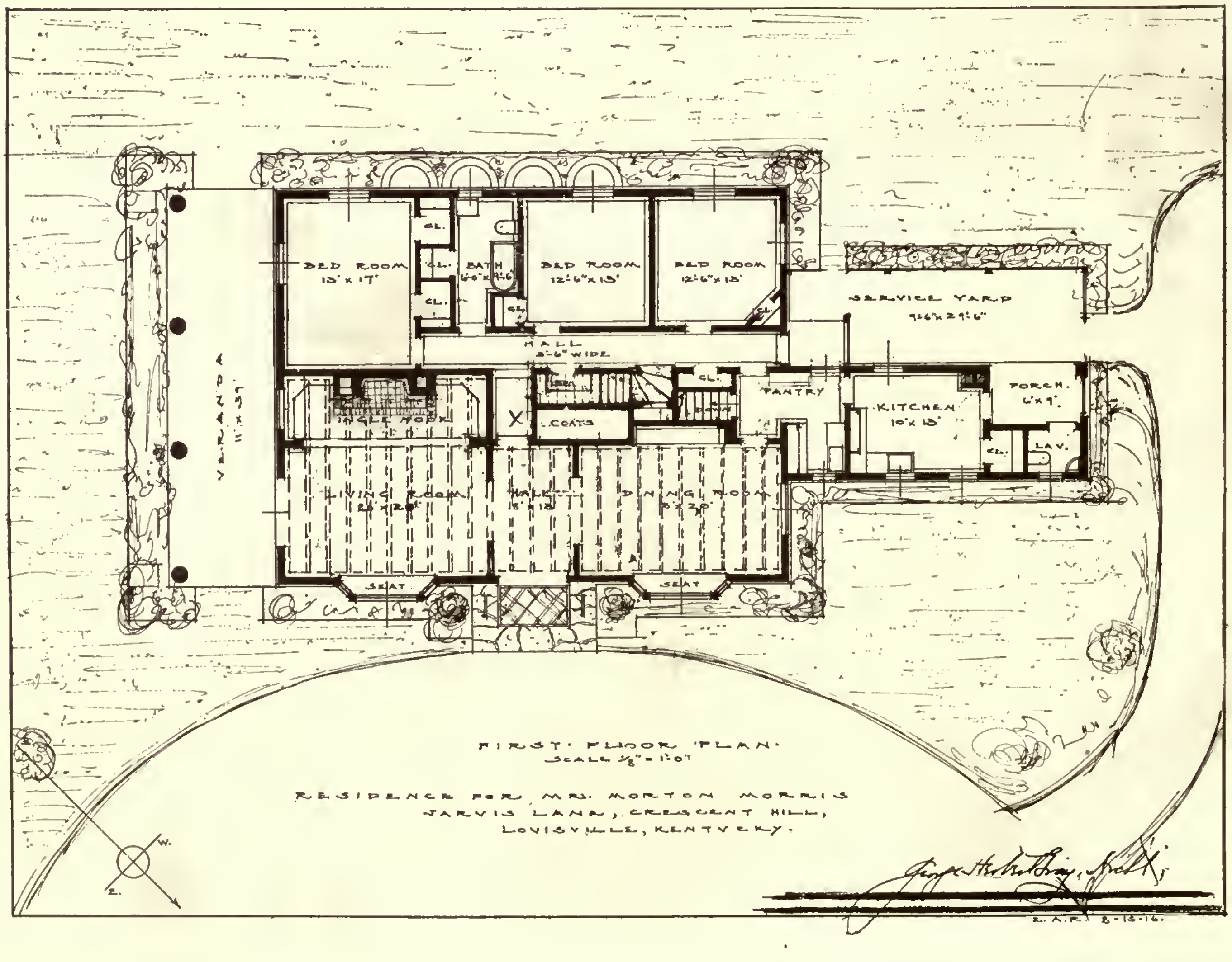
Both the public and the intercommunicating telephones were connected with the interior of the vaults, so that direct communication could be had with the outside by any one locked in. Safe-deposit vault had a switch in the vestibule, with momentary contact button, actuating the automatic switch; also, the vaults were provided with receptacles for attaching portable lights, and they had continuous burning night-lights for emergencies. As an extra precaution, the vaults were wired for an electric alarm system. The four side-walls, the floors, and the roofs of the vaults were surrounded with lead-covered cables, spaced four inches apart, and run both longitudinally and transversely, and terminating in a junction box, which connected with a conduit which ran to the telephone service, to be connected with the police signal system.

A system of panelled doors, similarly wired, were installed on either side of the vault doors, closing over them, and protecting them. This system was on a closed circuit and the breaking or cutting of any one of the wires would give an alarm. The wiring was covered over with marble panelling, which was set so that it was easily accessible in case of repairs, which might be made necessary by any break in the system.

The counter fronts were built up to the level of the counter tops with walls of hollow tile four inches thick. In these walls were set steel angle standards, which were securely bolted to the floors, and which formed a rigid support for the bronze screenwork, which was above the counters. The outside face of the counters was faced up with marble, with moulded base course and cap mould, all anchored back to the tile walls by means of brass-wire anchors. The marble which was used above the base was Italian Pavanozza. On account of the extremely fragile character of this marble, all of the slabs were backed up with slabs of hard, sound, cheap marble, the backing and the face being set together with plaster of Paris, which insured a perfect adhesion between the two slabs. We examined all pieces of marble to see that no fractured pieces were used, and that none of the pieces were dowelled along the line of a fracture, which is sometimes done with this marble.

The screenwork above the counter tops was of bronze and plate glass. The pilasters, cornice, frames, grills, and wickets at the various windows were of cast and wrought bronze. A continuous reflector which was set in a drawn bronze frame ran around the inner side of the cornice, forming the finish. The reflectors were carried along the tops

(*Continued on page* 158.)


BED ROOM 13' x 17'
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BATH 6'0" x 9'6"
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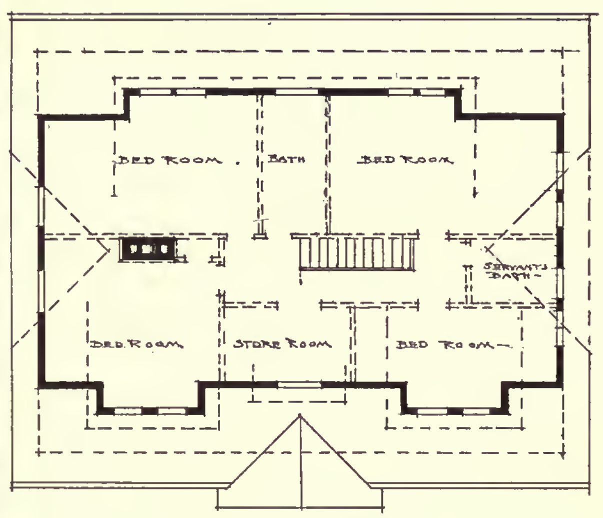
BED ROOM 12'6" x 13'
BED ROOM 12'6" x 13'
CL.
SERVICE YARD 9'6" x 29'6"
HALL 3'6" WIDE
VERANDA 11' x 35'
INGLE NOOK
COATS
CL.
PANTRY
KITCHEN 10' x 13'
PORCH 6' x 9'
CL.
LAV.
LIVING ROOM
HALL
DINING ROOM
SEAT
SEAT
FIRST FLOOR PLAN
SCALE 1/8" = 1'0"
RESIDENCE FOR MRS. MORTON MORRIS
JARVIS LANE, CRESCENT HILL,
LOUISVILLE, KENTUCKY.
W.
E.
E.A.R. 8-15-16.


BED ROOM
BATH
BED ROOM
SERVANTS BATH
BED ROOM
STORE ROOM
BED ROOM

ATTIC PLAN

(*Continued from page* 155.)

of the partition screens, and formed a cornice over them, giving light to the desks on both sides. The backing of all the screenwork and the cap plates of all the partitions was number-sixteen-gauge cold-drawn bronze; all of the bronzework in the screens was the highest class architectural bronze. All of the ornamental work was cast from carefully modelled patterns; where five or more castings were to be made from the patterns, metal master patterns were used. These patterns were cast from the plastic models, and were then finished by hand-chasing. Where not more than four reproductions were to be made from a pattern, the moulds were made directly from the plastic model.

All of the castings were rechased from a chased master pattern. All of the exposed surfaces of the moulded and plain work had the fire skin removed by filing or grinding, and brought to a true surface and finished with a draw file ready for coloring. All of the bronzework was put together in a most approved manner, by means of concealed screws and rivets. All of the framing, blocking, reinforcements, screws, and connections were of bronze, or other non-rusting alloy, and where the bronzework was attached to the steel framing, it was bushed with bronze or copper, and the connections were made by means of bronze bolts and rivets. No work the face of which formed a finished surface was allowed to come in contact with the steel framing. All of the steel framing was painted two good coats of graphite paint before the bronzework was erected.

All of the glass used in the screens was a non-shattering glass, which was made up of two pieces of polished plate glass, with a sheet of celluloid between them and welded together under a high temperature and a tremendous pressure. This glass will not shatter or fly when struck by any ordinary missile, strong impacts merely causing a multitude of hairlike cracks, but no breaks or flying splinters. The glass was held in place by means of stops formed of rolled-bronze channels, held in place by means of oval-headed bronze machine-screws.

The tellers' cages were framed up of bronze tubing, one and one-half inches square at the angles and corners, with roof framing of three-eighths-inch by two-and-one-half-inch bronze bars; the panels were filled with one-and-one-half-inch mesh. The finishing of the bronzework was done by first cleaning it by dipping in a solution of sulphuric acid and water, then washing thoroughly, and oxidizing with a solution of sulphate of ammonia, and rubbing it down to an even color with pumice-stone, and finally given one coat of white wax, thinly and evenly brushed on.

The tops of all of the counters were formed of two-inch-thick slabs of structural glass, making a smooth, impervious surface. The space under the counters was filled in with drawers and lockers made up of furniture-stock sheet steel, finished in enamel. The drawers had slides with antifriction-bearing surfaces, and all of the cases were completely closed at the bottom with steel shelves to keep out mice and vermin. All of the desks, filing-cases, etc., were made up of sheet steel in the same manner. The dressing-rooms for the clerks and the officials were fitted up with steel wardrobes provided with hat-shelves, bronze coat-hooks, umbrella-holders, and drip-pans.

With the installation of the lighting fixtures, which were of bronze of an ornate character, the work of fitting up the banking-room was completed, except for the installing of the movable furniture and the rugs in the president's and directors' rooms, and the rooms for the women customers, which does not come in the construction, so need not be described.

Announcements

Roger C. M. Carl has opened an office for the practice of architecture at 1012 Murchesin Bank Building, Wilmington, Delaware, and would be pleased to receive manufacturers' samples and catalogues.

Lewis H. Bacon, architect, announces the removal of his office from 50 Bromfield Street to Rooms 521–522 Walker Building, 120 Boylston Street, Boston. Telephone changed to Beach 6768.

C. E. Schermerhorn, architect, member American Institute of Architects, 430 Walnut Street, Philadelphia, Pa., announces resumption of practice, having completed his services with Military Intelligence Section, Plant Protection Division, General Staff Corps, United States Army.

Rudolph E. Lee, A.I.A., of Clemson College, S. C., T. A. MacEwan, of Pittsburg, Pa., and A. R. Turnbull, of Charlotte, N. C., have opened an office at 1214 Realty Building, Charlotte, N. C., under the firm name of Lee, MacEwan and Turnbull, for the practice of architecture and engineering. A. R. Turnbull is the business manager of the firm, and they will be glad to receive manufacturers' samples and catalogues.

We note with regret the death, on March 31, of Mr. Louis M. Even, who was well known to the architectural profession as a sculptor and modeller. His marked skill and acknowledged ability, his devotion to his work, and his engaging personality had secured for him many friends among the architects.

Rayburn S. Webb, formerly of the firm of Parlow & Webb, architects, Cape Girardeau, Mo., announces the opening of an office for the general practice of architecture at Room 519 Himmelberger-Harrison Building, Cape Girardeau, Mo. Manufacturers' catalogues and samples are requested.

Mr. Ralph Mornington Weinrichter, F.A.S.L.A., landscape architect, of Rochester, N. Y., takes pleasure in announcing the opening of a New York office at No. 10 East 43d Street.

Fulton & Taylor and Paul T. Cahill desire to announce the formation of a new partnership, Fulton, Taylor & Cahill, architects, and the removal of their office after April 1, 1920, from 631 Hippodrome Building to 8120 Euclid Avenue, Cleveland, Ohio.

Messrs. Edward C. Van Leyen and Edward A. Schilling, architects, Henry J. Keough and Robert A. Reynolds, engineers, wish to announce that they have associated under the firm name of Van Leyen, Schilling, Keough and Reynolds for the purpose of supplying at the least cost complete service in architecture, engineering, and supervision, and to further announce the removal of their offices from the Union Trust Building to 556 Cass Avenue, Detroit, Mich.

C. P. H. Gilbert, architect, announces the removal of his offices to the Metropolitan Tower, 1 Madison Avenue, New York.

Frederick G. Frost, architect, 19 West 44th Street, has removed to 144 East 54th Street, New York.

Harry Leslie Walker, architect, announces the removal of his offices from 19 West 44th Street to 144 East 54th Street, New York City.

The death is announced of Miss Eliza Codd, architect, at Nantucket, Mass., on Easter Sunday, 1920.

A group of architects have rented the building at 27 East 40th Street, New York, which has been remodelled for architects' studios. The following architects have taken spaces in the building: Eugene J. Lang, Harry St. Clair Zogbaum, A. Wallace McCrea, Arthur Loomis Harmon, E. F. Murgatroyd, Wm. F. Dominick, and Donald P. Hart.

IMPORTANT COMBINATION OF TWO LARGE ENGINEERING AND CONSTRUCTION COMPANIES — WESTINGHOUSE, CHURCH, KERR & CO., INC., AND DWIGHT P. ROBINSON & CO., INC., ARE MERGED — NEW COMPANY TO BE CALLED DWIGHT P. ROBINSON & CO., INC.

Of general interest is the combination recently announced of the organizations of Westinghouse, Church, Kerr & Co., Inc., engineers and constructors, New York, and Dwight P. Robinson & Co., Inc., constructing and consulting engineers, of New York.

The new company will be called Dwight P. Robinson and Company, Inc., and will occupy executive offices at 61 Broadway, and engineering and designing offices in the Grand Central Palace, 125 East 46th Street, New York.

The Eleventh Annual Convention of the American Federation of Arts at the Metropolitan Museum of Art

A GOOD sign of progress in our land is the concrete evidence of the work of that live, hard-working art organization the American Federation of Arts, which holds its annual convention in New York at the invitation of the Metropolitan Museum of Art, which celebrates its own golden anniversary this year. For eleven years this national society, consisting of two hundred and twenty-four affiliated chapters in forty States, besides thousands of individual members, has been building up a reputation for solid service along lines of great value to the American people.

This year's convention, of which all sessions are public, will be held May 19 to 21. There will be two sessions May 19. In the morning President de Forest will deliver the opening address and reports of the secretary and treasurer will be heard. Vice-President Hutchinson will speak of the extension work of the Federation; Francis C. Jones will lead discussion on "Travelling Exhibitions," which constitute an important part of the Federation's work, and Allen Eaton, field secretary, will discuss the Federation's new venture under the slogan "Art in the Home," now applied to a group of exhibitions of prints and photographs for home decoration but later to be extended to other fields.

The Federation works for better art education, uniform art legislation, establishment of competent art commissions; it supplies art information and study courses. It has thrown its weight in favor of the rapidly growing movement toward industrial arts design worthy of the stamp "Made in the U. S. A."

To advance these many lines of usefulness the Federation counts upon the services of many public-spirited men and women. Its president is Robert W. de Forest, who is also president of the Metropolitan Museum of Art. Its first vice-president is Charles L. Hutchinson, who is president of the Chicago Art Institute; while Charles D. Norton, vice-president of the First National Bank in New York, is its treasurer. The board of directors includes men and women of like importance from a number of cities in various parts of the country, from St. Paul to Santa Fé, from San Francisco to Savannah.

Some of the things the Federation does: Sends out travelling exhibitions selected by experts. Circulates illustrated lectures by authoritative writers. Publishes a monthly illustrated magazine (*The American Magazine of Art*). Issues a yearly art directory (*The American Art Annual*). Conducts a campaign for better war memorials. Holds annual conventions. Serves as a national art clearing-house. Supplies art information, study courses, etc. Aids in establishing art commissions.

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Being made of cork, a substance composed of myriads of tiny air-cells, Armstrong's Cork Tile acts as a pneumatic cushion. It deadens the sound of footsteps almost completely. It has no grain, and does not crack or splinter. Neither does it crumble, scale or dust off when subjected to abrasion. Furthermore, cork is resilient; hence Armstrong's Cork Tile floors are remarkably comfortable and easy underfoot—a big point in their favor, too.

Silence and durability are not the only advantages offered in Armstrong's Cork Tile by any means. The many others are explained in the illustrated book, "The Ten-Point Cork Floor." Write and ask us to mail you a copy.

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Frontispiece to No 6

HÔTEL DE VILLE, ARRAS. *From a drawing by David Varon.*

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLI JVNE, 1920 NO. 6

The Certosa of Pavia

By Frank Jewett Mather, Jr.

I

THE Certosa of Pavia lies vacant and solitary in the endless Lombard plain. From afar one sees the light arcades of the octagon drawing in tier by tier to uphold the slender lantern, but the rest of the big monastic pile squats sullenly behind its walls, as if it renounced its site and surroundings. And this forbidding quality persists even when one enters the close. This Carthusian abbey has nothing of the pathos of a dead building giving itself back to the soil under the influence of sun, wind, and rain; it displays instead the aggressive spick-and-spanness of a well-kept national monument. Have you ever seen a bedizened Pharaoh exposed in a museum, mortal but hopelessly incorruptible, a butt for the chatter of guides and tourists? That is the plight of the Certosa of Pavia.

That fair but false miracle, the façade.

Such it was, for, incredible as was the elaborateness of this design, it was promptly outbid by the terra-cottas of the great cloister. By the simple expedient of alternating white columns with rose-colored, and enlarging the tiny caryatids to nearly life size, a new note of color and a whole battalion of imposing effigies were obtained. And then both cloisters were outdone in marble on the façade, where for the space of two generations Gian Galeazzo's money was cheerfully chipped away.

I have no wish to follow the story through the building, or rather the embellishment, of this front. Three better designs had been considered and rejected before it was committed to the Amadeo and Mantegazza families, shrewd artisans who had come to the Certosa in the humble capacity of stone-cutters and had grown up with the building. They knew a good job and according to their lights tried to give a good money's worth. Wherever a bas-relief or a statue might be put they put one or several. The façade blossomed into profane effigies and sacred stories, as the routine imagination of the monks directed the chisels of the master workmen. In the borders, capitals, columns, bases, sills, and buttresses they lavished an invention always ingenious, and sometimes exquisite in its overblown fashion. Considered as so much mellowed and corrugated marble, it is very beautiful, especially as glimpsed from the outer portal. But it exercises, after all, merely the charm of fancifully intricate workmanship. It goes with carved cherry-stones, or, more amiably, with the frost crystals on the window-pane. Borgognone, after the first architects the single fine and restraining influence in the enterprise, is supposed to have had a hand in the riot of stone-cutting he surely must have disapproved. One is tempted to credit him with some of the charming decorations that ripple about the windows, and we perhaps have better warrant for believing that he designed the bas-reliefs of the entrance, depicting the founding of the Certosa by Gian Galeazzo and the transportation thither of his body. In any case, these stories, with their exquisite setting of biblical subjects in a trellis, surpass anything we have from the stolid talents that contrived the rest of the front. On the whole, one shares Erasmus's lack of patriotism. Indeed, even the enthusiasm of the monks gave out after a time, and they hastily finished the half-done task by embedding the left-over bits of sculpture in the papery panels above.

Gian Galeazzo laying the first stone, August 28, 1396, of the church portal, executed about a century later. The design is ascribed to Ambrogio Borgognone.

Had the Carthusians rested there, one would feel more kindly toward them. But they merely arrested the upcreep of sculpture on the façade to start a fury of decoration in the side chapels within. These quiet recesses, which at the best had been tastefully decorated by painters of the early Renaissance, and at the worst remained in seemly rough cast, were with a few blessed exceptions to be turned over to the sugariest and most flamboyant artists of the baroque period. A tedious Pavian family named Sacchi, whose forte was transposing embroidery designs into semiprecious stones, was to succeed to the Mantegazzas and Amadeos. Of all this work there is little left to be enjoyed except the admirable gratings and occasional fine bronzes. Metal seems antiseptic. In periods of decline, the art of the smith retains something of primitive vigor, and possibly one might best illustrate the true continuity of art by sticking to iron and bronze. As for the chapels, about the best one can say is that the architectural arrangement happily conceals them, and that the founder would probably have approved heartily of their over-decoration.

It may seem that one does Gian Galeazzo an injustice in holding him responsible for the extravagances he did not live to witness. But study his face as it meets you in the outer portal, in the lovely reliefs of the entrance, over the door of the old sacristy, high up in Borgognone's fresco, in miniatured choir books, and over the exit to the cloister—where at last you shake him off—and you will find that these many portraitists have united in one, and not an agreeable, interpretation. The forehead projects in a keen ridge over the full orbits, only to recede unpleasantly under the long hair brushed straight down the temples. Beneath the inquisitive and acquisitive nose the smooth-shaven lips are firmly set. The chin protrudes stubbornly—an effect exaggerated by a wisp of pointed beard, but this impression of power is somewhat cheapened by the grossness of the pendulous double chin. In all these portraits there is an incongruous hint of the devilish sly Yankee deacon of caricature, but the large eye, with its massively cut socket and lid, tells quite another story—of passions, or at least of indulgences, more rightly to be associated with the Mother Church than with the meeting-house.

Here, unless his features belie him, was a man not given to fastidiousness. In honoring his memory with a magnificent church, that was mostly a decorator's church, the monks did about what he would have done himself. They wanted, as he would have wanted, something more dazzling and costly than Lombardy had yet seen, and the Mantegazzas and Amadeos were precisely the men to enlarge upon such instructions. It all corresponded to the dynastic ambitions of the donor. In the few years between the Duchess Caterina's vow and the laying of the first stone in 1496 his intentions for the Certosa were growing rankly. Toward the last actual delusions of greatness seem to have centred about the temple, or rather the pit that represented it. In his imagination it rose no longer a simple memorial to Caterina or

The Certosa of Pavia—seen from behind.

The façade—capitals with entablature and cornice.

an offering to Our Lady, but a mausoleum for the dynasty he believed he had founded. Gian Galeazzo entertained kingly ambitions, and with a certain warrant, for kings craved his alliance, and his domain had stretched to Sienna and Spoleto, enveloping redoubtable Florence. The regalia had been ordered, so the chronicler Poggio tells us, when Gian Galeazzo fled from the plague at Pavia, only to die at Melagnano in September, 1402, in his fifty-second year. Seven years earlier he had ordered his tomb at the Certosa in royal state. At Milan he had treacherously slain his uncle Bernabo, co-heir of Lombardy, so he preferred to lie rather in the abbey that was to rise near Pavia than in the great white cathedral that already towered above the scene of his foulest usurpation.

So he commanded "a marble chair nine steps high to be built behind the high altar, and on that chair to be cut the figure and effigy of this testator, as seemly as may be in marble, the ducal form and costume, in and under this chair a marble sarcophagus . . . in which the body and heart shall be buried and concealed." Having provided for his own splendid sepulchre, he ordered as well on his right a tomb and effigy for his first wife Isabella, and on the left similar honors for his second wife Caterina, their offspring to be buried in the order thus established for the entire line of Visconti.

You may seek in vain for the towering throne and ducal image behind the high altar; you shall find in the Certosa neither the grave of Isabella nor of Caterina. It was seventy years before the body of Gian Galeazzo lay in the church in a kind of makeshift state. It had passed from the Abbey of Viboldone, where the first masses were sung, to the Cathedral of Milan, where the draped coffin hung in the choir arch for a generation. It approached its last resting-place by way of the venerable church of S. Pietro in Ciel d'Oro at Pavia, and was fairly forced into the Certosa by the indignant urgings of a descendant, Galeazzo Maria Sforza. For a time it lay behind the high altar, indeed, but surmounted not by the throned figure required in the will. An equestrian portrait, presumably made for another purpose, guarded the coffin when the gossiping Commines saw, and, he assures us, smelled, the bones of Gian Galeazzo. Later they were relegated to the right transept, in contravention of his wish, and enclosed in the fine tomb which we still see, and it has been twice violated. His wish that the Certosa should be the mausoleum of the Visconti is fulfilled most imperfectly by the lovely cenotaph of Lodovico il Moro and his wife Beatrice d'Este. For if Lodovico was remotely of Gian Galeazzo's blood, the Sforzas had in turn usurped the Lombard state.

If I have recounted perhaps at undue length these disregarded ambitions of the founder and the odyssey of his mortal remains, it is because in a manner these facts explain the somewhat composite and inharmonious nature of the Certosa itself, and because they go far toward answering Erasmus's query as to the sense of it all. We have seen that it quickly outgrew its finer and simpler origins in the zeal of a monk and the fears of a godly woman, and came to express mainly the pride of a prince, inherited and enhanced by many generations of too prosperous monks. Its history, or absence of history, betrays the barrenness of such a foundation. Let us trust that after a reasonable interval of intercession the soul of Gian Galeazzo was in a position to face St. Peter; his lands and money, so far as the annals show, were less productive of piety and scholarship than so shrewd a dealer in futures had reason to expect. It is part of the divine irrelevance

A window of the façade.

St. Ambrose enthroned, with four Lombard saints, by Ambrogio Borgognone.

Tomb of the founder, Gian Galeazzo.

of art to convert to finer purposes the narrow designs of donors and patrons. If the Certosa is something better than a museum of Renaissance decoration, if one still finds in it a higher pleasure than one gets from the picturesque, or from sentimental reconstruction of the princely life of the monks, it is because the work enlisted at least one exquisite artist, Ambrogio Borgognone, and something of fine original purpose persisted through all changes. The temple itself has never quite forgotten that it must symbolize the beauty and simplicity of holiness. We know the names of the three architects who drew the plans, Bernard of Venice, Giacomo da Campione, and Cristoforo Beltramo, but we may only surmise who it was that gave this, almost the last of Lombard Gothic churches, the form it still retains. One likes to think that Stefano Macone, who had inspired the Duchess Caterina's vow, may have had a voice in the matter. In any case, when work was resumed on the old foundations after a lapse of fifty years, an aged architect, Cristoforo da Conigo, who had been present at the laying of the first stone fifty-six years earlier, was called in to advise the new architect, Giovanni Solario. We may suppose that this single survivor of the Gothic beginnings saw to it that they should be respected by these builders of the classic revival. Only through some such piously conservative influence could a building of the Renaissance remain so loyally Gothic in spirit.

Without the touch of Ambrogio Borgognone the Certosa would be merely one of many fine Lombard interiors, notable for the light spring of its massive vaults, for the beauty of its painted windows, but, after all, the counterpart of dozens of churches of the plain. It remained for Borgognone to lend it a peculiar decorative elegance which dignifies it not merely among Italian churches but also among those of Europe. He came to the work in 1490, and while the journeymen sculptors outside were chiselling the façade like a sugar-cake, he and his brother Bernardino were drawing delicate borders along the stout vaulting ribs, crowning the main arches and wreathing the little chapel arcade with similar patterns—everywhere imposing upon the roseate brown of the interior a celestial hint of blue. In the vaults they dared more, raising the pale tone to a vivid, and near the crossing, where the eye rests, tracing a simple geometrical pattern. In the transept again they stretched the blue behind the two apsidal groups of Viscontis and Sforzas who kneel by the Virgin's throne, proudly, as great lords may before so great a lady. On the transept walls they set graceful whorls of ribbon against the blue, and up and down the nave above the piers they placed medallions apparently opening to the sky, to bind the azure of the ceiling in with that of the two ranges of supporting arches. Thus they decked the abbey discreetly in the Virgin's color, modestly, as should be adorned the lady of the land, while outside the sculptors were providing it with a stone breastplate more ornate even than a Milanese corselet of the time.

(*To be continued.*)

For the Student of Architecture

By David Varon

Author of "Indication in Architectural Design"

BEFORE taking up the study of architecture one should feel the calling, else it is no use starting. For architecture is an art, and while one may guide an art-student's efforts, one can hardly do more than to instil in him the enthusiasm which belongs truly only to those who *feel* the calling of the profession.

Once there is started the sacred fire of love for an ideal and the desire to express it in architectural forms, the student can be helped to find the way toward practical architectural design.

What is commonly termed the appreciation of architecture is mainly associated with the laymen and he should be encouraged in his patronizing of art or architecture by a genuine love for them. It seems to be incumbent upon the architect to help to further the educational work so essential in bringing up the masses to the realization of what a real work of art is, which is a hard enough thing to do when dealing with sculpture and painting, but how much harder with architecture.

The commonest way of reaching the stage of good design is not unlike that of good writing. First comes the vocabulary, then the forming of phrases, paragraphs, and chapters, finally treatises and books. The process is also about the same in the cultivation of the other arts. But while one may learn correct use of English, and clearness in the study of grammar, one will never find in it inspiration. And this is what gives a soul to a creation. A masterpiece of painting is, as well as sculpture, the expression of an idea in terms comprehensible to the public at large. It is to learn the interpretation of great ideas in a natural yet distinguished manner that keeps students for years in search of master works, comparing them to their surroundings and analyzing the qualities which give each work its attraction. It is in this same manner that the architects of the Renaissance studied Roman antiques with a desire not to copy, but to receive inspiration.

Not only is there similarity in the process of studying the various arts, and architecture, but they all tend to express more or less the same feelings or moods in different manners. And he can best say he is thoroughly familiar with one particular mood or expression in architecture, when he appreciates the corresponding one in one of the arts. It is well to remember that in the time of the Renaissance, architects were nearly always painters as well as sculptors.

The above points the way to proficient study. First, we must see types of structures, edifices of the same family treated in about the same manner, then go over edifices of another class. From the mere comparison of these analogies and contrasts will come forth a fertile teaching.

All this can be done in one way: observation, which will be greatly helped by drawing from the work itself with enthusiasm not only for the details, but especially for their distribution on the main lines. The mechanical reproductions of proportions and details may give an idea of camera resemblance, but never the artistic impression that results from just a few strokes of properly selected elements in the right proportions.

Drawing, more drawing, and constant drawing, is the essential to make the qualities of a good analyst first, and, next, a designer. The latter will find interest before a mere enclosure wall with its gate—like those we meet in Italian villas—as much as in the most gorgeous monument, and it will help develop a sense of fitness and of measure, in a word of harmony.

THE STUDY OF NATURE

Nature will teach us more than one lesson of architecture whether it be by the differentiation of species in animals and plants or by showing us in a striking manner the difference between beings and plants created for a definite constructive purpose; some requiring adequate equipment, prohibiting purely ornamental accessory and, on the other hand, species whose unique purpose seems to be the charming of the eye or the ear as flowers and ornamental trees, song and plumage in birds, etc.

Many a modern artist has gone to nature not only to get some ideas, but direct inspiration. Not long since one of them, Binet, made special studies of aquatic creations and applied his observations in a very decorative manner in his architectural ornamentations.

The study of nature is the one thing in which a true lover of art should be indefatigable. He will see in the tiniest and simplest as well as the most complex plant or animal, a programme of nature solved in a clear, definite manner. Our inspiration will be greatly helped through an understanding of the relation between the animal or plant and its function.

Whether we can explain the place occupied by the woodpecker or the warbler in creation, it matters comparatively little once we notice the change in physical appearances correspond to functional differences. The existence of the peacock is a pretty clear demonstration of the need of purely æsthetic beauty in the world. On the other hand, other species show the idea of *service* stretched to its limits. But with a few exceptions, we find in creation almost everywhere a touch of grace. This is the great lesson for us, that no matter how utilitarian our programme be we ought to instil in it a touch of beauty, be it in shape, in line, or in color, according to the case, and take advantage of every possibility to do so. Furthermore, we will find that in many cases what is thought to be a superimposed element, beauty, is merely dictated by necessity, order, safety, protection of the structure itself.

It is such a moral help to find in nature, the ocean of great inspiration constantly working for us, constantly rejuvenating itself. The study of nature and man helped the Greeks to foster their architecture, and to be thoroughly understood it ought to be seen under this light. The natural inference of this is that we ought to draw from life, nature, and architecture simultaneously, so as to understand and appreciate better all of them.

THE VALUE OF FREE-HAND DRAWING

The beginning of real architectural design is not to be found in the work done with dividers and all sorts of instruments, but in free-hand drawing from a well-liked feature. Those efforts are most fertile in results which are exerted before the masterpiece in an attempt to reproduce free-hand the best qualities of the model. Many will be the stumblings, but as many times the student will pick up his courage and at last triumph over all the difficulties.

To the true lover of architecture there is hardly need to urge the amount of time he should devote to drawing for he will be doing that all the time almost unconsciously, practising not only from the model, as a pianist from his notes, but trying himself at memory work. Students who have practised long enough reach the point where they can reproduce pretty faithfully a well-known edifice or architectural composition from memory. We can see no reason why it should be different in our art than in other arts or literature. Macaulay is said to have been able to memorize "Paradise Lost" and many other long poems.

The advantage of this memorizing work is self-evident especially when it has been assimilated, which cannot be without a thorough analysis going to the very core of the compositions, to the very principles embodying their beauty. It is a blessing to be able to carry faithful memorv impressions, and to sift them in the light of art, analyzing in leisure moments the merits or demerits of such and such a composition in the whole or in details. What Macaulay did for literature we ought, each one of us, endeavor to do for our art, first for the pure enjoyment of it, and then for the profit ensuing from it. It is like supplying the brain with inestimable stores of ideas in which you may delve at your leisure, and nothing helps better to do this than drawing after deep scrutiny.

It is obvious that the mere camera eye will not be able to fix alone the feature in the mind. Historical facts will give it much strength and the observations made by the student, the relations which he may establish between each feature and some outer fact, will still more favor the fixing of the impression on the brain.

In this respect the good instructor is the one who can give the student the key to the secret of studying by himself. No matter how valuable the instructor's work is in helping us, it is by our own efforts that we advance, if we do not become too well satisfied with what we have done. The real beginning of our achievement is when we can ourselves see our shortcomings and be ready to profit by intelligent criticism.

Memorizing is not to be encouraged for mere copying purposes. A true artist will never indulge in such practice, but only for reference and inspiration.

It is self-evident too that it is best for the student-architect to do this work in the light of the science of construction. He will thus learn to discern between what is purely architectonic and what is architectural. The former owes its merits to merely well-proportioned structural elements; while the latter sometimes adds additional elements, symbolical or decorative ornaments, either to perpetuate some tradition or to commemorate a new deed. For instance, the architectonic beauty of a vaulted ceiling consists of the emphasis of its structural elements leading to coffers, ribs, etc., confining itself strictly to the main organs of the structure, whereas the architectural beauty will come out of an attempt of the artist to take advantage of the possibility of the structure to extend its effect or to give a structural element a decorative function to fulfil. Such for instance as detached columns supporting a statue or an ornament. To what extent and in what way this can be done successfully without violating the very fundamental principles of architecture, a comparative work between various masterpieces may determine. The works of many thinkers and critics cannot be ignored, especially since their endeavors tend to retrieve the art of architectural design which now and then falls so low that the public begin to doubt whether architecture is an art at all. Most interesting of all it is to find out how merely structural forms assume a sculptural character. Such is the impressive Greek Doric cap, the ribs in the so-called Gothic architecture, romanesque caps, etc., in fact most structural elements of the Gothic architecture are vested with architectonic beauty. Prominent among them all are the Greek coffers in their temples and the Roman in their Pantheon. The late Professor Guadet used to expatiate on the Greek Doric order as being the very expression of perfection in architectony, "because," he would say, "in this order every part, every element, is so because it could not be otherwise, from the shape of the echinus, crowning the entablature, which obeyed the law of necessity, it serving as gutter, to the mutules which were an interpretation of the wooden elements in the wooden shrines, showing a beautiful alloy of common sense and the respect of tradition so essential at the time when the Parthenon was erected."

In undertaking the task of analyzing and memorizing famous structures, wisdom seems to indicate the simple features first. As in music, after the first exercises simple melodies are played and gradually with the increased skill in exercises more intricate compositions are tried, so too in architectural design programmes may be very small yet differ so much in their character. To interpret them in drawing and rendering according to their meaning in the proper atmosphere is to comprehend thoroughly the grand art of architecture. Even in these small programmes there have to be taken into consideration such items as scale, proportions, silhouette, units, etc., which will be used likewise in more elaborate examples becoming more complex.

We Must Protect Our Forests

GREATER conservation of wood and wood products through protection for the raw material in the forests of the United States is urged by Secretary Houston's assistants in the Department of Agriculture. The secretary's annual report also advocates provisions for pushing more rapidly the improvement work in the forests, for a greater number of forest guards, and for earlier organization each fire season of the protective system.

It is declared that protection of the forests during the present year proved an exceptionally difficult task. An annual strain was imposed on an organization somewhat depleted in numbers and much weakened by the loss of many of its most experienced men. Added to this was the difficulty of securing good men for temporary appointment as guards during the fire season, and parties of men for fighting large fires. An unusually early and severe dry season caused the outbreak of serious fires before the summer protective organization was fully ready.

The department declares that some embarrassment in meeting the situation was caused by the failure of the annual appropriation act to pass Congress until after the fire season was virtually over. Relief was furnished by the President, who placed $1,000,000 at the secretary's disposal as a loan from the President's emergency fund. It may be necessary, the secretary says, to seek from Congress again a deficiency appropriation of $750,000.

An Economical House

Samuel A. Hertz, R.A., Architect

THE purpose is to build an economical house of refined proportions in the colonial style. The dimensions of the building are 31′ 0″ front by 27′ 0″ in depth, and the sun parlor 10′ 0″ by 24′ 0″ in depth.

In planning the house the idea uppermost in the mind of the architect has been a structure of minimum dimensions, that would enable the builder to keep the cost of construction at the lowest possible figure and yet offer the prospective client a plan containing every convenience which the modern housewife might desire to save time and avoid waste of energy.

The plan of the building is in the form of a square. In this plan a difficult problem arose in the preparation of a suitable façade, but it is believed to have been solved with attractive results.

The entire roof is covered with a good grade wood shingle, which should be stained in green; and the shutters, sash, window and door trim, together with the hanging shutters at each projection and the bay window on the second story, are of the same color. The body of the building should be painted white. The main entrance door will be of a mahogany finish. The upper section of this door is provided with leaded-glass sash to give light to the entrance vestibule. The main entrance is provided with an open porch, the pediment above gracefully supported by two colonial columns flanked by a seat on each side resting on a floor laid in tapestry brick and approached by brick steps. The house has been kept 3′ 0″ above grade; an unusually high level, yet most desirable. It saves 2′ 0″ of unnecessary excavation, permitting construction of the basement floor 4′ 0″ below grade, and allowing for the installation of good-sized windows for plenty of light and ventilation. The basement contains a laundry, storage-room, toilet, space for coal storage, and heating plant. The foundation walls are built of concrete 12″ thick, properly water-proofed, together with a concrete floor and 1½″ cement finish.

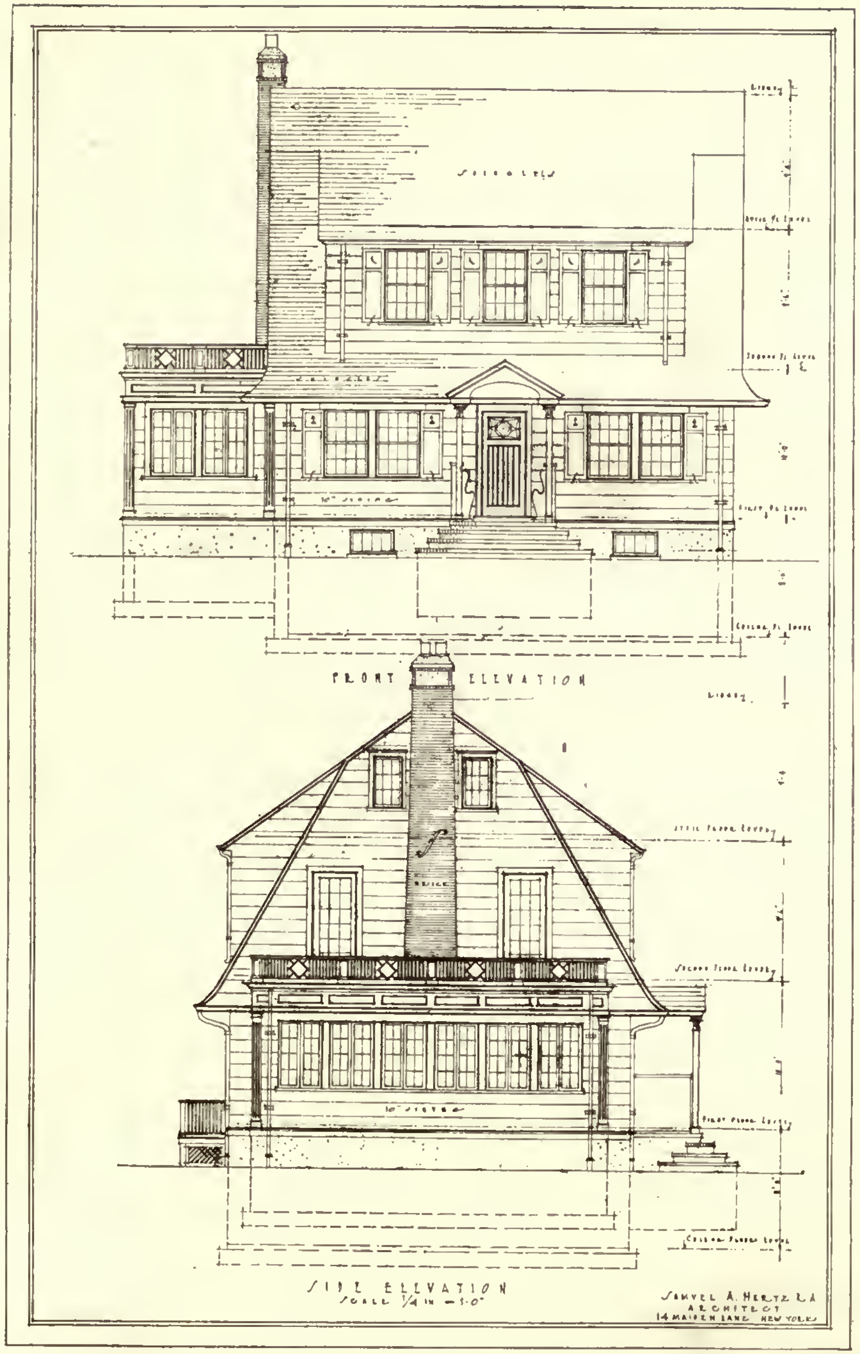
The laundry tubs are placed upon a wood-slat platform as close as possible to the staircase, so that the laundress will be saved unnecessary walking. The same holds true for the location of the storage-room, while the coal storage space is in the rear of the house, accessible from the exterior by a window opening in which will be placed an approved iron coal hopper. While the basement can be reached from the staircase at the service entrance situated in the rear of the building within 3′ 0″ of the rear door, the owner, if he so chooses, can readily install a staircase in a rear area in which area can also be placed an economical ash-hoist lift.

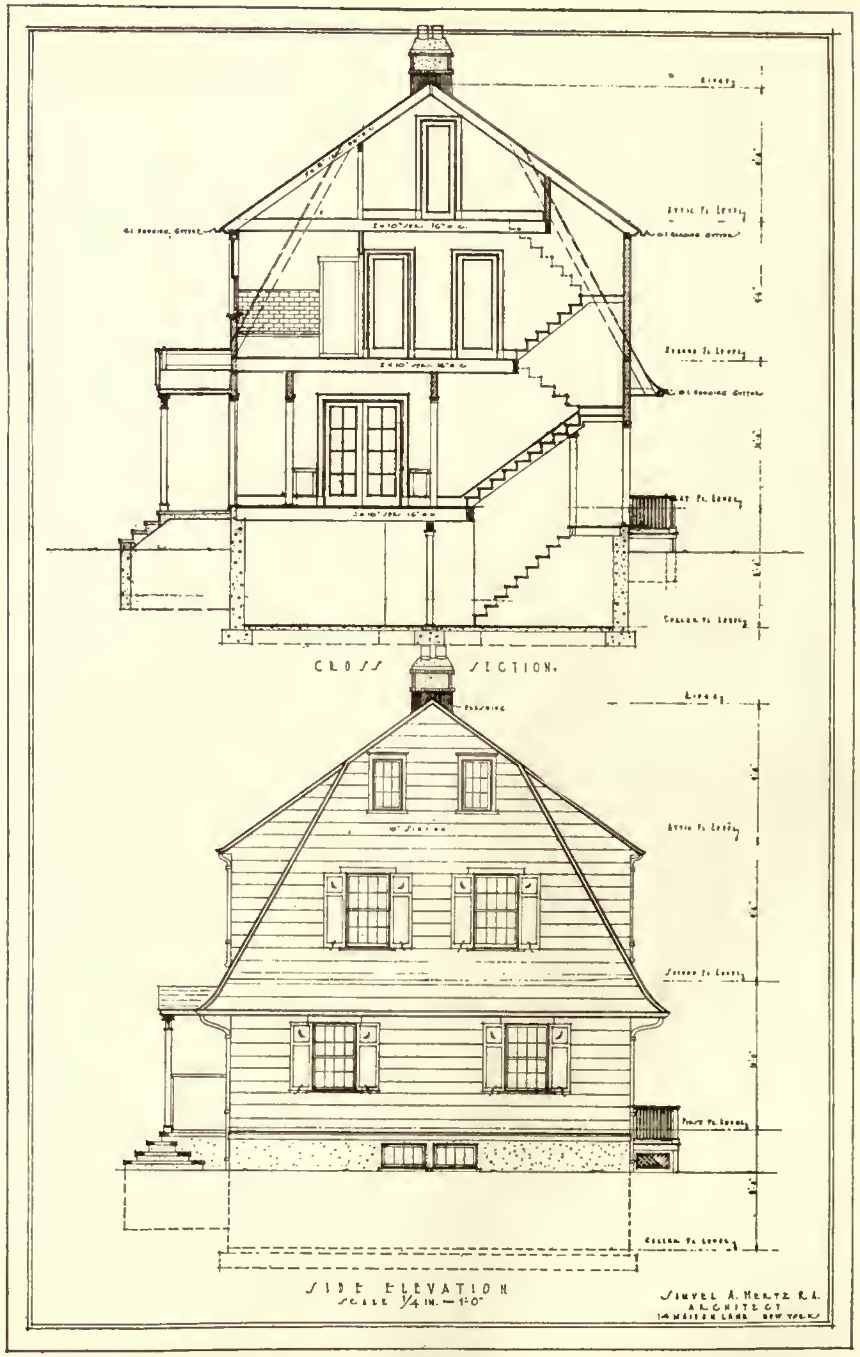
In designing the first floor the idea has been to submit a practical as well as a symmetrical layout. The sun parlor is of good size and proportions, and can be entered from the living-room by two French casement doors, making it possible to shut off this from the remainder of the house, thereby affording ample space and quietude for various social functions. The sun parlor is enclosed with glass sash on all sides which can be removed during the warm weather and can be used as sleeping porch. The living-room occupies the entire depth of one side of the house and is provided with a handsome fireplace built of red tapestry brick set in a neat pattern with a wood mantel over it. The living-room is finished in chestnut, and if the owner chooses he can also install a beam ceiling, in the same finish, at a small additional expense. The floor is of oak parquet with a border. It will be noticed that a vestibule has been provided. This tends to keep the house warm in the winter. The vestibule is made attractive by the installation of a Welsh quarry tile floor with a neat insert and walls of imitation Caen stone.

The plan contains a good-sized dining-room and kitchen with service entrance and place for the installation of a refrigerator, readily accessible from the kitchen as well as from the service entrance. The kitchen contains all facilities needed in a modern household including a good-sized gas-range set on a tile hearth and protected on the back by filling the wall with brick between the studs, three feet high and one foot wider than the range. This arrangement helps considerably to minimize the fire hazard. Large dressers are provided together with a broom closet. An enamelled iron sink is shown set beside the window with a large drain board on each side. This sink is provided with hot and cold water faucets. There is ample space left in the kitchen for one or two tables.

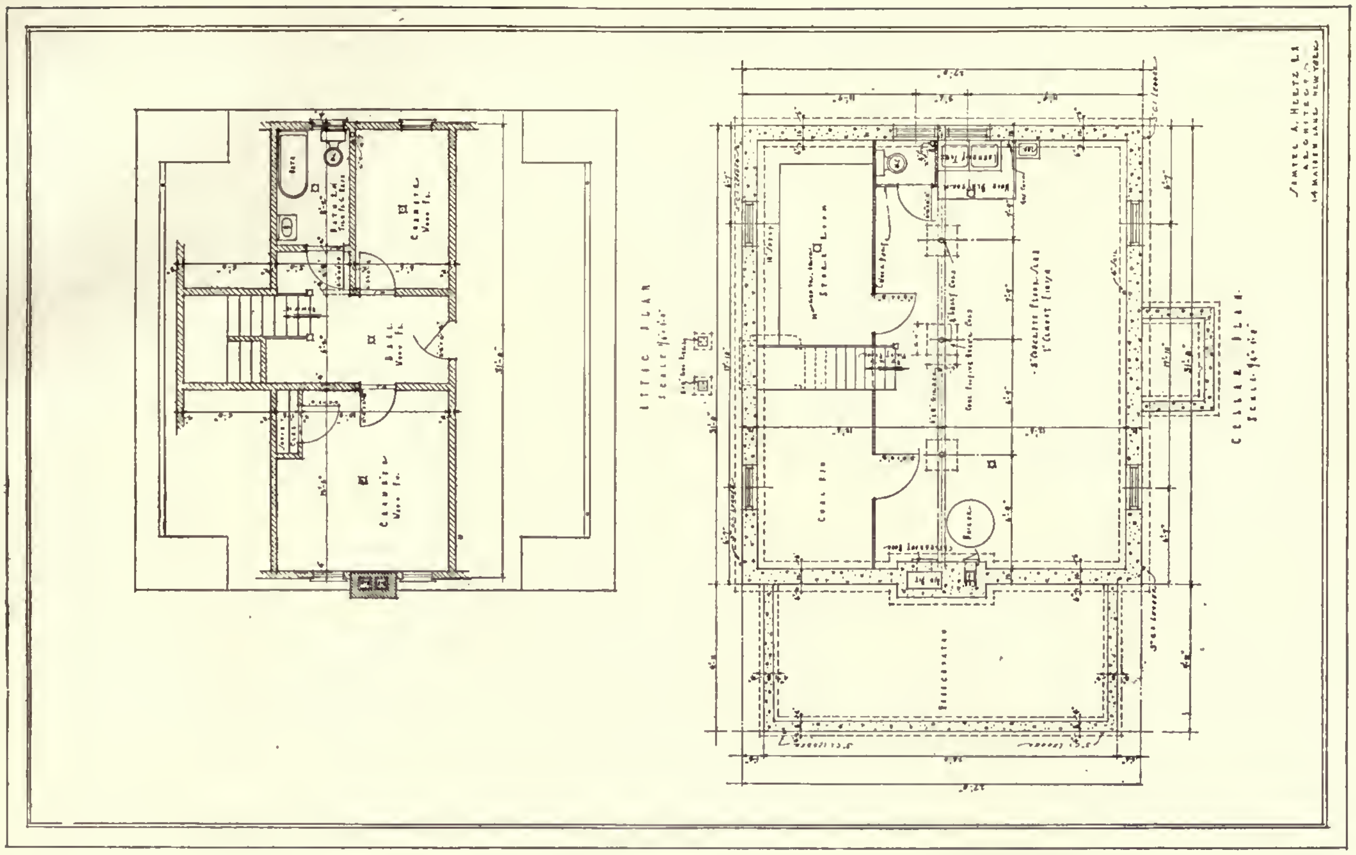
The entrance door from the kitchen to the dining-room is a double-action door. The dining-room is well proportioned, has two large windows and is finished with a parquet floor similar to that in the living-room and hall. The walls are panelled with a Dutch shelf together with a beam ceiling. The woodwork is of chestnut and finished like the living-room. It is entered from the hall through French casement doors. A main staircase has been provided with treads and risers. The newel post is of brick, with a mahogany finish, while the stair railing is finished in white enamel. The second floor contains four large chambers with good-sized built-in closets. The two main chambers are connected by a private passage. The balcony over the sun parlor is provided with a canvas roof, and is accessible from the two main chambers by casement doors, allowing the balcony to be used as an additional feature of the house. The chambers and the hall are finished in white enamel, applied to white wood trim. The doors are birch and finished in mahogany. Each closet door has a mirror insert, full length of panel. The floors throughout are of parquet. The hall contains a good-sized linen closet. The bathroom has a built-in tub and shower-bath. All plumbing fixtures are of modern type with hot and cold water connections. The bathroom contains a tile wainscot 4′ 6″ high with a tile floor and base. As already stated, the attic floor contains two finished chambers and a bath which may be used for guests or servants. Suitable storage space is also provided for in the attic in another separate room facing the hall. Below is an itemized list made in accordance with present-date prices, from which it will be seen that the house can be erected for a sum not to exceed $12,000.00.

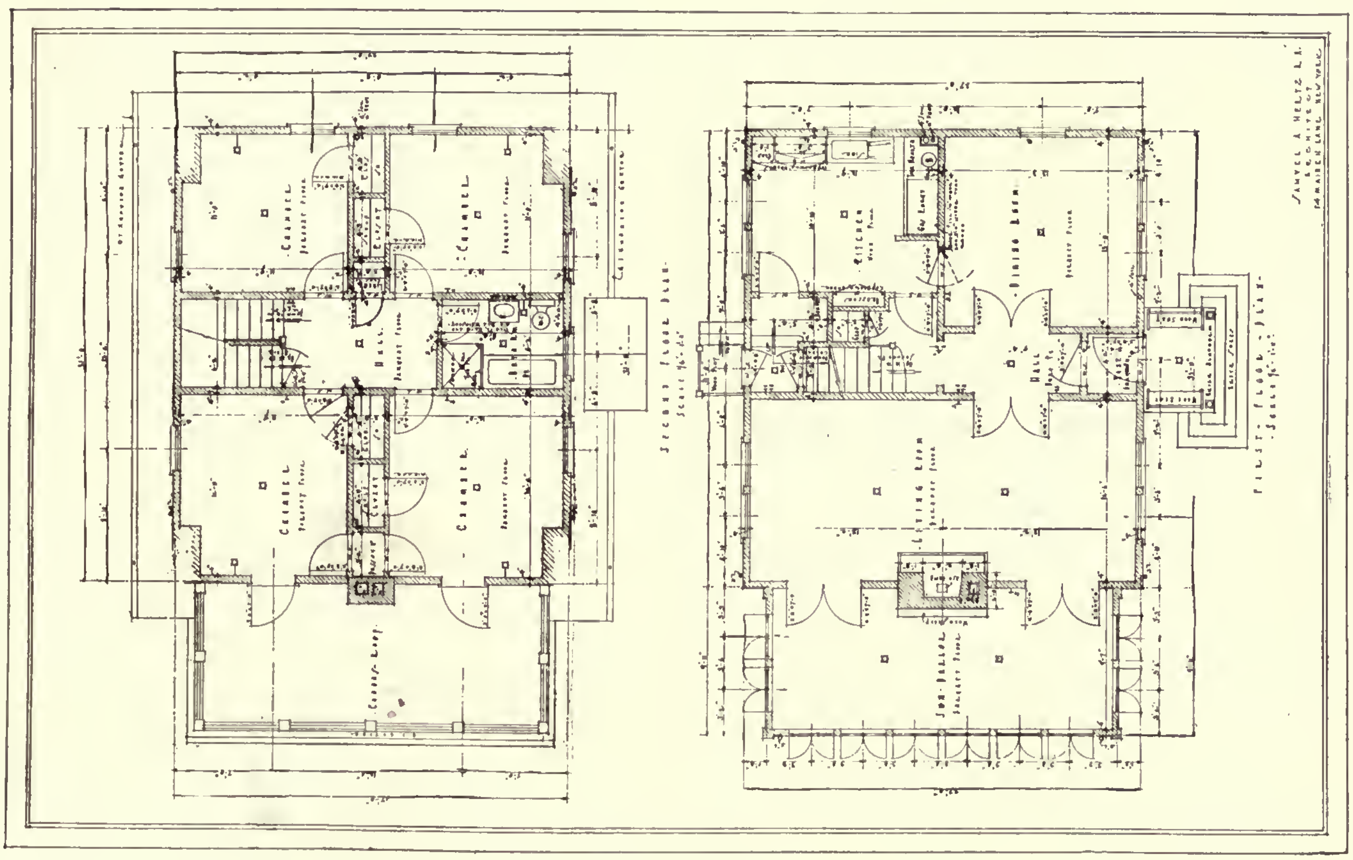
Masonry work	$ 2,600.00
Carpentry work	6,400.00
Electric wiring	450.00
Plumbing	800.00
Steam-heating	750.00
Scraping and varnishing	200.00
Painting	600.00
Tin work	200.00
	$12,000.00

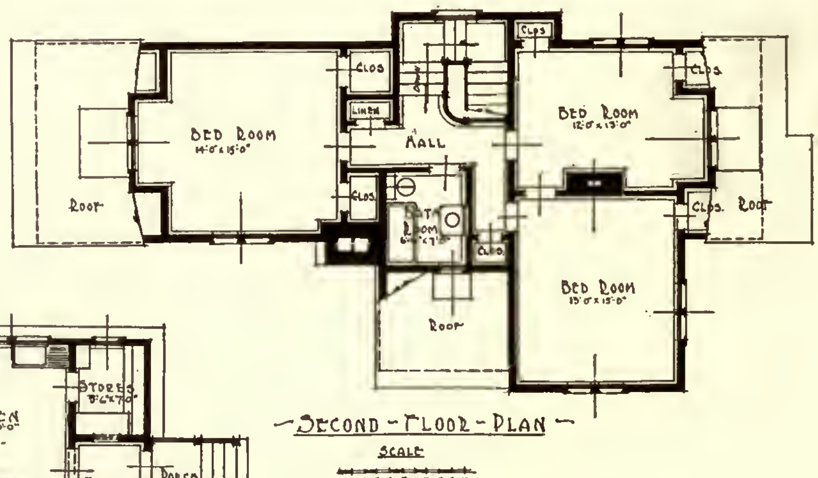


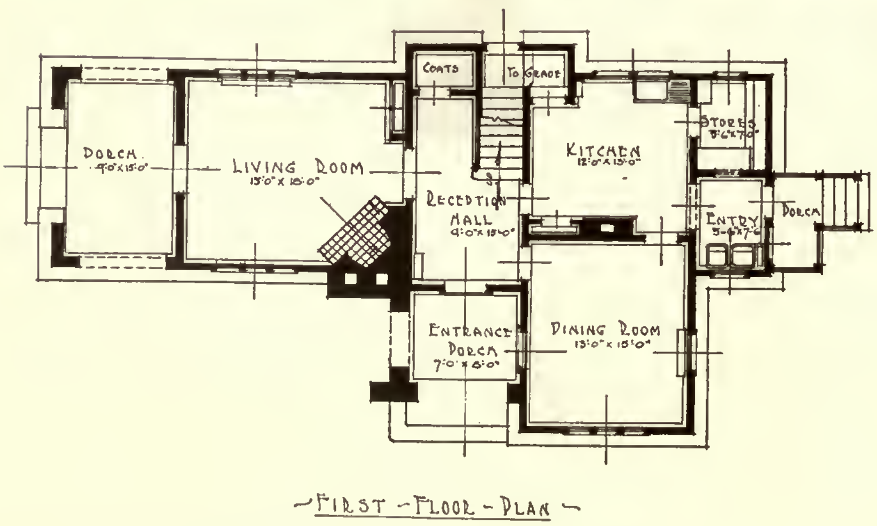


The building is executed in frame construction, widely used and most economical in cost. It is diagonally sheathed with 3/8" tongued and grooved sheathing which help materially to strengthen the exterior walls. Over these is placed a double layer of building paper upon which is laid wood siding 10" to the weather. This siding is very attractive. The architect has designed the building with a gambrel roof, bringing the lines of the roof with a graceful overhang above the first-story windows and around three sides of the house, thereby relieving the usual monotony of a house built on a square plan. The gambrel roof permits the installation of an attic story, with two chambers and a bathroom to be used either for guests or servants. They give the impression that the building is actually three stories high.









COTTAGE AT MOUNT KISCO, N. Y. Morrell Smith, Architect.

In construction the house is of frame with exterior walls of light-gray stucco with a rough-cast surface. The foundation-walls, chimneys, porch columns, etc., are constructed of field stone taken from the adjacent fences on the property. The roof is shingled with 24-inch cedar shingles, which are laid in wide courses at the eaves and gradually diminishing in the spacing to the weather as the ridge is approached. All exterior wood trim will be stained a rich brown color and the roof-shingles a moss green. The interior treatment is very simple. All interior woodwork will be painted white and the floors, which are of comb grain N. C. pine, will be stained and waxed. The house will be heated with a steam-heating plant and will be equipped with electric-lighting fixtures, screens, etc. The house will cost approximately $11,000.

Editorial and Other Comment

Luxuries vs. Homes

RECENT editorials in two great metropolitan newspapers, one in the East, the other in the West, dealing with the subject of the shortage of material in the building trades, dwelt at considerable length upon the diversion of enormous quantities of metal and glass for use in industries that come under the head of luxuries. The demand has been so great as to affect very seriously the supplies available for use in building. Emphasis is laid also on the thousands of laborers engaged in the trades associated with building who have transferred their services to industries that are more or less given to the production of what may be considered luxuries.

Our own building problem has been also the subject of serious inquiry in Europe, and it is becoming more and more a dangerously critical problem. There seems to be abundant capital for the building of great factories, all kinds of industrial buildings, great office-buildings, and the transformation of thousands of old-fashioned houses into places for business use. In the meantime there is growing every day an increasing shortage of places where people may live in all of our cities. A place to live within easy access of their places of employment is becoming practically impossible for thousands, and the adjoining suburbs within commuting distance of the city are already overcrowded. It does seem as though some immediate united and heroic effort should be made to use every possible resource toward the question of housing development. The present too often unscrupulous and unreasonable boost of rentals, not only in the matter of living places but in offices, it would seem must reach a limit before long.

From London we hear "that a crisis in the building trades has been reached, and that the London County Council has been obliged to stop all building except residences, under the powers granted by the Health Ministry, to overcome the housing shortage. Dry-goods stores, office-buildings, and other construction have to wait because the demands of housing are so great."

There are already signs made known in recent despatches, from the West especially, that the era of reckless spending for luxuries is nearing an end, and the sooner it does the better, and perhaps some of the money that has been used in this way with nothing to show for it can be diverted in the way of investments in new housing construction. There are hundreds of architects who have in mind thoroughly practical ideas for extensive housing schemes that need only the encouragement of capital to be developed successfully. Certainly it is high time to make a searching investigation of the conversion of building essentials into the manufacturing of things that are not vitally necessary in the ordering of the average life.

The Chicago *Tribune* says: "When mahogany is used for talking-machines, it is not so bad, because we can build without mahogany if necessary, but when metal that could be converted into necessary gutters, flashings, plumbing, and fire-resisting lath, or rubber and asphalt that could be converted into roofing, are used in the manufacture of luxuries to such an extent that the national living conditions are at stake, the matter becomes of public concern, and the construction industry must be welded into one compact organization to deal with the situation."

Give the Architect His Due

WE are in receipt of an interesting letter from a well-known architect, calling our attention to some misinformation contained in a more or less popular handbook dealing with the history and development of the city of New York. The quotations would be amusing if they were not so exasperatingly lacking in any sense of knowledge, accuracy, or respect for the truth. The proper attribution of the name of an architect of a great monumental building should be as important and as carefully authenticated as the name of the painter of a famous picture. The genius and skill of the architect of distinction is usually writ large in his work to the knowing observer, but to the average man in the street his creation is probably merely known as the office of such and such a trust company, such and such a court-house, or perhaps the residence of a multimillionaire, or mayhap a library or a museum. No one with even a mild interest in pictures or sculpture but finds added interest in being able to associate a particular work with the name of the artist. Visitors to our galleries take pride in their ability to talk of this and that painter and to be able to identify the work by the same artists when exhibited elsewhere. The same interest should apply to the work of the architect.

"The fact that architecture is first an art and secondly a science, and should be taught primarily as an art," is one of the chief considerations as announced in the prospectus of the new school of architecture at one of our greatest universities. If the position of the architect and his work are not more widely appreciated, it is because so few of their names are associated in the public mind with their representative work. The average layman probably thinks of a building first in questions of commercial terms—does it pay? Is it a good business proposition? Is it up to date in all its modern conveniences? Many of our great financial institutions have realized the advertising value not only of buildings that are notable for their mere size, but as well for their dignified exteriors and luxurious and beautiful interiors, that make them notable and distinguished from the great mass of buildings that surround them.

The question has often been discussed as to whether the architect should sign his work, and in a number of instances the architect's name appears in a more or less prominent place in or on the building he has created. From the letter which has prompted this, with thanks to the architect, we quote the following illuminating paragraphs:

"At No. 52 Broadway, below Wall Street, stood until recently a building of more than ordinary interest—the first Successful Skyscraper erected in New York (1884). It was only eight stories high, but will tower historically higher than any building that will ever stand on the Island; it demonstrated the feasibility of skeleton steel construction and caused Manhattan to develop up into the air instead of along the ground. Bradford Lee Gilbert, the architect whose genius gave to New York and the World this remarkable type of building, in telling the story to friends, said that the idea of an iron building had come to him in a dream."

Of the Municipal Building, "it is striking architecturally, and its massive sculpture is very impressive."

"Critics go in raptures over Doctor Parkhurst's Church and point out its many artistic qualities. All this may be art, but for a sacred edifice it is the most frivolous-looking structure ever conceived by the mind of man. For a Movie house it would be fine. The site has recently been purchased by the Metropolitan, and this Burlesque on religion will be removed, for which much thanks."

"With a sigh one recalls the sudden death by accident of the great architect whose brain planned this classic edifice (The New York Public Library) just a week before its formal opening. The doors of the still unopened building swing back to permit the body of John M. Carrerre to rest for a moment in the rotunda of what was to be the crowning achievement of his career. It was a graceful and beautiful tribute."

"At 96th Street is the Cliff Apartment House. Above the second elevation is a frieze in low relief, carrying out symbolically the mountain lions, rattlesnakes, buffaloes' skulls and other local environments of a genuine cliff dwelling in Arizona. It is a clever idea and never fails to attract attention."

We hope this will not seem trivial to our readers, but if stuff of this sort goes into one popular guide that, no doubt, accompanies many visitors that travel about in our sightseeing busses, other similar misinformation is, no doubt, available.

Council of Architectural Registration Boards

DURING the recent Institute convention at Washington it was decided to form a permanent organization to be known as the Council of Architectural Registration Boards, with Professor Emil Lorch, of the Michigan State Board, as president, and Emory Stanford Hall, president of the Illinois State Board, as secretary. The primary purpose of the organization is to bring together the experience of those actually engaged in the work of registration, to make a comparative study of all existing laws, and to work out a plan to facilitate reciprocity between States having such laws. Mr. W. P. Bannister, of the New York State Board, Mr. W. H. Lord, of North Carolina, and Mr. M. I. Kast, of Pennsylvania, together with Mr. Richard E. Schmidt, chairman of the Institute committee on registration laws, are to make a digest of the various laws.

All those interested in this work should write Mr. Hall, Secretary, 64 East Van Buren Street, Chicago, Illinois.

To Assist in Home Building

THE "instalment mortgage" is one of the features growing out of the shortage of homes. Its inauguration is due to the efforts of some of the large industrial concerns in Chicago and other cities to promote the interests of their employees. The shortage of homes adds not only to the financial burdens of many classes of people, but has a general disturbing effect that fosters unrest and a decrease in production.

In one of the plans involved the employees are to make an initial payment of 10 per cent of the cost of the home, and then pledge themselves to pay the balance in monthly instalments covering a period of ten years, the total cost being just what the cost has been to the corporation. It is believed that such plans can not fail to have a helpful effect on general industrial conditions, for nothing has a more stabilizing influence on those who perform the country's work than adequate and comfortable homes.

During the first four months of the present year more than one-half of the total valuation of new construction work has been for industrial and business buildings. While there is great need for these, there is a vital necessity that a larger percentage of the nation's building activities should be directed to the construction of homes. Only about 20 per cent of the total construction of the country so far in 1920 has been given to home building, which is at least 10 per cent below normal.

Book Reviews

"WESTMINSTER CATHEDRAL AND ITS ARCHITECT." By WINEFRIED DE L'HÔPITAL. With an Introduction by PROFESSOR W. R. LETHABY, F.R.I.B.A. Two volumes with 160 illustrations, including some in color. Dodd, Mead & Company, New York.

It would be difficult to find two great churches more widely contrasted or more typical from a stylistic point of view than Westminster Abbey and Westminster Cathedral—one a splendid example of English Gothic, the other a modernized version of the Byzantine.

This great Roman Catholic cathedral in London is built on the site of the old Middlesex County Prison of Tothill Fields, a part of the land of the Abbey of Westminster.

Begun under Cardinal Manning and carried on by Cardinal Vaughan, the cathedral has been a source of pride and labor of love to all concerned. Westminster Cathedral, as first conceived by the architect—John Francis Bentley—was to carry on the traditions of the Gothic, but after an extended journey in Italy, where he made an enthusiastic study of the churches of Byzantine type, he returned full of a new purpose and new ideals that expressed themselves in Byzantine terms.

This record of the prime achievement of a life, written by the architect's daughter, Winefried de L'Hôpital, is first of all a fine human document. In its narrative is revealed the architect's beginnings, his intense love for art as a boy, his interest in the work of the local joiners and carvers. His education was that of so many men who have distinguished themselves in the arts, the education founded on natural inclinations, and in doing things he loved. For a time he was a pupil of Henry Clutton.

In volume I is told fully the story of the building of the cathedral from the ceremonies attending the laying of the foundation-stone. Each development of the work is dwelt upon in considerable detail, and includes full descriptions of the architectural problems involved and the various materials used. The illustrations show plans and cross-sections, as well as many plates from photographs of details of both exterior and interior.

No matter what may be the first impression of the exterior of the cathedral, and it may at first strike the casual observer, especially in its contrast with Westminster Abbey, as an unusual conception of the modern Christian church, there is no denying that it grows more impressive with further study, and that the richness of color of the interior is strikingly beautiful and impressive. The love of color and the design of the East are manifest on all sides.

Bentley lived only to see the shell of his dream realized, but he knew that his work was to go on and live after him. From 1860 to 1870 he had become well known as an architect associated with ecclesiastical commissions as well as domestic architecture, and he was widely known as a skilful designer of stained glass, metal work, and ecclesiastical furniture.

It is of especial interest to American readers to know that he visited the United States in 1898 at the request of the Bishop of Brooklyn, to give advice with regard to a proposed cathedral in that borough, and that he made drawings for a fine Gothic church 350 feet in length, with two western towers.

Bentley, never robust in health, died at the age of 63. In the great church associated with his name he put himself, his very body and soul.

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Arthur Loomis Harmon, Architect.

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DETAIL IN DIRECTORS' ROOM.

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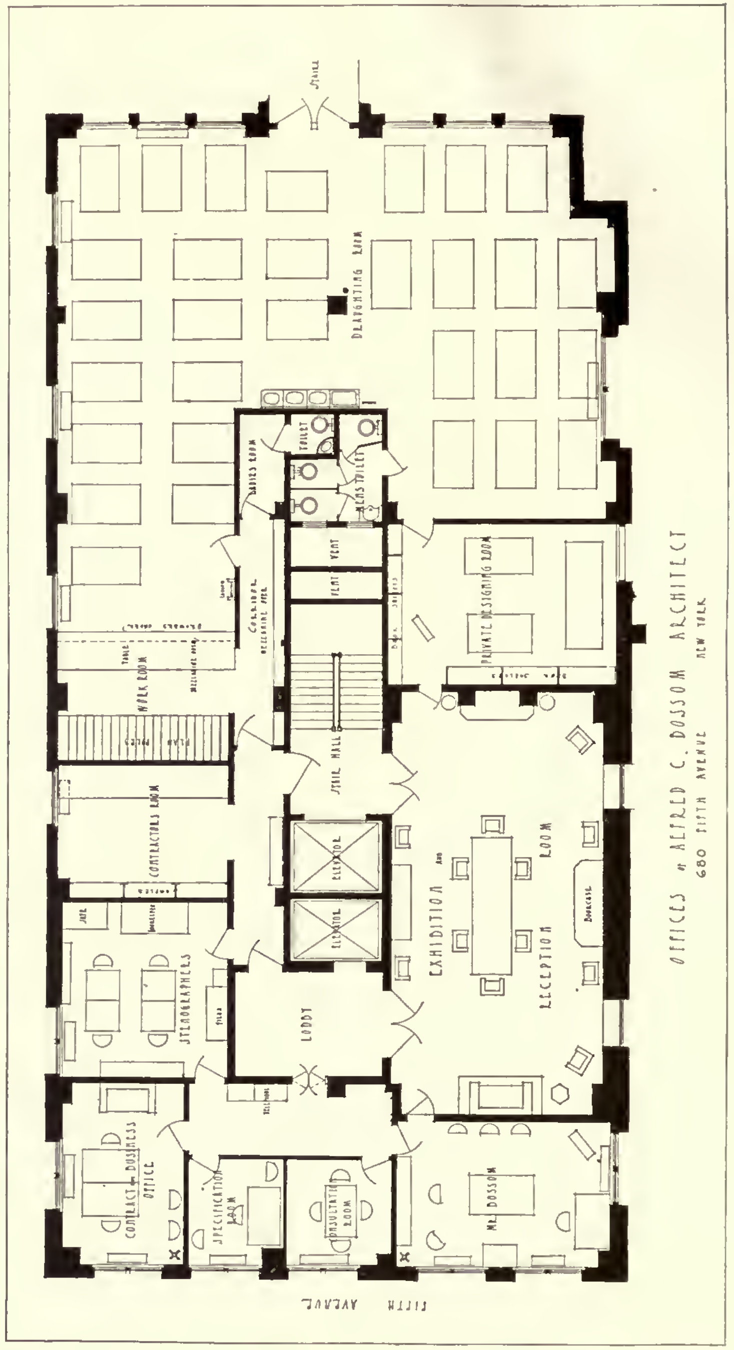

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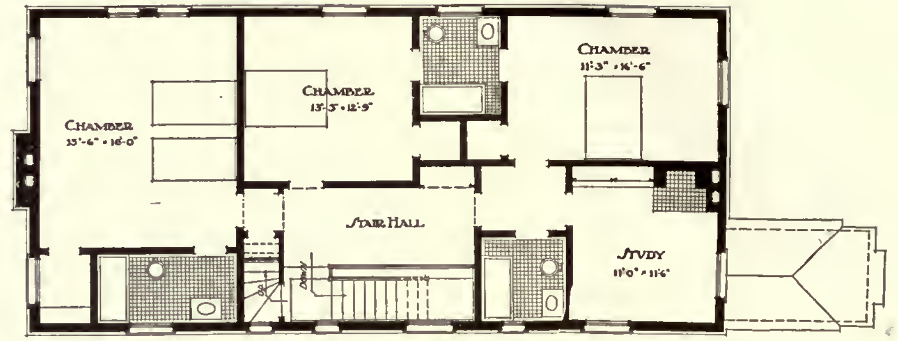
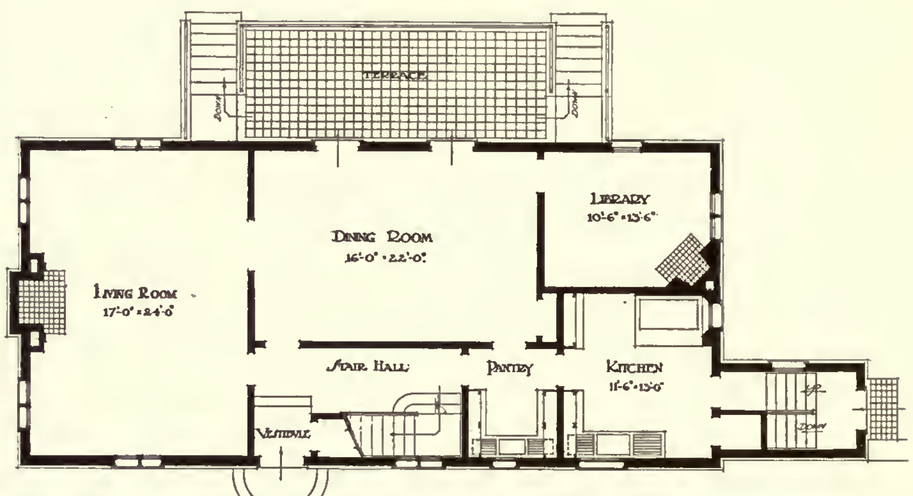


Second Floor Plan



First Floor Plan

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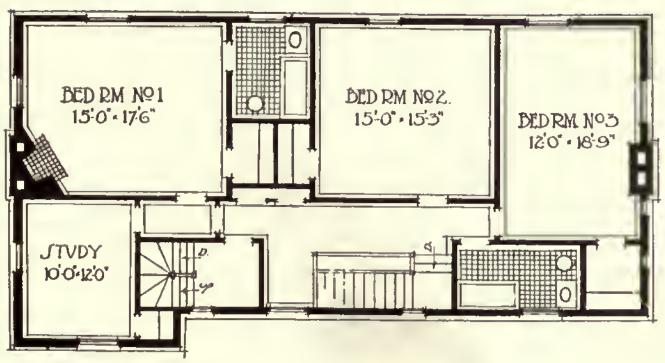

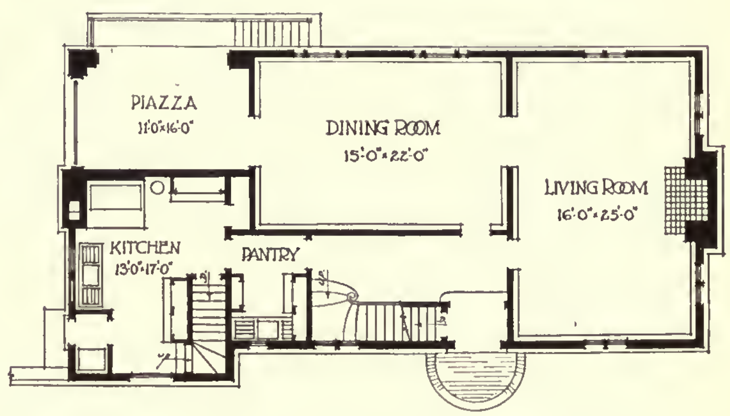

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Eugene J. Lang, Architect.

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WINDOW DETAIL.

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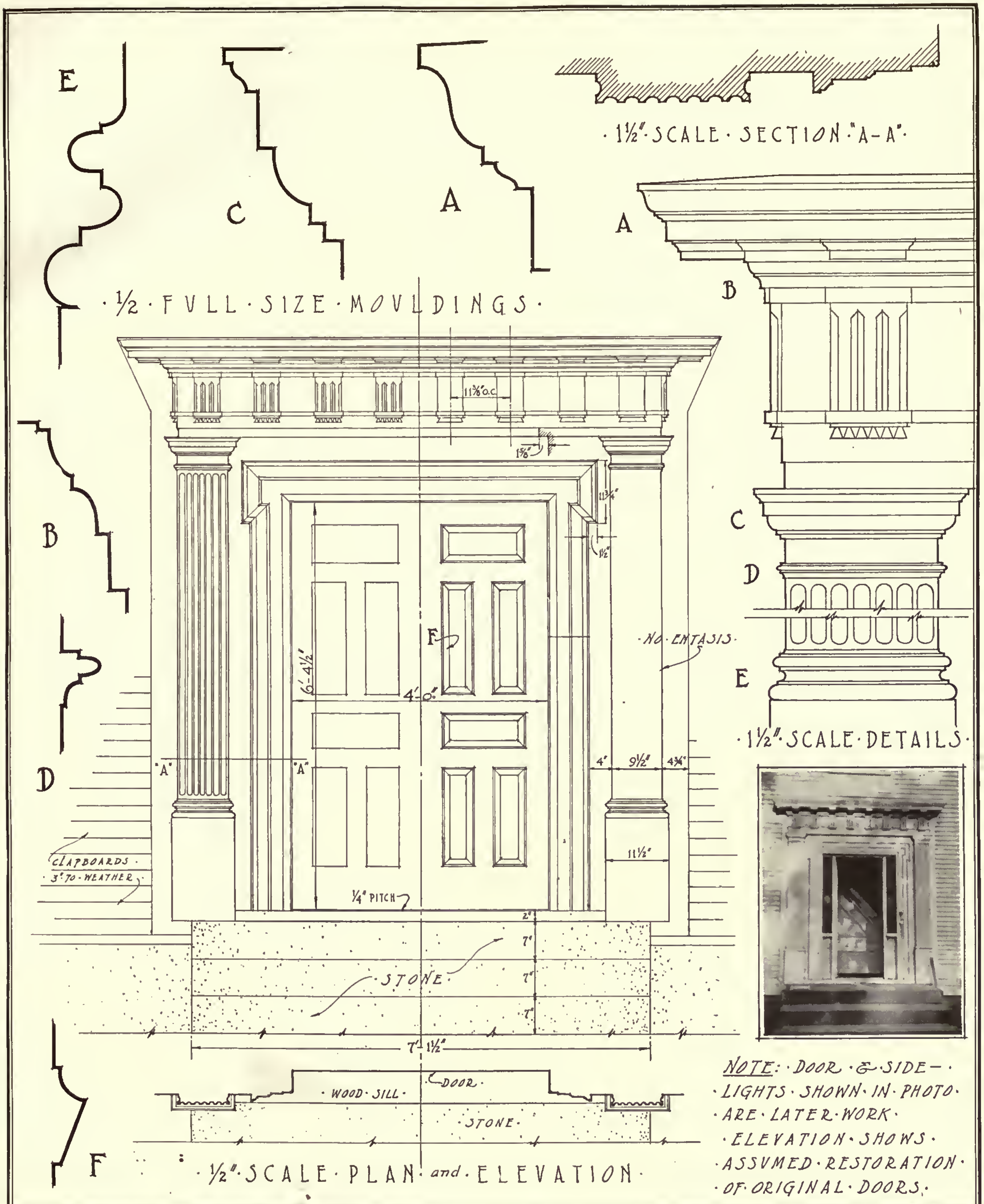


· EARLY · ~ · ARCHITECTURE · · OF · ~ · CONNECTICUT ·	· DOORWAY · OF · THE · · WELLES – SHIPMAN · HOUSE · · SOUTH · GLASTONBURY · CONN ·	MEASURED · BY · ~ J · FREDERICK · KELLY · DRAWN · BY · ~ · LORENZO · HAMILTON ·

The Fiftieth Anniversary of the Metropolitan Museum of Art

The great entrance-hall on Fifth Avenue has been especially decorated for the celebration from designs executed under the direction of McKim, Mead & White, to whom the Museum acknowledges their indebtedness for their generous contribution. The emblems in the medallions surrounding the hall are those of countries or cities represented in the collections of the Museum. The four heads on the sculptural piers—Painting, Sculpture, Architecture, and Decorative Arts—are the work of Ezra Winter, late of the American Academy in Rome.

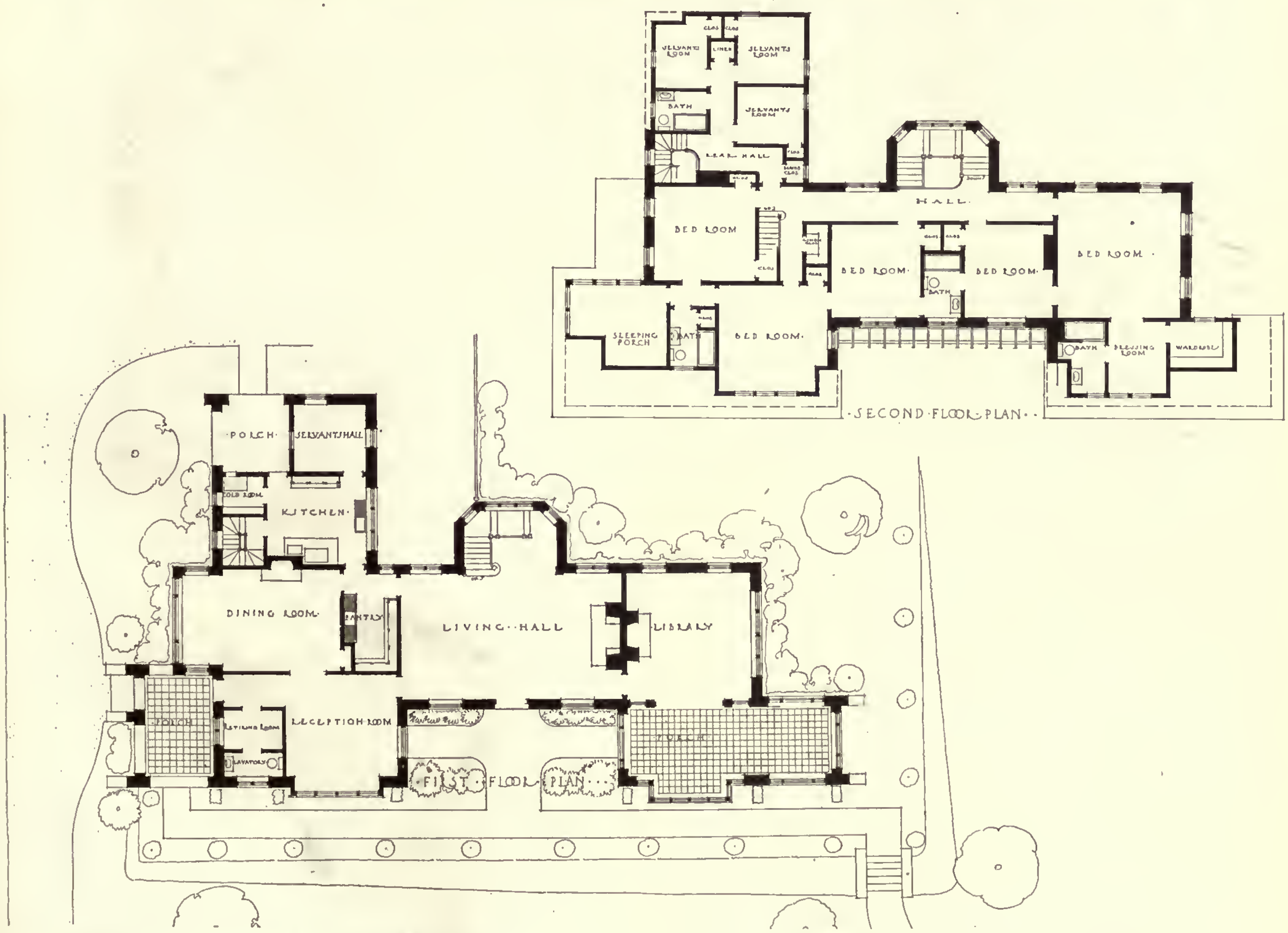
THE celebration of the fiftieth anniversary of the Metropolitan Museum of Art is not only of great interest to New York City and its environing neighbors but as well to the country at large, for the Museum is much more than a local institution. It is national both in its purposes and in its dissemination of useful art knowledge throughout the country. For this celebration of the fiftieth anniversary the Museum has gathered from many sources, including some of the famous private collections, rare pictures and other objects of art that are but little known to the general public.

Among the famous paintings loaned are: "Bacchanal," by Giovanni Bellini, lent by Carl W. Hamilton; "The Smoking Party," by Adrian Brouwer, lent by Michael Friedsam; "Lady Guildford," by Hans Holbein, lent by William K. Vanderbilt; "Portrait of a Musician," by Hans Holbein, and "Portrait of a Man," by Titian, lent by Henry Goldman; "Cardinal Pietro Bembo," by Titian, lent by Charles M. Schwab; "Two Wings of an Altarpiece," by Hans Memling; "Three Saints," by Martin Schöngauer, and "Christ Appearing to His Mother," by Roger van der Weyden, lent by Michael Dreicer; triptych, "Christ and Saints," by Cimabue, lent by Carl W. Hamilton; "Judith with the Head of Holofernes," by Andrea Mantegna, lent by Carl W. Hamilton; "Madonna and Child," by Giovanni Bellini, lent by John N. Willys; "Giuliano de' Medici," by Botticelli, lent by Mr. and Mrs. Otto H. Kahn; "Victor Guye," by Francisco José Goya, lent by J. Horace Harding; "Portrait of a Girl," by Velasquez, lent by John N. Willys; "Portrait of a Man Seated," by Franz Hals, lent by Henry Goldman; four paintings by Rembrandt: "Philemon and Baucis," lent by Mr. and Mrs. Otto H. Kahn; "The Savant," "Saskia," and "Hendrickie Stoffels," lent by Mrs. Henry E. Huntington; "Portrait of Mme. Cézanne," by Paul Cézanne, lent by John Quinn; "Reverie" and "Fisherman," by J. B. C. Corot, lent by George F. Baker; "The Drinkers," by Honoré Daumier, lent by Adolph Lewisohn; "Before the Race," by Edgar Degas, lent by Miss Lizzie P. Bliss; "Ia Orana Maria" and "Women by the River," by Paul Gauguin, lent by Adolph Lewisohn; "Still Life," by Edouard Manet, lent by Mrs. Eugene Meyer, Jr.; "Apple-trees in Blossom," by Camille Pissarro, lent by William Church Osborn; "In the Meadow" and "A Landscape," by Pierre Auguste Renoir, lent by Adolph Lewisohn; "Morning Effect—The Fisherman," by Théodore Rousseau, lent by George F. Baker; "Portrait of the Artist," by Vincent van Gogh, lent by John Quinn.

RESIDENCE, JONATHAN JENKS, MERION, PA.

Frank Seeburger and Charles P. Rabenold, Associated Architects.

REAR.



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Notes for Architects on Engineering Moments

Second Article

By DeWitt Clinton Pond, M.A.

IN the last article the general definition of moments was given and the method of determining a moment in the case of a simple cantilever was shown. There was also shown how moments were used to find the maximum tendency toward bending in a simple beam with a concentrated load located directly on its centre, and how the loads at the ends of beams could be determined by the use of the same units.

All these cases were comparatively simple and would only serve as an introduction to the more complicated engineering problems found in the designing of beams, girders, columns, and footings. It will be necessary to expand these conditions in order to furnish the reader with a more comprehensive foundation for engineering calculations.

In Figure VII, article I, the method of using moments in order to obtain the loads at the ends of beams was shown graphically. The same kind of problem but with more complicated loading is shown in the diagram in Figure VIII. Here the span of the beam is represented as being 24 feet and 6 inches long and the loads as 125, 260, 85, and 42 pounds respectively located 3 feet, 5 feet, 13 feet, and 18 feet from the left-hand support—R_1. The first step in designing a beam that will withstand such loading is the determination of the loads at the reactions, at R_1 and R_2.

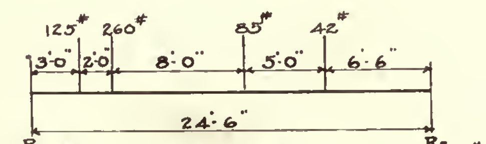


FIGURE VIII

As has been pointed out in the last article, the method by which the load at one end is found is to take moments around *the other end*. Usually the right reaction—R_2—is the one first determined, and in this case the centre of moments must be considered as being at the left support or at R_1. The moments caused by the four loads on the beam will be found as shown below.

	$125 \times 3 =$	375	foot-pounds
	$260 \times 5 =$	1,300	"
	$85 \times 13 =$	1,105	"
	$42 \times 18 =$	756	"
Totals	512	3,536	"

The total moment around R_1 is 3,536 foot-pounds, and this must be counteracted by the moment caused by R_2. The lever-arm from the left reaction to the right reaction is 24 feet and 6 inches. This lever-arm, multiplied by the right reaction, should give the total moment shown above, or $R_2 \times 24.5 = 3{,}536$. In order to determine the value of R_2 it is only necessary to divide 3,536 by 24.5. The answer will be 144.3 pounds.

The value of R_1 can be found by simply subtracting this figure from the total load, or from 512 pounds. $512 - 144.3 = 367.7$ pounds. It would be well for the beginner to check this result by taking moments around R_2 in order to determine R_1. The method of doing this will be given below.

	$42 \times 6.5 =$	273	foot-pounds
	$85 \times 11.5 =$	977.5	"
	$260 \times 19.5 =$	5,070	"
	$125 \times 21.5 =$	2,687.5	"
Totals	512	9,008.0	"

$$9{,}008 \div 24.5 = 367.7 \text{ pounds.}$$

This result checks with the one given above. It is usually a good practice to check results in this manner.

It might be well in passing to note that if foot-pounds are divided by feet the answer is found to be in pounds. On the other hand if foot-pounds are divided by pounds the answer will be expressed in feet.

The next step in the design of a beam is to determine the point at which it will have the greatest tendency to fail by bending. In the case of the cantilever it was obvious that the point at which the beam would fail was at the point at which the beam projected out into space. In the case of the simple beam, where the load was directly in the centre, the point of failure would be directly under the load. In the example under consideration it would be difficult to tell without investigation the exact point at which the greatest tendency toward failure will be. In order to thoroughly investigate this problem use is made of the shear diagram.

Until now no mention has been made of "shear." There are two ways in which a beam may fail. The first is by bending, which is the most common method by which failure occurs. When a beam fails in this manner the upper fibres of it are crushed together and the lower fibres are pulled apart. The second way in which it could fail is by shear. When a hole is punched in a steel plate the steel is simply sheared out. Shear is that method of failure in which particles slide by each other. The most common case in which a beam will fail by shearing is in the condition where the beam is short and the load is heavy. Figure V, article I, shows a condition where the beam would fail by shear rather than by bending.

Where a heavy load comes on a short beam the load acts as the punch and the supports as the die and the beam is sheared off at the supports in much the same manner as a piece of steel is sheared off by machinery in a steel-mill. Shearing depends upon the dead weight upon the beam and does not depend upon the distance such a weight acts away from a support. The greatest tendency toward shearing is found at the supports, and is equal to the load at the reaction. The value of shear is measured in units of weight. In the case of the beam shown in Figure VIII the greatest shear is found at the left reaction and is equal to 367.7 pounds.

It is sometimes difficult for the student of engineering to grasp what is implied by the word shear. If, in the case given above, he should look upon the force exerted in an upward direction by the reaction as the force imposed by one blade of a pair of shears, and if he should look upon the force caused by the loading on the beam as imposed by the other blade he will obtain a fairly graphic idea of this method of failure. The upward shearing force is equal to the downward force and both are equal to the reaction.

This shear will exist between the support and the first load. Between the first and second loads a smaller shear will exist as the shear will be diminished by the exact amount of the first load. In other words, the value of the shearing force between the left reaction and the first load is 367.7 pounds, and between the first and second loads is 242.7 pounds. Between the second and third loads the shear becomes a *negative* shear, because the second load of 260 pounds is greater than the shear at the left of it. At the left of this load the shear is 242.7 pounds; at the right of it the shear becomes *minus* 17.3 pounds. In the parlance of the engineer "the shear changes sign." The negative shear increases as the other downward loads are encountered. After the third load is passed the shear becomes *minus* 102.3 and after the fourth it becomes *minus* 144.3 pounds. This negative or downward shear continues until the right reaction, or R_2, is reached, when this upward load will exactly counteract the downward shear and the result will be zero.

This condition is shown graphically in the "shear diagram" in Figure IX. This is a typical diagram for the condition where all the loads on the beam are concentrated at

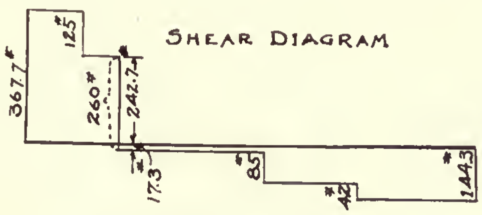


FIGURE IX

points along it. It resembles a crude flight of steps in which the "treads" are the distances between loads, and the "risers" are the loads themselves. A diagram such as this may be laid out at any scale with different units representing length and weight.

The important thing about a shear diagram is that from it one can tell at what point the beam is liable to fail by bending. At that point where the shear changes sign or becomes zero is the point where the greatest tendency toward bending is found. One must delve into the mysteries of calculus to prove this as far as formulas are concerned, but the reader may prove it practically by actually investigating the case of the beam with unequal concentrated loads, shown in Figure VIII. It might be well to investigate the tendency toward bending at all points where loads are concentrated.

The first load is concentrated at a point 3 feet from the left support. The tendency toward bending at this point will be caused by the left reaction, as this is the only load acting to the left of the one under consideration. The reaction is 367.7 pounds, the distance from the present centre of moments is 3 feet, and the moment is 1,103.1 foot-pounds.

The second load is located 5 feet away from the left support and there is one load between it and the left reaction. The method of determining the bending moment at this point is to find the upward or positive moment due to the upward reaction and to subtract from it the downward or negative moment due to the downward load. The upward moment is found by multiplying 367.7 by 5 feet. The result, 1,838.5 foot-pounds, is the positive moment. The downward moment is found by multiplying 125 pounds by 2 feet, and the negative moment is determined as 250 foot-pounds. By subtracting the negative from the positive the actual moment of 1,588.5 foot-pounds is found.

The third load is 13 feet from the left reaction and the positive moment is $367.7 \times 13 = 4{,}780.1$ foot-pounds. There are two negative moments, as there are two downward loads at the left of load number three.

$$125 \times 10 = 1{,}250 \text{ foot-pounds.}$$
$$260 \times 8 = 2{,}080 \quad \text{"}$$
$$\overline{3{,}330} \quad \text{"}$$
$$4{,}780.1 - 3{,}330 = 1{,}450.1 \text{ foot-pounds}$$

The fourth load is 18 feet from the left reaction. The moment at this point can be found by the same method as has been given.

$$367.7 \times 18 = 6{,}618.6 \text{ (positive moment)}$$
$$125 \times 15 = 1{,}875$$
$$260 \times 13 = 3{,}380$$
$$85 \times 5 = 425$$
$$\overline{5{,}680} \text{ (negative moment)}$$
$$6{,}618.6 - 5{,}680 = 938.6 \text{ foot-pounds.}$$

In this manner are found the tendencies toward bending at four different points on the beam. It will be noticed that in taking the points at which the moments were determined the process was to read from left to right, and that the negative moments were always caused by loads at the left of the point under discussion. Exactly the opposite process could have been used and the points read from right to left and the negative moments would then be caused by the loads at the right of the point. As a check on the last result and in order that the last statement can be shown to be true, the moment at the fourth load will be determined by finding the moment caused by the right reaction around this load. The right reaction—R_2—exerts an upward force of 144.3 pounds, and it acts at a distance of 6.5 feet from load number four. The moment then will be $144.3 \times 6.5 =$ 938 foot-pounds. It will be noticed that this result does not check exactly with the one given above, but this is due to the fact that the two reactions are determined only to the first place beyond the decimal point, which is accurate

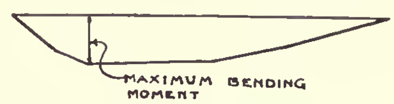


FIGURE X

enough for all practical purposes, but does not give the exact amount when moments are determined at the right or left of a certain point.

A bending moment diagram is shown in Figure X. The figures are the same as those already determined. The maximum bending moment is discovered under the second load, and this is in accordance with the statement that the maximum moment will be found at the point where the shear changes sign. An investigation of the shear and bending moment diagrams will show this to be the case.

This discussion has been largely theoretical, and may not seem to have much value. Actually the shear diagram is a very practical time-saver. It has been shown that by means of this diagram the point at which the maximum tendency toward failure by bending is found. This is important as beams and girders are designed to withstand the maximum bending moment, and once this is found, it is only necessary to find the size of the beam which will answer this purpose.

As an actual example of this the maximum bending moment found above was 1,588.5 foot-pounds, or 19,062 inch-pounds. The formula given in the last article for the design of a wood beam is $M = S \times \frac{1}{6}bd^2$. We will assume that S—the strength of wood—is 1,200 pounds per square inch, that b—the breadth of the beam—is 2 inches, and that it will only be necessary to find the value of the depth d.

The formula becomes, when all the values are substituted, $19{,}062 = 1{,}200 \times \frac{1}{6} \times 2 \times d^2$, or, $19{,}062 = 400d^2$. It can be found from this that d^2 will equal 47.7 inches and that d becomes 6.9 inches, and that the beam that will withstand the loading given in the problem will have to be a 2-inch by 8-inch beam.

So far all problems have dealt with concentrated loads, but as a rule, the most common loading on beams is known as uniform loading. By this is meant that most loads on beams are spread over a part of, or over their entire lengths. The first example of this kind of a problem is shown in Figure XI which is a diagram representing a simple beam with a uniform load extending over the entire span. For a condition such as this the formula $M = \frac{1}{8}Wl$ can be used and the beam designed without much effort, but as there are many conditions where a beam is loaded with both concentrated and uniform loads it is important that the reader understand all the principles involved in the derivation of this formula.

In Figure XI is shown the shear diagram. It will be seen that this diagram differs from the one shown in Figure IX as the shear changes not in a series of steps, but as an inclined straight line which passes through zero at the centre. This is the point at which the shear changes sign, and where the greatest tendency toward bending will be found.

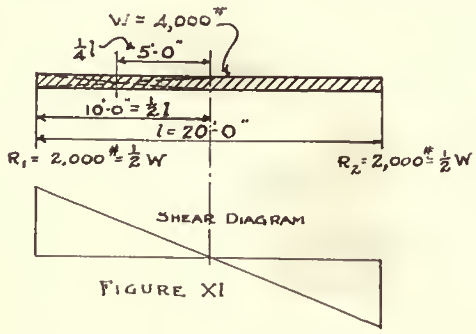


FIGURE XI

It is obvious that the beam will bend more in the centre than at any other place.

It will be necessary to determine the bending moment at this point, and an actual condition of loading will be assumed. The span will be considered as 20 feet, and the load as 200 pounds per foot. The total load on the beam will be 4,000 pounds, and the load at each end will be one-half of this or 2,000 pounds. The upward moment around the centre caused by the reaction will be $2{,}000 \times 10 = 20{,}000$ foot-pounds. It is sometimes difficult to understand the next step. This step consists of determining the downward or negative moment which is caused by part of the uniform load at the left of the centre point. The half of the uniform load that is at the left of the centre point will cause a downward or negative moment around this point. The amount of this load is 2,000 pounds and the lever-arm will be the distance between the centre point and the centre of gravity of that part of the uniform load that is causing the moment. In other words it will be the distance between the centre and a point 5 feet to the left of it. The moment will be $2{,}000 \times 5 = 10{,}000$ foot-pounds. This should be subtracted from the positive moment and the result—10,000 foot-pounds will be the total moment at this point and the maximum for the beam.

Suppose that algebraic letters were substituted in place of actual loads and distances then the load will be designated as W, which will stand for the total load of 4,000 pounds, and the span will be denoted as l. Then the loads at the supports—the reactions—will both equal $\frac{1}{2}W$, and the distance from the centre to the reaction will be $\frac{1}{2}l$. The positive moment will be $\frac{1}{2}W \times \frac{1}{2}l = \frac{1}{4}Wl$. The negative moment will be caused by one-half of the load, which extends over

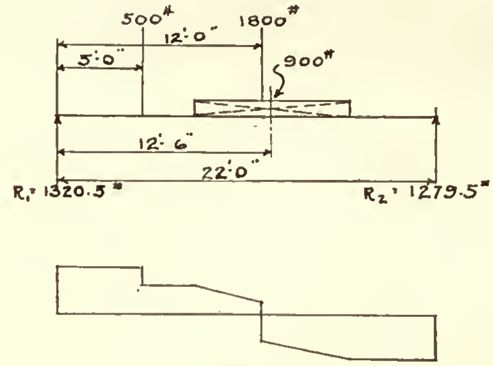


FIGURE XII

the beam to the left of the centre, and the lever-arm will have a length equal to *one-quarter* of the span. This length was equal to 5 feet in the example given above. With the downward load equal to $\frac{1}{2}W$, and the lever arm equal to $\frac{1}{4}l$ the negative moment will equal $\frac{1}{8}Wl$. Subtracting the negative from the positive moment the result will be $\frac{1}{4}Wl - \frac{1}{8}Wl = \frac{1}{8}Wl$.

The formula $M = \frac{1}{8}Wl$ is one of the most useful in all engineering work. It is used to develop all tables giving safe loads uniformly distributed on beams as well as deflection tables, and in all calculations involving uniform loads. On the other hand the reader must not make its use too general. It will not apply to a condition where concentrated loads are encountered or where the uniform loads do not extend over the entire spans.

If there is need of proof of this formula, other than that already given, it may be well to substitute in the formula the load and span in the previous problem. In this example the total uniform load was 4,000 pounds, and the span 20 feet. Now the formula is $M = \frac{1}{8}Wl$. Substituting in it the result is $M = \frac{1}{8} \times 4{,}000 \times 20 = 10{,}000$ foot-pounds, which is the result obtained without the use of the formula.

There is only one other condition to be investigated. This is the case where there is a combination of uniform and concentrated loads. Diagrammatically this is shown in Figure XII. There are two concentrated loads on the beam; one is 500 pounds, located 5 feet from the left support, the other is 1,200 pounds, located 12 feet from the left support. The uniform load is 900 pounds and extends from a point 8 feet from R_1 to a point 5 feet to the left of R_2. The *method* of finding the reactions does not differ from that given above, but there is a difference in procedure when the uniform load is encountered. This load is regarded as a concentrated load with the entire 900 pounds concentrated at the centre of gravity, which in this case is one-half of a foot to the right of the 1,200 pound load and 12 feet and 6 inches from the left support.

$$500 \times 55 = 2{,}500 \text{ foot-pounds}$$
$$1{,}200 \times 12 = 14{,}400 \text{ “}$$
$$900 \times 12\tfrac{1}{2} = 11{,}250 \text{ “}$$
$$2{,}600 \quad 28{,}150 \text{ “}$$
$$28{,}150 \div 22 = 1{,}279.5 \text{ pounds} = R_2$$
$$2{,}600 - 1{,}279.5 = 1{,}320.5 \text{ pounds} = R_1$$

The shear diagram shows that the shear changes sign under the 1,200 pound load, and this is therefore the point of no shear or maximum bending moment. The bending moment at this point is obtained in the usual manner.

Positive moment,
$$1{,}320.5 \times 12 = 15{,}846 \text{ foot-pounds}$$
Negative moments,
$$500 \times 7 = 3{,}500 \text{ foot-pounds}$$
$$400 \times 2 = 800 \text{ “}$$
$$4{,}300 \text{ “}$$
$$15{,}846 - 4{,}300 = 11{,}546 \text{ foot-pounds}$$

No matter how complicated a problem in the design of beams or girders may appear it cannot involve any considerations which have not been investigated in these two articles. It can be seen that all problems involve the use of moments. This will be true of nearly all problems in the design of beams, girders, slabs, footings, or foundations. The importance, therefore, of the knowledge of the use of moments should be appreciated.

Practice is as important in the profession of engineering as in the game of golf. No one would expect to be able to play golf because he has read a book about the game. In the same manner unless the reader practises the use of moments he will never be expert in the design of structures. It is therefore suggested that he invent problems for his own practice and check each result. One of the encouraging things about the study of engineering is that all results can be checked.

A Fine Memorial

The Burnham Library of Architecture at the Art Institute, Chicago

WITH the opening of the Burnham Library of Architecture, says the *Bulletin of the Art Institute of Chicago*, one of Daniel Hudson Burnham's cherished projects for the civic beautification of Chicago approaches realization. At his death in 1912 he bequeathed a fund of fifty thousand dollars to be administered by the trustees of the Art Institute for an architectural library. Before the end of that year the president of the board of trustees had appointed a committee of five architects, who have outlined, and are now consummating, a policy of obvious soundness—their declared aim being "to cover the field of architecture and landscape architecture, in books and photographs, as generally as funds will allow." An agreement with the libraries of the city is leaving the field of architecture clear for the Burnham Library. First were purchased the books on architecture in the Ryerson Library, later the architectural magazines in the John Crerar Library—all of which were temporarily housed in the Ryerson Library. In accordance with a well-worked-out plan the most necessary additions have been secured, even when the works sought have been rare and costly. The collection at present numbers more than 2,500 volumes. Howard Van Doren Shaw, Peirce Anderson, Hubert Burnham, Edward H. Bennett, and Walter F. Shattuck (who has been succeeded by Edmund S. Campbell, head of the Department of Architecture in the school) formed the original committee. Mr. Shaw, its chairman from the beginning, designed the new library.

A striking contrast with the character of the Ryerson Library is presented in this new room opening from it. The Renaissance feeling is replaced by the mediæval, the circular form of chamber by that of a long barrel-vaulted hall. The doorway is in the middle of the north wall. High-leaded lights in that wall permit a beautiful play of light and shadow on the vaulted ceiling. The lamps, concealed in inverted opaque bowls suspended from the ceiling, cause a diffused glow in the room. The decorative value of the long shelves of books, with their bright colors, in this room of gray oak and rough plaster, the high windows, the furniture with its slightly monastic character, the hooded reading-lamps, the high reading-desks placed at intervals near the bookcases, the vaulted ceiling, and the sparse use of ornament, give the room a compelling character. Zorn's fine portrait of Daniel H. Burnham, lent by Mrs. Burnham, faces the entrance.

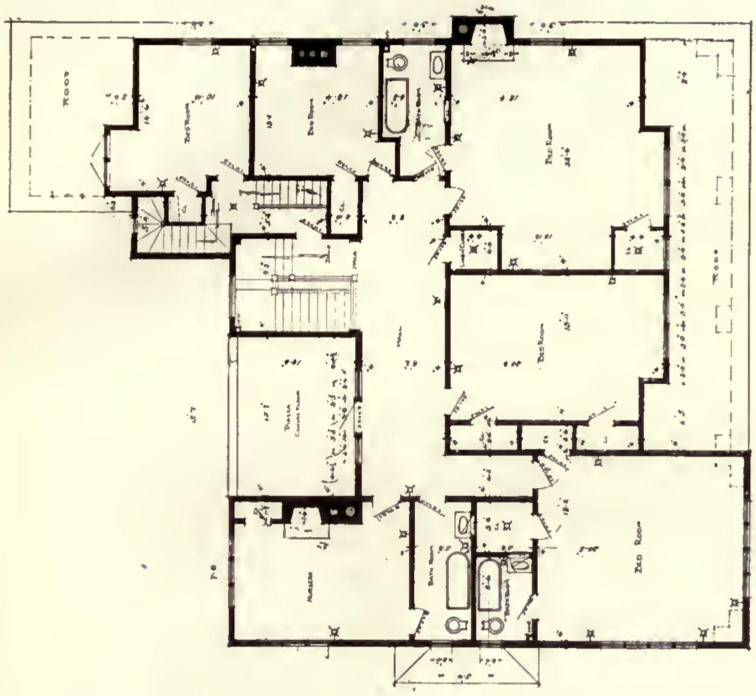
Already the library is a daily necessity to the students of the Chicago School of Architecture, who work at the Art Institute. What it may do for architecture through these students is more than a pleasant conjecture. Its wider opportunity is plain. In this city of departmental libraries here is a well-laid foundation for the architectural collection of the city.

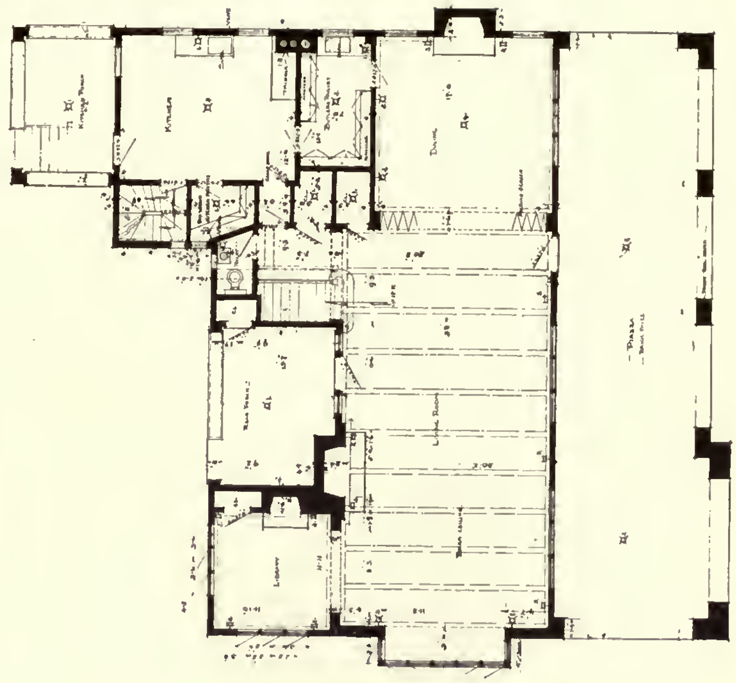
A comprehensive library on civic art is needed for the new Chicago. The home-builders, landscape gardeners, and all the younger architects, may find here the plates and periodicals which are beyond their means of owning. And with the growth of the collection of books and magazines will come the gradual realization of the policy implied in the bequest of Daniel H. Burnham.

A Roosevelt Tree Road

AT a memorial-tree planting in memory of Theodore Roosevelt and Quentin Roosevelt, Charles Lathrop Pack, president of the American Forestry Association, said in a recent address at Flushing: "A Roosevelt Road of Remembrance, planted with memorial trees from ocean to ocean, would be the greatest of all memorials that could be erected in honor of the former president." Two white oaks that have been registered on the association's honor roll were dedicated in honor of the president and his son.

RESIDENCE, H. P. BENSON, MARBLEHEAD NECK, MASS. John P. Benson, Architect.





John P. Benson, Architect

PLANS.

RESIDENCE, H. P. BENSON, MARBLEHEAD NECK, MASS.

LIVING-ROOM AND DINING-ROOM IN REAR.

LIVING-ROOM MANTEL.

The Place of the Institute

IN his address at the Fifty-third Annual Convention of the Institute in Washington, President Kimball said: "I know of no organization whose possibilities are greater—possibilities for service to society, I mean."

If these possibilities are yet to be realized it is not through lack of high ideals in the past nor want of sincere endeavor. Perhaps no factor has more determined and limited the achievements of the Institute in its wider usefulness than the fact that it represents but 10 per cent of the architects of the country. It has been in the nature of a close corporation, and in these expanding and progressive days there is need for the closest co-operation and unity of purpose of the entire profession. We quote the following significant paragraphs from President Kimball's address:

"For the sake of argument, let us keep in mind the fact that while the American Institute of Architects is still far from being numerically representative of the profession, it has from its birth furnished to the profession the ideals and examples after which the architectural practice of this country has been patterned, and has always been the court of last resort before whose bar all its serious and most important questions have been decided. Wherefore, in assuming for the Institute the credit of such leadership, we are debarred from disclaiming our share of the blame, where blame exists, for conditions that are not consistent with what should be present-day architectural heritage. During the sixty-three years of the life of the American Institute, profound changes have taken place in almost everything but the Institute itself; possibly out of love for its traditions, possibly largely the result of habit, those responsible for the A. I. A. have not seemed to take into account that its work has grown out of all proportion to its membership and machinery. The official instrument to adequately represent and make the most of a great public servant, such as is our profession, should count as members approximately one-half of those who legitimately practise that profession, which means we owe it to our pretenses to promptly secure a membership of at least 3,000, which in turn means better than doubling our present list. To do this, and do it fairly, changes are essential, membership must be made both more attractive and more easily attained. I place representation, adequate representation, as one of possibly three essential fundamentals in which the American Institute is not quite filling the bill.

"A second important item, in which we must assume for the Institute full responsibility, is the example set to all architects as well as to all professions, of valuing professional service upon a percentage basis. To the baneful effects of this one *faux pas* I ascribe most of our really serious troubles. Certainly failure to hold, in a higher degree, the confidence of the public and of the client is traceable directly to this fallacious and mischievous source of suspicion which we have erected into a barrier between ourselves and our clients and society. Until architects as a class realize this and better understand the nature and extent of the harm done, I feel perfectly sure they will never enjoy that position of trust in the community to which their qualifications should entitle them, nor will they achieve that degree of usefulness which the public has a right to expect of them; and until the American Institute has set the example of changing this, to me, perfectly indefensible system to one which by its nature removes the cause of suspicion, I feel the Institute will continue to occupy a position of not quite 'filling the bill.' This item of a right basis for professional charges is, to my mind, one of those three fundamentals in which we are not quite measuring up, and for which I earnestly bespeak a cure."

Little Greek Theatre, Corcoran Art Gallery, Washington, D. C. Waddy B Wood, Architect.

New Officers of The American Institute of Architects for 1920–1921

President	Henry H. Kendall, Boston
First Vice-President	Charles A. Favrot, New Orleans
Second Vice-President	Wm. B. Faville, San Francisco
Secretary	Wm. Stanley Parker, Boston
Treasurer	D. Everett Waid, New York

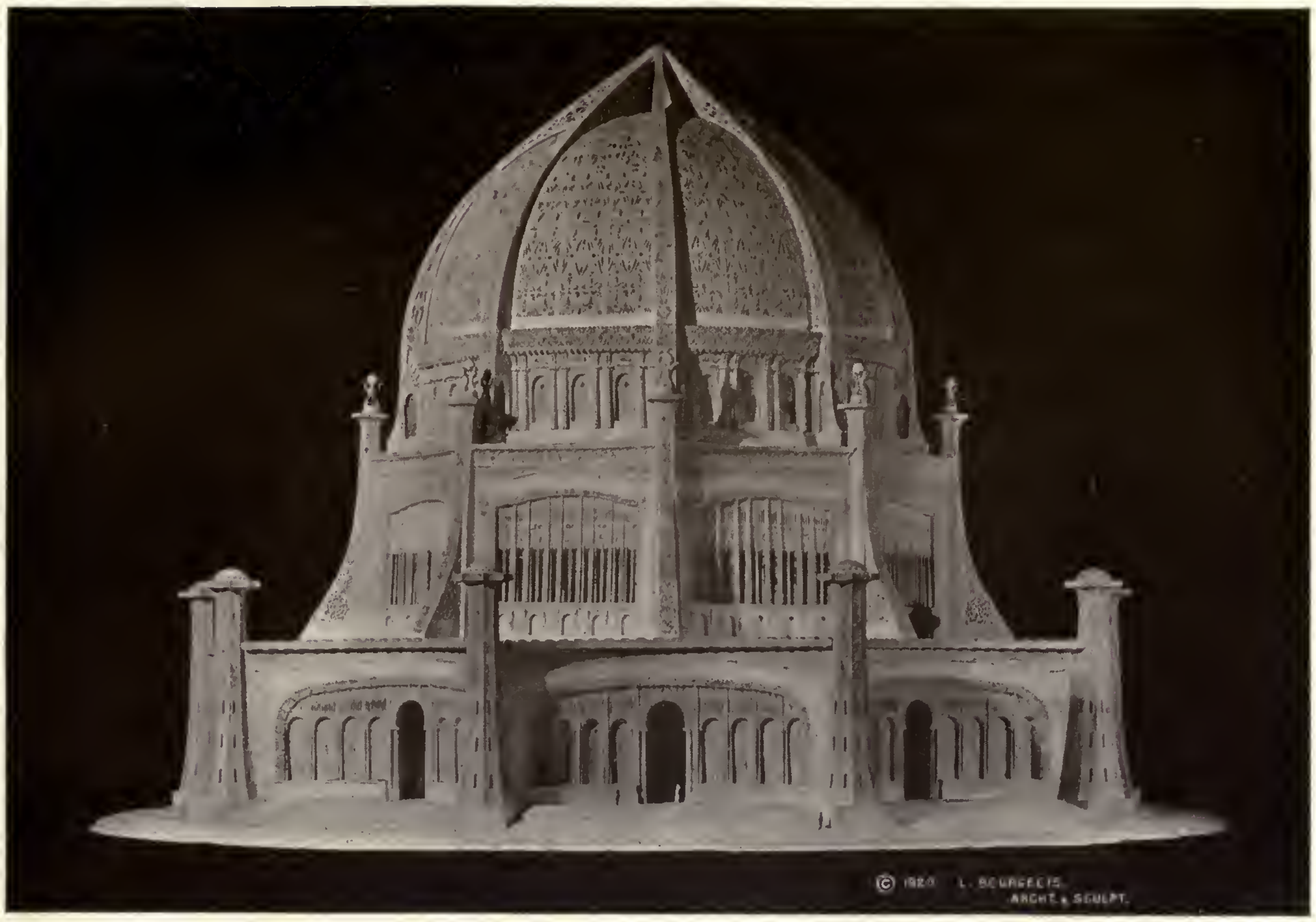
Board of Directors

For One Year—1920–1921
Edward W. Donn, Jr., Robert D. Kohn, Richard E. Schmidt

For Two Years—1920–1922
Edwin H. Hewitt, William B. Ittner, Ernest J. Russell

For Three Years—1920–1923
Charles H. Alden, N. Max Dunning, Abram Garfield

A New Idea in Architecture



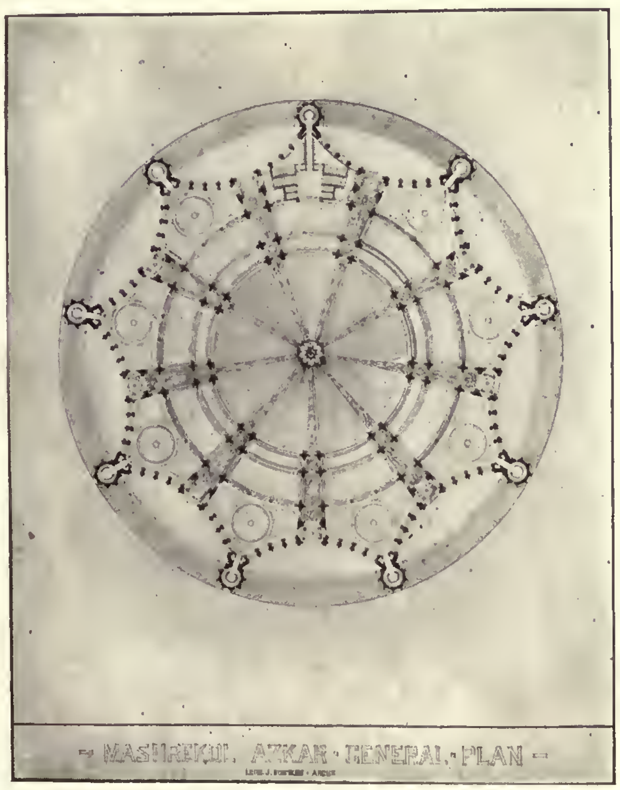
Model for the Bahai Temple of Peace.

ON the shore of Lake Michigan, north of Chicago, the Bahai movement is soon to begin the erection of a great Temple of Peace.

The doors of the Bahai Temple of Peace will never close, day or night, and all may worship there regardless of creed. The Temple will cost about $1,500,000. It will be 225 feet in diameter and 180 feet high, its outer walls covered with cream-colored terra-cotta.

The model submitted by Louis Bourgeois was selected by a committee of forty-nine. This committee approved the design, but, because the structure differed from any other building that had ever been erected, they felt that they needed expert guidance from an architect who could tell them whether it was practical, before making the formal acceptance.

Mr. H. Van Buren Magonigle, president of the Architectural League, was consulted, and without knowledge of the committee's choice he studied all the models submitted and quickly selected that of Mr. Bourgeois. His comment was: "It is the first new idea in architecture since the thirteenth century; I want to see it erected."

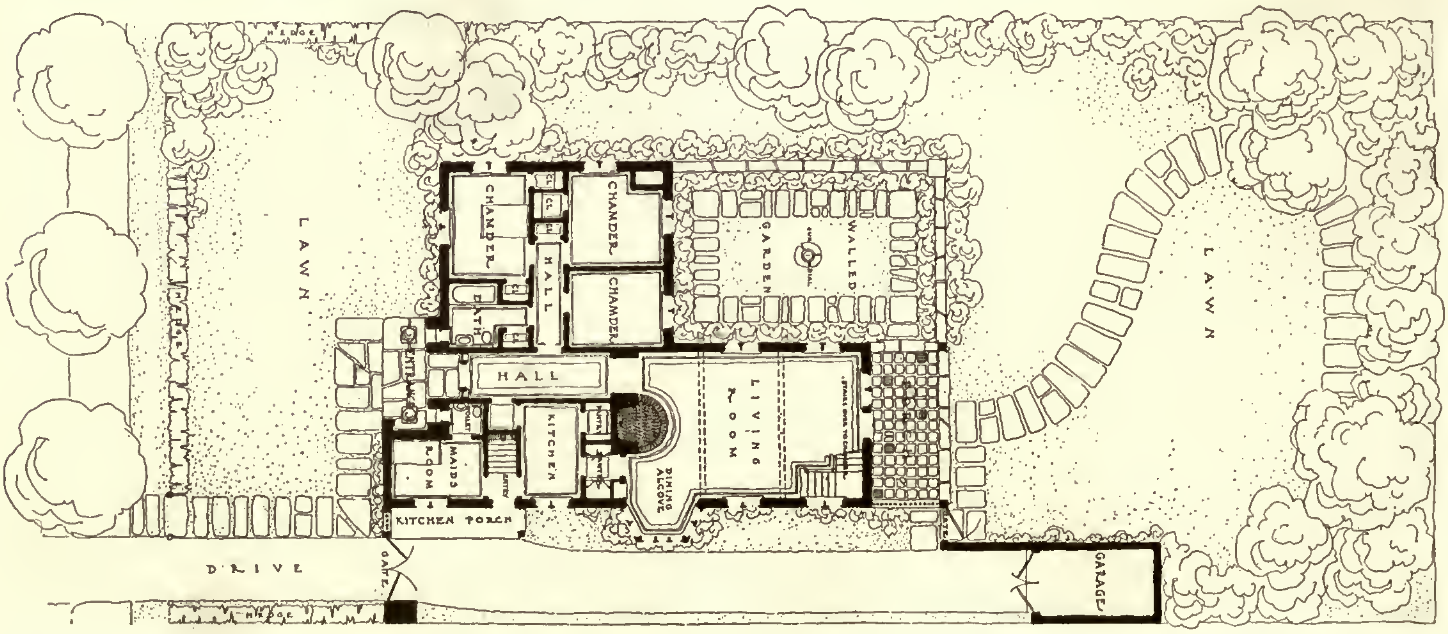


The first story in its simplicity suggests the Greek and Egyptian temples, while the treatment of the doors and windows is Romanesque in form, and the intricacy and beauty of the ornamentation suggests the Gothic and the Arabic.

The second story, in its windowed elegance, is Renaissance in line but purely Gothic in the interlaced arches of its openings.

The third story is Renaissance in feeling, restful and quiet. Above it rises the dome which suggests the Byzantine, while above the closed top is a unique feature—the beams of the dome arising like hands clasped in prayer, so as to give the feeling of ascension and aspiration heretofore found only in Gothic towers.

An intricate system of ornamentation covers the columns, surrounds the windows and doors, and comprises the dome itself, and in this one deciphers symbols of all the religions of the world.



PLAN.

Bloodgood Tuttle, Architect.

RESIDENCE, MRS. THOMAS T. HOPPER, PELHAM, N. Y.

LIVING-ROOM MANTEL.

LIVING-ROOM.

DETAIL.

ENTRANCE-GATE.

Bloodgood Tuttle, Architect.

RESIDENCE, MRS. THOMAS T. HOPPER, PELHAM, N. Y.

An Architect's Office

By Alfred C. Bossom

WE have heard of the architect who runs a business. Also, of the æsthetic member of the profession who insists on making everything subservient to his point of view. Also, of the man whose great leaning is toward practicability at the expense of beauty, but to-day we are confronted with the necessity of combining all three of these points of view.

For five years general building has been at a very low ebb, and the need for more structures has been slowly increasing, so much so that now we are confronted with the task of erecting many buildings very quickly, and in doing this it is the duty to carry high the standard of American architecture.

So frequently in the past offices were laid out to express only the personal tendencies of the architect without sufficient regard to being able to absolutely fulfil the client's needs, which in the end are the controlling factors for which the office exists. When the opportunity occurred in this case an endeavor was made to meet this condition, and to so co-ordinate the functions of the office that it would run as smoothly as business would through a well-organized bank.

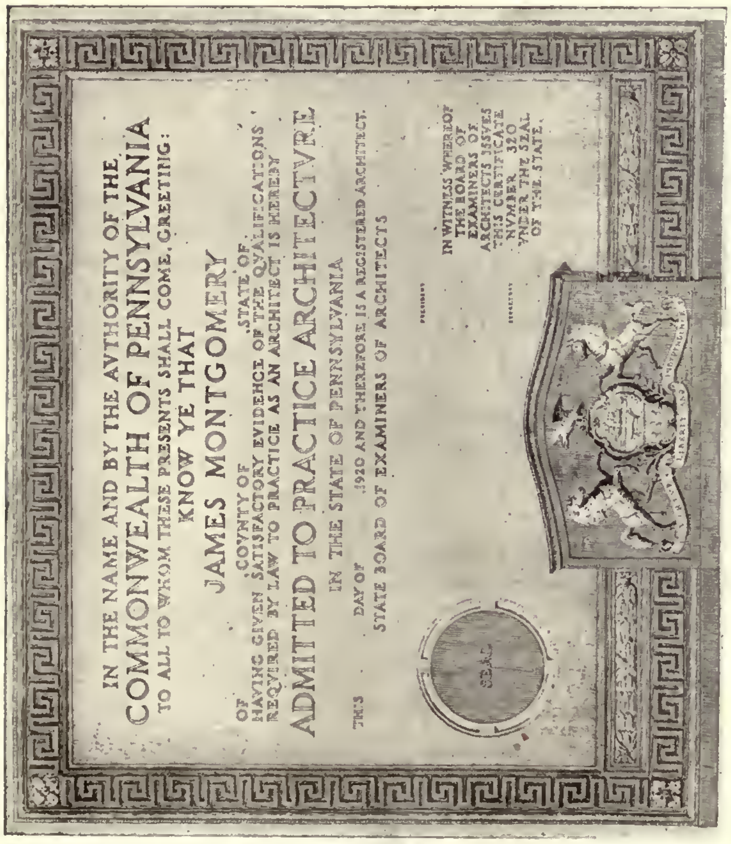
Having the opportunity of light on all four sides, and with the utilities located in the centre, it was possible to so arrange the different sections that the work travels easily, from its inception from the client to its construction by the contractor, without obstacles.

Having an open loft, there were no hindrances to carrying out a preconceived plan. At the same time making the path of the work easy, a great effort was made to build up attractive surroundings for the workers in the office and to make them as harmonious and agreeable as possible.

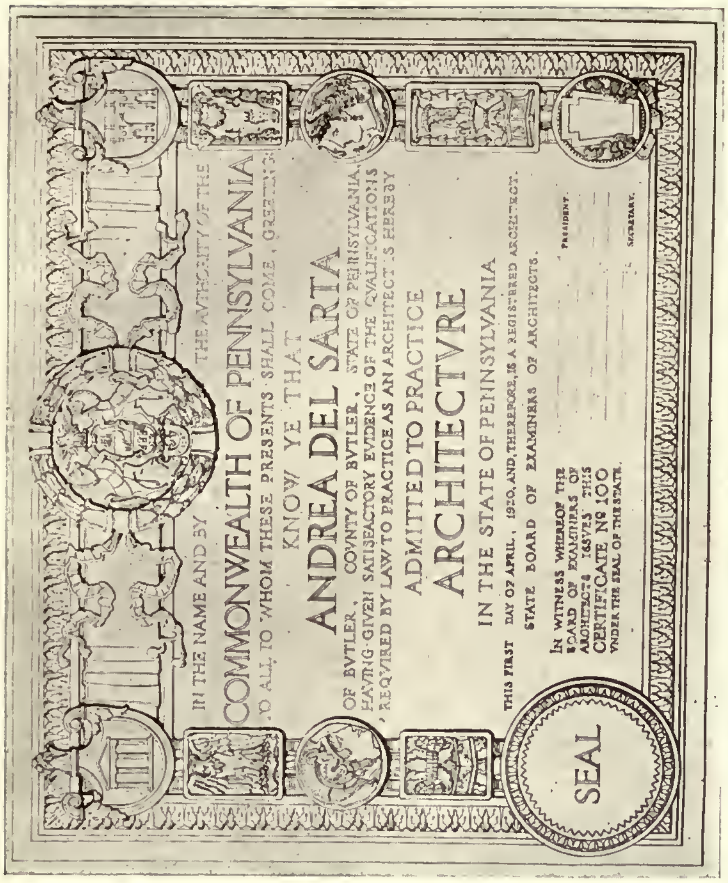
In carrying out this work in leased quarters, the ex-

pense naturally formed a very important consideration, and various expedients were adopted to do the work as quickly and as inexpensively as practical. For instance, throughout the entire suite of offices there is not a single foot of plaster other than that upon the exterior walls of the loft. Cardboard upon stud partitions, very heavily stippled, has been used to form the walls, with chair-rails, etc., so that this should not be damaged. The original cement floor has been tinted in various places to give the effect desired, and where the rooms are to be used for constant service either linoleum or cork has been fixed upon the same. Where a more finished treatment was needed for the walls they were boarded, and to this either marble was fixed, or canvas applied, upon which a stencil treatment was adopted. Everything has been fixed throughout with screws, so that should it be desirable to move later, all can be taken away without undue difficulty or expense, and practically without defacing the structure of the building at all.


Drafting-room.

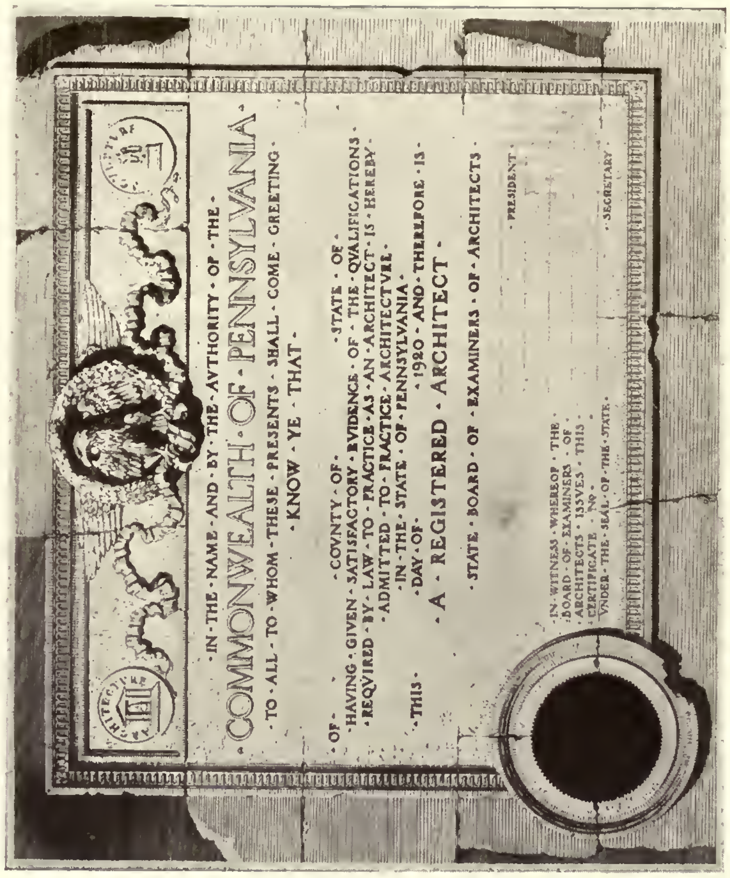


NO. 8. FIRST PRIZE, FRANK L. BODINE, ST. DAVIDS, PA.



NO. 5. SECOND PRIZE, ROBERT W. HUBEL, DETROIT, MICH.

NO. 12. FIRST HONORABLE MENTION, GEORGE HOWE, PHILADELPHIA, PA.



NO. 3. SECOND HONORABLE MENTION, ELLIOTT L. CHISLING, NEW YORK.

COMPETITION FOR A DESIGN FOR ARCHITECT'S CERTIFICATE, COMMONWEALTH OF PENNSYLVANIA.

Modern Building Superintendence

By David B. Emerson

CHAPTER X

HEATING AND VACUUM CLEANERS

ALTHOUGH no mention has been made so far of the heating apparatus, it has not been forgotten or neglected. As the construction work progressed the steam mains, risers, and returns were installed. The boilers were set early in the progress of the work, being delivered at the building before the steel frame was erected, and were placed in the sub-basement before the floor beams were set. The heating of the offices, corridors, etc., was done by a vacuum system of heating, using low-pressure steam.

On account of the large amount of radiation required, steel boilers were used. The boilers, three in number, were of the horizontal return tubular type, two being used for heating the building, and the third being held in reserve. A small auxiliary high-pressure boiler for heating water and for supplying heat for the Turkish bath was also installed. The boilers were 16 feet long and 72 inches in diameter, which gave a length of a little over 2½ diameters, which is the ratio generally recommended in good boiler-making practice. The tubes were of standard thickness, 4 inches in diameter, which gave them a length of 48 diameters, which is the maximum length which should be used. The boilers were made up of special high-grade steel, tested to sustain a tensile stress of 60,000 pounds per square inch, and each plate was so stamped. The boilers were riveted in the best manner, all longitudinal seams being butted, double-strapped, and triple-riveted, the vertical seams and the flanges of the dome were double riveted. The edges of all sheets were planed and bevelled before the sheets were put together, and all of the seams were caulked with round-nosed tools.

The shells of the boilers under the domes were not cut away, but were perforated to afford the free passage of steam and drainage. The boilers were thoroughly braced with crowfoot braces, made of refined steel. A manhole 11 inches by 15 inches was placed in the top of each boiler, and handholes were provided in the heads of the boilers. Each boiler had three heavy cast-iron lugs on each side, which set upon 12″ x 12″ x 1¼″ cast-iron plates, set in the brick setting. The two rear bearings were roller bearings, to allow for expansion. The boilers had full sectional cast-iron fronts, with double doors opposite the tubes, and feed and ash-pit doors. All of the iron-work was extra heavy and well bolted and screwed together, and finished with pilasters and cornices.

As the boiler room was below the bed of the old stream which was on the site, and there was considerable liability of the boiler pit being flooded, the boilers were placed in a water-tight steel pan. This pan was three feet deep, and wide enough to accommodate all of the boilers, and of sufficient length to allow room for firing; it was made up of ¼-inch plate, reinforced with steel angles and tees, but so constructed as to present an unbroken floor surface. Three-inch pipes, which were as long as the pan was deep, placed so as to come between the boilers, were flanged to the bottom of the pan, to give an air relief, so that the water pressure would not lift nor buckle the pan.

The boilers were set with walls of hard-burned brick, laid up in cement mortar. The side and rear walls were 18 inches thick, which included a 2-inch air space, the centre walls were 24 inches thick, and the bridge walls were 24 inches thick at the top. The walls were provided with 6-inch steel I-beam buckstays, with tie bolts and anchor rods. The tops of the boilers were levelled off with porous terra cotta blocks, 4 inches thick, supported on steel tees set 13 inches on centres. The walls of furnace, bridge walls, and the back connections were all lined with fire brick laid in fire clay. The fire brick were laid up dry, and the fire clay was mixed to the consistency of thick soup, and the brick were dipped in the clay and then laid in place, and well hammered down, so as to get the thinnest possible joints. The ash pits under the boilers were paved with hard paving brick, laid on edge and thoroughly grouted with cement mortar.

Each boiler had a separate smoke flue, so placed that the fire gases passed under the boiler shells, then forward through the tubes, and then across the front through the vertical flues, which connected with the main flue, which was increased in size for each boiler flue connection. The smoke flues and connections were made up of No. 10 gauge wrought iron, riveted with ⅜″ rivets, with 3″ pitch, all of the connections being made perfectly tight. The flues were supported by means of wrought-iron hangers, fastened to the steel floor beams above the boiler room. Each flue was provided with cleaning doors, and had a pivoted hand damper, and the main flue had a damper regulated with an automatic damper regulator. The flues from the boilers and the main flue were covered with No. 26 gauge, galvanized metal lath, securely fastened to steel angle framework, which was built around the flue, and then plastered with 2 inches of magnesia covering. The boiler flue connected with the chimney stack, which was made up of ⅜″ steel plate, riveted with ⅝″ rivets, with a 4″ pitch, all joints being caulked and made gas tight. The flue was built up in 20-foot sections, and it was erected in conjunction with the steel framing. Each section of the flue was supported by means of two 6″ I-beams, bolted to the floor beams. A horizontal section with an outlet flanged with 3″ x 3″ angles extended into the boiler room and was connected to the boiler flue. The stack had a cleanout, with a hinged door at the bottom.

The boilers had 3″ blow-off cocks and valves, and blow-off pipes to the blow-off tank. The blow-off pipes were extra heavy pipe, to resist any sudden stress which might be liable to occur in them. The blow-off tank was 3 feet in diameter by 6 feet long, with a manhole at one end. The shell was constructed of best open-hearth iron, $\frac{5}{16}$″ thick, and the heads were of flange iron, ⅜″ thick. The tank was riveted, caulked, and braced, and had a drain-pipe connected to the house drain outside of the vault wall, and it was also provided with a vapor pipe which was carried up 10 feet above the main roof, and capped with a galvanized iron exhaust head. A cooling coil was installed in the tank, connected with the water supply and with the discharge pipe.

(*Continued on page* 190.)

WINNSBORO MILLS, WINNSBORO, S. C.

This plant was purchased by the present owners in 1916, and consisted of a three-story main mill, two-story weave building, boiler-engine house, etc., together with a village of low-grade houses, located close to the mill and on low ground.

In order to increase the capacity of the plant to 3,000,000 lbs. of tire fabric per year, it was found necessary to make a complete reorganization of the old mill and its machinery, so that the plant to-day, as designed by Lockwood, Greene & Co., Engineers, is practically a new productive unit.

A new village was laid out on high land some distance from the mill with streets, sidewalks, etc. Such of the old houses as could be were moved to new positions, and new houses, together with community buildings, were erected.

The original mill building was 75 ft. by 355 ft., with three stories for half the length and two stories for the remainder. The new extension is 103 ft. wide and 366 ft. long, three stories high.

Everything that could be done to make this a perfect plant, within reasonable expense, was done. Lockers are provided for the employees, the toilet facilities are of the best, drinking-water distributed throughout the plant is pure and cold. Space has been provided for rest-rooms, etc.

A clock, with four illuminated faces, in the tower acts as a master clock for an entire system of secondary clocks through the plant and also serves the entire village by day and night.

The power-plant of the Detroit Edison Company embodies the most advanced principles of power-house construction. The plant was designed by the company's own engineers and erected by the company.

Natural ventilation is used throughout the plant, Mr. H. H. Esseltyne, chief construction engineer of the company, having made a special study of the question of natural ventilation and its solution as worked out by prominent engineers of the United States and Europe.

His conclusions are as follows:

(1) Use large areas of window-walls, adequately and scientifically equipped with ventilators.
(2) Over turbines and boiler-room install monitors to take off heated air.
(3) In monitors use continuous sash to give wide exit and maximum ventilation.

(*Continued from page* 188)

Each boiler was equipped with a 2″ feed valve, with stop and check valves, and had a combination water and steam gauge with try cocks, and brass safety valve, with lock-up attachment.

The steam distribution was accomplished by means of a down-feed system of piping. The main supply was taken from the steam header over the boilers, and was connected with the rising main, which ran up to the ceiling space over the twentieth story. The riser had an expansion loop located at the tenth-story ceiling. The loop was so constructed that all of the movement caused by the expansion of the pipe was taken up by the turning of the pipes in the fittings, and no strain was placed on any part of the piping. The expansion loop was hung at the far end in an adjustable wrought-iron hanger secured to the steel floor beams. The riser was anchored to steel framing at the fifth and fifteenth floor levels, by means of adjustable pipe anchors. From this main riser a series of distributing mains hung from the roof beams by means of adjustable expansion hangers, were run above the ceiling, to feed the down-feed risers.

All of the pipe used in the heating system was standard lap welded, puddled wrought-iron pipe, and all fittings were standard cast-iron fittings. The fittings on the boiler header, the main feed line, and the main riser were standard cast-iron flanged fittings, with companion flanges on the pipe, and they were put together with copper gaskets. The ends of all pipe were reamed out to remove all burr caused by cutting. Before installing the pipe each length was stood on end and pounded, to remove all loose scale, dirt, rust, etc. The use of red lead, or pipe cement, in the joining of pipe and fittings was not allowed, joints having to be screwed up and made tight, without the use of these materials.

The connection from each boiler, of steam header, the main supply, the main riser, the distributing mains, and each down-feed riser were valved. The valves in all of the horizontal lines were gate valves. All valves over 2 inches in diameter had iron bodies, with steam metal mountings, and all valves of 2 inches diameter or under were of steam metal. The down-feed risers were run from the distributing mains down to the second floor, decreasing in size as they descended. The return lines started at the twentieth floor and ran to the sub-basement, increasing as they descended. Wherever the pipes ran through the floor, they were fitted with nickel-plated, hinged, floor and ceiling plates.

The radiator runouts were taken off the risers above the floor, and care was taken to see that they were pitched toward the riser in all cases, and that there were no sags nor pockets to cause trapping. The radiation in the corridors, brokers' offices, and minor rooms on the first floor and basement was supplied by an up-feed system, taken off the main steam supply, the returns being taken into the main return line. All of the radiators throughout the building were plain cast-iron hot-water pattern radiators, the difference between steam and hot-water radiators being that steam radiators have both the supply and return tappings at the bottom, whereas hot-water radiators have the supply tapping at the top, and the return tapping at the bottom. This type of radiator is preferred for vacuum systems of heating. All of the radiators were thoroughly washed out at the foundry to remove all core sand and other foreign matter. The air-vent tappings were plugged with permanent iron plugs, and the supply and return tappings were plugged with wooden plugs, which were not allowed to be removed until the radiators were ready for connecting up. The radiators had modulating valves on the supply end, which allowed a regulation of temperature by the controlling of the circulation of steam, by throttling the inlet on each radiator.

The vacuum traps on the return ends of the radiators were of the sylphon type, operating on the thermostatic principle, using a sylphon bellows made up of a multiple construction of seamless brass folds. These traps allowed the free passage of air and water, but were closed by the action of heat and prevented the leakage of steam. The return lines were connected to the return main in the sub-basement. This line was graded in the direction of the flow of the condensation, and ran to the vacuum pump. A suction strainer was provided between the suction end of the pump and the end of the line, to prevent dirt and scale entering the cylinder of the pump. The supply line and the main riser were dripped into the vacuum return line, and they were provided with gate valves, dirt strainers, and sylphon traps. The vacuum pumps were electrically driven, direct-connected, rotary pumps, with automatic float control switches. An air-separating tank for eliminating the air from the condensation was placed between the vacuum pumps and the boilers.

The heating of the banking-rooms and the safe-deposit department in the basement was accomplished by means of an indirect system of heating, with a fan and air washer, and fitted with a temperature-regulating system. The apparatus was located in the sub-basement. The fresh air was taken through the intake into the fresh-air chamber, which was made as nearly air-tight as was possible, to prevent taking air from the interior of the building. The fresh-air chamber was connected with the tempering coils, which were made up of 1″ wrought-iron pipes, in four-row sections, set into a cast-iron base, which was connected with the steam header. These coils were encased in galvanized sheet casings, firmly braced with steel angles. The air washer adjoined the tempering coils. This sat on a tank made up of No. 14 gauge sheet iron, braced and riveted to a galvanized steel angle frame, with all seams and rivet heads soldered over to make them water-tight. The upper casing was of galvanized sheet iron, braced with galvanized steel angles, and all seams and rivet heads soldered over as in the tank. The principal features of the air washer were the diffuser plates on the intake side, which were of heavy gauge galvanized iron plates; these served the double purpose of evenly distributing the incoming air and maintaining an even velocity through the spray chamber, and preventing any back splash of atomized water from the spray chamber. The bottom header risers and spray nozzles were placed in front of the diffuser plates, which gave a body of atomized water, through which the tempered air passed, was humidified, and all dust, soot, etc., removed. At the discharge end of the washer were the eliminator plates, which removed the entrained water from the air. These were placed in tiers and a spray pipe was arranged to flood them and keep them washed and cleaned.

The air washer had a direct-connected, motor-driven, centrifugal recirculating pump, and the tank was provided with strainers of fine copper mesh to prevent the dirt which was washed from the air from reaching the pump and the spray nozzles. The tank had an overflow trap and drain to the sewer, and a valved waste was located in the bottom of the tank for emptying purposes. The fan was of the multivane, direct-connected, motor-driven type, with a speed of 425 revolutions per minute. It was set in a sheet steel housing. The discharge of the fan connected with the heating coils, which were of the same construction as the tempering coils, and set in a galvanized sheet steel casing, which was connected with the ducts. The returns from the tempering coils and the heating coils were fitted with vacuum traps with thermostatic disks, and were connected to a special return main connected with the vacuum pumps. Individual ducts ran from the heating chamber to the various outlets in the basement and the first floor. Where the horizontal branches in the sub-basement connected to the riser ducts and flues, especial care was taken that there should be no abrupt turns, all of the curves having a long inside radius.

All ducts and flues were built of galvanized sheet steel. Where one dimension was 48 inches or over, No. 20 gauge metal was used, and they were braced with steel angles. Where one dimension was 30 inches or over, No. 20 gauge metal was used, and where they were 12 inches or over, No. 22 gauge metal was used. The ducts were made with slip joints, presenting a smooth surface in the direction of the flow of the air. Each duct was fitted with a mixing damper, controlled by a pneumatic thermostat located in the room to which the ducts lead. These thermostats were supplied with compressed air from a small hydraulic air compressor located in the sub-basement. The compressed air was carried to each thermostat by means of a small pipe concealed in the wall, and a branch pipe connected the thermostat with the damper. The registers were placed in the walls, and in the front of the marble bank screens, boxes being provided at the ends of the duct for attaching the registers, which were of cast bronze, finished to match the bank fixtures. All register boxes were closed up with boards until the completion of the building, to keep out dirt and rubbish.

When the system was completely installed, all of the exposed piping in the basement, the main riser, and the distributing mains were covered with sectional magnesia covering, all fittings and flanges being covered with magnesia blocks and magnesia plastic, smoothly trowelled. The coverings were finished with an 8-ounce canvas jacket, put on over heavy sheathing paper, and well sewed with approximately three stitches to the inch, and held by means of japanned bands, and then given two good coats of lead and oil paint. All pipes and fittings which were not covered, and all hangers and other ironwork, including the boiler fronts, were painted two coats of best black Japan varnish. All radiators and all of the exposed piping was given a coat of yellow ochre, and a coat of special primer, and bronzed with liquid bronze, except in the toilet-rooms, where they were enamelled with white radiator enamel.

Before turning the system over to the owners, the contractor tested it out thoroughly in our presence. The boilers were tested by the makers before delivery to a hydrostatic pressure of 100 pounds to the square inch. The boilers were filled with water, and the entire system was started under pressure, to clean it out. The condensation was allowed to waste into the sewer, instead of returning to the boilers, a globe valve being provided under the strainer for that purpose. This was continued for several days, until the system was cleaned of grease and dirt. Then the safety valves were temporarily reset, and the pressure was run up to 15 pounds, and kept there until all piping, joints, valves, and connections could be examined, and those few which we found defective were made tight; one or two radiator sections were found to be cracked and were replaced by perfect ones. The boilers were blown off and the interiors of the sylphon traps were removed and the traps were thoroughly cleaned. The vacuum pumps were then started, and the vacuum control was regulated to start the pump at from two to three inches of vacuum, and to stop the pump at from five to six inches of vacuum.

A vacuum-cleaning plant was installed. Two four-sweeper cleaners with two risers each were installed. By four-sweeper cleaners it is meant that four sweepers can be used at the same time. The piping for the vacuum-cleaners was installed at the same time that the steam piping was installed. All of the pipe was standard-weight, black wrought-iron, screw-jointed pipe, smooth on the inside, and free from dents, kinks, fins, or burrs, and all fittings were cast-iron recessed drainage fittings. The ends of all pipe were squared and reamed smooth, and the threads were cut so that the pipe would screw into the fittings in such a manner as to leave a practically smooth passage through the pipe and fittings. Brass cleanout plugs were installed at the base of all risers, and they were set so that they pointed in the direction of the flow of air. All horizontal pipe was supported by means of adjustable pipe hangers, spaced not less than 10 feet apart, and all risers were secured to the steel floor beams. The inlets were of nickel-plated brass, with self-closing covers, and they were placed in the baseboard in all cases, and were so located that a 50-foot length of hose would reach to all points, and each cleaning radius overlapped the adjoining radius.

The cleaners were located in the sub-basement. The exhausters were of the centrifugal fan type, with 10 horse-power motors direct-connected to the shaft of the fan. A 5-inch exhaust pipe was run from each cleaner, and was carried overhead on the sub-basement ceiling into the pipe shaft, up to and through the roof, and fitted with a galvanized-iron exhaust muffler. The motors were provided with 75-ampere double pole, single brake, knife switches, one double-pole circuit breaker, and starting rheostats of proper capacity to control the motors. The cleaners had dust separators to prevent dirt and dust from passing through the vacuum producers.

After the cleaners were installed they were tested out as follows: All of the piping was subjected to 7½ pounds air-pressure, to determine the tightness of the system. We then had an operating test made by selecting four outlets, two on each riser, to which was attached 100 feet of hose of the size which was to be used on the system, with the ends open. The exhauster was required to maintain the specified vacuum when running at or under the specified speed, and the power consumed was not to exceed 14 kilowatts. As a test of the tightness of the whole system and the effectiveness of the vacuum control, the exhauster was run with all outlets closed and the power consumed was not allowed to exceed 50 per cent of that at the full load.

A final test was made of the separators. We selected four convenient points near four outlets, two on each riser. The contractor then spread on the floor, evenly covering the surface, or four spaces 7 feet square, a mixture of 24 pounds of dry, sharp sand, that would pass through a 50-mesh sieve, 12 pounds of fine wheat flour, and 4 pounds of finely pulverized charcoal. Fifty feet of hose was then attached to each of the four outlets, and all of the surfaces were cleaned simultaneously. When all of the sand, flour, and charcoal had been taken up, the exhausters were stopped, and the dirt was removed from the separator and spread upon the floor again, and the operation was repeated until the floor had been cleaned four times. On the completion of this test the cleaners were examined, and more than the required 95 per cent of the dirt removed was found in the separators, so the system was accepted and it was turned over to the owners' employees to be operated.

Announcements

A Correction.—In the alteration of the building at 512 Fifth Avenue, shown in the May number, the store of the A. Sulka Co. should have been credited to Alfred Freeman, architect, and that of the National City Co. offices to Starrett & Van Vleck.

H. H. Whiteley, of Los Angeles, California, formerly at 429 Story Building, begs to announce the opening of new offices and studio, "La Cabana Azul," 520 South Western Avenue, for the practice of architecture, building, decorating, and furnishing. He wishes samples and catalogues.

Beverly S. King and Shiras Campbell have removed their offices from 103 Park Avenue to 36 West 40th Street, New York City.

Clifton Lee, Jr., and Merrill C. Lee desire to announce the formation of a new partnership, Lee & Lee, architects and engineers, and have opened an office at 918½ East Main Street, Richmond, Va. Manufacturers' catalogues and samples are requested.

At the annual convention of the New York Society of Architects, held at the United Engineering Society Building on May 19, James Riely Gordon was unanimously re-elected for the fifth consecutive term as president; Adam E. Fisher, of Brooklyn, first vice-president; Edward W. Loth, of Albany, second vice-president; Frederick C. Zobel, of New York, secretary; Henry Holder, of Brooklyn, treasurer, and Walter H. Volckening, of New York, financial secretary.

The seriousness of the building, housing, and labor situations was discussed at length. Many committees reported, and many others were appointed to investigate these conditions.

Warren W. Day announces that he has formed a co-partnership with Mr. Clark Wesley Bullard, architect, of Champaign, Ill. Mr. Bullard, who is a State licensed architect, is a graduate of the School of Architecture of the University of Illinois, was for several years associated with Bullard & Bullard, well-known architects of Springfield, Ill., and has, for the last four years, been with Professor James M. White, supervising architect of the University of Illinois. A general practice of architecture will be conducted under the firm name of Day & Bullard, at 527 Main St., Peoria, Ill.

Sanford O. Lacey and Gerald G. Schenck, of the firm of Lacey and Schenck, architects, announce that George Bain Cummings, formerly of New York, has been admitted to partnership. The new firm will be known as Lacey, Schenck and Cummings, and will continue the practice of architecture, with offices at 514–516 Phelps Building, Binghamton, N. Y.

Messrs. York, Regan & Burke wish to announce that they have formed a partnership, March 13, 1920, to be known by the firm name of York, Regan & Burke, located at 1323 North Clark Street, Chicago, Ill., as architects and engineers.

Charles W. Deusner and Helen Dupuy Deusner announce that they have resumed the practice of landscape architecture in Southern California, under the firm name of C. W. & H. D. Deusner, with an office at 15 North Euclid Avenue, Pasadena, California.

Roy A. Benjamin and Harry M. Prince announce the establishment of offices under the firm name of Benjamin & Prince, architects, 2003½ Main Street, Dallas, Texas.

The Indiana Limestone Quarrymen's Association, Bedford, Ind., announces the establishment of a metropolitan service bureau, under the management of George Bangs McGrath, 489 Fifth Avenue, New York City.

Benjamin Howell Lackey announces that he has opened offices at 509 Federal Street, Camden, New Jersey, for the practice of architecture.

Mr. George O. Rogers announces that on and after May 1, 1920, he will be located in Suite 608–9–10, Penn Office Building, 706–8–10 Penn Avenue, Pittsburgh, Pa.

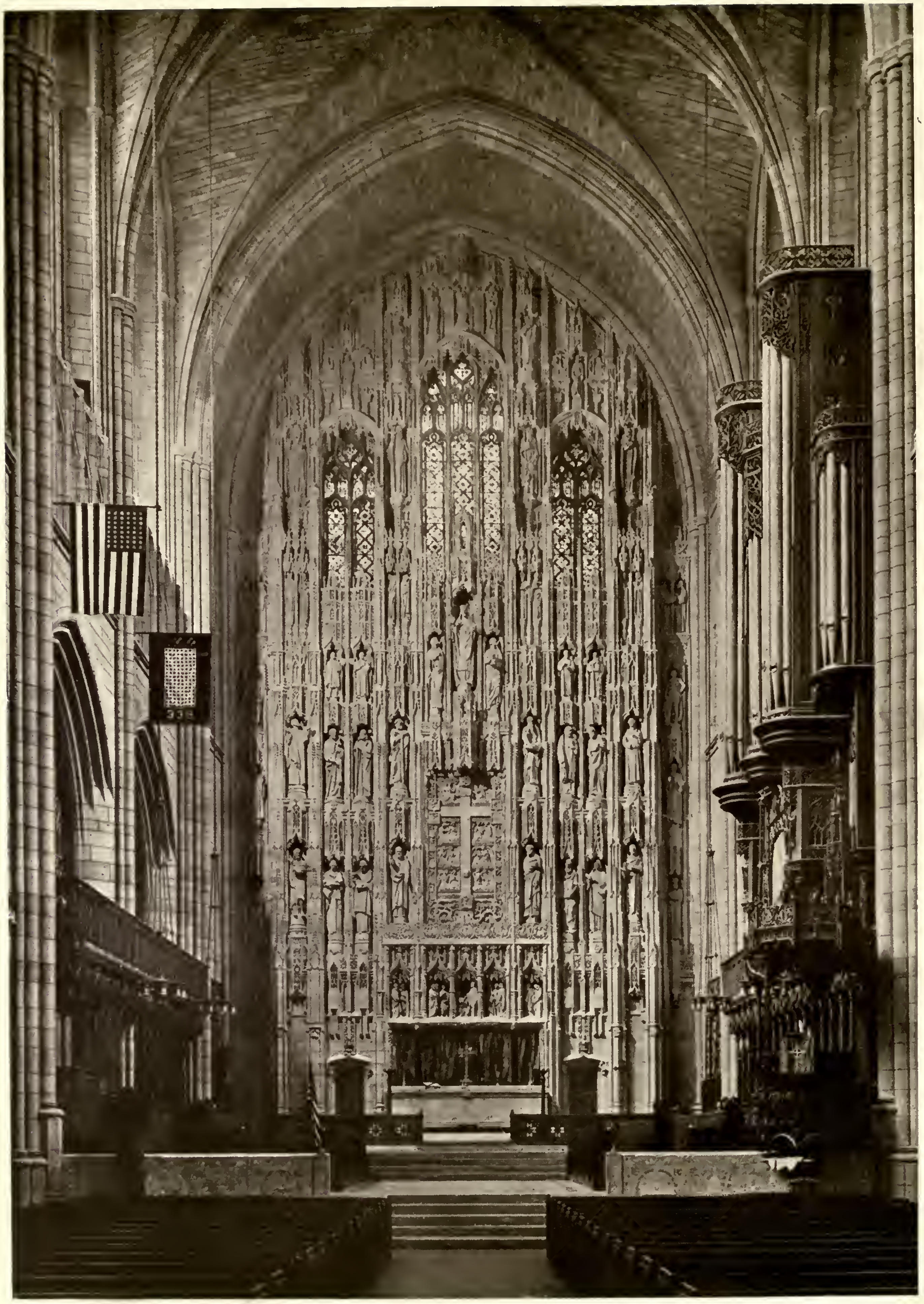
The Stanley Works, New Britain, Conn., has purchased the manufacturing business of The Stanley Rule & Level Company. The Stanley Works will now own and operate some twelve different plants and properties, located where for years the workmen have grown up and become accustomed to the exact requirements needed in the production of the particular articles that are manufactured in these factories. In connection with these are operated open-hearth steel works, hot and cold rolling mills, foundries, timber lands and sawmills for furnishing much of the raw material used.

Book Reviews

"HOW TO USE CEMENT FOR CONCRETE CONSTRUCTION FOR TOWN AND FARM, INCLUDING FORMULAS, DRAWINGS, AND SPECIFIC INSTRUCTIONS TO ENABLE THE READER TO CONSTRUCT FARM AND TOWN EQUIPMENT." By H. Colin Campbell, C.E. Chicago: Stanton & Van Villet Co.

This is a practical book, written by an authority of wide experience in his subject. The 250 illustrations from photographs and drawings admirably supplement and make clear the various particular uses of cement dealt with in the text.

Frontispiece to [illegible]



REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK. Bertram Grosvenor Goodhue, Architect.

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St. Thomas's and Its Reredos

By Ernest Peixotto

IN the handsomest portion of Fifth Avenue, only a few blocks apart, stand two great churches, both in the Gothic style, both imposing by reason of their bulk and dimensions. But here their similarity ends, for St. Patrick's Cathedral, though the larger of the two, though the more symmetrical and regular in plan, though carefully studied after the best traditions of the Gothic builders, leaves a cold and harsh impression upon the beholder, while its neighbor, St. Thomas's, seems a living thing, a creation imbued with life, possessing that subtle, tactile quality that a sculptor so aptly ndicates by rubbing his thumb briskly upon his forefinger.

To impart this rare quality to a great work of ecclesiastical architecture is, I think, one of Mr. Bertram G. Goodhue's greatest gifts, one that places him at once among the foremost church architects of the day. The architect of ecclesiastic buildings is forced, perhaps more than any other, to conform to traditions, to follow certain precedents, to design after given formulas, but Mr. Goodhue succeeds, despite these restrictions, in making his noble churches alive and part of our life to-day.

The plans for St. Thomas's Church were drawn, it is true, by the firm of Cram, Goodhue & Ferguson, and Mr. Cram, the other great exponent of the Gothic spirit in America, must share with Mr. Goodhue a certain amount of the credit of the design. But the church as we see it to-day is essentially Mr. Goodhue's.

Processional door.

Its exterior is picturesque. Asymmetrical, with a sturdy, square tower on one corner, balanced only by a delicate tourelle on the other side of its porch, the centre of the edifice is not placed in the centre of the plot. Its north wall is, you might say, a blind party wall, designed to become part of the business building that adjoins it. A deeply recessed portal shades handsome niches decorated with richly pierced canopies, and is surmounted by a beautiful rose-window with elaborate traceries, above which an open arcade, adorned with niches and crocketed pinnacles, stands silhouetted against the sky. All this richness of detail contrasts agreeably with the simple wall-spaces of the tower and of the massive buttresses that support the main walls. The detail is drawn from the creations of the later-Gothic builders, and its delicacy and elegance make St. Thomas's appear less robust than some of Mr. Goodhue's other churches, notably St. Vincent Ferrer's.

Along the south side of the edifice, in the side-street, lies a chapel used for weddings and lesser ceremonies, that is entered by its own delicately sculptured doorway. Behind this chapel rise the arcades and mullioned windows of the Parish House, capped by an octagonal tourelle. Above these buildings runs a long range of clerestory windows that forms one of the finest features of the fabric.

The interior of St. Thomas's produces a profound impression of dignity and harmony of proportion, and again evinces Mr. Goodhue's conspicuous talent for creating living architecture, for although a new church, it already has the tone of an edifice that has existed for many years. The stonework, of Kentucky sandstone, is warm and ingratiating in color, the joints being emphasized with dark-gray cement. The nave is broad and lofty and so arranged that practically all seats command a view of the pulpit and altar. Its massive piers are devoid of capitals. Engaged in them, slender ribs rise unbroken from the floor to the spring of the main vaults poised high overhead. Along each side of the nave run narrow aisles, whose places in the façade are marked by the two picturesque little doorways at each side of the main portal. The north aisle is bordered by the simple masonry of the great blank wall to which I have alluded, while the south aisle opens into the chapel to which I have referred —a chapel with its own polychrome altar, its own aisle and pews, and with low vaults that support a gallery that adds materially to the seating capacity of the main church.


Through the nave, looking toward chancel.

But, from the very entrance, the eye is immediately attracted by the exceeding richness of the chancel, where the great reredos—a gigantic work of art only just completed—rears itself aloft, piling its niches, its sculptured figures, and its pinnacles from the altar to the topmost curve of the main vaults of the church, a height of some eighty feet.

This reredos is, I believe, one of the greatest accomplishments in modern ecclesiastical art. The union between architect and sculptor seems quite complete. Its several tiers of niches, peopled with saints and prophets, with great reformers and dignitaries of the Christian Church, rise one upon another, cut in stone of the same warm character as the rest of the church and forming an integral part of it. These niches are shaded by richly carved canopies and separated by slender columns or by delicate buttresses ornamented with exquisite detail.

Toward its summit, the reredos is pierced by three openings, that reveal windows which, though not intended to be permanent, are glazed in the rich, jewel-like tones of the glass at Chartres.

Immediately above the high altar, which in itself is extremely simple, in a deeply recessed porch, stands a group of figures that depict St. Thomas kneeling as he recognizes the Risen Christ. Above this porch towers a great cross, surmounted by a crown of thorns, capped by a diadem, and surrounded by adoring angels enclosed in a flat panel whose frame is embellished with scrolls and foliations, and with shields showing the implements of the Passion.

Above the cross again, in a glorified calvary, appear life-size figures of Christ, St. Mary, and the Beloved Disciple, while in niches above these and about them appear apostles and saints, missionaries and reformers, divines of the Episcopal Church in England and America. All these figures have been carefully studied in their relationship to each other and to the whole, and produce that wonderful impression of richness combined with order, of dignity combined with grace, that quite overpowers the beholder in the storied retables of Italy and Spain.

The work of the sculptor forms no mean part in the success of this accomplishment, for, as in much of the late-Gothic work, the stonecutters art almost overshadows that of the architect.

When I asked Mr. Goodhue how far his plans went toward determining the actual detail of the sculpture, for reply he showed me the three-quarter-inch-scale drawing of the reredos, a vast drawing on which are plainly indicated the position and attributes of each figure and a clear suggestion at least of all of the ornament. He also showed a section of the entire work as well as plans made at a number of different levels, at every height, indeed, where the plan changed materially, with the profiles of the mouldings, the depths of the niches, the diminishments of the buttresses—all the complications and intricacies, in short, minutely worked out. He dwelt too upon the zeal and the quality of the work of his assis-

St. John the Baptist.

St. Thomas.

tants, Messrs. Jago and Murray, to whom he unselfishly gives much credit.

From their plans the sculptor, Mr. Lee O. Lawrie, took up his problems one by one, and for each problem he modelled his figure or his ornament. He has, I think, succeeded to a remarkable degree in imparting the Gothic spirit to his work, as the details reproduced with this article will show. His figures of the early saints and martyrs—St. Francis or St. Athanasius, for example—have that suffering, mystical aspect so characteristic of true Gothic statues, their thin draped figures treated with the elongations so loved by the mediæval sculptors, who sought, by means of them, to tie their statues to the perpendicular lines of the architecture about them. In his more modern figures of the prelates of the English Church—Canon Liddon, Bishop Selwyn, Bishop Payne—he has individualized his personages, basing his portraits on reliable data without departing too much from the proper decorative spirit, adjusting each figure successfully to the shape of the niche in which it belongs and to the general Gothic spirit of the reredos.

These qualities are equally apparent in his sculptured ornament. His birds and beasts, his foliations and traceries, have been designed to fit their spaces nicely and in proper scale, enhancing, with their varied detail, the amazing richness of the whole. The actual cutting of the stone was done by Ardolino Brothers, who have seconded the architect's intention by leaving their work in the rough, so to speak; that is, devoid of those finished and polished surfaces that are so out of the spirit of Gothic sculpture.

When one approaches the reredos for a nearer view of its manifold details, one perceives that the sedilia also, as well as the stalls, the pulpit, the lectern, and the organ case, have been elaborately enriched by a wealth of wood-carvings done under Mr. Goodhue's supervision by the firm of Irving & Casson—A. H. Davenport Co., of Boston and New York.

The choir is separated from the nave by a parapet or railing made of inlaid stone and marble. At one end of this rail rises the pulpit, at the other end the lectern. The pulpit is unusually ornate. It is octagonal in shape, each of its

(*Continued on page* 198.)

Fronts of Choir Seats.

Parapet over Choir.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Fronts of Choir Seats.

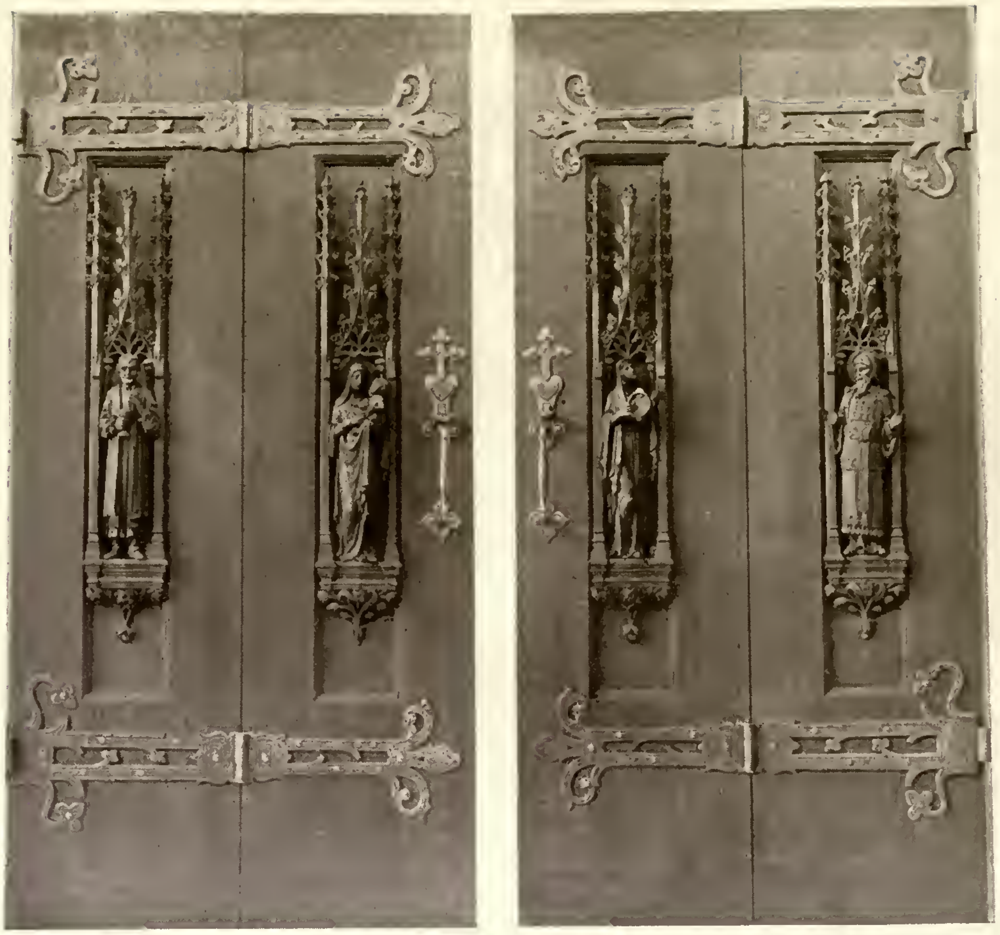
Clergy Stalls.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

(*Continued from page 195.*)

exposed faces being decorated with three figures of renowned churchmen separated from each other by slender buttresses that uphold canopies of the richest flamboyant style. The pulpit hood is also decorated with carved ornament and a particularly beautiful cresting. It is tied by arches and crocketed pinnacles to the organ case, that rises high above it enriched also with elaborate carvings.



The doors of the aumbry.

Each side of the chancel is lined with stalls for the choir and clergy. Those along the wall are provided with pierced canopies of flamboyant design and with misericordia carved with fantastic animals and birds. The backs of the book-rests in front of each seat are carved with Biblical scenes—David and Goliath, the Crossing of the Red Sea, and kindred subjects—the little wooden figures being treated with the naïve simplicity and exaggeration of proportions so common in the work of the mediæval sculptors.

But all of the scenes are not drawn from the traditions of the past. As this church furniture and the great reredos were designed and executed during the turbulent years of the World War, this fact is commemorated in a number of incidents. Portrait reliefs of the Allied commanders—Foch, Joffre, Pershing—and of the Allied rulers—Wilson and Poincaré, Victor Emmanuel and George V—occur in the stonework, while in the panels carved in the woodwork appear the Sinking of the *Lusitania*, Allenby as he enters Jerusalem, and other episodes of the great war. On the parapets of the rector's and curates' stalls are carved the coats of arms of the Allied nations, while the mosaic of Rheims Cathedral on the chancel-rail is made of stones that actually were brought from the martyred cathedral. In the cove of the parclose screens the ribs terminate in a number of portrait heads, among which may be recognized those of the donor, the organist, the wood-carver, and the rector, Doctor Ernest M. Stires, who is responsible for the final choice of subject of most of the sculptured detail. There is, indeed, a wealth of incident quite beyond description, surpassing anything of the kind that I can recall.

One of the bishops—panel on back of sedilia.

And all this is quite as it should be, marking for future generations the historic epoch in which this great work of art was created, stamping it with the history of its day, even to the semijocose utilization of such motives (carved on the misericordia) as the prohibition movement and the ultimate consumer crushed between Capital and Labor.

But these are mere details made for the edification of those of a literary turn of mind. The dominant effect produced by St. Thomas's Church upon the beholder has nothing to do with these.

When one considers its interior as a whole, one forgets details and remembers only an impression of vast and harmonious proportions, of soaring arches and strong


The assistant rector's seat.


Ends of choir seats.

pillars whose perfect proportions and perfection of alignment accord well with the stately and ordered decorum of the Anglican Church. But even taking these facts into account, the elements that go to make up the beauty of this edifice are more complex. It is, for instance, admirably lighted, and so its light plays a conspicuous part in the general harmony of the whole, sifting down in medium intensity from the huge glazed spaces of the clerestory windows, creating a restful atmosphere of quiet and tranquillity.

It bathes the simple surfaces of bays and walls with a soft effulgence in which, as in the compositions of the great Spanish architects, whose work Mr. Goodhue loves so well, the great reredos forms the one spot of rich detail, gleaming at the end of the chancel like a costly jewel set in its plain setting.

Courses in Architecture at Columbia University—Summer Session

THE architectural school, which this summer offers more than twenty intensive courses, has adopted many of the army methods of training men in both theory and practice for practical work.

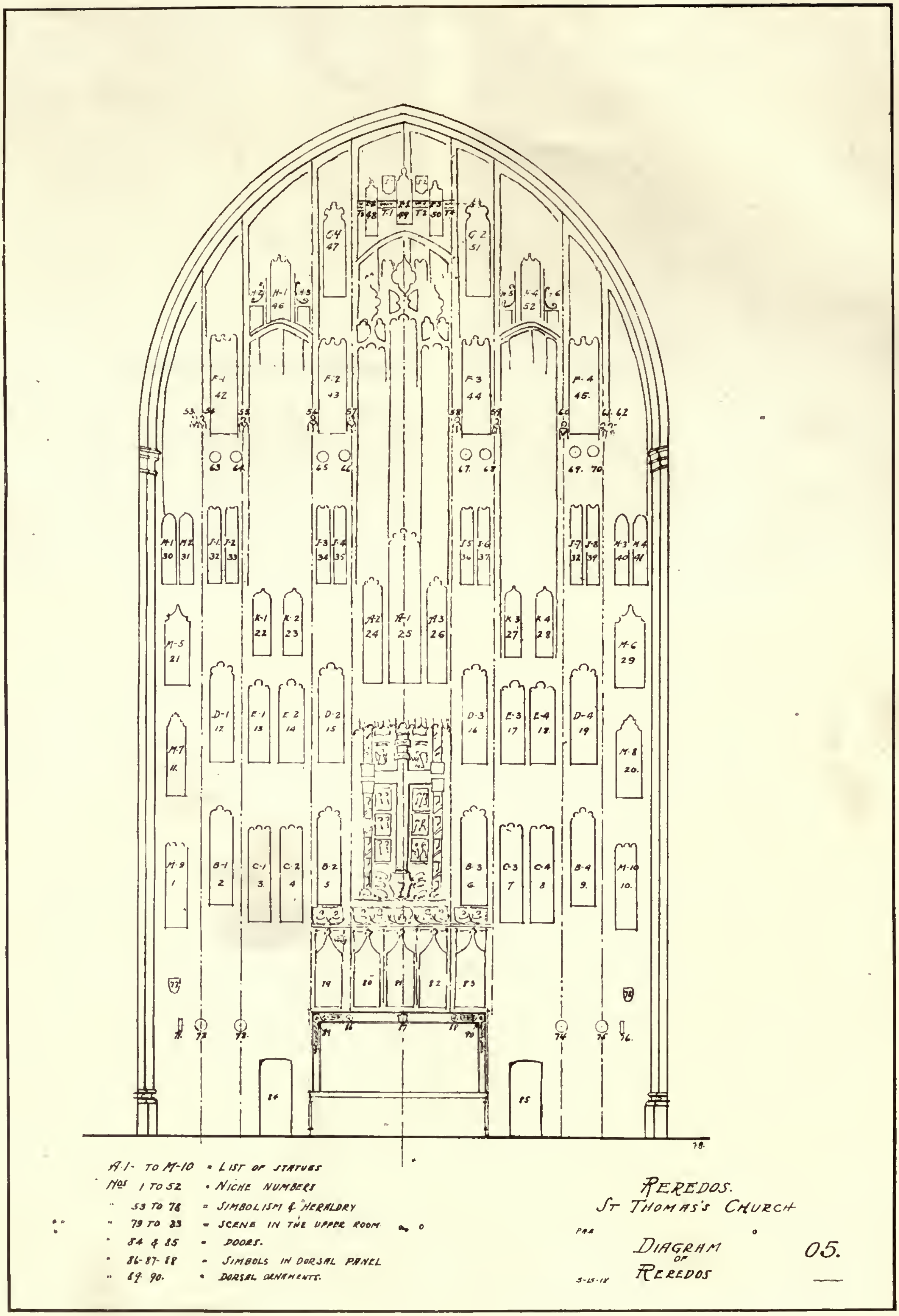
The courses have been so arranged as to be of particular value in view of the evident portent of the coming building boom, which will make a great demand for practical architects. H. V. Walsh will be departmental representative for the work, which will count toward the degree in architecture for students who have satisfied the entrance requirements and are open to all qualified students without examination.

The elements of free-hand drawing, lettering, drawing geometrical figures from dictation or diagrams, ornament forms in outline, simple architectural details, isometric projections, outline sketching from flat casts and from models will be taught by George Marcus Allen, instructor in graphics at Columbia, in a course which covers the requirements of the College Entrance Examination Board in free-hand drawing.

Professor Charles A. Harriman will give two courses in the elements of design, in one of which he will be assisted by Mr. Allen. Courses in elementary design, intermediate design, and advanced design will be given under M. Maurice Prevot and A. E. Flanagan.

For students beginning the study of architecture a course in architectural drafting covering drafting as seen from the architectural point of view, visualization, use of instruments, alphabets and lettering, standard drafting practice, symbols and indications of frame, brick, and stone construction, materials and fixtures, working drawings, large-scale drawings, architectural and structural details, sizes and space allowance for fixtures will be given by Mr. Allen.

Professor Harriman will give courses in charcoal drawing, pen-and-ink drawing, and pencil drawing, and Joseph Lauber will give an elementary and advanced course in water-color drawing. Courses in shades and shadows and perspective will also be offered. Surveying courses to be given at Camp Columbia, Litchfield County, Connecticut, will be open to students in architecture.


A·1· TO M-10 · LIST OF STATUES
NOS 1 TO 52 · NICHE NUMBERS
" 53 TO 78 = SIMBOLISM & HERALDRY
" 79 TO 83 - SCENE IN THE UPPER ROOM
" 84 & 85 - DOORS.
" 86-87-88 - SIMBOLS IN DORSAL PANEL
" 89 90. · DORSAL ORNAMENTS.
REREDOS.
ST THOMAS'S CHURCH
DIAGRAM OF REREDOS
05.

St. Thomas's Church

Cresting Under the Central Panel of Reredos. (Model.)

Subjects of Carving on the Chancel Fittings

Subjects of Cut Stonework in Parapet

Emblems of the Church

22. Ship.
23. Lighthouse.
24. City of Refuge.
25. Kingdom of God, tree, fowls.

The Church of America

26. 1607, Jamestown—First Communion.
27. Independence Hall, 1776.
28. 1865, Blue and Gray.
29. Rheims Cathedral, 1918.

Subjects in the Wood-Carvings

Figures on Balcony at end of Aisle

Presbyterian Church in the U. S.
Church of England.
Greek Church.
Church of Rome.
Church of the United States.
Council of the Church, U. S.

Figures in Pulpit

Henry Parry Liddon, Canon of St. Paul's.
John Henry, Cardinal Newman, oratorian.
William C. Magee, Archbishop of York.
John Wycliffe, Rector of Lutterworth.
John Chrysostom, Bishop of Alexandria.
Girolamo Savonarola, O. P., Florence.
Frederick W. Robertson, incumbent of Trinity Church, Brighton.
John Wesley, sometime Fellow of Lin. Coll., Oxon.
Frederick Denison Maurice, a noted English divine.
Jean Baptiste Massillon, Bishop of Clermont.
Jacques Benedict Bossuet, Bishop of Dijon.
Frederic Monod, fundator of the Evangelical Church of France.
Henry C. Potter, Bishop of New York.
Phillips Brooks, Bishop of Massachusetts.
Thomas Underwood Dudley, Bishop of Kentucky.
Canon Farrar, Dean of Westminster.
William Boyd Carpenter, Bishop of Ripon.
Frederick Courtney, Bishop of Halifax.
W. R. Huntington, Rector of Grace Church.

Figures in Rector's and Assistant's Seat

Rector's Side

Beginning at north side:
1. Dante.
2. Jeremy Taylor.
3. Augustine (on front).
4. Thomas à Kempis.

In back of seat:
The Ascension.

Assistant's Side

1. Chaucer.
2. Shakespear.
3. Pusey.
4. Milton (on front).
5. Bunyan.

In back of seat:
Council of Nicæa.
In front of desk:
Conversion of St. Paul.
The organists on the two rows of seat ends on the west front—
Reading left to right, west front:
1. Merbecke.
2. Farrant.
3. Gibbons.
4. Purcell.

Reading left to right, east end:
1. Croft.
2. Boyce.
3. Nares.
4. Purcell.

Miserere Seats

Epistle side, starting from east end:
1. Lion eating straw like the ass.
2. The dove and ark.
3. The cow and the bear shall feed . . . together.
4. The swallow has built her nest upon thine altar, O Lord.
5. The wolf and the lamb.
6. A phœnix—copy of an ancient miserere.
7. Young lions seeking their prey.
8. Foxes have their holes, etc.
9. The Russian bear being doped.
10. The Gallic cock.
11. Vine (Rector's seat).

On the north side, starting from the west end:
12. Salvation Army lass with doughnuts.
13. Out of the strong cameth forth sweetness.
14. The American eagle plucking the imperial eagle.
15. Prohibition overturning Bacchus.
16. St. George and the Dragon.
17. The Ethiopian eunuch baptized by Philip.
18. St. Christopher, patron of those who travel.

Emblems on seat ends:
S.E. Our Lady's Jester.
N.W. "Sursum Corda" (the ancient notes).
S.W. The honey-bees.
N.E. Cock.

St. Thomas's Chancel Fittings

Emblems along front of boys' desks, starting from the east end, Epistle side:
1. Doctors.
2. Engineers.
3. Bankers.
4. Authors.
5. Architects.
6. Musicians.
7. Wireless.
8. Railway.
9. Blacksmiths.
10. Telephone.
11. Sculpture.
12. Steamship.
13. Shield of Roosevelt.
14. Christopher Columbus (shield with ship).

North side starting from the west end:
1. Henry Hudson (shield with his ship).
2. Abraham Lincoln.
3. Airplane.
4. Painting.
5. Automobile.
6. Fulton's steamboat.
7. Telegraph.
8. Airship.
9. Woodcarver.
10. Cotton.
11. Electrical.
12. Iron, steel.
13. Teachers.
14. Lawyers.

Scenes carved in fronts of clergy kneeling-desk, starting from east end, Epistle side:
1. Adam and Eve expelled.
2. Sacrifice of Isaac.
3. Jacob's Dream.
4. Crossing the Red Sea.
5. David and Goliath.
6. Solomon building the Temple.
7. Elijah rebuking Ahab and Jezebel.
8. Belshazzar's Feast.
9. Nehemiah rebuilding Jerusalem.

North side starting from the west end:
1. Allenby entering Jerusalem.
2. Missions.
3. Cranmer, Latimer, and Ridley.
4. St. Paul, Mars Hill.
5. Pentecost.
6. Feeding the multitude.
7. Magi.
8. Nativity.
9. Church in America.

Gargoyles in cove, starting from the east end, Epistle side:
1. King of England.
2. King of Belgium.
3. Clemenceau.
4. Poincaré.
5. Lloyd George.
6. Haig.
7. English admiral.
8. Joffre.
9. Aviator.
10. Gob.
11. Ordnance.
12. Red Cross nurses.
13. Doctor Noble (organist).
14. Mr. Steele (donor).
15. Mr. Goodhue (architect).
16. Doctor Stires.
17. Mr. Casson (woodworker).

Starting from the west end:
1. Mr. Irving (woodworker).
2. Cardinal Mercier.
3. Burgomaster Maxe.
4. Bishop Brent.
5. Bishop Burch.
6. Artillery.
7. Red Cross.
8. Private.
9. General Allenby.
10. Mr. Hoover.
11. General March.
12. French admiral.
13. Foch.
14. Pershing.
15. American admiral.
16. King of Italy.
17. Paderewski.
18. President Wilson.

Sedilia

On Top:

Emblems of the Four Evangelists.
Three Bishops:
Bishop Courtney.
Bishop Whitehouse, Illinois.

Bishop Mackay Smith, Pennsylvania.

Four Deacons: St. Stephen, St. Philip, St. Lawrence, St. Francis.

On arms of Bishop's and Priests' seats:

Moses, Aaron, Timothy, Titus, Ignatius, Polycarp.

On fronts:

Consecration of Bishop White.
Consecration of Bishop Seabury.
Charge to St. Peter.
St. Paul laying on hands.
Bishop Greer laying foundation-stone of St. Thomas's.
Bishop Greer consecrating St. Thomas's.

List of Statues, Symbolism, and Heraldry for the Reredos

A–1. Our Lord. Two shields, five wounds.
A–2. Blessed Virgin Mary, in tunic, mantle, and veil. Shield, lily combined with monogram.
A–3. St. John the beloved Disciple, in tunic and mantle. Shield, chalice with protruding serpent.
B–1. St. John Baptist, holding lamb on book, clothed in camel's-hair rug.
B–2. St. Paul the Apostle. Shield, three fountains.
B–3. St. Peter. Shield, two keys crossed.
B–4. St. Thomas. Shield, spear on square.
C–1. St. Matthew. Shield, angel.
C–2. St. Mark, Evangelist. Shield, lion.
C–3. St. Luke, Evangelist. Shield, a bull.
C–4. St. John, Apostle and Evangelist. Shield, eagle.
D–1. St. Bartholomew. Shield, knife and book.
D–2. St. James Major. Shield, hat on staff and two shells.
D–3. St. Andrew. Shield, St. Andrew's cross.
D–4. St. Matthias. Shield, book and scimitar.
E–1. St. Philip. Shield, cross between two loaves.
E–2. St. James the Less. Shield, saw.
E–3. St. Simon. Shield, two fish.
E–4. St. Jude. Shield, boat.
F–1. St. John Chrysostom. Shield, beehive.
F–2. St. Athanasius. Shield, two columns.
F–3. St. Jerome. Shield, lion.
F–4. St. Augustine. Shield, flaming heart pierced with arrow.

Eight Emblems Across Reredos Below the Above Emblems of Old and New Dispensations:

1. Flood—Ark.
2. Divine Presence—Ark of the Covenant.
3. Crucifixion—Brazen serpent.
4. Resurrection—Jonah and whale.

Four New (Right)

1. Annunciation, Nativity—Lily and star.
2. Crucifixion—Three crosses.
3. Resurrection—Open tomb.
4. Church—Ship over crossed keys.

Arts and Crafts of the Church

Ten figure subjects—upper part of reredos:

1. "Setting out" the stonework.
2. The stone-carver.
3. The secretary.
4. The donor of the reredos.
5. The rector.
6. The architect.
7. The draftsman.
8. The sculptor.
9. The plasterer.
10. The stone-setter.

Six emblems of Our Lord circled by wreaths in lower part of buttresses, left to right facing:

1. Flaming sun.
2. I. H. S.
3. Dolphin.
4. Three fish.
5. X. P. S.
6. Phœnix.

Two small shields, one at extreme end in lower portion:

Cross and candlesticks—left facing, The Church.
Seven-branched candlesticks—right facing, The Synagogue.

G–1. St. Stephen, protomartyr, vested as a deacon. Principal shield, dalmatic with five stones. Twelve minor shields, dalmatic, letter S and three dice variants.
G–2. St. Philip the Deacon. Shield, three crowns.
H–1. St. Polycarp. Shield, burning fagots.
H–2. Savonarola.
H–3. St. Gregory the Great.
H–4. St. Francis of Assisi.
H–5. St. Ignatius.
H–6. St. Cyprian.
I–1. Angels holding innocents. Text across group.
I–2. Angels holding innocents.
I–3. Angels holding innocents.

Two shields flanking central "innocent":

Arms of see of New York (left facing), arms of parish (right).

J–1. Restitutus.
J–2. St. Columba, abbot of Iona.
J–3. St. Augustine of Canterbury. Shield, font.
J–4. St. Theodore, Bishop of Canterbury. Shield, arms of Canterbury.
J–5. St. Bede the Venerable—monk of Jarrow.
J–6. Wycliffe, in mass vestments. Shield, morning star of Reformation.
J–7. Cranmer—Archbishop of Canterbury. Shield, arms of Canterbury.
J–8. Laud, Archbishop of Canterbury. Shield, arms of Canterbury.

Missionaries:

K–1. Selwyn (George Augustus), Sometime Primate of New Zealand. Shield, arms of Christ Church.
K–2. Patteson (John Coleridge), Bishop of Melanesia. Shield, arms of Melanesia.
K–3. Payne (John), Bishop of Cape Palmas. Shield, mitre and staff with "Palmas."
K–4. Williams (Channing Moore), Bishop of Yedo. Shield, mitre and staff with "Yedo."
M–1. Hooker, rochet and chimere.
M–2. Butler, rochet and chimere.
M–3. J. Wesley in surplice and stole.
M–4. Canon Liddon—as a canon of St. Paul's.
M–5. Gladstone, over. Shield, Gladstone arms.
M–6. Seabury, first Bishop of Connecticut, rochet and chimere. Shield, Seabury arms.
M–7. White (William), first Bishop of Pennsylvania. Shield, arms of diocese.
M–8. Washington. Shield, his arms.
M–9. Phillips Brooks, Bishop of Massachusetts, rochet and chimere. Shield, arms of see of Massachusetts.
M–10. Tuttle, Presiding Bishop (Missouri), rochet and chimere. Shield, arms of Missouri.

Emblems in central portion of reredos—main panel:

Scene in the upper room from the life of St. Thomas from St. John's Gospel, 20th chapter, Christ showing his wounds to the doubting Apostle.

Panel of the cross:

Cross of the vine rising from shield containing a chalice circled by crown of thorns and with text, "This do in remembrance of me."

Cross crowned, and below angels bearing superscription with monograms I N R I Ribands circling angels containing inscription: "The leaves of the tree were for the healing of the nations."—Rev. 22 : 2.

Lower portion contains six panels of angels as originally modelled by Saint Gaudens, separated by the words of the Te Deum, from "We praise thee, O Lord," to "Thou didst open thy Kingdom of heaven to all believers."

At the foot of the cross, lambs drinking from rivers, representing the means of grace.

Four emblems of the Evangelists at the ends of arms of cross—two at each end:

Matthew, angel, and Mark, lion (top), Luke, ox, and John, eagle (bottom).

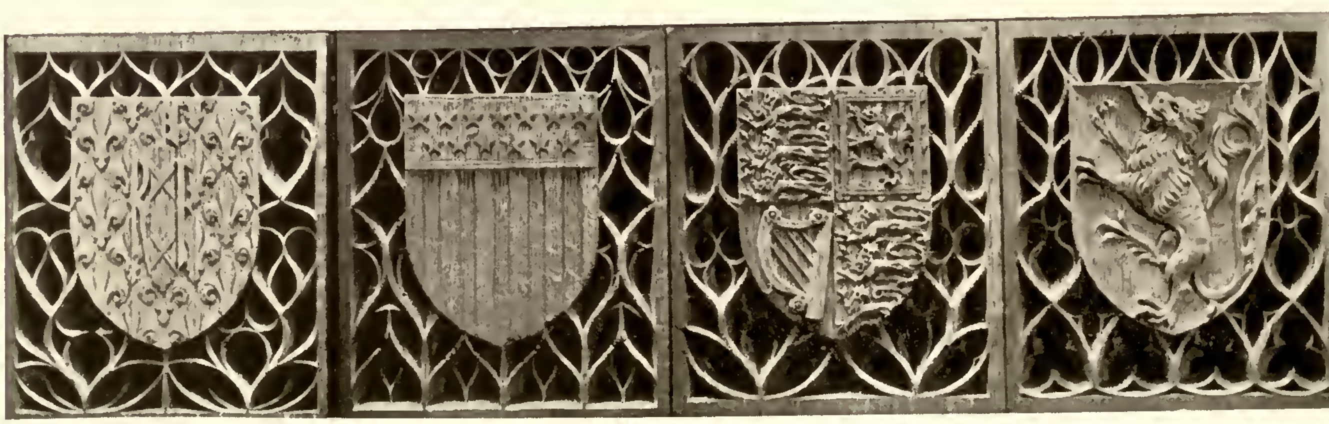
At each side are twelve emblems of the Passion. Left side facing, beginning at top:

1. Cock, with motto, "I know not the man," Matt. 26 : 72.
2. Money and bag, "I have betrayed," Matt. 27 : 4.
3. Basin and ewer, "I wash my hands," Matt. 27 : 24.
4. Column, "With his stripes."
5. Scourge, "He was scourged."
6. Lanthorn (no inscription).
7. Coat and dice, "They cast lots," John 19 : 15.
8. Crown of thorns, "They crowned him."
9. Hammer and nails, "They nailed him."
10. Cross, "If I be lifted up."
11. Ladder and spear, "They pierced my side."
12. Pincers.

Shield in middle of central panel above altar, arms of parish.

Shield in centre of face of mensa I–C–X–C–N–I–K–A, with cross.

In the two curves at the side above the windows are representations of 1. The Annunciation; 2. Adam and Eve expelled from Paradise.



Shields of the Allies.

Editorial and Other Comment

Industrial Housing

WE are indebted to Fred T. Ley & Co., Inc., for a pamphlet prepared by Mr. Leslie H. Allen on "Home Building for Wage-Earners." In it we find summarized with great clearness the result of wide experience in the construction of homes for industrial workers, both for the government and large private corporations. The subtitle, "A Financial and Economic Problem," best expresses the point of view of the discussion, and to this aspect of what is probably one of the greatest human problems of modern times the writer brings clear vision and an analysis of tried methods.

There is hardly a city or town in the country where the congestion has not become a menace to the general welfare of the community, or where varying methods of trying to solve the problem have not been considered. Housing shortage and labor shortage are bound together, and the solution of the first seems the essential step in making possible the resumption of production so vitally needed, if we are to find a way out of the prevailing high prices.

Our population has grown apace, our building construction in the way of homes has been almost at a standstill. The old days when a laborer would put up almost any sort of a hovel where he could sleep have gone with the coming of high wages. The workman of to-day demands and expects a comfortable home for himself and family, and goes where he can find them, for he is no longer at the mercy of mere local employment, but may choose the place and work that best provides the most favorable living conditions.

Former speculative building projects no longer even begin to meet the demand; in fact, they are no longer possible at present high costs and uncertainty of everything concerning building.

"What Is a Fair Rent?" "Resale and Repurchase," "Renters," "Financial Plans," "Loan Associations," "Methods of Selling," "The Copartnership Policy," "The Best Type of House," "Economy in Large-Scale Operation" are some of the very pertinent matters discussed by Mr. Allen. We commend these last two extracts for especial consideration:

"*Management.*—If a housing enterprise is to be really successful, too much emphasis cannot be laid on the importance of good management. One untidy or disorderly tenant can spoil the surroundings of a whole block. Destructiveness if not checked at the outset will soon ruin the best-built premises.

"Overcrowding must be prevented by proper restrictions in the leasing or selling of the property, and a district nurse or friendly rent-collector should make periodical inspections to see that the premises are kept clean and that the tenants are living decently."

"*Conclusion.*—During the war over one hundred millions were spent on housing. The evidence collected by government officials proved that good housing was necessary to reduce labor turnover, to increase production, to maintain health and efficiency, and to make men contented.

"We are now in a condition of industrial unrest where high turnover, low production, low efficiency, and industrial discontent are menacing national prosperity and happiness.

"The measures that were used to allay these troubles in time of war are equally needed now. Good housing was one of the chief remedies.

"Until every citizen has a place which he can think of with pride and affection as 'Home,' we shall not be enjoying to the full the *Life*, *Liberty*, and the pursuit of *Happiness* that is our national aim. We want America to be not merely a 'melting-pot' but the *Home* of every citizen.

"Home turn the feet of men that seek
And home the hearts of children turn."

Good for Detroit

WE have been reading with a mood of cheering optimism born of the text a pamphlet on the "Building Zone Plan for Detroit." One sentence gave us pause for thought, and brought pictures of certain localities in many of our Eastern cities that are even yet a disgrace to so-called civilization. Perhaps they are not as bad as they used to be, but bad beyond words they are even yet, and with the present congestion of population some of them will be very apt to revert to the worst conditions of the old days.

No wonder Detroit is proud when she can say: "This city is now free from the character of slums and tenement-house development existing in many Eastern cities."

Detroit has always been spoken of and looked upon as a city of homes, but "the intensity of the use of the land" is even there an increasing question. The manifest need for the multiple house will raise the intensity of population per acre, and the intrusion of the multiple house is apt to be, as the intrusion of the store, the garage, the factory, destructive of the character of an entire neighborhood.

Detroit has, too, her own very serious traffic problem, one of the most pressing of all cities, owing, no doubt, to its being such a great centre of the automobile industry.

Zoning regulations are being established all over the country, but the dead past will have to bury its dead, and with the present critical need for places where people may exist—we would not call it living—there may be an inevitable tendency to forego many of the gains already made.

"Increasing city growth causes more intensive residential development, which should be curbed in the interest of public health and safety. Studies of new multiple-house construction built under the pressure of a rapidly increasing population discloses in some cases a density of 1,000 persons per acre—an astonishing and alarming condition. If Detroit is to retain anything of its former pride as a city of splendid residences and homes, its present average density of population should be maintained in so far as possible."

A Great Ecclesiastical Monument

A LARGE part of this number of ARCHITECTURE is given to a presentation of the great reredos and the woodwork of St. Thomas's Church, New York, recently completed under the direction of the architect, Mr. Bertram Grosvenor Goodhue. We feel quite sure that most of our readers will think with us that we are justified in making this representative showing of a work of such great distinction. The church itself is one of the notable Gothic structures of the present day, and we know of few great churches in Europe where a reredos of such magnitude and beauty and such woodwork may be found. This, we sincerely believe, is a number of ARCHITECTURE that every subscriber will value highly as a record of a really great modern Gothic monument of art.

Mr. Goodhue, we are advised at this writing, has been chosen as the architect for the new capitol of Nebraska. Out of a list of ten competitors who submitted plans he was selected by a jury of three disinterested architects, Waddy B. Wood, of Washington, James Gamble Rogers, of New York, and Willis Polk, of San Francisco. The choice was confirmed by the members of the capitol commission comprising Governor S. R. McKelvie, of Lincoln, William H. Thompson, of Grand Island, William E. Hardy, of Lincoln, Walter W. Head, of Omaha, and George E. Johnson, state engineer. Thomas R. Kimball, advisory architect for the board, assisted the jury in its decision.

Co-operation

TO THE EDITOR OF ARCHITECTURE:

In the past year or so it has percolated through to some of the architectural profession that there exists somewhere in New York City a model co-operative multiple dwelling. This enterprise has been hailed as a means of lifting us out of the present money shortage for housing. The writer visited this group of buildings some time ago, and desires to correct some of the impressions which are given credence concerning it.

Assuming, like other architects, that it would be masterfully designed and set in a parked space, we passed it by without notice, but finally returned to the street number given me. We entered an ordinary building similar to the type with which Brooklyn, Manhattan, and the Bronx are too profusely provided. Upon being invited to enter one of the apartments, however, the spirit of the place became evident. The ideal that had been in practical operation was then explained by three or four of the co-operators.

First essential. The co-operators had inherited the science of co-operation, and desired to co-operate in the realm of home production. They did not by any means do this for the monetary saving alone, but they did it also for the peace of mind that was engendered, and which is so obvious even to a casual observer. Next, how did they proceed? They took the building plans to the usual loaning institutions and found out about how much they could borrow, just as any of us would do. Finally they borrowed from a very usual source. Then they made up the rest of the equity among themselves. This was the interesting part, for some of them had not sufficient capital to supply the fund necessary to enclose the space they were to occupy. But others among them were better supplied with money. Finally a group concurred that could aggregate the necessary amount. Here is the co-operative element. All had five hundred dollars, so they each put that in without interest and called it a share. Some had more, others a good deal more. They hired the additional "capital" necessary to make up the needed amount at the rate of 7 per cent per annum.

Now, after a few years' operation, intruders like myself discover them and they explain their creed, "one man, one vote, no matter how much money he may have brought to the enterprise." How different from the misnamed co-operative apartments which are springing up all over, and in which half of the occupants are stockholders and the other half tenants, with a real-estate firm to "manage" them. And so it came about in the South Brooklyn apartment that one chap with only five hundred dollars had as much say about the dwelling as another who had supplied twelve times as much. When asked about this, the co-operators answer: "Why should he not?"

There is a charm about this multifamily dwelling that is not discernible in the bricks and mortar. It comes from the character of these souls that trust and respect their friends and neighbors. Co-operation cannot be assumed lightly like the flinging on of a mantle, nor can it be superimposed. It is a deep and fundamental thing. Where is there any beauty in life, even in one's own individual castle upon one's own individual lot, if there is not accord with our neighbor on the right and left and front and rear? This is all too seldom the case in our suburbs, with all of their wealth and exterior beauty.

These co-operators were trained in co-operation in a foreign land, and for them co-operation is akin to religion. It would not seem to be a sound policy of Americanization if we should attempt to turn these more recent arrivals into sordid individualists. The future greatness of America will be built by learning from them and by incorporating into our national life much of their spirit.

Very truly yours,
HENRY ATTERBURY SMITH.

Announcements

We are in receipt of a letter from Mr. H. Van Buren Magonigle from which we quote the following regarding his reported comment on the Bahai Temple published in our June issue:

"I did say that I had never seen anything quite like it; that it was referable to no style with which I am familiar, but it seemed to belong to the school of which Louis Sullivan is the leader and chief exponent; I also said that I should like to see 'how it would work out in execution,' and when executed I strongly advised that the upper part be revolved on the central axis so as to bring the apparent thrusts of the upper buttresses to the angles of the lowest story instead of over the voids."

G. C. Freeman, architect, announces the removal of his office from 1111 North 11th Street to the Reading Liberty Bank Building, opposite the Court House, Reading, Pa.

Brentwood S. Tolan, architect, Rooms 316–317 Farmers Trust Building, Fort Wayne, Ind., announces that he has re-established his office at Fort Wayne, Ind., and that he will be pleased to receive catalogue and samples.

Grosvenor Atterbury, Stowe Phelps, and John Tompkins announce the removal of their architectural offices to 139 East 53d Street, New York City.

We are in receipt of "The Dunham Hand Book No. 114, The Dunham Heating Service, Chicago," a little reference of practical service to all interested in heating problems, and one that architects will be glad to have available.

We also wish to acknowledge the receipt of the booklet on "Quarter Turn Padding Lock Valves," published by Gorton & Lidgerwood Co., New York.

St. Thomas Acknowledges Our Lord.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

The Recognition of the Risen Christ by St. Thomas. Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Central Panel of the Cross, with Adoring Angels. Originally Designed by Saint-Gaudens. Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

St. James and St. Andrew, Either Side of the Canopy Over the Cross.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Our Lord with St. Mary and St. John, Immediately Over the Cross.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

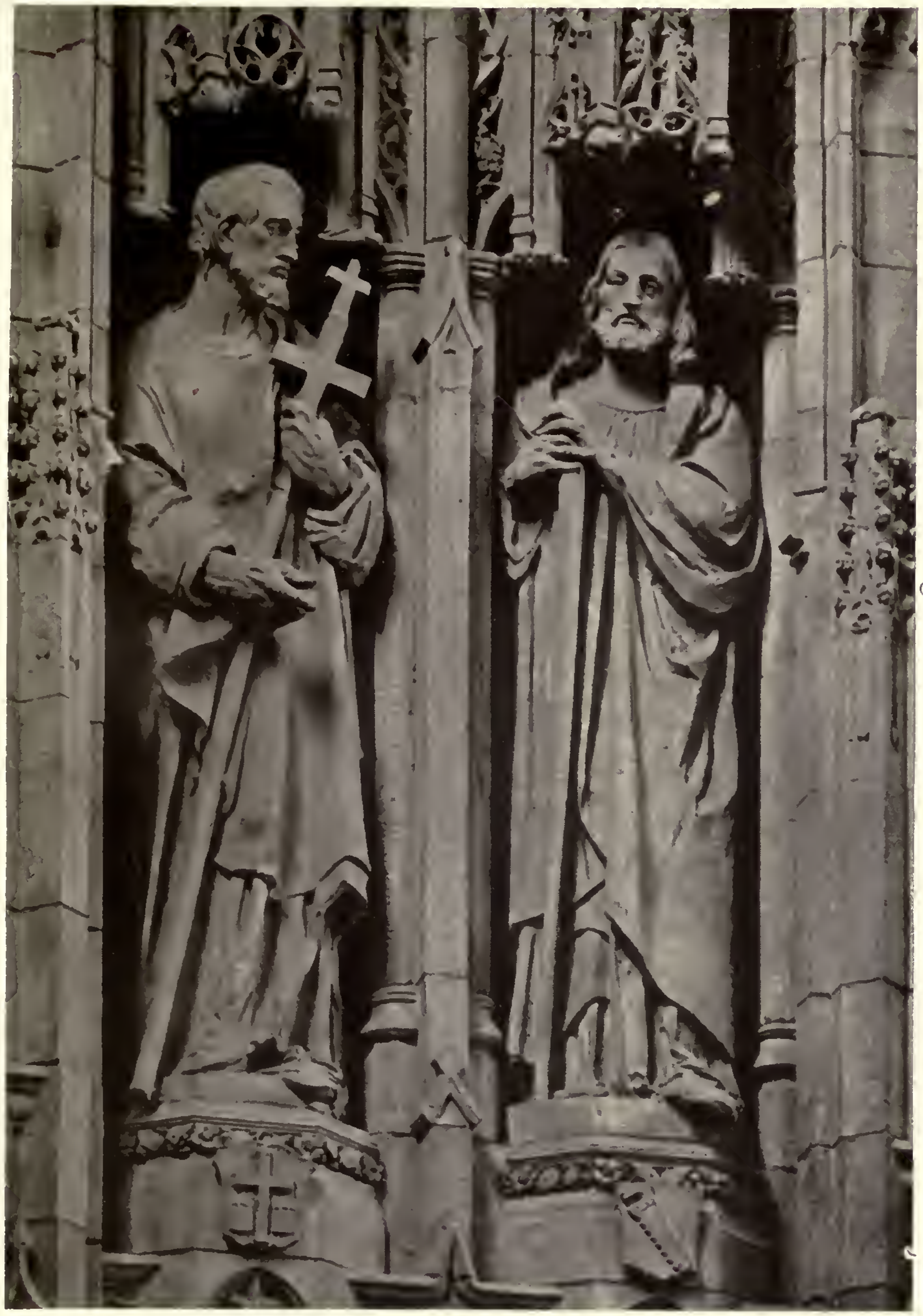
A Group of Apostles. At Right-Hand Corner, Bishop Tuttle, of Missouri.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Two Missionary Bishops: Bishop Selwyn, Primate of New Zealand, and Bishop Patterson, of Melanesia. Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.



St. Philip and St. James the Less.

St. Matthew and St. Mark.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

The Pulpit and Rector's Stall.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

The Lectern.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

The Bishop's and Priests' Seats.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Sedilia.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Front of the Kneeler, Assistant Rector's Stall.

Back of Assistant Rector's Seat.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

End of Choir-Stall.

End of Choir-Stall. — Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

One of the Canopies of the Stalls. The Rector and the Architect.

Back of Rector's Stall.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.

Crossing the Red Sea.

Adam and Eve Expelled.

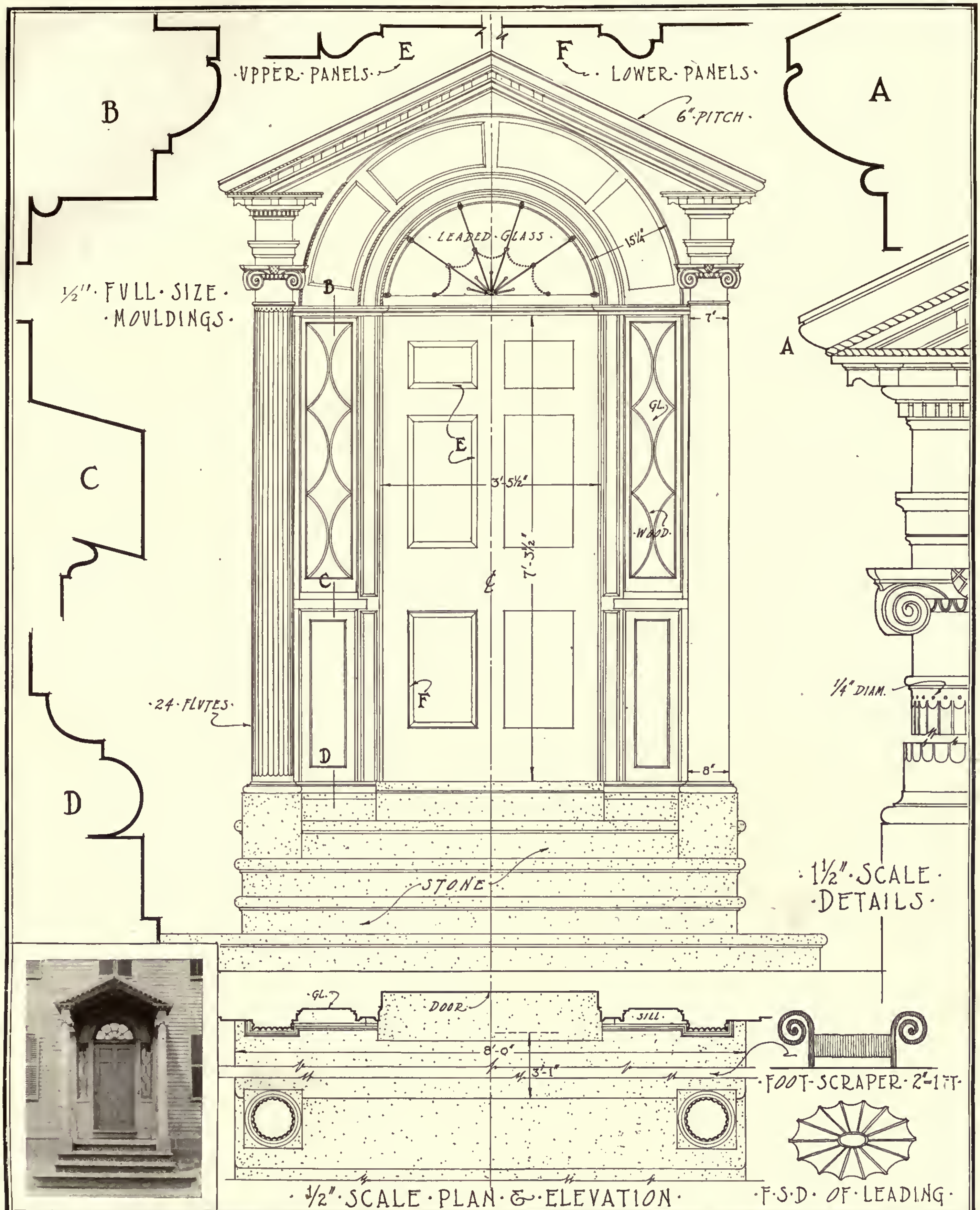
The Fronts of the Kneelers of the Clergy Stalls.

Miserere—St. Christopher, Patron of Travellers.

Miserere—St. George and the Dragon.

Bertram Grosvenor Goodhue, Architect.

REREDOS AND CHANCEL, ST. THOMAS'S CHURCH, NEW YORK.



·EARLY·ARCHITECTURE·OF·CONNECTICUT·

·DOORWAY·OF·A·HOUSE·
·AT·144·OLIVE·STREET·
·NEW·HAVEN·CONN·

·MEASURED·BY·
·J·FREDERICK·KELLY·
·DRAWN·BY·
·LORENZO·HAMILTON·

The Module System in Architectural Design

From a book in preparation by the author on "Economic Design and Construction of Small Houses"

By Ernest Flagg, Architect

DESIGN by the use of a modulous, or fixed measure, is evidently of very ancient origin; but not much used now, and one hears little of the module except in connection with the architectural orders.

My own attention was first called to the desirability of this method of planning almost by accident. While working on a design when a pupil at the Ecole des Beaux Arts in Paris, it occurred to me to save time and trouble by drawing in the axis lines all at once. When that was done, the paper was covered by squares, so nearly of a uniform size, that I determined to make them uniform and see what would happen. This necessitated a number of slight changes in the design, which to my surprise seemed greatly to improve it; and the thought suggested itself, that perhaps this uniform measure, pervading all parts of the composition, and simplifying it, might, if properly used, serve like time in music to give that harmony of proportion for which I was otherwise blindly groping. And is it not reasonable to suppose that this may be so, for what is artistic proportion but harmony of dimensions? It seemed to me that the slight correction of what had been drawn, to fit it to the fixed unit which now governed, added charm which was otherwise lacking; and I have repeatedly noticed the same effect in subsequent work. As in music, even the unskilled ear may be offended by a mistake in time, without discerning the cause; may not also a mistake in the harmony of dimensions unconsciously offend us in design?

Having become convinced that the principle was right, I determined to use it as soon as an occasion should offer. That came in the very first building for which I was architect—St. Luke's Hospital, New York. From calculations I found that a convenient module in this instance would be 2′ 2¾″, and upon that unit the entire plan depends, from its layout on the ground to the spacing of the modillions of the cornice. In marking the modules by the modillions, I thought with some pride and satisfaction that they might serve to indicate the harmonic scale of the plan, and show how I had obtained the good proportions which I fondly believed the buildings in some measure possessed, but the module was not used for heights.

The second building in which I was able to use the system was the Corcoran Gallery of Art, Washington, D. C. Here the module was 3′ 6″. I marked the module lines on the structure, by the points on the chéneau, and the short pilasters between the pierced panels of the *claustra* mark every second module. At that time, before I had learned what a small estimate would be placed on my work, and filled with the enthusiasm of youth, I wondered whether the meaning of this harmonic record might not some day be recognized.

Since then I have used the system in buildings, public and private, for hospitals, churches, warehouses, office-buildings, hotels, mansions, and cottages. Even for tenements it has worked well, and plans for several large groups of model fireproof tenements were made in this way. In the Naval Academy at Annapolis the module is 8′ 4″ and that unit governs both the plans of the buildings themselves and their arrangement on the grounds.

I mention all this simply to show the adaptability of the system for all sorts of buildings, and my experience in its use.

For the last two or three years I have been engaged in the preparation of a book on the economic design and construction of small houses—the result of many years of study and experiment in that field. The work will consist of a number of essays, each dealing with a particular point in construction or design, of which this module system of planning is one, and also of drawings explanatory of the processes used and the results obtained.

There are more than sixty designs, each representing a different type of plan, or a very important modification of a common type. Here, then, in a restricted programme, that of a small house with the ordinary accommodations, there is great variety of treatment; yet the same module governs throughout, both horizontally and vertically.

I have used the module system in planning so long that I have become well acquainted with its properties. I think I realize both the advantages and danger in its use. Like fire, it is a good servant, but a bad master. The danger is that it may lead to a cramped and mechanical design. One may easily become a slave to the module, and do things because of it, which his taste or reason would not otherwise commend. The advantages in its use are great. It is the easiest and surest way of obtaining harmony of dimensions and commensurability in all parts of the design. It is the simplest way of designing, and the most convenient and economical in execution. How can the danger in its use be avoided and the benefits secured?

It was only quite recently, while examining Laloux's restoration of Olympia, that the thought flashed on me as to what might be the true meaning of the Greek triglyphs. Did they not indicate the module used? Were they not the record of the harmonic scale of the monument? Had not these buildings been designed by the same method I had for so long been using? And had not the builders marked their scale on the work, just as I had marked mine, and for the same reasons?

When I had drawn out the plans of several of these buildings, having first ruled the sheets with the module lines as indicated by the triglyphs, I had no doubt that this conjecture was correct. What was my surprise and satisfaction to find that methods which I had by long practice found to be best, were apparently the very ones used; and also to find that the one danger, which I had always recognized and supposed inherent in the system, was, by a very simple expedient which I had never thought of, completely removed.

I know from my own experience that when one uses a module in architectural design in the manner described, the temptation to indicate it on the structure is almost irresistible. It is the natural thing to do. One does it almost instinctively, and in looking back over my own work I find that in every instance where this system was used, in some way, the imprint of the module appears on the building, and I am firmly convinced that a Greek architect of the great epoch would no more have thought of omitting the mark of the harmonic scale of proportion, on which the design was based, than would the composer of music think of omitting the harmonic scale of his composition.

If one will take the plan of any ancient Greek Doric temple and draw lines through it in both directions from the centres of the triglyphs, he will see that the lines so made undoubtedly formed the basis of the design. He will also see that in general care has been taken by the designer to use the lines rather than their intersections. While the module lines govern, their points of intersection are for the most part avoided. With the Greeks it was not a system of ordinates. Thus all danger of a cramped or mechanical plan was completely removed.

In peripteral buildings the outside of the lateral walls of the cella generally follow very closely the third module lines. The main columns never stand at the intersection of the module lines, and it was probably to avoid such intersections that the end intercolumniations differ from the others. In the most ancient example, the Heræum at Olympia, the module lines of the main order govern inside the cella also, but in later buildings it often happens that an auxiliary module is used for the interior, which coincides only at a certain point or at points with the main one. In the Parthenon there seems to have been more than one of these auxiliary scales, and even the second row of columns at the ends are arranged by some method which is not clear. Apparently the inside face of their architrave runs on the fourth module line.

Most peripteral Doric temples may be classed by the placing and ending of the lateral walls of the cella, as follows:

Placing:

1. Face of wall on a module line.
2. Wall centred on a module line.

Ending:

1. Both ends terminate about in line with columns in antis centred on a module line; either transverse or longitudinal.

   NOTE.—If centred on one they are often off the other; apparently to avoid an intersection. Sometimes they are off both.
2. Both ends terminate on a module line.
3. One end terminates in the first of these two last-mentioned ways and the other in the second.

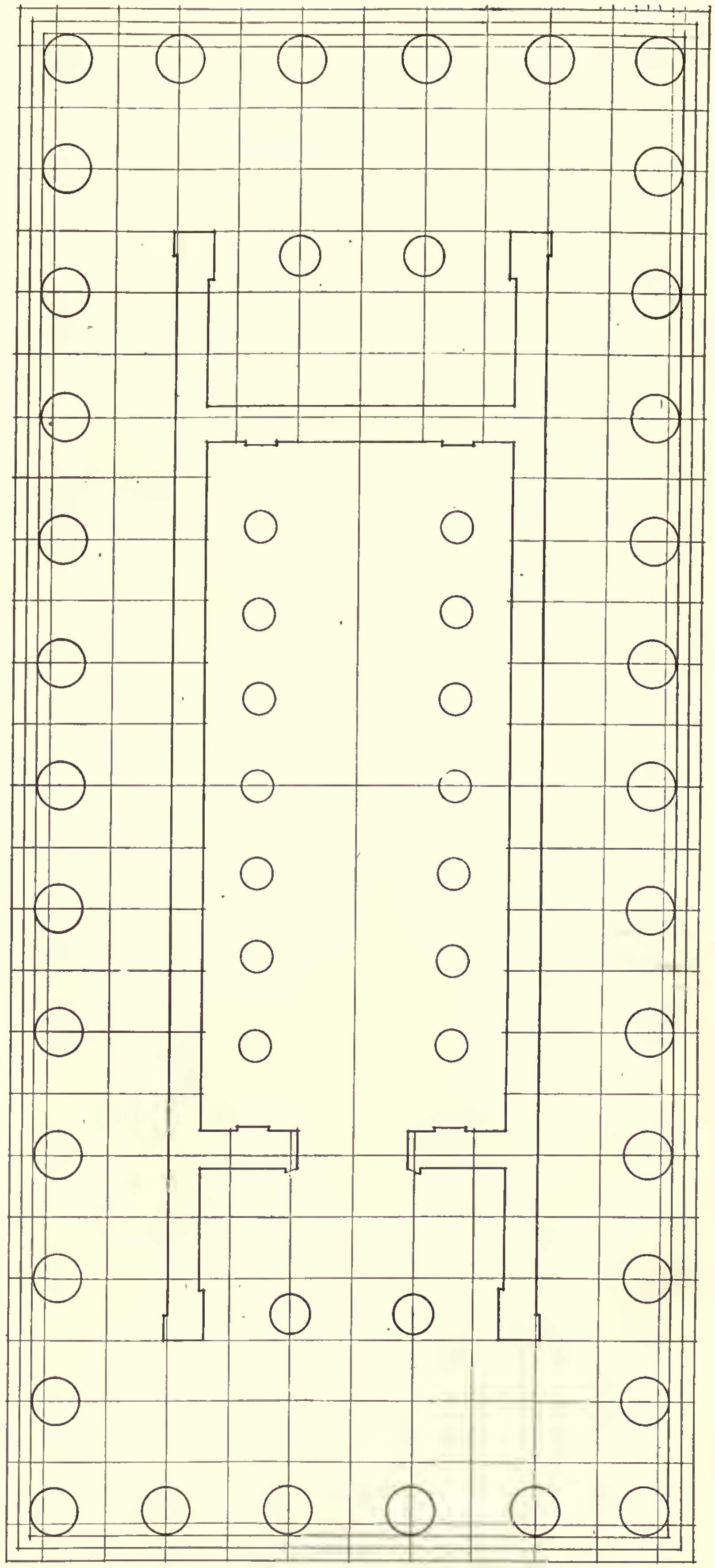
This permits of six possible arrangements of wall, as follows:

A. Face on a module line; both ends stop on a module line.
B. Centred " " " ". " " " "
C. Face " " " " " " with columns in antis.
D. Centred " " " " " " " " "
E. Face " " " } one end stops on a module line and
F. Centred " " " } the other end with columns in antis centred on a module line.

Examples:

Heræum at Olympia	A
Metroum at Olympia	A
Temple of Zeus at Olympia	A
Temple at Selinus (designated C by Koldeway)	A
Parthenon at Athens	A
Temple of Nemesis at Sunium	B
Temple at Ramnus	D
Temples at Selinus (designated A and O by Koldeway)	C
Temple at Pæstum (Neptune)	E
Temple at Pæstum (Basilica)	C
Temple of Theseus at Athens	E
Temple of Hera, Selinus	E
Temple at Epidarus	E
Temple of Jupiter at Ægina	*F
Temple at Bassæ	C
Temple of Juno, Agrigentum	E
Temple at Syracuse (Cathedral)	D
Temple of Concord, Agrigentum	E
Temple of Hercules, Agrigentum	C

* NOTE.—This temple is irregular in that the module line is neither on the face of the wall nor at its centre, but 6 inches inside the face.



MODULE LINES OF THE TEMPLE OF ZEUS AT OLYMPIA

About one hundred years ago L. N. L. Durand, professor of architecture at the Polytechnic School, Paris, well known as the compiler of the "Récueil et Parallèls des Édifice de Tout Genre," wrote his "Précis d'Architecture," setting forth the advantages of this method of planning, but he did not deal with the danger in its use, and so far was he from realizing that the triglyphs had any bearing on the theory he was expounding, that he refers to them as useless, having no meaning and no resemblance to anything, or at least to anything reasonable.

Vitruvious tells us that triglyphs represented the ends of beams, but if so, why do they appear at the ends of the building? * He tells us other things which the buildings themselves do not confirm. He says the modulous of the order lies in the lower diameter of the column; but the buildings show this to be a mistake. Acting on the information given by him, many attempts have been made to apply his theory, but it cannot be done; not only do no two examples agree, but the diameters of the columns of the same row vary, the angle ones being larger; a fact which he seems not to have known. On the other hand, the principle of the practically uniform spacing of triglyphs in each specimen never changed.

Vitruvious lived four hundred years after the great epoch of Greek art, and much may be lost during four hundred years in a time of decadence. It is only one hundred years since we had a true and living national style of architecture in this country; but how completely have been forgotten the principles and methods which enabled the housewrights and carpenters, who acted as architects, to produce the beautiful specimens of architecture with which the country at one time abounded. It may well have been that in the time of Vitruvious the ancient art of the Greeks had given place to mathematical formulæ, or rules of thumb of the kind he explains, but that the method was not used by the Greeks in the time of Pericles existing buildings prove.

A building depending for its proportions on some unit of measure must necessarily have all parts proportional. It is therefore possible to find a modulous in almost any member, but whether a similar modulous from a second building will agree in its application with the first depends upon whether the proportions of the parts so taken as a modulous were obtained by the same method in both cases.

Vitruvious and the architects of his time, if they agreed with him, were peculiarly unfortunate in the selection of the part chosen as a modulous, because the shape of the column, more than that of almost any other feature, underwent constant change, from Corinth to Cora. In other words, their proportions were not obtained by the same method, whereas the principle of the uniform spacing of the triglyphs in every building never changed.

The use of a fixed measure in design is at once the simplest, easiest, and most natural way of obtaining proportionality and commensurability. Such a system is in direct harmony with what we know of Greek art, which was direct and simple in all its ways. Whatever methods the Greeks may have used in determining the minor proportions of the order, after the main ones had been fixed by the spacing of the triglyphs, whether by the eye or by a mathematical formula, as Vitruvious would have us believe, it is certain, from the testimony of the buildings themselves, that the main proportions, both for plan and order, depended absolutely upon the spacing of the triglyphs. They constitute, therefore, a modulous for the design, which never varies in its application. Moreover, the extraordinary pains which the builders invariably took to mark the buildings in this way seems to show that they intended this fact to be known. In making the plan and laying out the work, they probably used the module lines in some very simple way, which might easily be discovered if investigators would abandon their vain attempts to fit the buildings to the Vitruvian module, and turn their attention to this.

As has been said, the outer face of walls generally follows the module lines. It is much easier and simpler to lay out work in that way than to centre the wall on a line. Perhaps the half module lines, which were also marked on the building by the mutules over the metopes, were also used. I have found it convenient to do so.

It will be seen from all this that the plan is certainly determined in its most important parts by these module lines. In what other way, if any, they affect its minor details can only be determined by further study. When it comes to the order, however, it is immediately apparent that the module lines govern absolutely. The spacing of the triglyphs fixes the size of the metopes, which were square, and upon which the size of both frieze and architrave depend. The cornice must, of course, bear a proper relationship to these members, and the columns to what they support; thus the proportions of the whole order depend absolutely on the spacing of the triglyphs, and that spacing cannot be changed in the slightest degree without changing every dimension, both of plan and order. It is therefore the primary unit governing the design, the first dimension to be fixed after the general size of the building has been determined, and the one upon which all other dimensions depend; it is most natural, therefore, that it should appear on the work.

If this is all true, then the meaning of the triglyphs is perfectly clear; the measure which they mark constitutes the harmonic scale of the design, and as such is most important. Their presence and prominence are thus abundantly explained.

And why is not this hypothesis reasonable? Has any other for which this can be said, ever been advanced? Why were these strong markings invariably placed on the buildings? They must have meant something—everything else in Greek art has its meaning. Moreover, they must have had what the Greeks thought a very important meaning, and we know that the Greeks thought nothing more important than harmony of proportion. So true is this that the use of triglyphs with the main order is invariable, and if for any reason they were omitted elsewhere, as, for instance, to permit of a continuous band of sculpture, the places where they belonged were carefully indicated by the base and guttæ.

Could there be a more striking or amusing contrast between Greek art and subsequent art than this use of triglyphs by the Greeks and the senseless ape-like use of them by their successors; of whom Vitruvious was a shining light?

This theory of the meaning and use of triglyphs is not founded on elaborate mathematical calculations, but is so simple that any one may test its truth. Little respect is due to theories of the other sort when applied to architecture. They prove too much and are too easy to find. Many wonderful things may be found in almost any geometric design. I once took the elevation of an ordinary New York tenement-house, which had certainly been designed on no very elaborate theory, and tried fitting circles and triangles to it and drawing mathematical deductions therefrom. I found the possibilities almost limitless and

* This theory evidently belongs with the one which finds the origin of Gothic piers and arches in the trunks and spreading branches of trees.

that theories without number might be set up and demonstrated. It is therefore safe to conclude that one who adopts such methods to discover the hidden mysteries of ancient designs is likely to deceive himself.

In testing this theory doubtless many hair-splitting irregularities will be pointed out; it is well understood that they exist, but they do not affect its correctness. The Greeks were men of sense; if they used the system they did so for a purpose, as artists rather than as mathematicians, and imperceptible irregularities could not affect that purpose.

Here, then, is the solution of an archæological problem of the very first order—a mystery of the ages. Grecian Doric temples represent the supreme examples of art on earth; in which taste was carried to heights never since approached. It is not surprising therefore to find methods used in their design which were unknown to subsequent art.

It has been well said: the Parthenon stands as a reproach to the rest of the world. May not that be because the rest of the world has forgotten or never knew the principles which made the Parthenon possible and of which harmony of proportion as the Greeks understood it was one?

If the Greeks used this system in their buildings of the Doric order—the most ancient of all—is it not likely they used it with the other orders? Be this as it may, there has always seemed to me sound reasons for using the module system in architectural design.

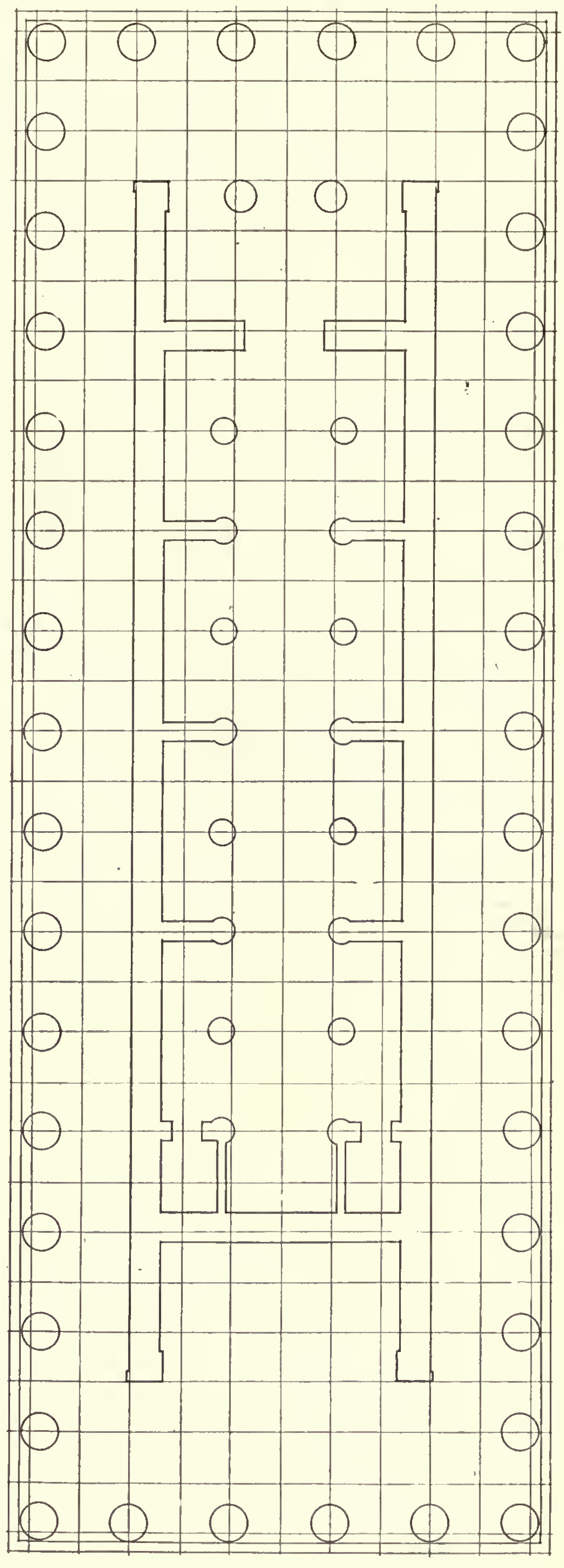
By this method practically all figuring of plans and all liability of error, so far as the plans concerned, are avoided. As I use it, one side of all walls (generally the inside) runs on the module line, and most partitions are centred on it, as are doors, window, and other openings. If for any reason a departure is made from this rule, then it is only necessary to give the distance to the nearest module line.

In the plans for the little houses above referred to, the module is 3′ 9″, divided into five parts of 9″ each. For the working drawings the sheets are ruled to show both the module lines and the parts. When drawings are made in this way, nothing is left to doubt; every dimension is fixed, and a mistake in one part will not affect other parts. Every necessary dimension is definitely shown on the drawing, yet few figures are used.

By the common method of making working drawings, it takes almost as long to figure the dimensions as to make the drawings themselves, and there is great liability of error; moreover, a mistake in one figure may cause mistakes in other figures. By the use of the module system the work of making the drawings is so simplified that it can be done by the architect himself, free hand, as these drawings are made, to the very great benefit of the design and at a great saving in time and cost.

In this country the general practice is to leave too much to the draftsman. By so doing the architect loses individuality in his work, and that is especially true of architects who have a large practice. Any system which may tend to give the architect more intimate control of his work and make it a profession rather than a business ought to be of benefit.

I was once told by an English architect, visiting this country, that the thing which most surprised him here was the large number of draftsmen employed in architects' offices. He said that in London the most prominent architects rarely have more than three draftsmen; and that every well-known architect of his acquaintance would never accept commission for more than one building a year, that being all he felt he could properly care for.



·Module · Lines · of the Temple · of Hera · at Olympia

A COLONIAL HOUSE. A. RAYMOND ELLIS, WEST HARTFORD, CONN.

A. Raymond Ellis, Architect.

A Colonial House

By A. Raymond Ellis, Architect

OUR domestic architecture is developing a strong and interesting style truly American, due to a clearer and more forceful interpretation and expression of some of our early Colonial types which have filled so many architects with an inspiration to strive to maintain the charm and simplicity of plan and design that the early Colonial possessed. Much of this was gained by good proportion and simple architectural detail. The architectural publications are in a large measure responsible for this, because the improvement and certain characteristics are to be seen plainly in the work of the younger men, who evidently have drawn ideas and their inspiration from these published works. This is clearly shown by the rapid development of the elongated plan, with extended front or with a wing at each end or at an angle. The treatment of these wings is noticeably interesting in many of the newer houses of Colonial type. The simplicity of the front elevation is accented by the simple and well-proportioned front entrance, which is usually an exact reproduction of an old one.

In the house shown here, the front hall is 10′ 6″ x 15′ 6″, painted cream-white, with a low wainscot and the walls above laid off in panels formed by mouldings. The staircase is very pleasing with its slender balusters and ramped mahogany rail. Under the stairs is a coat closet and lavatory. Through an arched entrance at the end of the hall, the den, 10′ 6″ x 10′ 6″, is reached. This room, while connecting with hall and living-room, is essentially a workroom. It has been decorated to harmonize with the other rooms, and is painted a beige or brownish color. The group of windows across the east end are used to avoid the confining feeling one gets from unbroken walls. At each side are bookcases with doors glazed with mirrors, making this end of the room have the appearance of being a deep bay window. The living-room at the right of the hall is 14′ x 27′ 6″, with a fireplace on the south wall. This room has a low wainscot, lining with the window-sills, and the walls above are laid off in panels formed by mouldings on the walls. The room has a simple cornice, and the fireplace mantel covers the whole breast with panelled sides. French doors open onto the piazza, which is enclosed with glazed sash; and from the piazza, doors open onto the flag-paved pergola.

On the left of the hall is the dining-room, 14′ x 15′, with an alcove for the sideboard. This room has a wainscot, lining with the window stools, and above, the walls are laid off in panels formed by mouldings, repeating in fact the scheme of decoration in hall and living-room. From the dining-room there is a serving-room 6′ 9″ x 10′ 6″, containing a butler's sink, glazed cases, cupboards, and drawers. Off the kitchen is a pantry 5′ x 6′, on the north, containing a refrigerator with a door in the wall to the porch so that it can be iced from the porch. The kitchen is 11′ x 13′ and contains an enamel'ed iron sink with drain boards, an electric range; and has a chair-rail 3′ high. The plaster walls are painted and the floor has a sanitary base. The rear hall is between the kitchen and the front hall, and contains the service stairs and broom closet. This is very convenient, as they may be used by family or maids in going to cellar or attic without entering the kitchen.

The second-floor hall is planned so that it may be used as a sitting-room, or a place to sew in. The open stair well forms a gallery that makes it attractive and unusual.

The owner's chamber is 14′ x 20′ 6″, with two large closets and a fireplace with Colonial mantel and an English hob-grate. This side of the house is quite conveniently arranged for the owner, and the chamber over the piazza which is 10′ 6″ x 18′ 0″ is used as a sleeping-porch or chamber. A small dressing-room separates the owner's chamber from the bathroom, and through it a small east chamber, 10′ 6″ x 11′ 0″, can be reached and used en suite, or shut off from the owner's rooms. This would be very convenient for a nursery. The sleeping-chamber windows are so placed that plenty of air can be obtained without a draft. The chamber over the dining-room is 13′ 6″ x 14′ 0″; the north chamber is 10′ 6″ x 18′-0″. Both are near the guests' bathroom. Off the second-floor corridor is a large linen closet and a door to the service staircase.

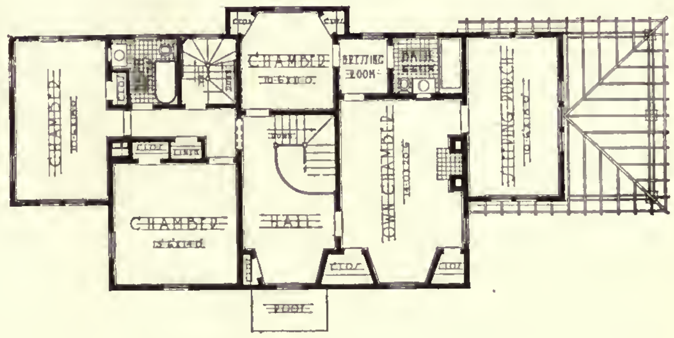
In the attic there are two large chambers, two storerooms, and the maids' bathroom. In the cellar there is the laundry, vegetable closet, toilet-room, heater, and coalbins, and hatchway to yard. The heater for the garage is also in the cellar with the pipes carried underground to it.

The house is of frame construction, with the exterior walls covered with 24″ split cypress shingles, laid about 10″ to the weather in order to carry out the early Colonial feeling. The blinds are painted green. The interior of the house is painted old ivory in the principal rooms, and buff in the service portion; the floors in all principal rooms are oak, and those in the service portion are hard pine.

This house is the residence of the architect. The plan was developed with the particular purpose of affording a house, without any wasted space or useless ornamental features, that could be built for a reasonable amount in these times when the cost of building is at its highest and likely to be still higher.

FIRST FLOOR PLAN

JOB 207-SHEET 2



SECOND FLOOR PLAN

A. RAYMOND ELLIS ARCHITECT

The Certosa of Pavia

By Frank Jewett Mather, Jr.

II

OUR theme is the Certosa of Pavia, not Ambrogio Borgognone, that incomparable painter of the divine Girl Mother. Otherwise I should tell you how, outliving Raphael and witnessing the exuberance of the high Renaissance, he continued to make those lovely panels, timid, reserved, devout, perfect in tone, which now one sees best in the Brera Gallery. At the Certosa one has still refreshing bits of him in their original places over doors, besides precious fragments transferred from the cells to redeem some of the worst chapels. The great frescoes in the transept, and the important altarpieces of St. Ambrose Enthroned and the Crucifixion hardly represent his intimate quality. But the loss is slight, for, by some magic, defying analysis, and with a power only given to the great decorator, he has diffused this intimate spirit, this serene sense of worship, through the monumental spaces of the temple.

The church from the little cloister.

To many the finer meaning of the Certosa will be bound up with the work of the Lombard Fra Angelico. We may be sure the easy-going monks took no such view. If we would realize their attitude we must not dwell too long upon the place where they mumbled perfunctory litanies, but must rather consider the cells in which they lived and the routine of their contemplative days. Like so many of the offshoots from the great parent order of St. Benedict, the Carthusians found the average monastic life, the necessary sociability of refectory and corridored dormitory, unfavorable to contemplation and austere discipline. Accordingly each monk had his detached cell, an independent establishment comprising four rooms, a loggia, a well, and a garden—all deliciously clean and comfortable. To spare him needless talk and contacts, his food was passed in through a turnstile that concealed the caterer. His duties, aside from those of the ritual and frequent prescribed prayer, were to cultivate his garden, pursue such studies as he chose, and do the business of the monastery. Surely the self-denying life was seldom led more agreeably. A host of retainers were necessary to guard these ascetics from the cares of the world; nobody guarded them from the deceitfulness of riches. We may imagine the bland satisfaction with which they walked the great cloister, gravely saluting each other, identify themselves, the saints and the conquerors of this world proudly wrought in terracotta above the arches, and all enlivened by flying loves in the prettiest taste of the time. And if such recreation savored too much of the world and the flesh, it might readily be corrected by pensive consideration of the velvety quadrangle already spotted by the funeral tablets of earlier inheritors of this ease. To such thoughts the incessant picking about the workshops and the façade must have played a grateful undertone. The day was nearing when their monastery should seem the most splendid in Europe, and the day

The church, from the great cloister, upon which open the cells—the library and other monastic buildings between.

when Gian Galeazzo's ducats must be distributed to the distant, unappealing poor was being indefinitely postponed. Surely the ascetic life had its features at the Certosa of Pavia. The Sieur de Montaigne, who enjoyed its hospitality in 1581, was chiefly impressed by the number of "servants, horses, equipages, workmen, and artists" about the place.

Since that time the Certosa has received many famous guests, but none that the imagination more willingly revives than Francis I, captive. He had beset Pavia, where he hoped to seize his most formidable foe, the Viceroy Constable Bourbon. A mutiny among the unpaid mercenaries of the Constable suddenly reversed the situation. The sortie took place at night and threw the French into confusion. Through the cowardice, or worse, of his hireling Swiss, the King, after a gallant struggle, was unhorsed and captured in the Emperor's name. From that night Charles V of Hapsburg fulfilled Gian Galeazzo's dream of an Italian overlordship. Pleading not to suffer the chagrin of imprisonment at Pavia, whose conquest he had confidently promised himself, Francis, so tradition asserts, was led to the Certosa. As he entered the monks happened to be chanting that most appropriate verse "*Coagulatum est, sicut lac, cor meum* . . ."; and he, with the readiness that never forsook him, joined in the response, "*Bonum mihi quia humiliasti me ut discam justificationes tuas.*" That night his captors, captivated by his bravery and good humor, served him at table with royal honors, and within a few days we hear of him playing contentedly at handball in his prison tower some miles away. One would be glad of his reflections during that brief stay at the Certosa. How would he have regarded this proud monument to a forgotten woman and a dynasty that had run its course? It may be that its famous embellishments seemed as unsubstantial as the golden spurs, the brocaded sleeve, and the reliquary necklace which, we read, certain base fellows among the Spaniards took from him the night before. Surely he must have envied for a moment the quiet, opulent dignity in which his Carthusian hosts rejoiced. At least the spectacle of so much unforfeitable wealth must have struck his ever-eager imagination.

He could hardly have foreseen the day when fate would play as ruthlessly with the monks as with their royal guest, and their halls, cells, and cloisters should stand empty, their temple devoid of psalmody, all as meaningless as the trophies, become mere curiosities, which the Emperor's hirelings had torn from the Most Christian King.

And yet to a philosophic spirit the Certosa retains a significance impersonal but profound, even now when psalmody no longer fills the church nor prayerful high-living the cells. The humble employees of the government who have replaced the proud monks, the rather painful neatness of a well-kept and much-restored national monument, the sense that the old wealth of pictures and plate has gone to remote museums and melting-pots—all this does not blunt the intuition of some larger meaning, one transcending the zeal of a monk, the fears of a gentlewoman, and the pride of a prince. For the Certosa, in the strange dualism we have noted in it, is an authentic embodiment of the artistic spirit of Lombardy. We have noted how, about a temple simple, spacious, excellently proportioned, discreetly adorned by an exquisite artist, there has been loaded an appalling mass of carved, painted, and incrusted ornament, all of it ingenious, some of it charmingly picturesque, but most of it superfluous. That contradiction is Lombardy.

From Rome the Milanese readily took over a paradoxical tradition: a love of spacious, logical, monumental building,

Terra-cotta relief of the little cloister.

The nave.

which as many costly objects as possible must be crammed. Florence perceived the reticent Greek originals behind the florid examples Rome furnished her, while Milan fairly outdid Rome herself in purple feats. In this, as in many other regards, Milan proved herself Rome's legitimate heir.

The reasons for this contrast would be matter for a book, not for the last paragraphs of a sketch. But may we not imagine both in the stately piles they raised and in the decoration they lavished unconscionably the reaction and protest of the Milanese against the monotony of their vast alluvial plain? Nature surely counts for much in these matters. We may fancy a Florentine architect dreading to cast a line less crisp than the outline of the distant Carrara mountains, less suave than the gently falling buttresses of the Apennines; fearing to arrange a space more crowded than the overlapping plains of the Chianti hills. And at Milan we may imagine an architect resenting the tameness of the green, unbroken plain, and stung to a hopeless emulation by the serried confusion of the distant Alps, striving to assert himself against both in such structures as the Cathedral at Milan and the Certosa of Pavia.

Lest I should seem to depreciate this potent people, at all times the political and industrial bulwark of Italy, I hasten to say that they and their buildings are strangely like ourselves and ours. I could show you fifty mansions and as many public buildings in New York that are Milanese, but will not. And if you will breathe the æsthetic air of Milan without the pains of a sea voyage, you have but to visit the Congressional Library at Washington. In both cases great pride and wealth and a common impatience of the more reflective and precious qualities of art have produced analogous effects. Even in our eclecticism, a natural tendency in a nation that can afford to pay, we are the followers of Milan and Rome. Milan had the good sense to send for Michelozzo and Leonardo, as Boston did for Puvis de Chavannes. Milan produced a Borgognone on her own account, and by a similar miracle Whistler was born one of us and found here encouragement for his exquisite talent. Milan culminated in Bramante, and I trust we are not more than literally culminating in the sky-scrapers that would contain most of his buildings.

But we have drifted far from Certosa. As memory seeks to harmonize its dissonances, the buoyant vaults traced with blue, the ample cloisters with slender columns straining under heavy mouldings, and finally that fair but false miracle the façade, all seem a proper expression of that Lombard spirit which drove men to build nobly only to decorate at random profusion; it all appears a fitting memorial of the pride of a monarch interpreted by an aristocratic order; even more, perhaps, since happily the finer impressions are the most permanent, it declares itself a monument to the sagacious architects who started the work and to

and a craving for inordinate decoration as an end in itself. To the first tendency we owe those admirable Romanesque and Gothic churches, domed and basilical, which merged naturally into Bramante's sublime invention of a poetry of enclosed space. To the second tendency, which was greatly reinforced by the Renaissance, we owe the façade of the Certosa, the mouldings of its cloisters, the external ornamentation of the Cathedral of Milan, in fine hundreds of northern palaces and churches, to adorn which tone and clay are so tortured and paint so insistently applied that the poor eye is fairly harried from the spot. In other words, the Lombards, by a whimsical fate, were ever striving for effects as architects, which they straightway weakened or even destroyed as decorators.

Go to Florentine Michelozzo's lovely chapel in St. Eustorgio, Milan, and study the wise subordination of its rich and characterful decoration to the general effect, and you will realize not merely how impossible it was that the Milanese should have done so fine a thing for themselves, but also certain radical distinctions between the Lombard and Tuscan taste. The Florentine artist came naturally by a reverence for a fine space. It seemed to him a thing so precious in itself that he must beware of obscuring it even by the most beautiful addition. To the Milanese artist before Bramante a fine space too often was merely a pocket into the admirable painter who so loyally respected their intention. For a last view of the Certosa in epitome go to the little cloister and pass to the far side, where across the garden close you may see the church drawing itself together, colonnade by colonnade, behind the light buttress pinnacles. Time has dealt gently with it all. The moss on the cloister tiles and the rank herbage below deepen the mellow reds of the bricks and mouldings. Deep shadows give relief to the loves and monks whose heads enliven the cloister arches and spandrels. From one of the Gothic corbels a fascinated monk listens to the promptings of the fiend in a woman's form. Toward him swings elatedly the lichened cupid who guards the fountain in the centre. In the far corner Giovanni Amadeo's little marble door, carved like the ivory frame of a jewel-casket, leads to Borgognone's realm, the transept. In such a spot nature has brought about a fusion. The confusingly ornate terra-cottas sink into flicker of light and shade, the graven door changes into an ivory gate of dreams, the temple becomes a towering warm thing, athwart which twinkling arcades draw velvety strips of shadow, the green of moss and lichens binds it all together, and, if there happens to be a gray Lombard sky, that gives to all the colors their most sonorous harmony, investing with a curious mystery the big, calculated pile. Under the touch of time and nature, those great reconcilers, the Lombard spirit seems no longer twain, but one.

Effigies of Lodovico il Moro and Beatrice d'Este by Andrea Solario—brought to the Certosa from S. Maria delle Grazée, Milan.

Book Reviews

"HELLENIC ARCHITECTURE, ITS GENESIS AND GROWTH." By Edward Bell, M.S., F.S.A. London: G. Bell & Sons. New York: The Macmillan Co.

The author of this little volume has done a service to the students of classical art in presenting in a brief form much of the information only available in special publications of societies and the results of recent archæological research. It is a logical and clearly written analysis of the origins of the classic orders. One of the best and most readable discussions of the subject that we have read.

The whole question of origins and racial influences is one of a more or less individual point of view, and the relative value of the influence of other civilizations upon Greek art must forever rest largely upon surmise. As the author well says: "An attempt to trace the history of architecture between the two great periods which are represented by the surviving monuments of Egypt and Hellas is necessarily, as the preceding pages have shown, a difficult undertaking involved in an obscurity which can never be altogether penetrated."

"THE STUDIO YEAR BOOK, 1920—THE FURNISHING AND DECORATION OF COTTAGES, SMALL HOUSES, AND FLATS." New York: The John Lane Co.

In addition to the interesting text and attractive illustrations in color on the main topic above, there are other chapters of especial interest on "Country Building and Handicraft in Ancient Cottages and Farmhouses," with sketches and plans for the architect; an article on "Concrete Homes," also with elevations and plans, and very fully illustrated chapters with many colored plates on "Decorative and Applied Art." The volume should be of interest to architects and all interested in the allied arts.

Announcements

Prix de Rome.—The American Academy in Rome announces that this year's competition in architecture for the Prix de Rome has been won by James Kellum Smith, of Towanda, Pa. The appointment is for three years. He will report in Rome October 1, 1920.

Mr. Smith is twenty-six years of age, a graduate of Amherst College. Last year he won the Stewardson Memorial Scholarship in Architecture in the State of Pennsylvania. He was a lieutenant in the Aviation Corps.

Black, Burris & Fiske, Inc., consulting landscape architects and foresters, announce that they have opened an office at 317 Broad Street, Bank Building, Trenton, N. J., for the practice of landscape architecture and landscape forestry. They would be interested in catalogues.

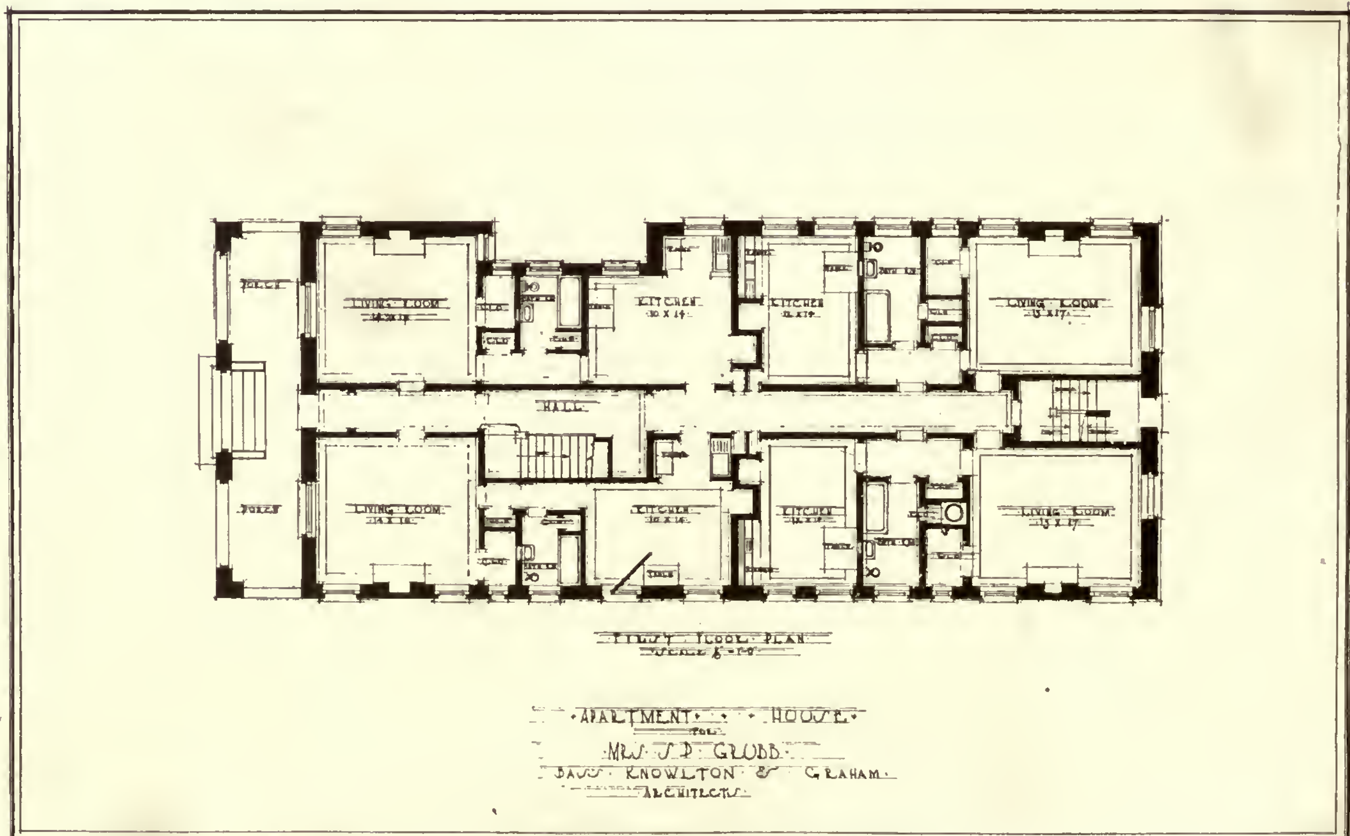
The architectural business conducted by M. Hawley McLanahan and Ralph B. Bencker under the firm name of Price & McLanahan will be continued from July 1, 1920, under the firm name of McLanahan & Bencker, Philadelphia, Pa.

The address of Rodger C. McCarl, architect and engineer, should have been 1012 Murchison Building, Wilmington, N. C., not Wilmington, Del.

The firm of Lee, MacEwan & Turnbull, architects and engineers, of Charlotte, N. C., is now Lee & Turnbull, Mr. MacEwan having withdrawn some time ago.

A. L. Thayer, architect, New Castle, Pa., and R. M. Johnson, formerly with Walker & Weeks, Cleveland, Ohio, announce their association for the practice of architecture under the firm name of Thayer & Johnson, with offices at 5716 Euclid Avenue, Cleveland, Ohio, and New Castle, Pa.

An interesting and valuable article discussing "Industrial Housing," written by Emile G. Perrot, of Ballinger & Perrot, that appeared in the May number of *General Fireproofing*, has been widely quoted. Mr. Perrot says *industrial housing lies in the eyes of industrial captains.*



APARTMENT-HOUSE, INDIANAPOLIS, IND. Bass, Knowlton & Graham, Architects.

ADMINISTRATION BUILDING, MILK STREET, BOSTON, MASS.

BACK BAY CENTRAL OFFICE, BOSTON, MASS.. (Latest type central office.)

MEDFORD, MASS. (Small city office.)

CENTRAL OFFICE BUILDINGS OF VARIOUS TYPES, NEW ENGLAND TELEPHONE & TELEGRAPH CO.

Modern Building Superintendence

By David B. Emerson

CHAPTER XI

INSTALLING OF FIRE PROTECTION AND FITTING UP TURKISH BATH

DESPITE the fact that the building was of a strictly fire-resisting construction (practically no wood being used except for the cabinet work in the first story), the furniture and the contents of the offices was most of it combustible, therefore some fire protection was necessary. The local ordinances required stand-pipes in all buildings over four stories in height, and by making these and all of the equipment comply as nearly as possible with the regulations of the National Board of Fire Underwriters, low insurance rates on both the building and its contents was made possible. Four six-inch stand-pipes were located in the corridors and stair towers, so arranged that any point on any floor might be reached with a fifty-foot length of hose. The supply for the stand-pipes was taken off the discharge end of the fire pump, and it was cross-connected so that either the fire pump or the house pump, or both pumps could supply water in case of fire. The stand-pipes were of extra-heavy galvanized, puddled wrought-iron pipe, with extra-heavy cast-iron fittings.

A steel tank made up of one-quarter-inch plate, thoroughly riveted and caulked, and set up fifteen feet above the roof on steel supports, kept the stand-pipes full of water and provided a temporary supply until the pumps could be started. Branch lines were run from the supply line for stand-pipes, through the basement walls on both streets and terminated with Siamese-twin connections on the sidewalks, through which water from the street hydrants or the fire-engines could be forced into the system. These Siamese connections were of brass, with two-and-one-half-inch outlets, fitted with couplings the same as those used by the local fire department. They were fitted with swinging flap valves, which closed one opening when the pressure was applied to the other and stood open when water was forced through both openings. The caps on the Siamese connections were of galvanized iron, on account of the liability of brass caps being stolen.

The pipes for these sidewalk connections were fitted with iron body, soft seat, straight way swinging check-valves, which prevented the water which was supplied from one source being lost through the other outlets. Another check-valve in the line connected to the tank prevented the water from filling and overflowing the tank when the lines were supplied from the pumps or the Siamese connections on the sidewalks, and a check-valve was placed in the pump pipe to relieve the pump valves of the pressure of the water in the system.

The system was provided with emptying pipes three-quarters of an inch in diameter to drain the entire system, and drip-pipes were provided to empty and prevent water freezing in the pipe between the check-valves and the Siamese connections on the sidewalks. Two-and-one-half-inch outlets were provided on each stand-pipe in the basement and in each story of the building, fitted with quick-opening, gate-type hose valves. The stand-pipes had a short horizontal line directly under the roof, with a gate-valve in the line, with a long stem, the wheel handle being placed above the roof. From the horizontal line a riser ran through the roof, and was fitted with a two-and-one-half-inch hose connection. A drip-valve with a three-quarter-inch drain line was placed at the bottom of this riser. Each stand-pipe was fitted with a gate-valve, placed just above the ceiling. This valve was kept strapped open. All of the valves used on the stand-pipes had Babbitt metal seats, which allowed them to close tighter than those having hard metal seats and prevented any leakage of water.

The hose-valves on each story terminated in hose cabinets, which were set in the walls and finished flush with them. These cabinets were made up of No. 18-gauge steel, with frames and doors formed of No. 14-gauge steel, all finished in baked enamel, which matched the steel trim throughout the building. The doors had plate-glass panels, and they were fitted with bullet catches and pull-handles. Inside of the cabinets were swinging hose racks, each one fitted with fifty feet of two-and-one-half-inch Underwriter's unlined linen hose, with an Underwriter's play-pipe. This play-pipe was of aluminum bronzed iron, as brass play-pipes are constantly being stolen in public buildings, thereby rendering the fire protection ineffective. Unlined linen hose was used in preference to rubber-lined hose, as it is not affected by heat, is much lighter, occupies very much less space, does not require testing, does not deteriorate, and also it costs less. At each hose connection on the roof was set a fireproof hose-closet, made up of No. 20-gauge corrugated iron, with a steel angle frame, and fitted with slatted shelves and a rain-proof door. This closet was provided with fifty feet of rubber-lined cotton hose, one Underwriter's play-pipe, a Tabor pattern spanner, a lantern, a fire-axe, and a pick. The hose-closet was painted one coat of red lead and oil, both on the inside and the outside, and then painted two coats of white lead and oil of a gray shade.

The fire pump was located in the sub-basement, and was a three-stage turbine pump, with a capacity of five hundred gallons per minute, direct-connected to a seventy-five horse-power electric motor, with a gasolene-engine at the opposite end of the shaft, so that in case of any trouble with either the motor or the wiring, the coupling-pins could be removed from the motor coupling placed in the opposite end and the pump operated by the engine.

The building was equipped with stations for watchmen's portable clocks, having one station in the boiler-room, the rubbish-room, and machine-room, and one at each end of the corridors on each floor. The key-boxes in the sub-basement were of iron, aluminum finished, with lift covers. Those in the corridors were of the flush type, of bronze, finished to match the door hardware.

As soon as the construction work in the basement was finished, and the marble and tile workers had commenced work in the other parts of the building, the work of fitting up the Turkish bath in the basement was commenced. The swimming-pool was constructed of reinforced concrete, and lined with tile, with a combined scum gutter, life-rail, and overflow drain formed in the tile, and with a tile curb around the edges to prevent splashing. The scum gutter was provided with oblong bronze gratings, which were connected to two-inch wrought-iron pipes provided with running traps

(*Continued on page 220.*)

MANCHESTER, MASS., CENTRAL. (Season business. Typical North Shore office.)

NAHANT, MASS. (Small town office. Senator Lodge is served by this central.)

WELLESLEY, MASS., EXCHANGE. (Typical small town office.)

LINCOLN, MASS. (Suburban community.)

CENTRAL OFFICE BUILDINGS OF VARIOUS TYPES, NEW ENGLAND TELEPHONE & TELEGRAPH CO.

and discharging into the drainage system. The concrete shell for the swimming-pool was poured with the other concrete, and it was water-proof with a membrane water-proofing on the inside to prevent the leakage of the water. The water-proofing was given a protecting coat of cement mortar one inch thick, which was scratched to receive the floating coat. The floating coat was applied before the scratch coat had thoroughly set, and had an open-mesh metal lath bedded in it, to prevent the cracking of the tile. The tile was a ceramic mosaic tile, laid with a white field, and the depth marks, lines, etc., set in in black tile. The ceramic tile was used in preference to biscuit tile, as they are absolutely impervious, whereas biscuit tile are only impervious on the face, and any water getting behind the tile would do serious damage.

The pool was provided with built-in ladders of reinforced concrete, covered with tile, and set into recesses in the sides of the pool, so that there were no projections into the pool. The floors throughout the Turkish bath were of vitreous ceramic tile. The wainscot around the rooms, partitions around dressing-rooms, the partitions and tables in the shampoo-rooms, and the enclosures around the showers, were all of structural glass, the same as was used for the toilet-room partitions throughout the building.

The partitions around the Tepidarium and the Torridorium were of plate glass, double, with an air space between, set in white enamel steel frame work. The heating of the Tepidarium and the Torridorium was done by means of concealed pipe-coils, taking steam from the high-pressure boiler at ten pounds pressure, which gave a larger amount of heat than low-pressure steam would have given. Live steam was also furnished to the steam-room from this boiler. The baths were fitted with a hydriatic douche-room, with control table made up with structural glass sides and top, and fitted with thermostatic control mixing-valves and thermometers; nozzles and control-valves for supplying ice-water, hot and cold water, or steam, to the various fixtures and nozzles; needle and shower-bath, with pipe-trench fitted with perforated brass cover; and a porcelain seat bath with wave spray, built into the wall.

An electric-light bathroom was included in the equipment, and it had two forty-six light electric cabinets, made up with white enamelled exterior and the sides and back of the interior lined with mirrors. These cabinets were fitted with thermometers and had separate switches to control the lights in each section. The shampoo-room had shampoo fixtures, fitted with thermostatic mixing-valves, thermometers, rubber hose with cloth insertion, spray nozzles, and nickel-plated copper tilting basins, with brackets and stops. The swimming-pool was supplied with filtered and sterilized water. All of the water, before entering the pool, was heated, using a water-heater of the same type as was used for heating the water for use in the building; it then went through a pair of vertical pressure filters, then through an ultra-violet-ray sterilizer, and then into the pool. This method of sterilization is particularly efficient, destroying all forms of bacteria in the water. It adds no taste and no odor to the water, and gives no irritation to the bathers.

The pool had a recirculating pump, which drew the water from the pool, delivered it to the filters for clarification, and then to the sterilizer and back to the pool, so that the entire contents of the pool were recirculated, clarified, and sterilized once in every twelve hours. The sterilizer consisted of a cast-iron shell, made up in three sections, with proper baffle plates and a cylindrical clear quartz tube inserted in each section. Inside of these tubes, were placed mercury vapor arc-lamps, having a normal current consumption of about three-and-five-tenths amperes each. These lamps generated the ultra-violet rays, which were projected into the water as it passed around the quartz tubes, and all disease-producing bacteria were killed instantly. The sterilizer was equipped with a special switchboard, divided into four panels, one for the main control, and one for each of the three lamps.

The switchboard was equipped with switches, reactance coils, resistance controls for each lamp, telltale lamps, and pilot-lamps, as well as the necessary volt metres and ammeters. The sterilizer required 220 volts direct current, and as the current supplied by the local lighting company was alternating current, a 3½ K. W. motor generating set was installed for the purpose of rectifying the current. A four-inch supply pipe was carried around the pool, with two-inch valved branches, with reducers connected to one-inch brass inlet pipes, two of which were located at the shallow end of the pool near the bottom, and four were located at the deep end, two at near the bottom, and two near the top. The pool had an eight-inch drain with bronze strainer and valved so that the water might be held for recirculating, or allowed to waste to the sewer when it was desired to renew the water.

The recirculating pump, which was of the horizontal, direct-connected, centrifugal type, with a capacity of 175 gallons per hour, with a fifty-foot head, was connected on the suction end with this drain, between the pool and the gate-valve. The filters were of the vertical pressure type, with a combined capacity of from 10,000 to 13,000 gallons per hour, with a cast-iron coagulant tank. The filtering material was silica quartz in three grades, placed in layers, the coarsest grade at the bottom and the finest at the top.

The barber-shop, which was to be operated in conjunction with the baths, was finished with tile floors and structural glass wainscoting, the same as described for the baths. It was equipped with vitreous china lavatories, fitted with self-closing faucets, and shampoo fixtures, fitted with thermostatic mixing-valves; vitreous china manicure-tables, with six-inch bowls, supplies and waste being located under the tables and operated by means of knee-action valves; and towel sterilizers which were operated by live steam taken from the high-pressure boiler, which supplied the steam for the baths. The work on the baths was not completed until all of the rest of the building was finished and occupied, as the unavoidable delays in getting specialties and installing them always make this class of work progress very slowly. With the completion of this work our building was completed and our duties as superintendent ended.

AFTERWORD

Now, kind reader, as our tale is finished, we will say a word in parting. Some who have read these pages may have wondered where this building is, some might wish to visit it, so I will tell you: It never was; it is merely a creation of the writer's imagination, designed to illustrate the various materials and methods described in the various chapters, and the experiences and incidents were drawn from many buildings with which he has been associated in his fairly long and rather varied experience. The various conditions described may be applied to any modern building which the reader may have to do with, and if any lesson has been learned from the reading of them, the mission of these pages has been successful and the purpose for which they were written—that is, the helping of the younger generation of the architectural profession to a better and fuller understanding of the problems of modern building construction—has been accomplished.

THE END

The Gleason Works

A Plant Planned for the Future

John W. Vickery, Architect

THE Gleason Works is a notable exception among large industrial plants where provision was made for expansion and where expansion took place along predetermined lines.

The original plant was of the old type, in a congested section of the city, where any material growth was out of question. There was a vision of the future in the management, and a tract of land was purchased, so far beyond the prospective needs that the sale of a portion of it was considered. Fortunately, this was not done, and the original tract has been considerably enlarged by the purchase of adjoining property. The site selected is one of the most desirable in the city of Rochester. It is on the main line of the New York Central Railroad and is between two main thoroughfares, with good street-car service. While not in the outskirts, it is beyond any possible congestion.

The first building was erected in 1905—the foundry. At this time the general scheme of future building was determined and has been closely followed. The foundry is a large structural-steel building with brick and concrete-block walls. Originally the high centre bay had a gable roof with flat skylights. This has since been altered to a monitor of the Pond type, with electrically operated top-hung continuous-steel sash.

A three-story reinforced-concrete building followed in 1907 for pattern-making and pattern storage, but now used for pattern-making, with a separate building for storage.

The original down-town plant was maintained until 1910, when the first unit of the main shop was erected. This consisted of a two-story reinforced-concrete and concrete-block front building, the front designed to harmonize with the front of foundry building, with the main shop one story of steel and concrete. The larger portion has saw-teeth skylights, but there is a higher section for erecting floor, originally with gable roof, but subsequently altered to saw-teeth skylights. The second floor of the front building was used as temporary office. The first unit of the power-plant was built at this time. The erection of these first buildings developed the desirability of a system of planning all columns and piers on centre lines, a standard design and a provision for end walls designed for expansion and additions.

The scheme of centre lines is a most interesting feature. It might be said that the entire plot is divided into rectangles by a series of lines running parallel to front-lot line and 16 feet apart, and another series at right angles to the front-lot lines. These are of various spacings. The original longitudinal lines of foundry which determine those on the east were not designed on any particular multiple. The first units of main shop were designed on multiples of 16′ 0″ and later additions on multiples of 20′ 0″. Practically all piers and columns are on the intersection of these lines. Difficulties encountered where this scheme was not followed have emphasized its desirability, and it is probable that future expansions will be along these lines. This brings openings of parallel buildings opposite each other and makes possible their connection at future times.

While some attempt was made for architectural effect on the front, particularly for the office-building, as is shown in the illustration, a simple standard design has been developed for the sides and rear, as is indicated on detail drawing of typical elevation. While expansion was expected, sufficient provision was not made on first units. Subsequently, all sections where expansion was probable were built with steel columns and girders drilled for future connections, and with sand lime brick walls and piers corresponding closely to the standard concrete pier wall and piers.

After the completion of the first shop unit in 1910, other additions followed rapidly. The office or administration building, erected in 1914, forms one end of the two-story front building, and is, and will be, the dominating feature of the entire front. It is a reinforced-concrete building with precast-concrete walls and cornice. A wide stairway leads from a ground-floor entrance-vestibule to the office proper on the second floor. The offices and drafting-rooms adjoin the second story of the two-story front building and extend into it. The remaining portion of the second story is occupied by the dining-room, seating nearly one thousand people, completely equipped for cafeteria service.

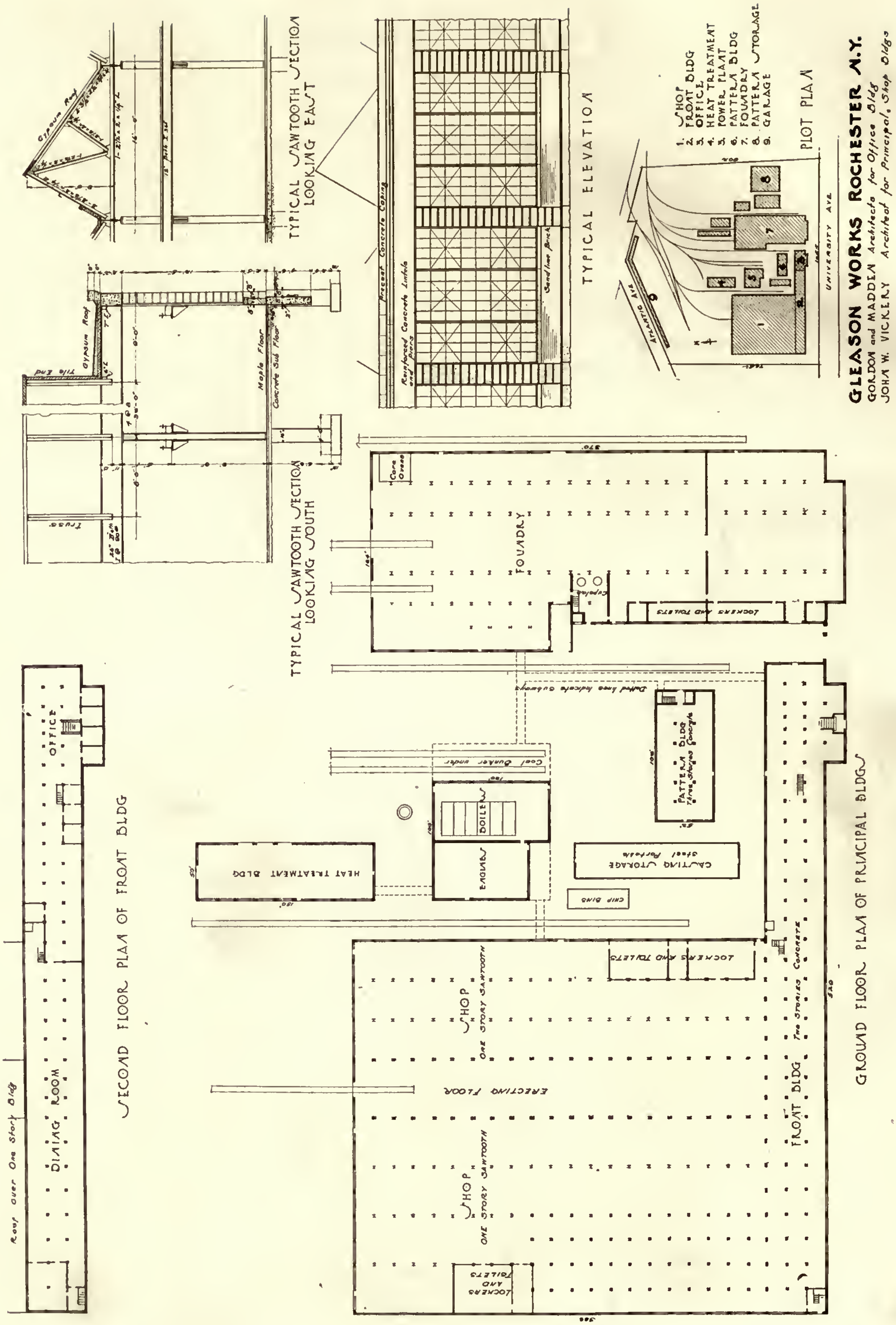
The heat-treatment and case-hardening has a separate building. This has a truss roof with a Pond-type monitor and top-hung continuous steel sash. Lockers and toilet-rooms in this building are installed on a mezzanine floor at one end.

The original unit of the power-plant has had several additions largely along predetermined lines. The boiler-room floor is on a lower level with coal-bunkers extending out below grade, into which coal is dumped directly from cars. All buildings are connected to low level of power-plant by a system of subways.

The most recent addition to the main shop was constructed in 1919, details of which are shown on drawing. It is typical of all the saw-tooth construction, but contains minor improvements over original units. The saw-teeth are constructed of steel trusses 8′ 0″ centres with a poured gypsum roof spanning from truss to truss without purlins. The glass section has a lower 3′ 0″ stationary steel sash and an upper 4′ 0″ top-hung continuous-steel sash, operated in about 80′ 0″ lengths. All sash are glazed with ribbed glass. The trusses span from I-beam girders, which are 16′ 0″ centres, and the girders are carried on H columns, 40′ 0″ centres, making panels 16′ 0″ x 40′ 0″. Brackets on the columns carry travelling-crane girders. Wall sash in the original buildings were wood, but in the more recent additions are solid steel with pivoted ventilators. They are glazed with clear glass in lower lights, and upper lights, where exposed to sun, with a sand-blasted rough glass, and in a few exposed places with ribbed-wire glass. The outer walls are of the standard design previously mentioned, with reinforced-concrete piers and lintel and a simple precast-concrete coping. The piers are relieved by small horizontal grooves about 8″ apart, formed by attaching triangular strips to the form work. Built-up felt roofs without slag are used; no preference has been given to any one type.

The floors are of planed and matched maple $1\frac{3}{8}$″ thick, nailed directly to sleepers with no wood subfloor. The

(*Continued on page* 224)


GLEASON WORKS ROCHESTER N.Y.
GORDON and MADDEN Architects for Office Bldg
JOHN W. VICKERY Architect for Principal, Shop Bldgs
PLOT PLAN
1. SHOP
2. FRONT BLDG
3. OFFICE
4. HEAT TREATMENT
5. POWER PLANT
6. PATTERN BLDG
7. FOUNDRY
8. PATTERN STORAGE
9. GARAGE
UNIVERSITY AVE
ATLANTIC AVE
TYPICAL SAWTOOTH SECTION LOOKING EAST
Gypsum Roof
TYPICAL SAWTOOTH SECTION LOOKING SOUTH
Maple Floor
Concrete Sub Floor
Truss
TYPICAL ELEVATION
Precast Concrete Coping
Reinforced Concrete Lintels and Piers
Sand lime Brick
SECOND FLOOR PLAN OF FRONT BLDG
OFFICE
DINING ROOM
Roof over One Story Bldg
GROUND FLOOR PLAN OF PRINCIPAL BLDGS
FOUNDRY
Core Ovens
Cupolas
LOCKERS AND TOILETS
Dotted lines indicate subways
PATTERN BLDG
Three Stories Concrete
Coal Bunker under
BOILERS
ENGINES
HEAT TREATMENT BLDG
CASTING STORAGE
Steel Portable
CHIP BINS
SHOP
ONE STORY SAWTOOTH
ERECTING FLOOR
FRONT BLDG
Two Stories Concrete
LOCKERS AND TOILETS

GENERAL VIEW OF FRONT.

OFFICE OR ADMINISTRATION BUILDING.

FOUNDRY BUILDING.

REAR VIEW OF MAIN SHOP.

GLEASON WORKS, ROCHESTER, N. Y.

Gordon & Madden, Architects for Office-Building.
John W. Vickery, Architect for Principal Shop Buildings.

sleepers are rectangular, with galvanized-steel cleats instead of the usual dovetail section. They are laid on a concrete subfloor with a cinder-concrete fill.

The interiors of buildings are painted white, including even the structural steel of trusses.

Minor partitions around locker-rooms, etc., are of sheet steel. Aside from floor, practically no wood is used.

There is a complete system of fire-service pipe with yard hydrants and hose houses, also connections with small hose in buildings. Certain more hazardous sections are protected by automatic sprinklers, but there is no general sprinkler protection.

Direct radiation, vacuum system, steam-heat is used throughout, supplemented by a fan system in the main shop. This is found to be a most satisfactory combination. There is sufficient radiation for heat under ordinary conditions. The fan is used to raise temperature quickly early in the day and later to circulate and introduce fresh air. The cubic content per occupant is so high that ventilation is not a serious problem. The introduction, however, of a certain amount of fresh air, particularly in mild weather, has been found desirable. Although there is no air-washing or cooling device, as the air is drawn from the north side, it has been found possible to materially cool the building in hot weather.

General illumination is used in nearly all places, usually with 150-watt lamps and enamelled sheet-metal reflectors, spaced about 16 feet each way. Very little local lighting has been found necessary, though a few portables are used on erecting floor.

A siding from the main line of the New York Central Railroad extends into the property and a most complete system of yard tracks has been installed, extending into buildings, under travelling-cranes and over coal-bunkers. A steam-storage fireless locomotive makes it possible to transfer and place cars very quickly. There is also a complete system of concrete pavements joining all buildings and storage sections of yard. Elevating electric trucks are used on these pavements for transfer of coke, pig iron, castings, etc.

The property extends along University Avenue over 1,000 feet. There is a steel flagpole 100 feet high in front of office-building, and the 70 feet of lawn between buildings and sidewalk is beautifully planted and excellently maintained, all forming a most attractive feature on that thoroughfare, the result of foresight fifteen years ago.

The Right Way to House the Single Worker

AN example of the right way to house the single worker will be exemplified in the "hotel club" for men which the General Motors Corporation is erecting in Flint, Michigan. It is interesting to note that in the matter of sanitary and other structural standards the corporation is following the lead of the U. S. Housing Corporation which did pioneer work last year in the establishment of standards for the housing of the single worker.

A seven-story fireproof dormitory costing approximately $2,500,000 and having recreational and entertainment facilities to accommodate 2,759 persons is under course of construction. The main building will be 280 feet long and 214 feet deep with a basement and six full stories and a partial seventh story between two elevator towers. All of the upper floors will be devoted to sleeping-rooms, providing accommodations for a total of 1,168 men. Each bedroom will be provided with a lavatory with hot and cold water, and a clothes closet. There will be four general toilet-rooms on each floor, each with shower baths. There will be two light courts above the first story, each measuring 86 by 142 feet to provide light and air to all bedrooms. The building will stand 25 feet from the building line on all street fronts and will be 10 feet from the south line of the property. The building will be of steel frame construction and brick walls with fireproof floors and partitions throughout. The exterior walls will be faced with red brick with limestone trimmings.

On the main floor and in the basement will be located the public recreation-rooms and other amenities for the use both of the single workers and of married men and their families. These will consist in part of a large library with a stock-room having a capacity of 6,000 volumes, a billiard and game room, a gymnasium and smaller exercise room, together with instructor's office, examination-room, dressing-room and bathroom; classrooms with a capacity of 180 scholars; and auditorium with a seating capacity of 1,279 persons; bowling alleys; a cafeteria, a restaurant, a Turkish bath establishment, a drug-store, a tailor shop, a shoe shop and a men's furnishing store; and the largest swimming-pool in the State of Michigan, 25 x 75 feet, with a spectator's gallery accommodating 184 persons.

It is interesting to note the motives which prompted the corporation to launch into such a project. These have been set forth as follows by Vice-President Walter P. Chrysler:

"We realize that such an undertaking is a far cry from the construction of automobiles, which is our business. Nevertheless we feel that the best interests of the corporation are being served when we step out of our beaten paths and spend our money to provide comfort, entertainment and pleasure for our employees and their families. By bringing contentment and happiness to our employees and their families, we naturally surround ourselves with the highest type of workmen and workmanship. Their best interests are our best interests. Their welfare is our aim if we seek to make our welfare their aim."

Announcements

Stork & Knappe, architects, specializing in school work, announce the removal of their offices from Palisade, N. J., to King Street, Ardsley, N. Y., June 1, 1920.

The Portland Cement Association announces that J. W. Johnston becomes District Engineer in charge of the Milwaukee Office of the Portland Cement Association. Mr. Johnston has been with the Association since July, 1916. Before joining our organization he had been City Engineer of Sioux Falls, S. D., County Engineer of Minnehaha County, S. D., and had served in various engineering capacities on railroad and general contracting work. For the past two years Mr. Johnston has been District Engineer in charge of our Parkersburg, W. Va., office.

They also announce that J. H. Riddle, who since 1916 has been connected with the Parkersburg, W. Va., office of the Portland Cement Association, becomes District Engineer in charge of that office, succeeding J. W. Johnston, who has been transferred to the Milwaukee office as District Engineer in charge. Mr. Riddle is well known in West Virginia, having been for a time County Engineer of Roane County, where he was identified with the construction of some of West Virginia's first concrete roads.

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Frontispiece to August

FOURTH CONGREGATIONAL CHURCH, HARTFORD, CONN. Davis & Brooks, Architects.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLII AVGVST, 1920 NO. 2

The Modern Theatre

By E. M. Mlinar

THE present activities shown throughout the United States in theatre construction are such as never before known in the history of the modern theatre. The demand is so great for good plots for theatres that in many instances large office-buildings are planned with a theatre adjoining, and I note in some Western cities hotels and department stores are giving way to space for the construction of the theatre in portions of the building.

Since the advance made in moving-picture productions and the interesting manner of presenting the picture to the public with a varied sort of entertainment, large corporations outside of theatricals have taken interest in the theatre, and I am well informed that in one instance such a corporation is planning to build 1,000 theatres, of about 1,600 seat capacity, to be distributed throughout the smaller towns of the various States.

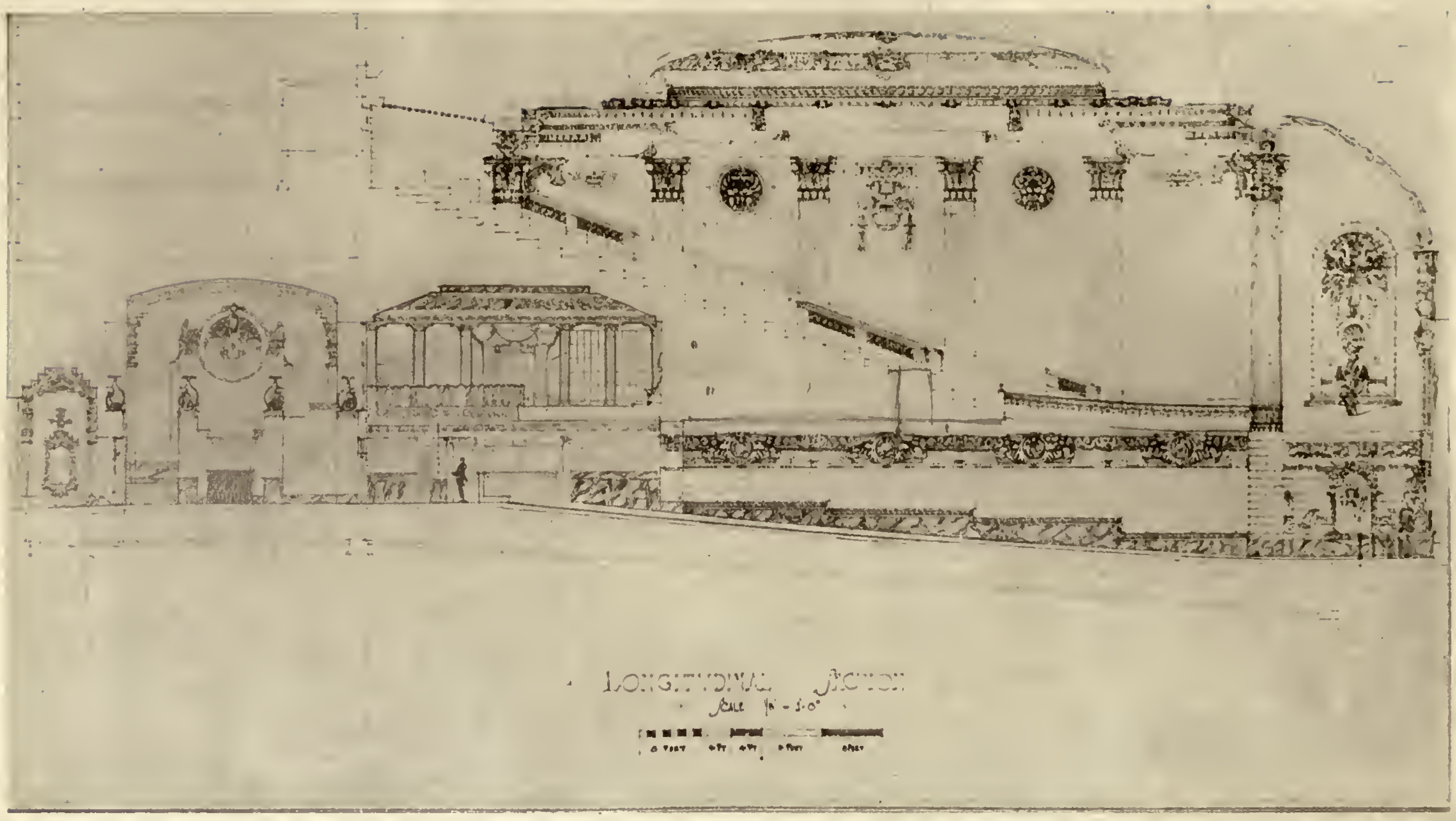

Architect's study of interior for theatre, Los Angeles, Cal. Thomas W. Lamb, Architect.

At present there are three types of theatres: first, the legitimate playhouse; the motion-picture theatre arranged as a concert-hall; and the combined picture and vaudeville house.

The requirements of each and every one vary, and it is a credit to the profession to note that the architects engaged are giving proper study to their plans to meet these requirements.

The concert-hall and vaudeville type of theatre being most in demand, seating between 2,500 and 3,500 persons, the conditions and various requirements for the proper handling of the theatregoers are far more intricate than in the legitimate house, owing to the continual entrance and exit of patrons. The lobby in this instance is a very essential thing, and should be planned so as to permit the handling of an overflow crowd awaiting the end of any one performance. It is necessary to provide an entrance-vestibule which contains the ticket-office on the outside, then the outer lobby to provide for the overflow, having also a ticket-booth, then the grand lobby. The grand lobby has the stairs leading to the mezzanine promenade, and very careful consideration is needed in the planning of the staircase leading to the mezzanine. There is a certain amount of psychology connected with this detail, since people are inclined to avoid the climbing of stairs; however, if carefully planned, such a feeling can be overcome. Some architects have attempted to overcome this condition by the use of ramps leading to the mezzanine. However, this is not satisfactory, not only because it mars the beauty of the lobby, but ramps are very tiresome, and by providing a well-designed staircase, centrally located, it has the tendency to draw people to that part of the building to which the stair leads. This is evident in New York with the largest theatre in the world, having some 5,000 seats, where the staircase leads to the mezzanine, which takes care of the overflow crowd of the balcony.

In the planning of the orchestra it is interesting to note that architects are now providing sufficient standing-room. This is very essential. However, in this connection the sight-line of these people must be considered when standing, as in some instances it is very annoying when one standing in the rear of the orchestra cannot see the top of the picture being presented. This, of course, is due to the at-



Architect's study for section of theatre, Los Angeles, Cal. Thomas W. Lamb, Architect.

tempt to keep the building down in height, which could be done otherwise, and would eliminate the squatty effect so evident in most theatres in back of the balcony overhang.

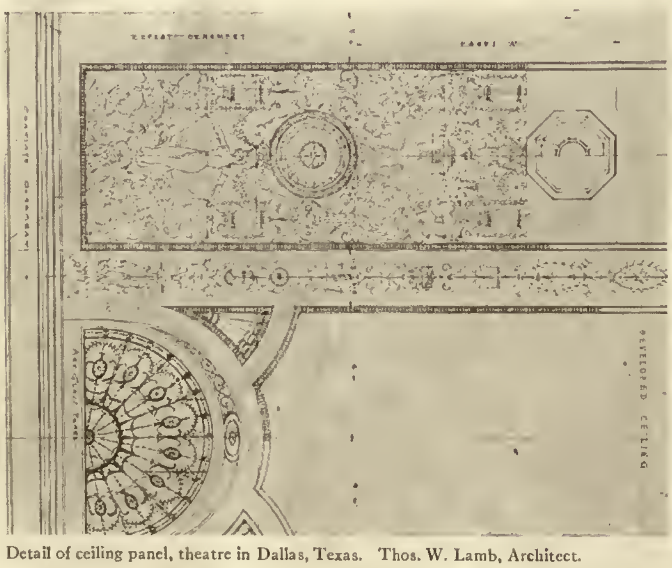
Owing to the new laws of the municipal authorities on gradients permitted, it is very difficult to provide the proper sight for patrons in a house having more than 25 rows, and necessitates the use of a different gradient, and steps under the seats to give the proper sight. This matter is of great importance and needs very careful study.

In connection with the planning of the orchestra, careful consideration must be given to the sanitary requirements—the men's and ladies' rooms and toilets adjoining. This seems to be neglected, and the proportion of fixtures required to the total seating of patrons is not properly taken.

In the type of theatre described, the mezzanine promenade is most essential. It should be spacious and carefully designed, with facilities to handle a crowd.

A very interesting point in the planning of the mezzanine is the provision of a so-called well-hole, located in the centre, which serves many a purpose. It avoids the crowding ceiling effect over the patrons in the rear of the orchestra, and permits the patrons to hear the orchestral selections in the case when seats are not to be had in the balcony. Here also proper provision should be made for men's and ladies' rooms and toilet facilities, which should be calculated to the proportion of the balcony seating. The entrance from the mezzanine to the balcony must be located carefully. Usually two such passages, one each side, are sufficient. These passages lead to the lower crossover of the balcony and the loges; also from this mezzanine stairs are required to the higher level of the balcony or the second crossover; these also should be placed one each side.

Entering the balcony of this type of theatre, it is very easy to note at once the difference between this type house



Detail of ceiling panel, theatre in Dallas, Texas. Thos. W. Lamb, Architect.

Detail, sounding board, theatre in Dallas Texas. Thos. W. Lamb, Architect.

Design for State Theatre and office building, New York. Thos. W. Lamb, Architect.

and the legitimate theatre: the steppings are much shallower, and should not be over 13 inches, whereas in the legitimate theatre they are in some cases as high as 21 inches. The saving in the height of building can readily be seen by this comparison.

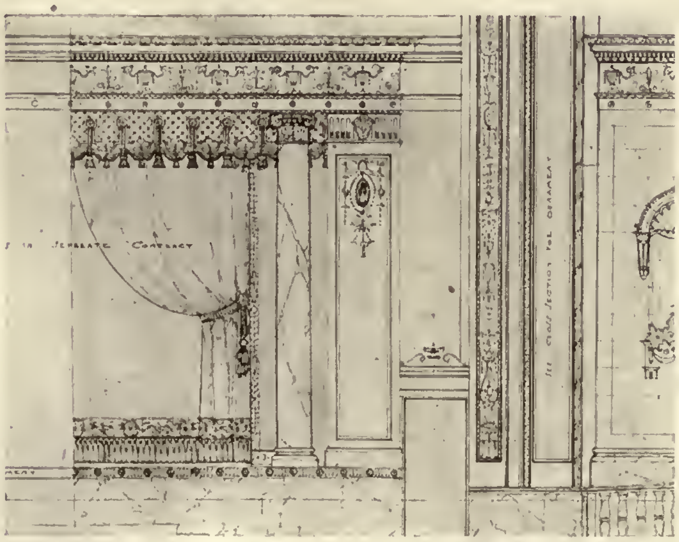
Two balconies should not be used for this type of theatre; as a matter of fact, the second balcony is being omitted in the new planning of the modern theatre. I have witnessed this in several of the large vaudeville-circuit theatres in the East, and it seems to work out most satisfactorily.

The picture-booth in most cases is placed in the rear of the balcony. It is interesting in some cases where the architect has placed the booth entirely on the outside of the building, cantilevered out from the rear wall of the balcony. This is a very good solution, as it does not break the seating in the rear of the balcony, nor does it interfere with the ceiling treatment.

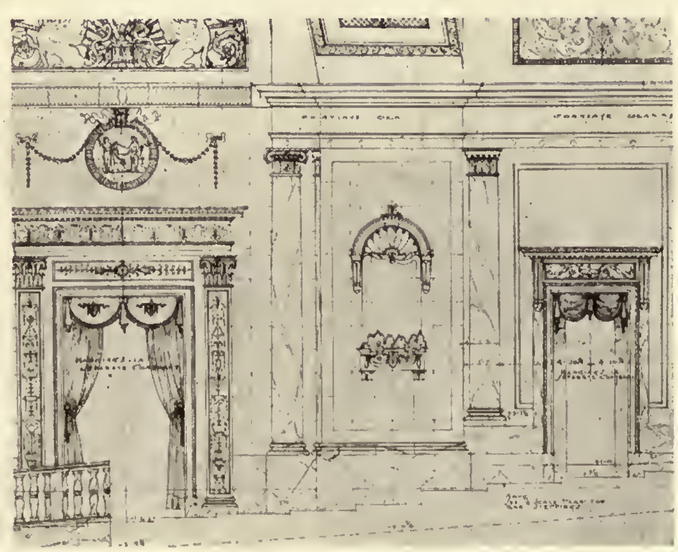
The general interior treatment of the auditorium is the next item worthy of note. Credit is due the architect who gives the balcony patron a treat on the side-walls rather than confining all his architecture to the orchestra and proscenium treatment. Somehow, too much has been done for one and not enough for the other, but from my observation this is now being well taken care of. In connection with the ceiling treatment of the auditorium, most theatres now being erected contain a central dome, which should not be dwarfed, as it has certain effects on the acoustics, a subject not to be tampered with. The dome is mostly used, however, for lighting effects, there being installed from three to four color lighting in coves. This eliminates a lot of ceiling fixtures, and also gives the producer a chance for effects to suit his production. As for acoustics, the curved sounding-board or proscenium and ceiling dome seem the most practical, yet the flat-beam-ceiling treatment has given equally good results, although in this particular possibly one of the most beautiful theatres in the United States has been a failure in the sense of acoustics on this account.

The stage, a prime essential, is a subject also greatly neglected, the relation of the working parts not being properly considered. In the vaudeville house dressing-rooms are required, which should be placed in proper relation with the working side of the stage, the working side being that side providing space for switchboard and pin-rails, also scene space. They should be placed opposite one another. The gridiron is the subject also neglected. In this type of theatre, if placed 60 feet above stage, it is sufficient to take care of all conditions provided that only vaudeville acts are to be handled; however, if the stage is arranged for any spectacular features, 80 feet is better proportion. This depends, of course, on the use of the stage.

In the vaudeville and concert-hall type 60 feet is sufficient; this permits a 28 or 30 feet high proscenium opening.



Detail, orchestra stage setting, theatre in Dallas, Texas. Thos. W. Lamb, Architect.



Detail, side wall treatment, theatre in Dallas, Texas. Thos. W. Lamb, Architect.

Sounding board and proscenium treatment, also showing balcony side walls, Capitol Theatre, New York. Thos. W. Lamb, Architect.

The concert-hall type of theatre has the orchestra sitting on the stage proper, having a higher dais for the soloist and the picture-screen. I was very much surprised to see in one instance of this type house that the architect had left but 2 feet of space back of the screen and rear wall for any special setting for the soloist. This hardly permitted a passage in the back, much less allowed a set to be placed in back of screen when raised. Space should be provided so as to permit a ballet and a regular set; therefore, the minimum for this in my judgment should be 5 feet.

In the heating and ventilating of the theatre, and especially in this type of building nothing should be overlooked to give the best possible service, as the success of the theatre is greatly dependent thereon, owing to the same being in operation during all seasons. It is hoped that owners of theatres will permit the installation of such a plant as the architect suggests, though for reason of expense this is often neglected. Special patented and speculative ventilating schemes, of which there are many, should not be used. Sad experiences in this respect have taught many an owner and architect a lesson.

The particular use to which the theatre is to be put is the first consideration in determining what system of lighting must be employed. However, all theatres have a great deal in common, and with the exception of the small moving-picture house, all are provided with a stage, all have auditoriums, either large or small, and all have some kind of lobby, and a façade which require lighting.

As far as the façade is concerned, it is unfortunately in most instances used for advertising purposes. For advertising electrical display lighting is required to announce a particular play or production. It should be the object of the architect to design the face of a building so that a sign could be installed without hiding all of the architecture, or the architect should take it upon himself to design the building and sign at the same time, so that architectural unity may result.

The marquise is a very important element in the exterior design. This not only serves its original purpose as a shelter but when properly lighted has an indirect advertising value. It is not unusual to outline the marquise in panels with as many as four or five hundred lamps. The particular object of this style of lighting is to make a bright spot in what might otherwise be a dark street. In addition to performing its utilitarian purpose and that of light attraction, the marquise has been impressed into service for direct advertising. Attraction signs are attached to the sides and front, and projectors to illuminate the façade may also be hidden on it.

In the latest house erected in New York, the façade, on which there are no signs whatever, is lighted by flood-lighting which emphasizes the architecture. The only signs on this particular building are small ones (the name of the

Inner lobby, theatre in Brooklyn, N. Y. Thos. W. Lamb, Architect.

Detail looking toward stage, showing effect of cove footlights. Theatre in Brooklyn, N.Y. Thos. W. Lamb, Architect.

theatre) at either end of the marquise. Underneath the marquise and against the building is a changeable attraction sign giving the attraction for the week.

The lobbies, halls, and anterooms require very little comment, as their problems are simple. As a rule these portions of the house constitute just so many rooms, each of which must have its lighting equipment designed to meet the views of the architect. Considerable cove-lighting is done

Ladies' retiring room, theatre in Brooklyn, N. Y. Thos. W. Lamb, Architect.

at present, and, where the height is sufficient to erect a dome, this style is particularly to be recommended. Panel-lighting is also used. This consists of diffusive glass panels set in the ceiling behind which the lamps when properly spaced give a light effect without revealing the source of light. Considerable care must be exercised in the design of panel-lighting.

For the auditorium, there are quite a number of lighting systems and combination systems to select from. Direct fixtures, cove-lighting or panel-lighting combinations of any two or all three may be used.

In cove-lighting the shape of the cove is important. If the cove and dome are too flat the light will not be projected far enough to the centre and in this system of lighting the entire dome surface should be evenly flooded. The

Grand lobby and part of main staircase, Capitol Theatre, New York. Thos. W .Lamb, Architect.

cove and reflectors should be properly designed for the purpose. There are domes of such great extent that it is practically impossible to entirely illuminate them from the cove. In such cases it is necessary to use a fixture to illuminate the surface that cannot be reached by the lights in the cove. Preferably, the fixture should be one of indirect type.

Panel-lighting alone should never be used in an auditorium, as this style of illumination does not permit enough light to reach the wall and ceiling surfaces to properly illu-

Third act of "Tannhäuser," Capitol Theatre, New York. Setting by John Wenger.

First act of "Lohengrin," Capitol Theatre, New York. Setting by John Wenger.

minate the decorations. In a number of houses that are exclusively so equipped, it has been found that the effect of the plaster detail on which a great deal of thought and money was expended is entirely lost. Therefore in planning this style of lighting sufficient wall-brackets or other light sources should be provided about the auditorium to accentuate the architectural details.

The combination of cove, panel, and fixture lighting usually produces a very happy effect. The main ceiling dome may be lighted with coves, some illuminated panels installed in the ceiling, and some also introduced into the soffit of the balcony, with brackets installed throughout the house to help in the general effect. The quantity of light to be used in both the coves and panels requires careful study.

In multicolored lighting we have a little different problem. The amount of white light introduced in color-lighting should be the same as though white lights only were to be used, and where colors are introduced they should be used in sufficient quantity to blend with the white lights. With the use of dimmers on the stage, effects can be obtained in color-lighting by means of various combinations which add materially to the effect of the dome and panels.

The question as to whether color-lighting shall be used in a house is one which should receive considerable thought. In a moving-picture concert house these effects are used in conjunction with the orchestration, and more or less with tableau on the stage. They are used in vaudeville houses which also show pictures.

The one important thing about the auditorium-lighting the architect must bear in mind is emergency-lighting. This usually consists of lights on double circuits which are placed on the walls in brackets, having one circuit controlled from the panel board in the box-office, and another circuit controlled from the stage switchboard, the particular object being to light the auditorium sufficiently for a dismissal of an audience in case of accident.

Stage-lighting to-day in principle is not very different from what it was years ago. There is usually a footlight, a number of borders, and certain spots. The footlight serves to throw light backward and upward, and the borders throw light downward and backward on the stage. In addition we have pockets for strips and for spotlights for special effects. The stage equipment will vary, depending on the character of the house. The vaudeville house should have a footlight of three colors with three or four borders, each of three colors, and in addition incandescent pockets either side

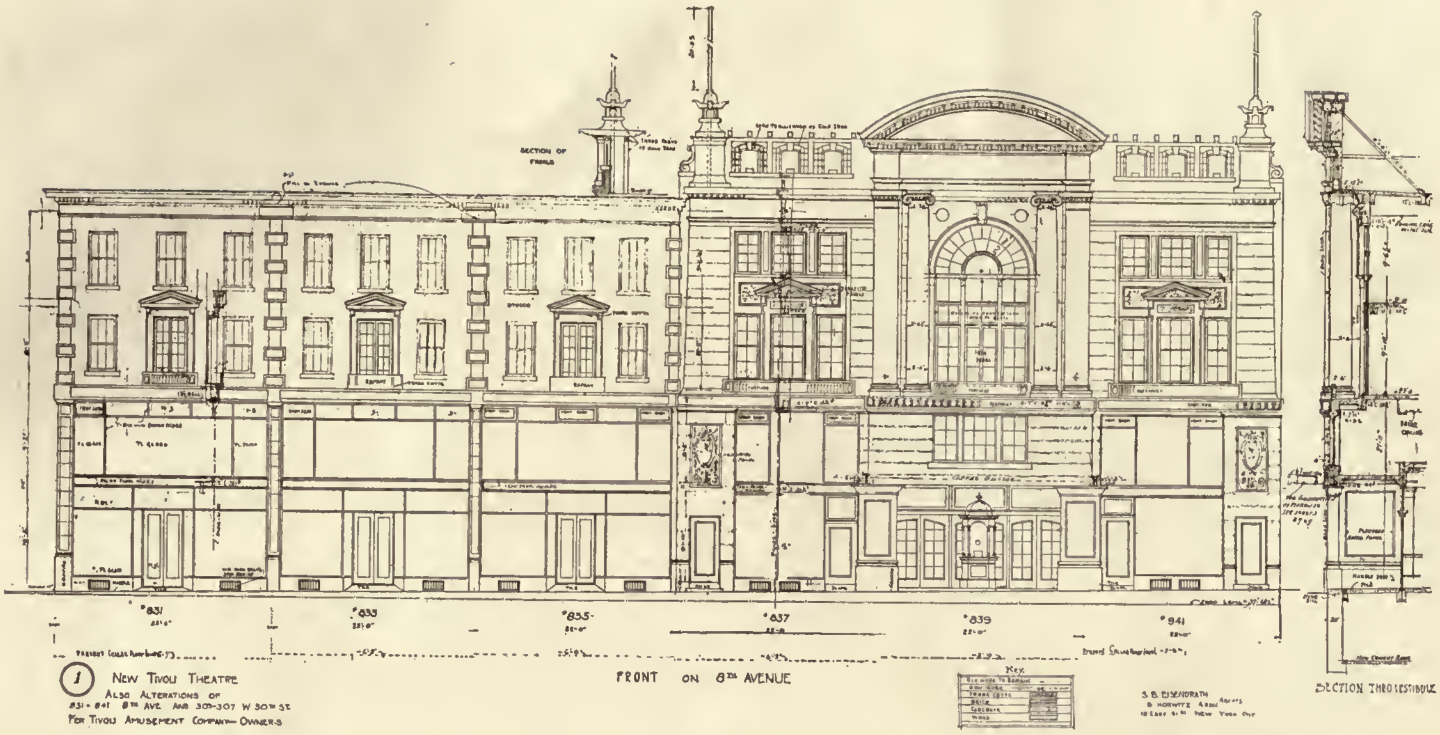
Ideal Theatre, New York. S. B. Eisendrath, Architect. B. Horwitz, Associate.

More than half of the entire roof over the auditorium is arranged to open by sliding on steel tracks so that in summer time the audience has the benefit of being practically out of doors, and therefore enjoys not only almost as much fresh air as a roof garden audience, but owing to the large size of the roof opening, the sky above is in full view from all parts of the auditorium.

Another feature is the skilful use of art-glass windows for lighting the interior by means of a series of oval shaped windows placed in the frieze as seen in the picture. In the daytime this glass subdues and colors the daylight so as to give the required light without artificial lighting, while the picture is on; and again at night these art-glass windows admit the same pleasing light by means of electric lights concealed behind the glass. In this manner both during the day and night time when the picture is on, the interior receives this beautifully diffused colored lighting and is entirely free from local electric lights, which are so annoying to the audience, and which more or less interfere with the effectiveness of the picture lighting.

Design for theatre on West 45th Street, New York (under construction), for the Walk Realty Co. Eugene De Rosa, Architect.

Design for Victory Theatre, New Brunswick, N. J. (under construction). John H Scheier, Architect.



of the stage, and from two to a half dozen arc or spot pockets. An equipment such as this will light the average stage.

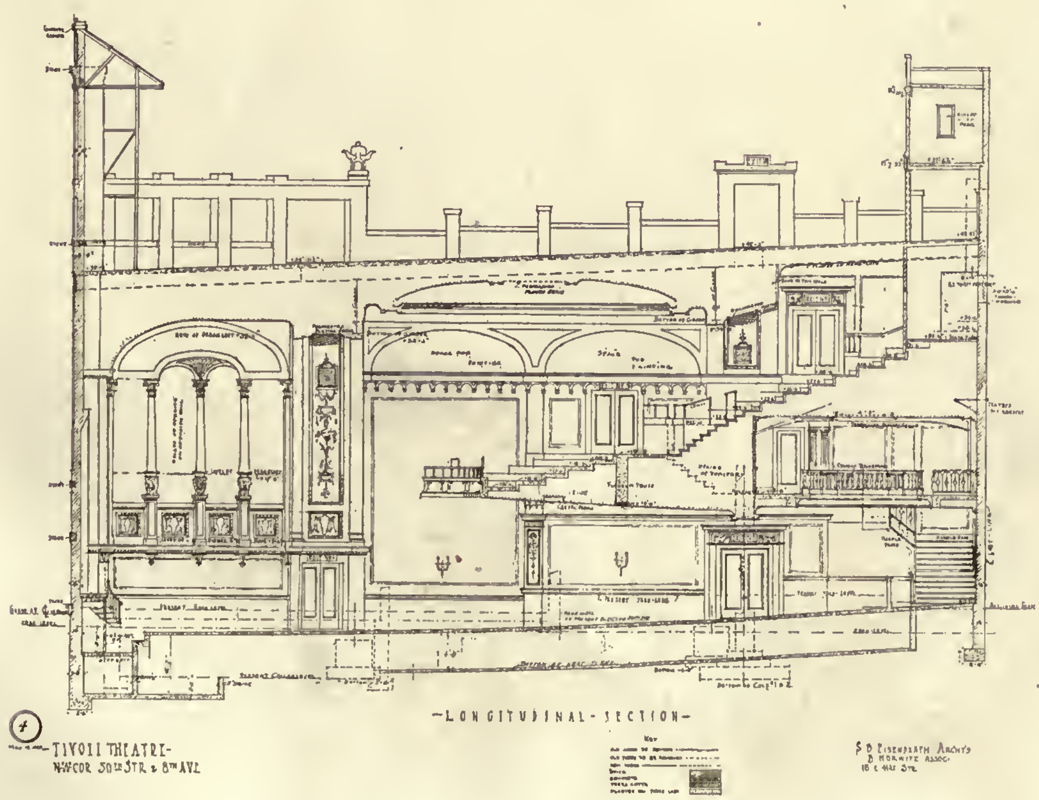
Where extravagant productions are given, such as some of the musical comedies, the stage-lighting is particularly heavy. A great many shows will require not only incandescent pockets of white only but incandescent pockets in colors—white, red, blue, or green, or amber—sometimes three colors, sometimes four.

In locating a switchboard it must be placed where the electrician can watch almost the entire stage. To get proper effects at the right time he must be able to watch for his cues. The slightest mistake in this direction will mar any show.

The switchboard itself should be of the "dead-face type," so as to be as safe as possible. A switch should be provided for each color in the footlight, for each color in each of the borders, for each color in each set of pockets, and for the various pockets throughout the stage. It does not pay to save cost on the stage switchboard.

The remarks relative to the switchboard apply to the dimmers.

No house is now complete, whether it be for legitimate or intimate drama, musical comedy, or any other purpose, without a picture-booth. The utility of a room of this sort is fully recognized, and it is now used for spot and flood light purposes in houses that do not show moving pictures. Formerly the spotlight operator occupied what was perhaps the most valuable seating-room in the house, the front of the first balcony. Now, however, he is put in a booth, and does not disturb the patrons in any way by his presence.



The electrical equipment of the booth for legitimate houses should consist of a sufficient number of pockets of large capacity for spot and flood lights. In addition it should be provided with capacity for one to three picture-machines, even though they are not required when the theatre is opened. The value of making provision for these machines is apparent to any manager who is suddenly called upon for current in excess of that originally provided for.

The interior color scheme is a very important subject for the architect. This subject is

Arena Theatre, New York. S. B. Eisendrath, Architect. B. Horwitz, Associate.

Auditorium, Arena Theatre, New York. S. B. Eisendrath, Architect. B. Horwitz, Associate.

usually well handled, though some houses have been made too light in color, which is regretted.

The selection of draperies is important, as they must be a color that will permit the use of various lighting effects thereon. It is very interesting to note the careful handling of this item in our most recent theatres. The carpets should be a dark color and set preferably on a wood floor. This not only gives better chance for the fastening of same but gives a more satisfactory surface to fasten the chairs. This is not an essential, however, as good results have been obtained with a cement floor.

The structural problems confronted in theatre design are most difficult, and are items where considerable money can be saved in steel tonnage by having the services of a specialist on the subject. It is hoped that one of the many men capable will later provide the readers of ARCHITECTURE with an article on the subject, wherein the points most necessary for economical steel design will be stated.

Making Over the Old Theatre for the Movies

CONVERTING the average theatre building to motion-pictures is a matter of little trouble and comparatively small cost.

The projection-booth should be placed in the back top end of the balcony and, if possible, suspended from the ceiling construction under the gallery. With a booth thus suspended, there is generally no loss of seats. If the space between the balcony and gallery is not sufficient to permit projecting the pictures without interception by people in the balcony, the booth can be placed at the back top end of the gallery. It is much better, however, to project the picture from the balcony, even at the cost of a few seats, as the screen image is many times badly distorted by wide angle and throw necessary from the gallery.

The dimensions of the booth need not be more than 7 to 8 feet in height, 6 to 7 feet in construction, and although the law requires it to be fireproof, it can be of light construction. Metal lath plastered solid 2½ inches thick with Portland-cement plaster is best for the enclosing walls. The screen should be placed on the stage, hung from above. It can easily be removed—if a drop is not used—either by sliding to one side as with ordinary scenery, or it can be made in the form of a roller-shade and readily rolled up.

The necessary feed-wires for supplying machines and other equipment are easily installed. The feed-wires carried into every theatre building are of ample capacity to take care of all requirements, especially where the usual scenic lighting for regular theatrical purposes is dispensed with.

Aisles, exits, and outside courts required in using a theatre for the showing of pictures in most cases need no attention other than for handling the outgoing and incoming audiences between shows. Any legitimate theatre conforming to the building laws is equally satisfactory and adequate for picture purposes.

Where a theatre is to be used largely for motion-pictures, various decorative features can be added on either side and above the screen, as it is done in many permanent picture theatres in the larger cities. This is particularly desirable if it is intended to have musical or vaudeville acts between the pictures, as it affords a pleasing background during these intervals. These decorative effects involve no structural change. On the contrary, most stages are of ample size to install special landscape or architectural effects around the screen.

A Design for a National Memorial

Submitted by Armstrong & De Gelleke, Architects, to the Mayor's Committee, New York

IT is proposed to erect a memorial to the men who served in the Great War, as a national token of esteem for their valor and patriotism. We believe such a monument should be large in its idea, daring in its conception, simple in its architecture, and purely American.

It is to be 1,000 feet high, situated in Central Park, at the head of the lower reservoir, and the surrounding in which it is to be situated would lend itself to a huge garden effect, and would lay claim to being the highest edifice in existence. Its location would be central from all parts of Manhattan Island, and a large section of the Bronx district, and visible for many miles by day, or when illuminated at night.

The general scheme of the monument is a hexagonal obelisk, symbolizing immortality, and to be flanked on both sides by two Greek-like temples; these buildings to contain trophies and war records, and to be connected by a semicircular colonnade leading to the principal entrance of a large open-air amphitheatre and public recreation grounds, which would be in the basin or sunken area of the large upper reservoir. The semicircular space between the colonnade and the monument to be a garden or grove, enhanced by small sculptural groups, and planted with fine trees and flowering shrubs, which would create an atmosphere similar to the famous temple and sanctuary erected to Apollo in the Sacred Grove at Delphi, erected by the Greeks in the first century B. C.

We believe the advantages of its proposed location are many in that the city is to abandon these water-storage areas, and these areas of water, together with their retaining walls and terraces, would be available and adaptable for a rare landscape and architectural development, such as the Gardens of Versailles or the Royal Italian Palace at Casertta. These sunken levels would lend themselves to such a treatment at comparatively small cost, and with this thought in view we have designed the monument as a start or nucleus of the suggested development. The illustration on page 234 shows the monument at the head or narrow end of a long pool and sunken garden, and would be an excellent setting for such a monument, as it would give a reflection that would mirror the changes of color and sky throughout the day.

The main monument is to be supported on its diagonal faces at the base by four smaller engaged obelisks, each to be a monument in itself to the four arms of the service, namely: the army, the navy, the marines, and aviation. The faces of these obelisks are to have sculptured ornaments of trophies of the particular service, together with tables at various heights, bearing the names of battles or campaigns in which the particular arm served with distinction. The obelisks are to be capped by gilded frustrums which would reflect the first rays of the morning sun and the last rays of the setting sun.

Over the central entrance, which faces south, there is to be a large group of figures representing the city or State of New York, and above this group is the Dedication Tablet in sculpture, flanked by two huge figures in bas-relief symbolizing Patriotism and Courage. The principal entrance admits to a huge central domed hall, whose walls are to contain inserted bronze or marble tablets recording the part played by any city, town, county, or State in the erection of this monument. This central hall would contain a bank of elevators to take the visitor to the observation-room at the top of the monument; also from this central hall would start an inclined ramp, or walk, to the top, with various landings to give interesting views.

In a chamber above the observation-room it is proposed to establish a permanent wireless-collecting station that might at some time serve the country in the same priceless way that the Eiffel Tower served France during the Great War.

The monument itself would be purely American in its symbolism and construction. The American contribution to the world architecturally has been the sky-scraper office-building, and in the constructive field the steel shell. Both of these would be incorporated in the monument, which would be built with a steel framework, veneered with white marble. Its cost would not equal that of any steel-constructed office-building, but, on the other hand, would be less because of the absence of interior furnishings.

Book Review

"OLD CROSSES AND LYCH-GATES." By AYMER VALLANCE. London: B. T. Batsford; New York: Charles Scribner's Sons. With over 200 illustrations from photographs, rare old prints, and original drawings.

Even a casual turning of the pages of this interesting book brings into one's thoughts the admirable and appropriate material it offers for moderate cost memorials to our soldiers. There are abundant and beautiful examples of these old monuments found in England and Wales upon which might be based especially suitable memorials for small communities. This applies particularly to the crosses, of which a great variety of form and design are shown. Many of them could be built of the local stone available in nearly every section of the country, and they could be simple or elaborate with suitable tablets either engraved in the stone or applied by means of a bronze tablet.

"In older times these crosses were the centre for various celebrations. At Chester the High Cross was the scene of all great civic functions. Here again royalty was received, here proclamations were read with due formality. They were a recognized place for public proclamations."

No one who has visited the smaller English towns off the beaten track will have failed to carry away some remembrance of an old cross or lych-gate connected with a picturesque little English church.

There is a fund of suggestion in the many illustrations from both photographs and drawings.

Most of us know both the stone soldiers and the more or less plain or decorated shafts put up as memorials to our Civil War veterans, and we all know how bad they are with very few exceptions.

The author's text traces the origin of these crosses back to the menhir, and describes many of the best-known types of the developed crosses in England and Wales.

The lych-gate was so called (the word *lich* meaning corpse) because it stood at the entrance of the churchyard, a place where the bearers might rest their burden on the way into the church. Many of them had screens built over them.

TO THE EDITOR OF ARCHITECTURE:

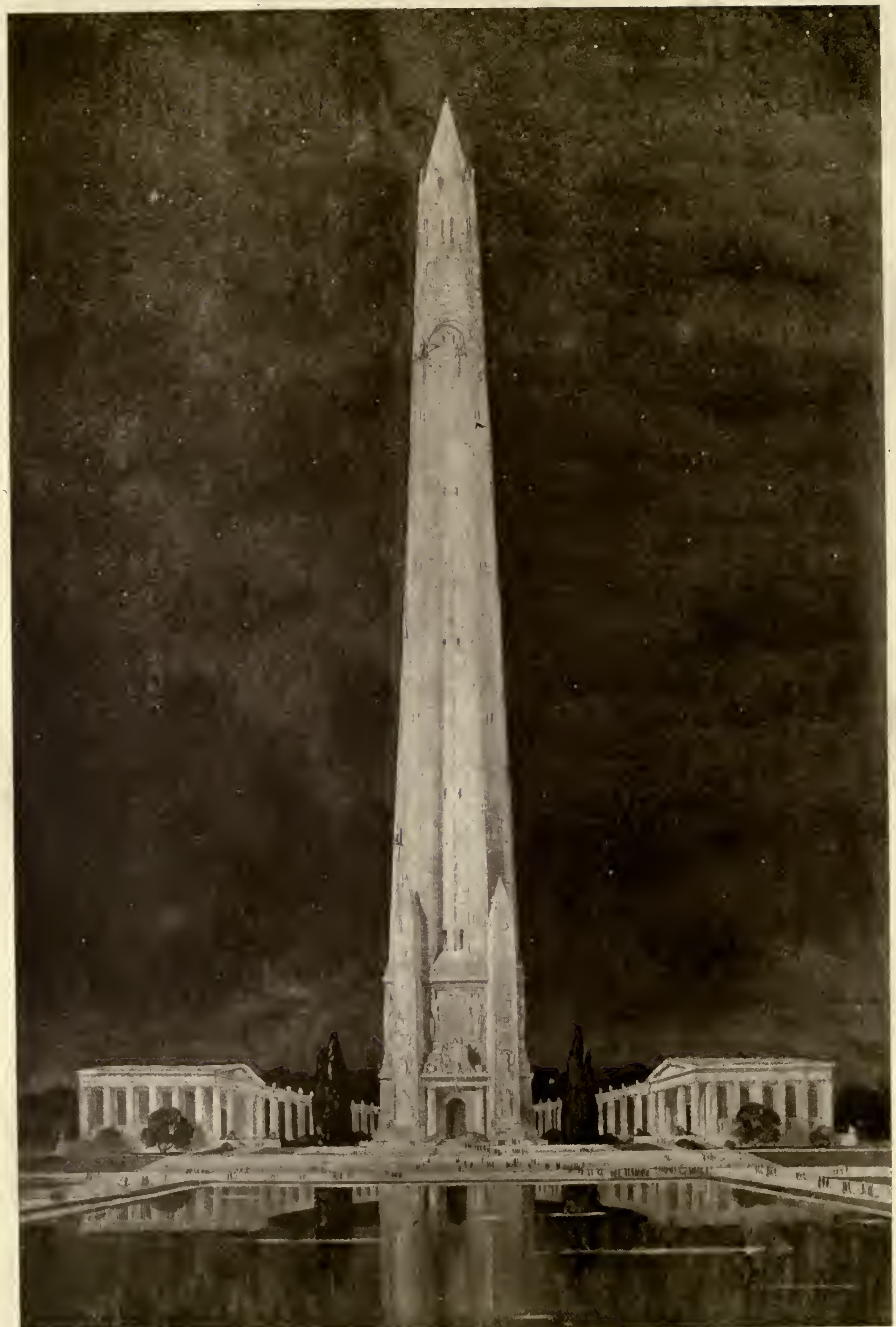
Dear Sir: The secretary of the American Institute of Architects has called my attention to an inaccurate statement made in my article, "An Accounting System for an Architect's Office," published in the April issue of ARCHITECTURE.

In the third paragraph of the article I stated: "The American Institute of Architects has established a schedule of fees to which we are obliged to strictly adhere."

This statement is in error. I should have said that the Institute has laid down a schedule of reasonable minimum charges which it is customary to employ under certain standard conditions. From a careful reading of the Institute's schedule of proper minimum charges, it is quite clear that the fees established are in no way mandatory.

Very truly yours,

H. P. VAN ARSDALL.



DESIGN FOR NATIONAL MEMORIAL. (From a rendering by W. T. L. Armstrong.) Armstrong & De Gelleke, Architects.
Submitted to Mayor's Committee, New York.

Editorial and Other Comment

The Architects of St. Thomas's—A Correction

IN his article in the July number of ARCHITECTURE on "St. Thomas's and Its Reredos" Mr. Peixotto quite inadvertently, in his statement that "the church as we see it to-day is essentally Mr. Goodhue's," did an injustice to the other members of the firm who were equally associated in its design. The church was the result of the co-operation between all the members of the firm of Cram, Goodhue & Ferguson, and credit for its great success and distinction should have been given alike to all three members of the firm. Mr. Goodhue personally asks us to state that the paragraph in question did "distinctly more than justice to me, and does very grave injustice to both my former partners."

Theatres

AS a sign of the times, an expression of the mood of a people, the taste of a public, there is nothing more significant than the multiplicity of theatres, large and small, that are going up all over the country. Hardly a small town now but has its playhouse, usually devoted to the movies, and that they are proving a profitable investment is evidenced by the fact that more than any other kind of building they seem easily financed. The movies have driven out plays from many famous old houses that were once the homes of the legitimate; and the largest of the new houses are given over to the movies, either with or without accompanying vaudeville or some musical entertainment. In New York there are more than 650 theatres in the greater city, and more are under construction. The amount of money already appropriated for new amusement houses in New York alone amounts, we are informed, to something like $25,000,000.

The architecture of the theatre seems to be very much specialized, and the problems involved call for trained experts in this particular field. The plans vary with the needs of particular localities and purposes, but the fundamental consideration seems the using of spaces to permit of the largest unobstructed seating capacity and the easy inflow and exit of changing audiences, combined with requirements of safety. We have had requests from various quarters asking for a number of ARCHITECTURE in which might be shown some typical theatres of to-day, and our readers will find shown herein types that have the authority of architects trained in this special field, together with Mr. Mlinar's admirable discussion of the practical questions involved.

One of the great contributing factors in theatre construction of to-day is the use of reinforced-concrete arches. Some of the spaces covered in this way are amazing in their daring and knowledge of the engineering problems involved.

In no other country in the world has the theatre become such an essential part, such an intimate part, of the lives of millions. One of the recent tendencies is in the combining of the theatre with a great modern office or studio building, and the economic value of such a combination seems too obvious to need emphasis.

There is too often much to be desired in the decoration of many of our playhouses, and there seems no reason why we should not have less of the garish and overloaded ornament so prevalent and more quietly appropriate ornament based upon either some frankly studied period style, or, if we must be modern, governed more by good taste than the mere desire to express the fact of unlimited expenditure.

Now and then we come upon some small provincial theatre devoted to the movies that is delightfully restful by its very absence of the customary stock-theatre decorative properties.

Some Comment on the Competition for the Nebraska State Capitol

WE were much interested in the comment and discussion of the question of the selection of the architect for the Nebraska State Capitol by a writer in the New York *Evening Post*. There are some points so well taken that we feel warranted in quoting this extract that may find a responsive attitude in the minds of many of our readers. The whole question of competition has been, and will be always, a moot question.

The Nebraska way, at least, had the great merit of avoiding some of the most objectionable features of old methods. As the *Post* says:

"The programme made three radical departures from precedent. No predetermined concept was disclosed; the competitors were left as much as possible in the dark as to the kind of building wanted. No jury was selected to judge the designs until after the designs had been submitted. No limits, beyond ordinary considerations of reasonableness, were set in the matter of cubage and cost.

"That direct selection of the architect has been approximated by these innovations is plain enough. Not a solution but ability to solve, not a design for use but a demonstration of power, not the plan but the man was the goal. The obtaining of a design was as far as possible eliminated from the test.

"What would be lost in eliminating it altogether? What is gained by retaining the competition at all? The programme, for all its breadth of vision, is hazy as to these implied questions. If a public demonstration is needed of the superiority of leaders and the inferiority of inadequate talents and experience, a competition under almost any plan will yield the object-lesson. The old dilemma meanwhile persists: the competition is a faulty method of obtaining solutions and the solution is the only truly adjusted function which a competition has. So far as the Nebraska plan devolves upon the jury a selection among ten designated architects on the basis of their ten solutions of a vaguely defined problem, the jury being cautioned not to rely too much on the solutions themselves, it may seem to be moving to improve the architectural competition out of existence. A few more steps in this direction and we may find the architect selected as other professional servants are selected—on the tangible evidence of past performances."

As to Advertising

OUR attention was attracted recently by an attractive city alteration, and our eyes focussed upon, among other things, two signs announcing the names of the builders and those of the architects. We couldn't help feeling that there was no sufficient reason why the architects shouldn't make themselves known to the man on the street, or see any lack of professional dignity in the fact. Of course there are certain reservations in the conduct of all professional men, a code of ethics, a gentleman's agreement to play fair and not bring contumely upon one's calling, but even gentlemen may announce themselves in gentlemanly terms and in the good taste that most men worthy of the name of architect would likely prefer.

The big men of any profession are quickly known by their works, but the man with a reputation yet to make finds it mighty hard in these competitive days to just sit tight and trust in Providence to be discovered. In an upstate newspaper we saw a large display advertisement of a local firm of architects, and now that the Institute has modified its rules, maybe we shall see more architects doing as other business men do who seek the public interest and declare themselves ready and qualified to accept commissions from all who offer.

Of Especially Timely Interest

ARCHITECTURE will begin in the September number a series of articles of great practical value to every member of the profession. They will be written by H. Vandervoort Walsh, instructor in Architecture, Columbia University School of Architecture, and will deal with

"The Construction of the Small House"

Articles already arranged for, each one of which will include illustrations, are:

I. Present-Day Economic Troubles.
II. General Types and Costs.
III. Essential Standards of Quality in Building-Materials.
IV. Construction of the Masonry-and-Wood Dwelling.

Others will be announced later.

Teaching Architecture by Practical Methods

NEW methods of teaching, designed to remove "the malicious influence" which pure paper has upon the imagination of the student and to avoid mistakes which would stand as glaring faults through many generations, are now being employed in the School of Architecture of Columbia University.

The student is no longer restricted to one dimensional architecture, portrayed wholly on paper, but is required to construct models which bring into play the same skill and perspective demanded in the actual practice of the architectural profession. Model-making as a means for construction in architecture is a long step in advance, according to the Columbia authorities, who also say that the war has changed American standards of art.

"It has long been appreciated that the student of architecture is trained largely in feeling for one dimensional architecture, presented entirely upon paper, and in the form of a plain elevation drawing," H. Vandervoort Walsh, of the Columbia teaching staff, said in describing the system of model-making now used to train Columbia architects.

"The student never has the opportunity which the practising architect finds of observing his design completed in all three dimensions. This privilege only belongs to the architect who has secured his commission and has had his building erected at the expense of his client. Many such architects have been astonished and surprised at mistakes in their design, due to the inability of drawings to fully represent the truth as it would appear in three dimensions. When the building is completed he has no opportunity of changing the form, and his mistake must stand as a glaring fault through many generations.

"The student of architecture who has the opportunity of designing a building, or a group of buildings, first on paper and then completing the same in the form of a model, has all the opportunities of observing the mistakes of his design without the cost of erecting the building. Moreover, he has removed the malicious influence which pure paper design has upon his imagination.

"Many a designer who has unusual skill in drawing and rendering, and who is blessed with an extremely fertile imagination, is often able to mislead himself with his pictures, and regard the thing he has erected on paper as beautiful architecture, while if it were constructed in three dimensions, in the form of a model, it would appear entirely absurd and ridiculous.

"The manner in which model-making is carried on in the School of Architecture in Columbia University is extremely simple. A squad of students is given a problem, as say, 'A Club Colony in Florida.' Each member of the squad then tries to solve this problem on paper according to his own ideas. These sketches are then judged by a jury consisting of the critics in design, and the best design is selected for the model. The students are then assigned to various parts of the model, some to making the landscape, others this building and others that building of the group.

"The models of the buildings are constructed entirely of heavy illustration board. All elevations are drawn upon it, and minor projections, mouldings, windows, doors, and ornamental features of this type are rendered not in the usual architectural manner, but with a very hard, contrasting technic, so that these features will stand out strongly and realistically in the completed model. Large projecting members like cornices, columns, chimneys and dormers, etc., are made from anything that the student may be clever enough to use.

"In fact, the ingenuity displayed in the construction of a model is one of the fascinating features of the work. As for landscape gardening, grass made from stained sawdust, trees made from sponges, colonnades made from toothpicks, water-falls and fountains made from glass are a few suggestive ideas of the possibilities in these models."

Plates CXIII – CXVIII to follow page 236

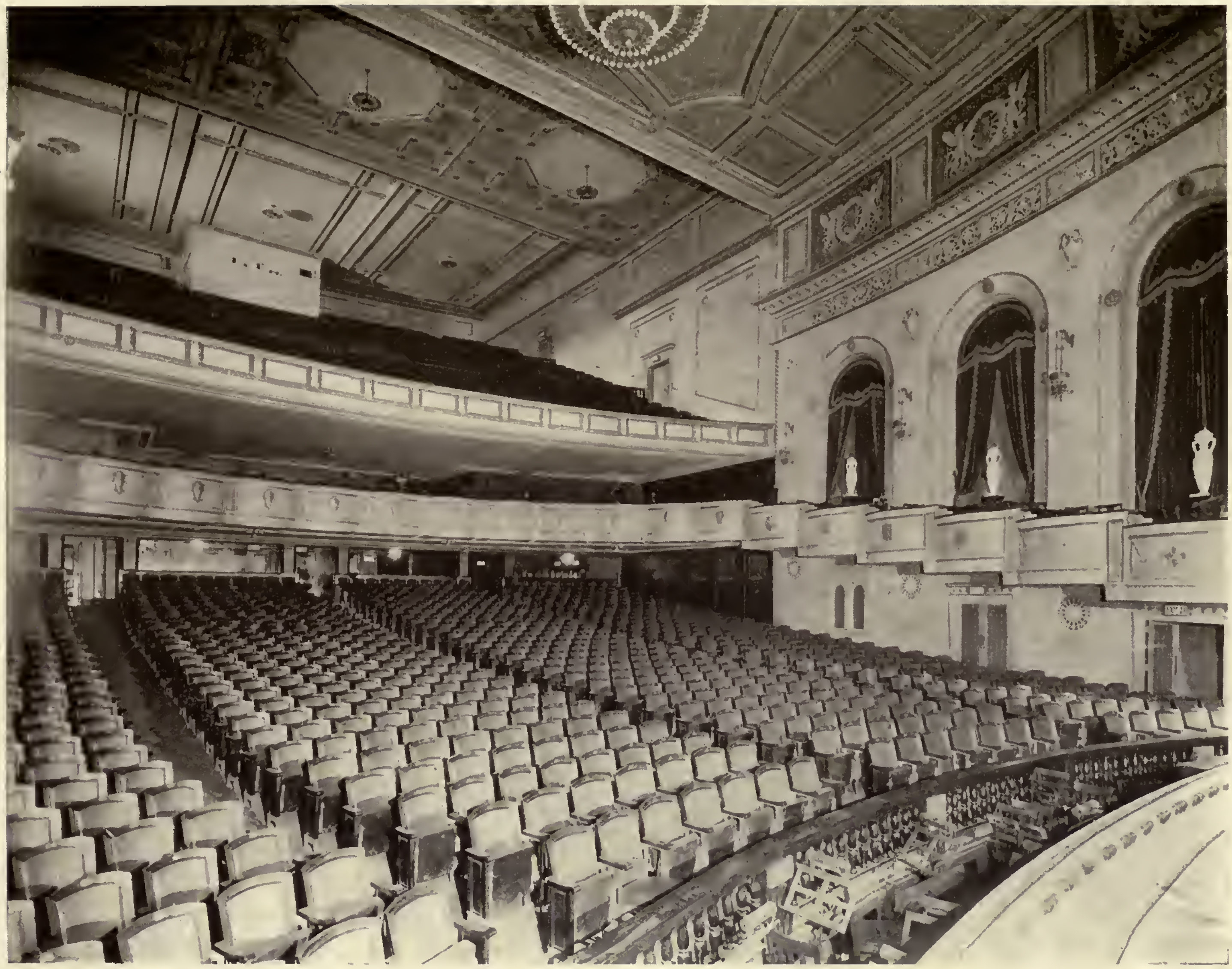
ORCHESTRA HALL, DETROIT, MICH.

C. Howard Crane, Architect. Elmer George Kiehler, Associate. Cyril E. Schley.

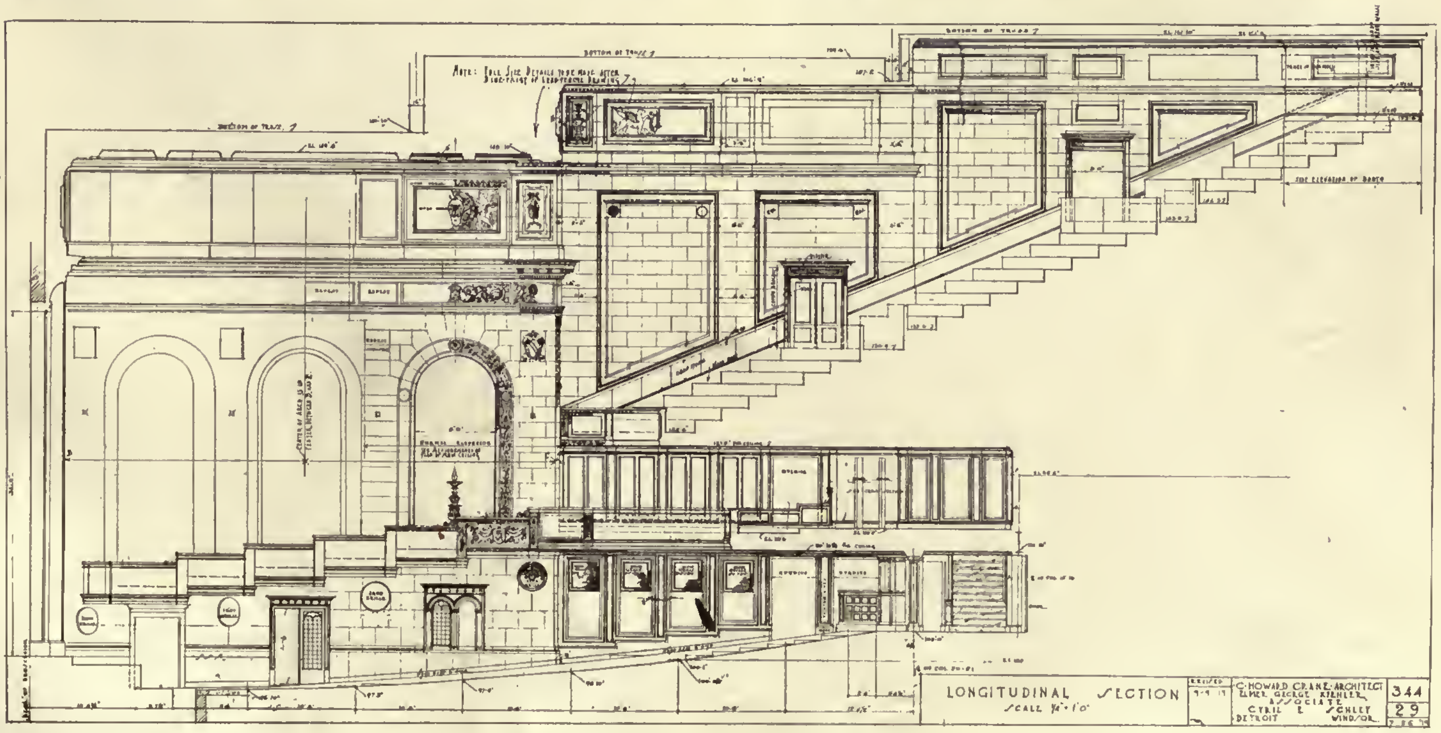
LOBBY.

VESTIBULE. C. Howard Crane, Architect. Elmer George Kiehler, Associate. Cyril E. Schley.

ORCHESTRA HALL, DETROIT, MICH.



AUDITORIUM.



LONGITUDINAL SECTION.

ORCHESTRA HALL, DETROIT, MICH.

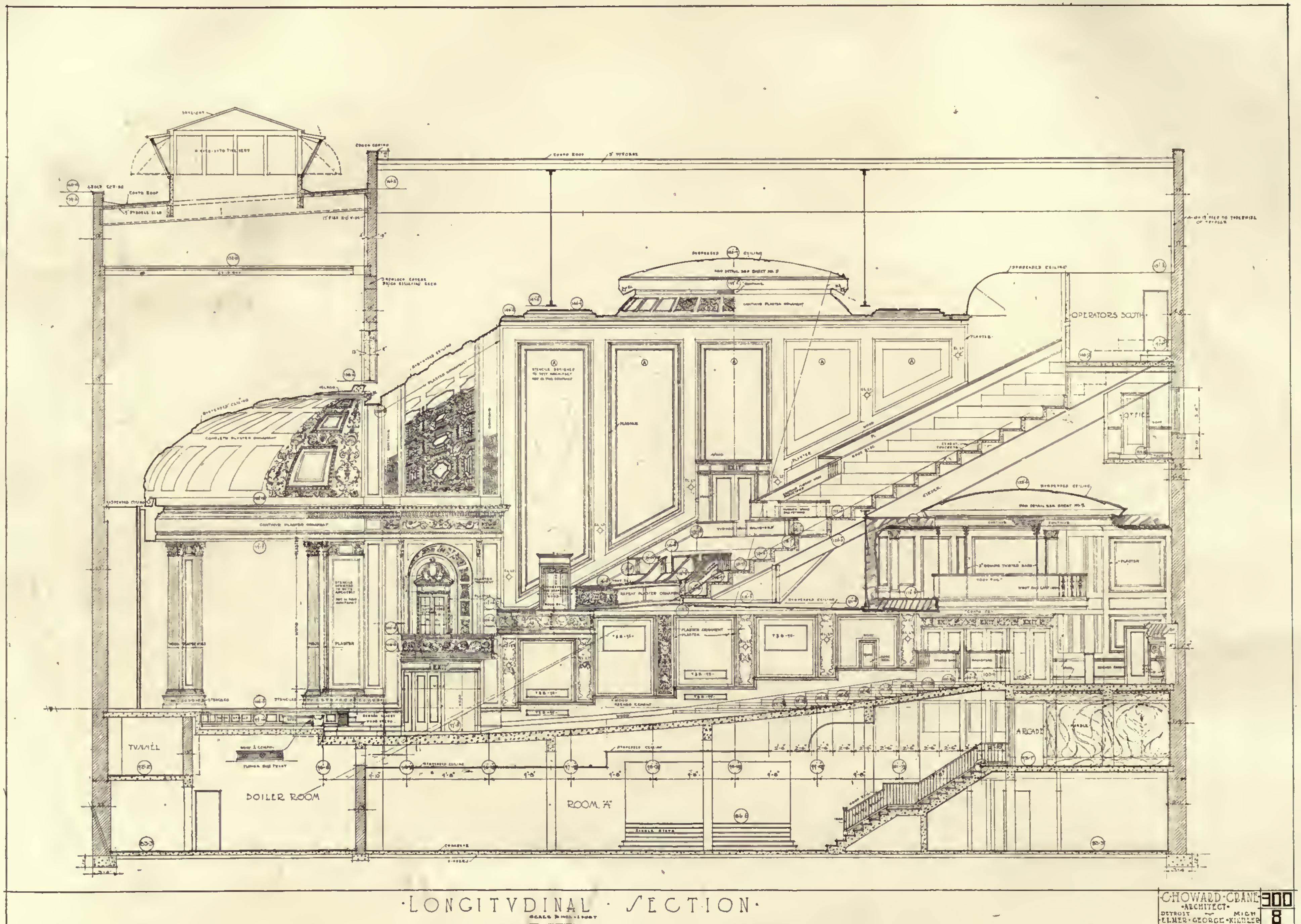
AUDITORIUM.

FOYER, FIRST FLOOR.

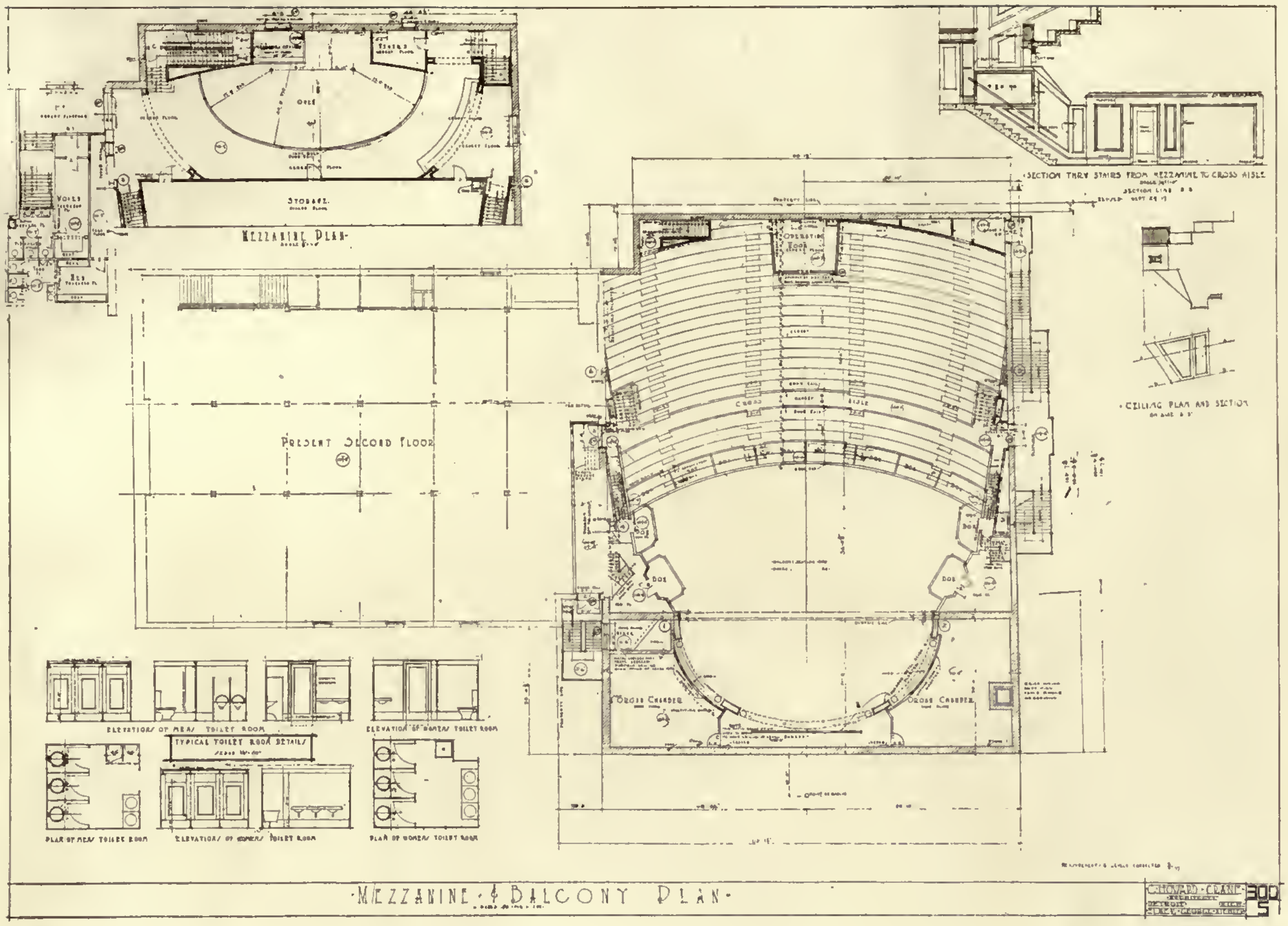
DETAIL OF BOX.

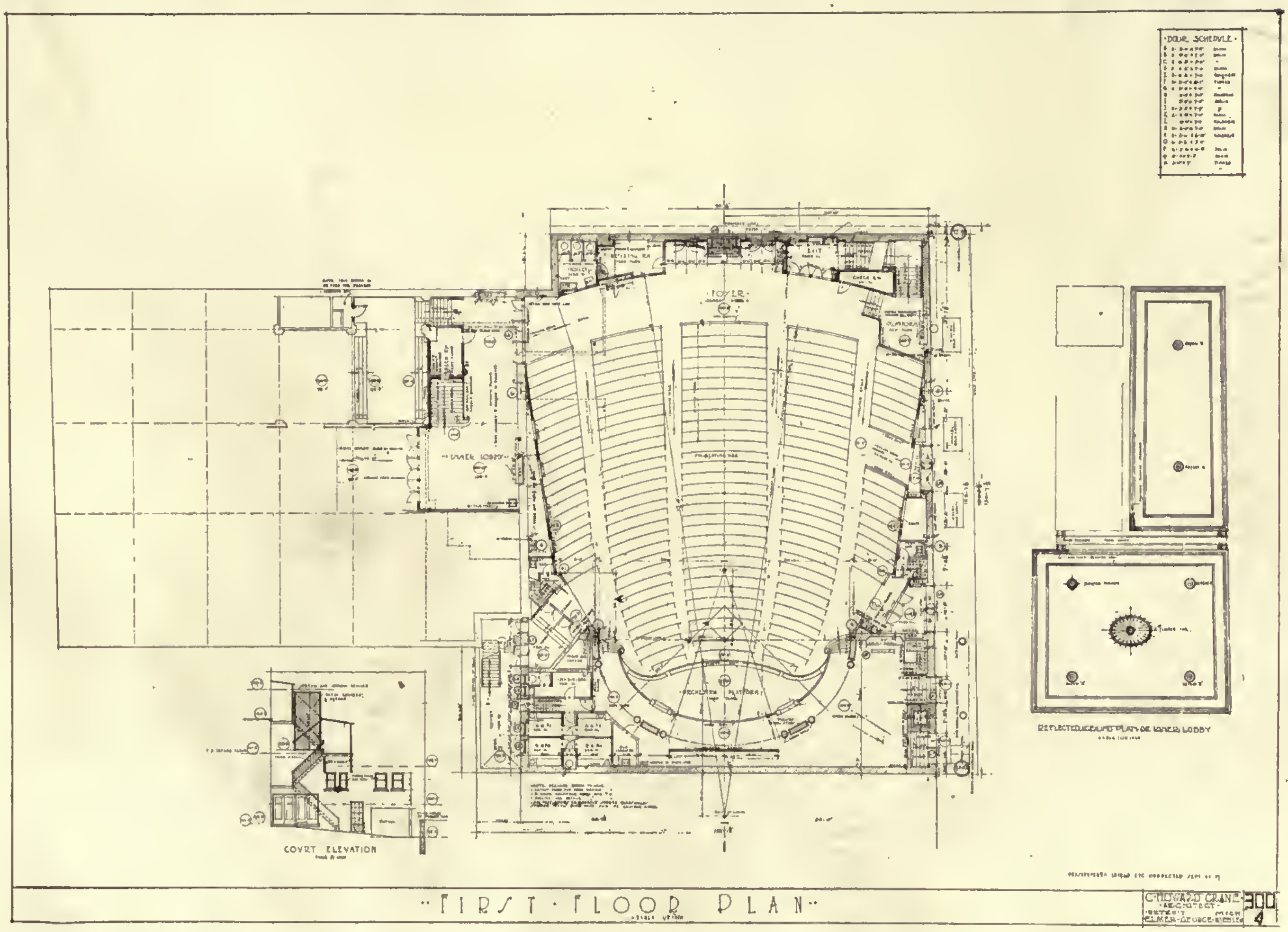
THE GRAND THEATRE, PITTSBURGH, PA.

C. Howard Crane, Architect. Elmer George Kiehler, Associate.

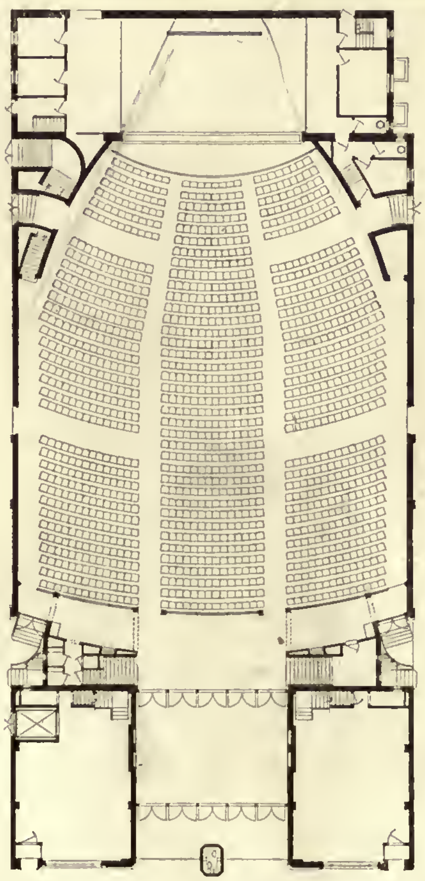


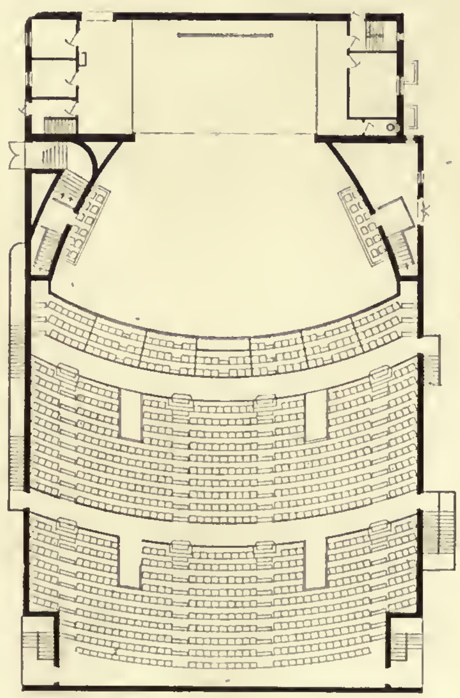
GRAND THEATRE, PITTSBURGH, PA.





GRAND THEATRE, PITTSBURGH, PA.





THE DAYTON THEATRE, DAYTON, OHIO.

Schenck & Williams, Architects.

BALCONY FOYER.

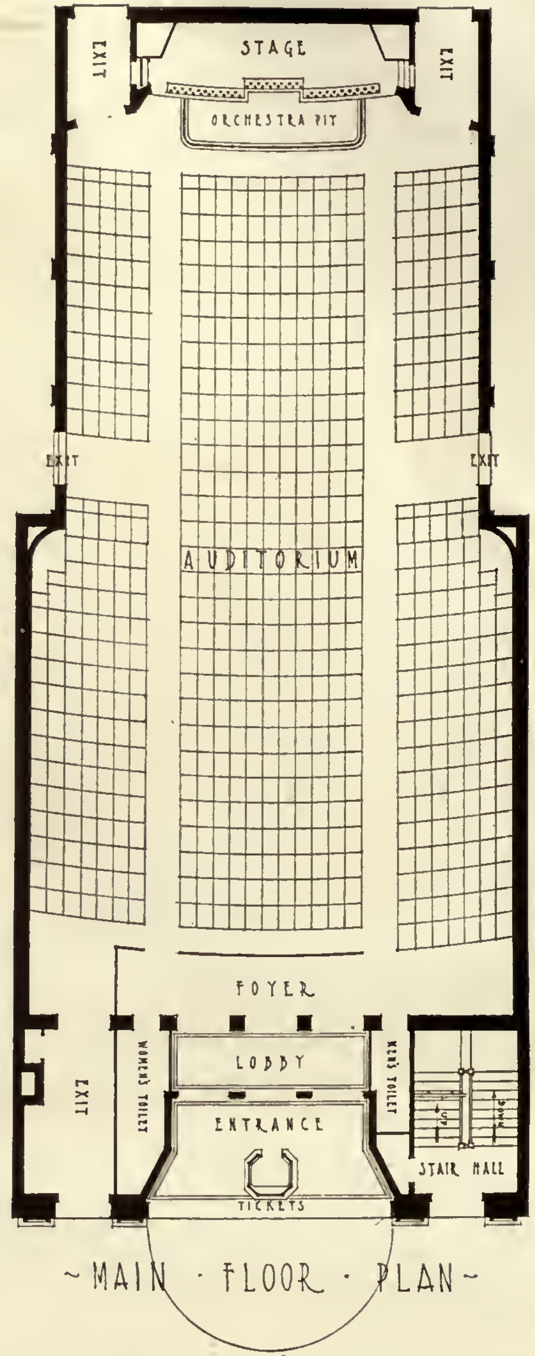
PROSCENIUM.

AUDITORIUM.

Schenck & Williams, Architects.

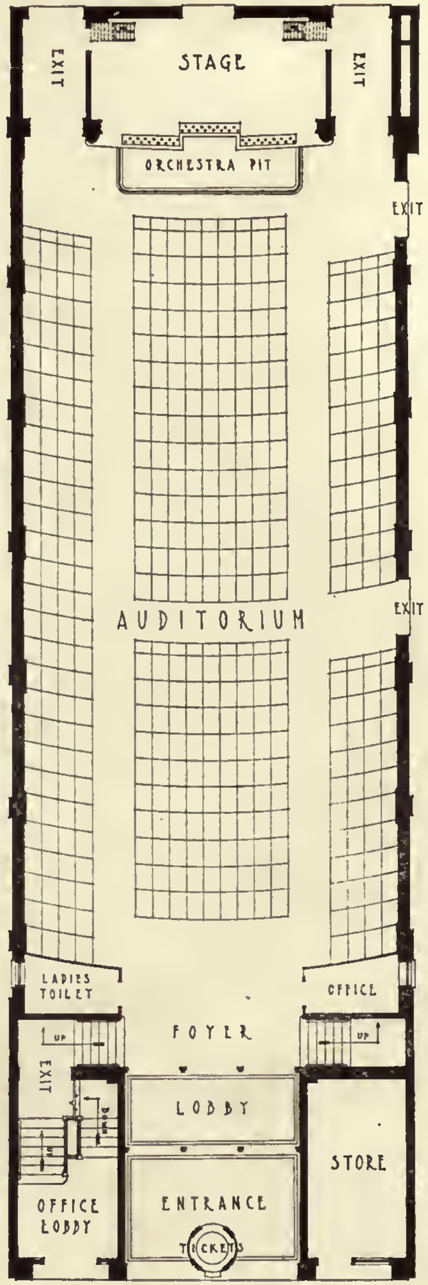
THE DAYTON THEATRE, DAYTON, OHIO.

The seating capacity of the house is 2,300. One of the distinctive features is the fact that the projection booth occupies a place in the front of the balcony, but is so placed that the only seats which it displaces are about a half dozen seats in the front row of the balcony. This arrangement makes a very superior projection of the pictures, the projection machine being not over seventy feet from the screen and almost horizontal in its throw. Also, there is no noise whatever from the projection machine conveyed to the patrons either in the ground floor or balcony.

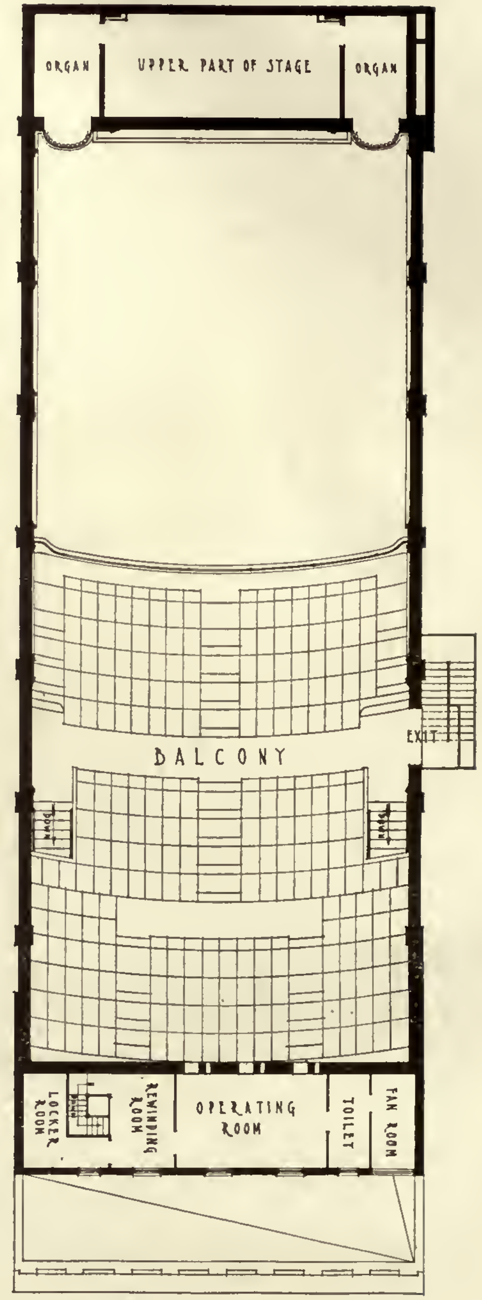


PLAZA THEATRE, PITTSBURGH, PA.

Harry S. Bair, Architect.



MAIN · FLOOR : PLAN



BALCONY · FLOOR · PLAN

FREDERICK THEATRE, PITTSBURGH, PA.

Harry S. Bair, Architect.

RESIDENCE, FRANK YOUNG, HACKENSACK, N. J. Wesley Sherwood Bessell, Architect.

Winner of the First Prize in the New York *Tribune* Suburban Homes Contest.

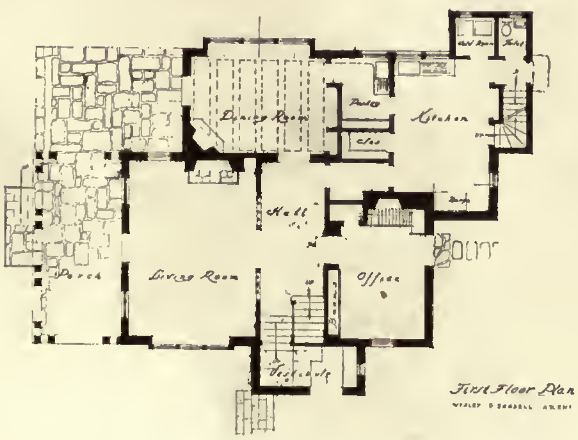
FRONT ENTRANCE.

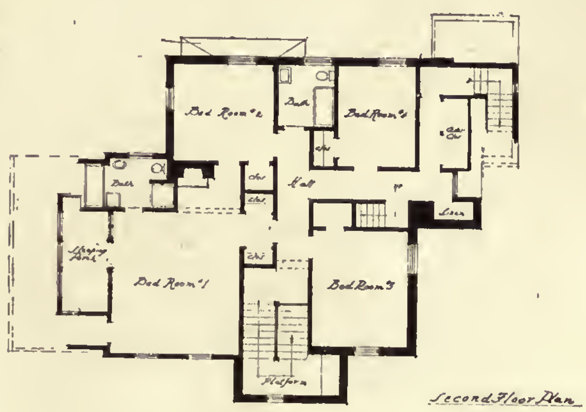
GARDEN.

Wesley Sherwood Bessell, Architect.

RESIDENCE, FRANK YOUNG, HACKENSACK, N. J.

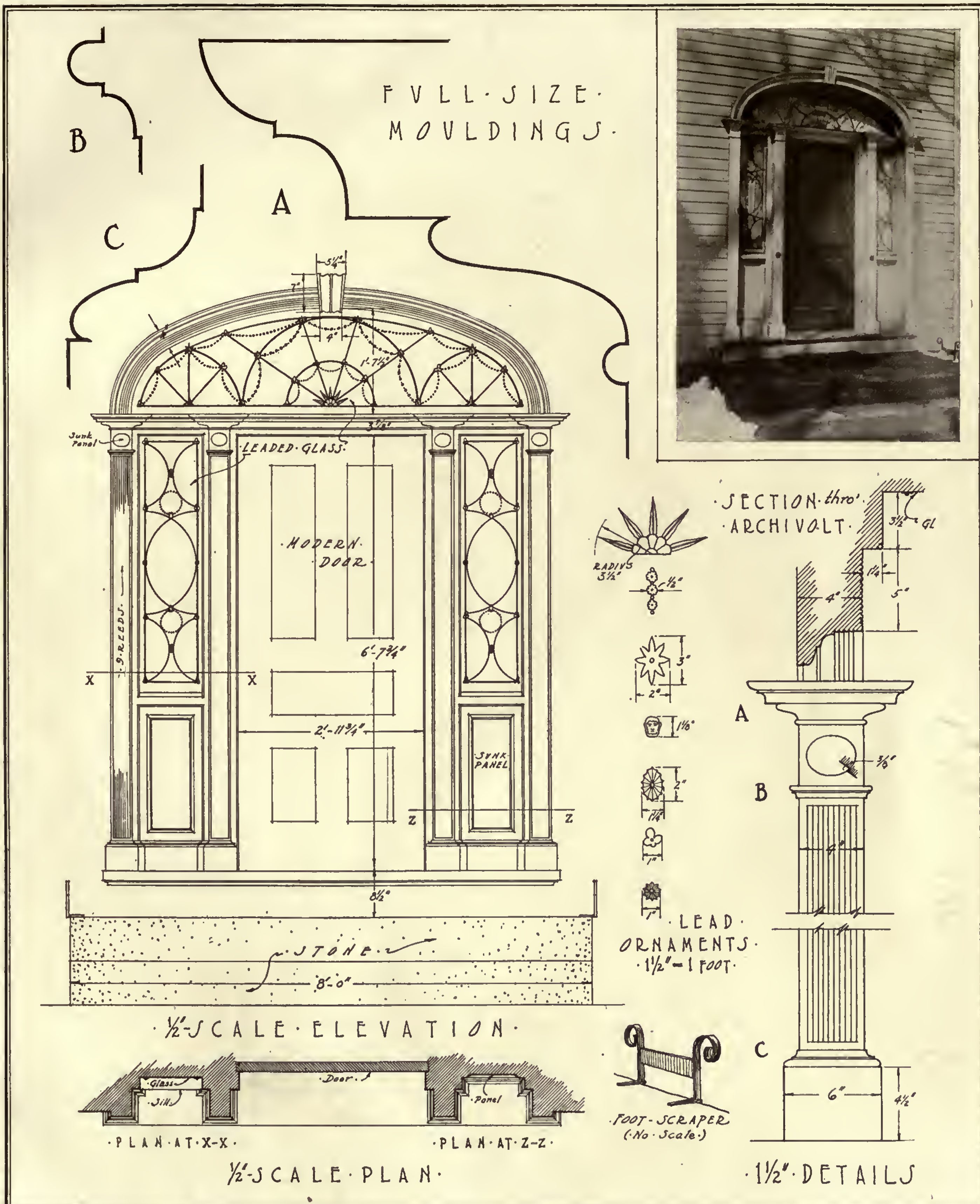
VIEW IN ROSE GARDEN.





RESIDENCE, FRANK YOUNG, HACKENSACK, N. J.

Wesley Sherwood Bessell, Architect.



·EARLY· ARCHITECTURE ·OF· ·CONNECTICUT·	·DOORWAY· ·OF·THE· ·CORNWELL·HOUSE· ·CHESHIRE·CONN·	·MEASURED·BY· J·FREDERICK·KELLY· ·DRAWN·BY· LORENZO·HAMILTON·


THE SIDE PORCH.


PORTICO. (The original doors in place in the new church.) Davis & Brooks, Architects.

FOURTH CONGREGATIONAL CHURCH, HARTFORD, CONN.

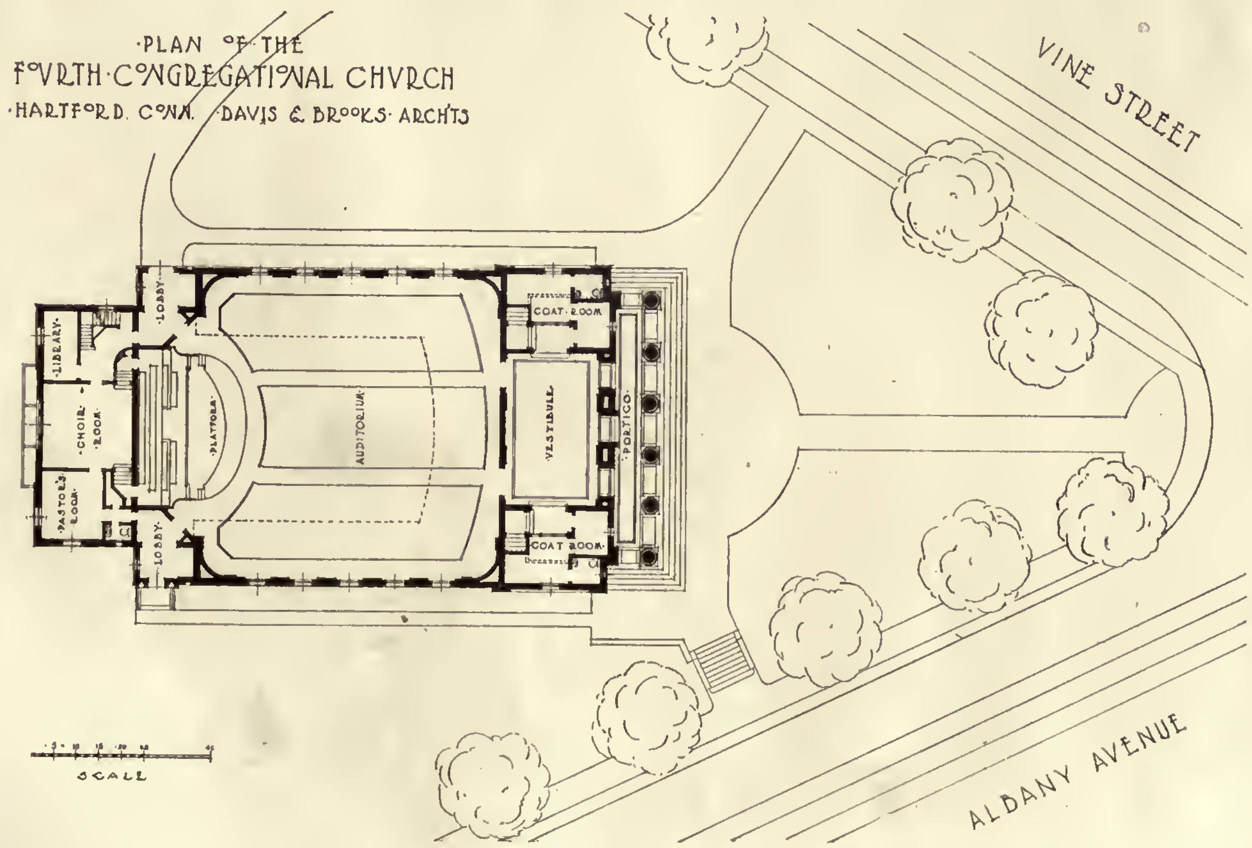
AUDITORIUM.

VESTIBULE.

Davis & Brooks, Architects.

FOURTH CONGREGATIONAL CHURCH, HARTFORD, CONN.

SIDE OF BUILDING, FOURTH CONGREGATIONAL CHURCH, HARTFORD, CONN. Davis & Brooks, Architects.



The Fourth Congregational Church of Hartford

Old Traditions Embodied in the New Building

By W. F. Brooks, Architect

THE new building for the Fourth Congregational Church of Hartford, completed just prior to the war, has a certain historical as well as architectural interest, and shows how important work of the past may be preserved in its main features, even though the upheavals incident to modern development in our cities make a change of location necessary.

Changes of residential centres and the encroachment of business often make the abandonment of an old location necessary, but if an edifice has character, which has become associated with and a part of the life of the users, it should not be lost in making the change if it is possible to preserve it. If, also, there are characteristic parts of the old building which not only help this association of ideas but are worthy of preservation for their own beauty, it is ruthless not to attempt their incorporation in the new edifice.

The Fourth Church is a case in point. It occupied a building on North Main Street built about 1850, and by 1913 its congregation lived far to the northwest, and the encroachment of business had made its dignified porch and spire seem incongruous, but had increased the value of its real estate so that it could afford to move.

All that is known of the earlier building is that in 1848 the congregation's committee went to New Haven, and were so pleased with the general appearance of the Centre Church of that city (the one recently so beautifully restored on the green) that they gave instructions to their architect, S. M. Stone, of New Haven, to build their new church in Hartford like it. Accordingly, there arose a fine building with a Corinthian pedamental porch and well-proportioned spire of superposed orders, ingeniously varied after the manner of James Gibbs. The capitals were all of hand-carved pine and in excellent preservation.

After the sale of the property in 1913 and the purchase of a new site in the northwest residential district, the committee considered the selection of an architect by means of an informal submission from a few invited local firms. Davis & Brooks were among these, but instead of submitting drawings of a new church, they proposed to the committee a scheme which preserved the character and best features of the old church. These architects explained the value, historic, sentimental, and real, of the easily removable porch and handsome spire for so many years one of the landmarks of Hartford, and that with these as the dominant adornment they would design a modern auditorium in keeping, agreeing thus to produce far richer and more important results than the money at hand could produce in new work. Their suggestions prevailed, the new church was built, proportioned and corniced to receive its predecessor's adornments, which were moved part by part, and the accompanying illustrations show the result.

The old church, built about 1850.

The new site was especially well adapted as a setting for the porch and spire. Here there was ample space, with well-formed elms about streets making an obtuse angle, the centre of which made a particularly favorable setting for the spire. Whatever may have been the original color of this architecture, it had, in common with so many Connecticut churches of the period, become a "two shade of brown" affair, obviously to the detriment of the general effect and detail. Naturally, the color was changed to white.

Even on its commercial side this solution proved wise and showed forcibly the folly of discarding what was so valuable to those who could properly make use of it. When the architects made their proposal the sale of the old property was already an accomplished fact and there were no reservations in the deed. So, in order to carry out the scheme, it was necessary for the new owner to consent to return a portion of the edifice which he had already paid for. This he readily consented to do, as his chief concern was with the auditorium, which he proposed to convert into a "movie" house; the porch and spire, to him, simply represented the cost of removal, which he was glad to be relieved of.

While the cost at that time would have no interest or significance now, it is obvious that the mere moving and erection of these features was only a fractional part of what their new cost would have been, aside from all questions of their superiority in workmanship or their sentimental value.

[Here was a fine opportunity appreciated, and the new church with its fine old front must be a source of pride not only to the congregation but to the city of Hartford.—Ed.]

The new church.

Orchestra Hall, Detroit, and the Grand Theatre, Pittsburgh

THESE two theatres are good examples of the modern American theatre by C. Howard Crane, architect, Elmer George Kiehler, associate, Cyril E. Schley, who have achieved much success in the theatre-building field.

Orchestra Hall is the home of the Detroit Symphony

Detail of boxes, Orchestra Hall.

Orchestra and one of the most beautiful and modern houses in the country. The building has a capacity of about 2,200, and although it maintains the feeling of compactness, is spacious but not vast or bare-looking. This sense of compactness is attained by the happy arrangement of the balcony and the fact that the mezzanine floor is held back slightly under the balcony, which seats 1,000. The floor accommodates about the same number, while the spacious mezzanine with its horseshoe of 26 box-seats accommodates 154.

Every provision has been made to secure perfect quiet in the building. Three sets of doors exclude the noise of traffic from the street, and spacious lobbies on both the main and balcony floors provide a place for late-comers to wait while a number is being given.

The acoustic properties of the building are so perfect that the most delicate tones of the strings are clearly audible in every part of the hall, thus making the auditorium equally suitable for grand opera or chamber-music.

The stage is completely equipped for grand-opera performances, and is said to be the largest in the city, having a span of 48 feet and a depth of 45 feet. Back of the stage are 15 dressing-rooms, two of which are large chorus-rooms, besides which there is a space under the stage for additional portable dressing-rooms if needed.

The lighting of the building is one of its most successful and unusual features. Instead of the glare of white lights, canary-colored bulbs are used, which shed a soft amber light. This is in keeping with the colorings of the Italian Renaissance decorations. The entire building is suggestive of the old Italian.

The Grand Theatre of Pittsburgh is one of the largest theatres in this section of the country, which is readily shown by the seating capacity, which is well over 2,600.

This great auditorium is devoted almost exclusively to motion-pictures. The interior of the auditorium is decorated in blue, gold, reds, and ivory, giving an intimate and cheerful effect, so essential to a successful theatre. The ceiling consists of a large central dome, and surrounding it are very highly decorated and enriched panels. The central dome is beautifully lighted by cove-lighting in three colors. Very highly enriched sounding-boards spring from the proscenium framing in the stage boxes. The hangings of these boxes as well as the main drops in the theatre have rich quality velvet velour, heavily lined and trimmed with gold brocade. The sight lines and acoustics in this theatre are perfect.

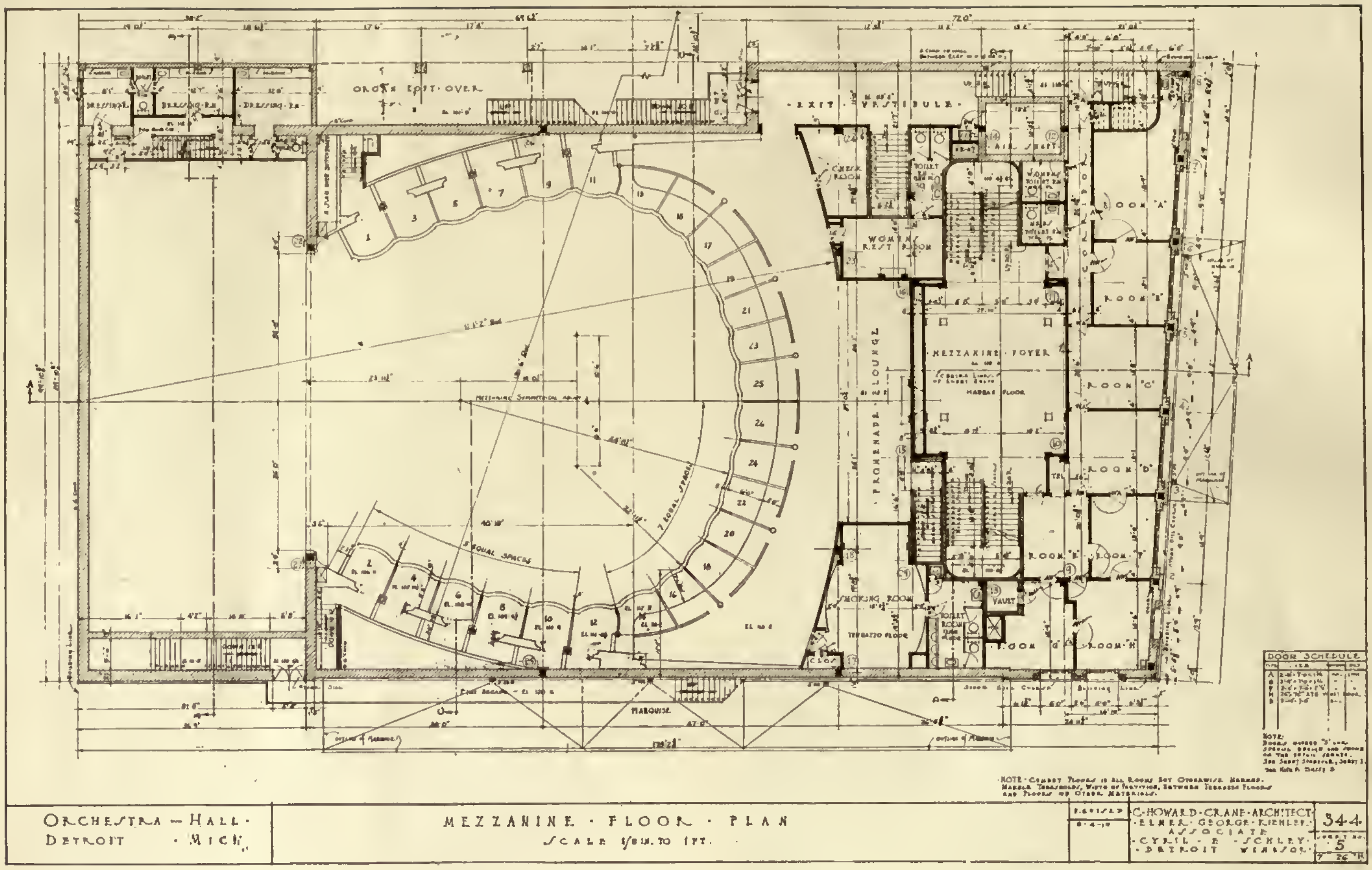
No small amount of study has been given to the beautiful interior and the adjoining lounges, promenades, and retiring-rooms.

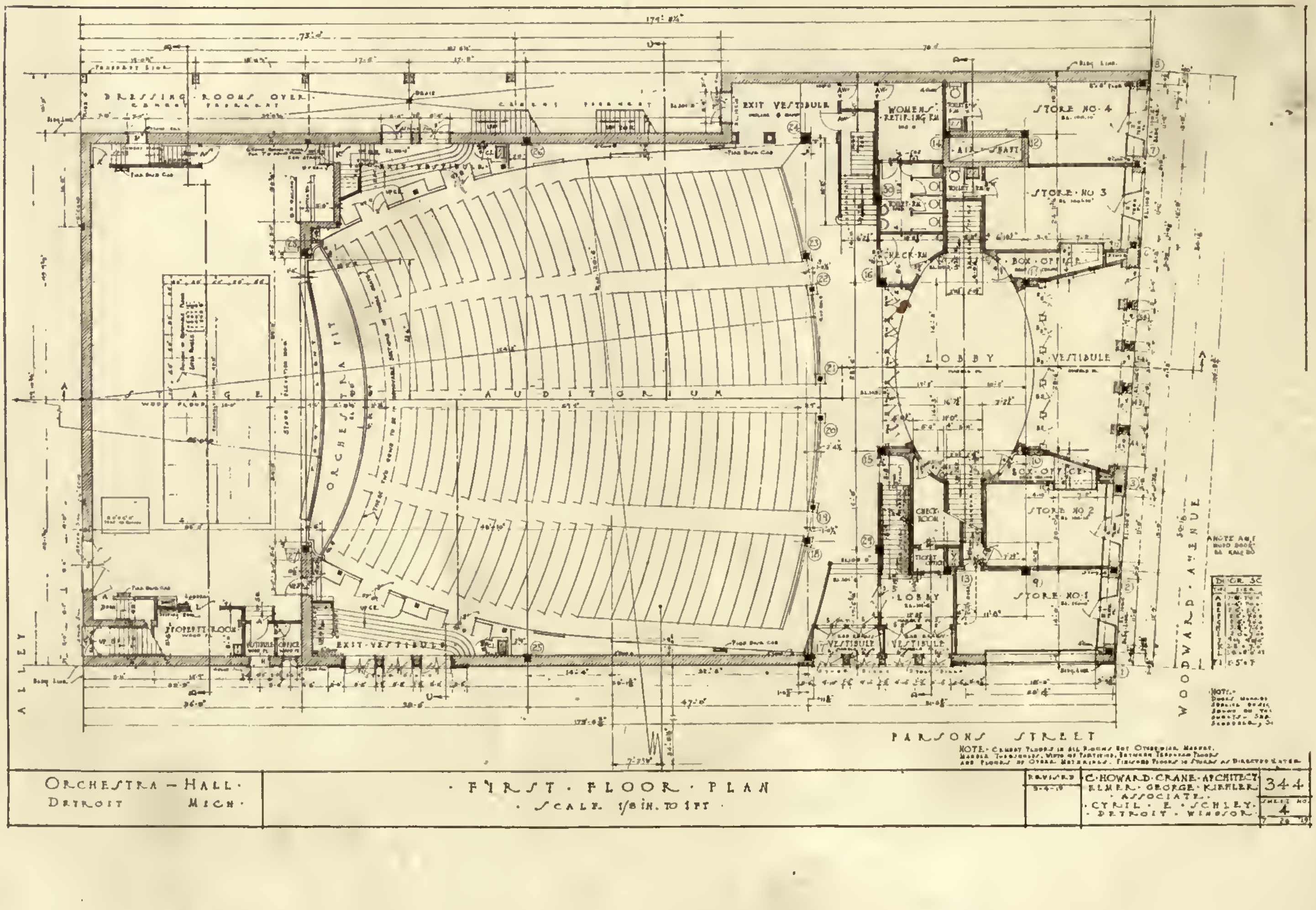
The entrance to the theatre is off a spacious arcade connecting Diamond Street with Fifth Avenue.

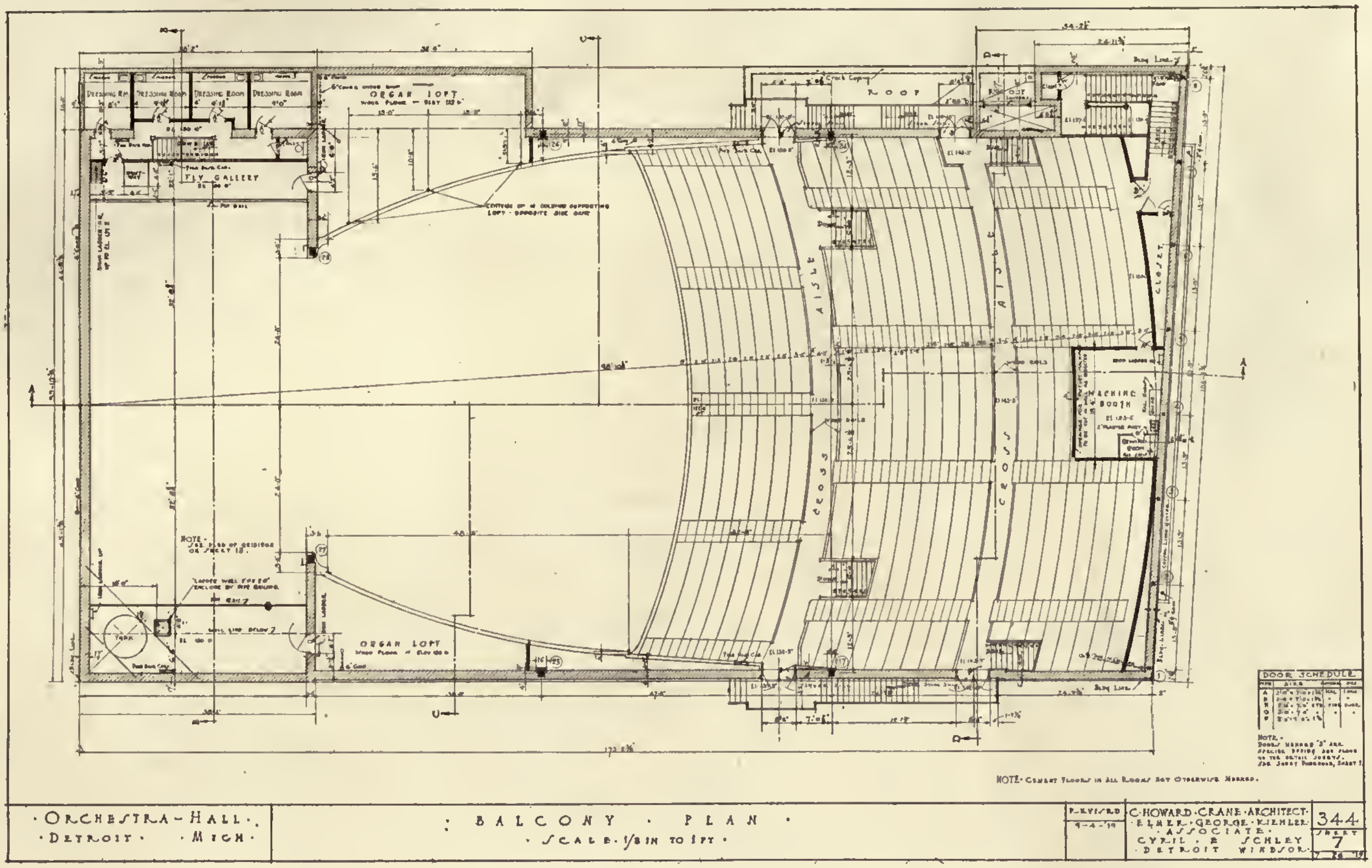
The walls of the entire lobby and arcade are of white Italian marble and floors of same are of Tennessee marble with verde-antique borders. On either side of this arcade are exclusive little shops, telephone-booths, telegraph-station, etc. A luxurious stairway leads from this arcade to the theatre foyer. The walls of the foyer are decorated in French gray and rise to a highly enriched ceiling. The stairways from this foyer lead to a handsome promenade and mezzanine floor, which has a large open well in the rear, giving extreme height to the foyer. Over this well is a

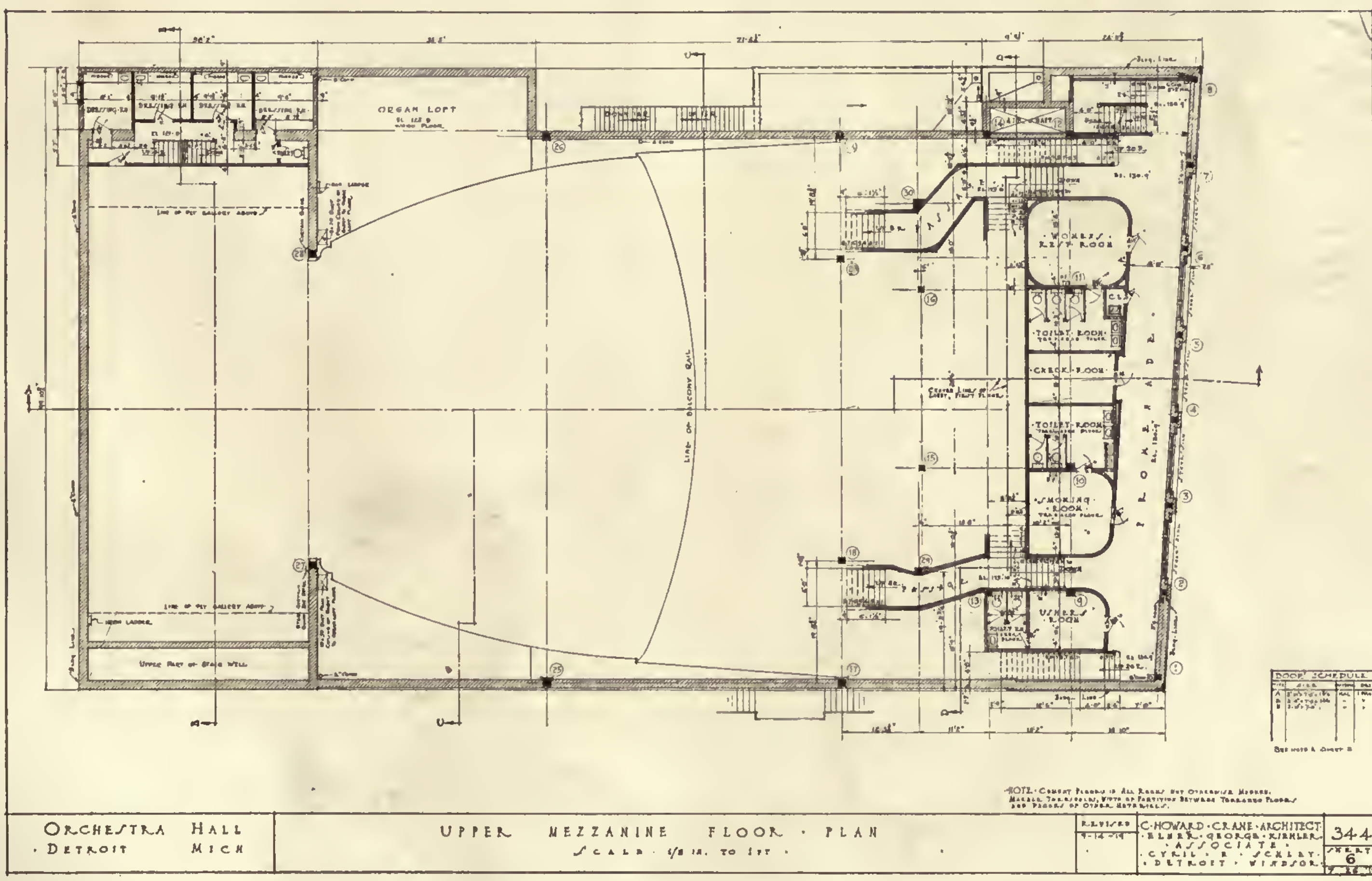
(*Continued on page* 242.)

Mezzanine foyer, Orchestra Hall.


ORCHESTRA - HALL - DETROIT - MICH.
MEZZANINE - FLOOR - PLAN
SCALE 1/8 IN. TO 1 FT.
C. HOWARD CRANE - ARCHITECT
ELMER - GEORGE - KIEHLER - ASSOCIATE
CYRIL - E - SCHLEY
DETROIT - WINDSOR
344


ORCHESTRA - HALL - DETROIT - MICH.
FIRST - FLOOR - PLAN
SCALE 1/8 IN. TO 1 FT.
C. HOWARD CRANE - ARCHITECT
ELMER - GEORGE - KIEHLER - ASSOCIATE
CYRIL - E - SCHLEY
DETROIT - WINDSOR
344
PARSONS STREET
WOODWARD AVENUE
ALLEY
AUDITORIUM
LOBBY
VESTIBULE
ORCHESTRA PIT
STAGE


ORCHESTRA HALL
DETROIT MICH
BALCONY PLAN
SCALE 1/8 IN TO 1 FT
C. HOWARD CRANE ARCHITECT
ELMER GEORGE KIEHLER ASSOCIATE
CYRIL E SCHLEY
DETROIT WINDSOR
344
SHEET 7
ORGAN LOFT
FLY GALLERY
AISLE
CROSS
CLOSET
DOOR SCHEDULE


ORCHESTRA HALL
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SCALE 1/8 IN. TO 1 FT
C. HOWARD CRANE ARCHITECT
ELMER GEORGE KIEHLER ASSOCIATE
CYRIL E SCHLEY
DETROIT WINDSOR
344
SHEET 6
ORGAN LOFT
WOMEN'S REST ROOM
TOILET ROOM
CHECK ROOM
SMOKING ROOM
USHERS ROOM
PROMENADE
LINE OF BALCONY RAIL
DOOR SCHEDULE

Promenade, Mezzanine, Grand Theatre.

(*Continued from page 239.*)

large dome which is decorated in gold-leaf, and hanging from the centre of this is a huge polychrome lighting fixture.

No expense has been spared in furnishing and equipping this theatre in every detail.

Concealed system of lighting has been used in the auditorium, together with very elaborate fixtures which are equipped with diffusers that are used to illuminate the auditorium during the time the pictures are shown. The theatre is lighted by different-colored lights and separately controlled from a switchboard on the stage which is so arranged that the lights can be dimmed and the colors blended, giving the most unusual effects.

The organ-chambers are located over the boxes on either side of the theatre. This arrangement makes it possible to procure the best effects, the thought foremost in mind being that the organ shall be one of the greatest features of the theatre.

Proposed Fraternity House for Small College

By A. Raymond Ellis

THE plans and perspective sketch herewith (page 243) reproduced are for a proposed fraternity house designed by A. Raymond Ellis, architect, and at the present time is of unusual interest because so much has been said about the type of hall or fraternity house best suited to college life. Before the war an effort was being made by some Eastern colleges to reduce the scale of living as established by many of the wealthier students. Since the war the style has been for simpler accommodations, and the above plan has been worked out to meet the prevailing requirements for a small college.

The first floor contains a large living-room, billiard-room, and library, which may be used by the members for recreation purposes, and in addition there is a large dining-room and serving-room with a kitchen and helpers' quarters in the basement. A women's reception-room is provided for their use at social functions, which are occasionally given. Above the first floor the rooms are arranged for chambers, sitting-rooms, and study-rooms. In some cases the chamber is also used as a study and is called a study bedroom. In other cases where two men wish to live together there are two bedrooms and a study which can also be used as a living-room. There are no private baths, each floor being provided with two general bathrooms. This type of building seems to represent about the average requirements for the present-day college life. The building is to be built in brownstone, with brownstone trimming and heavy Tudor slate, and leaded casement sash of fireproof construction.

It will be noticed that some of the study suites are arranged so that two single bedrooms have a common study-room; others have a single bedroom to contain two beds, the adjoining study-room being shared as in the case of the above arrangement. The latter plan seems to be the most popular with the student and is at the same time the most economical from a building and housing standpoint. The study bedrooms are arranged for one person only, as it can readily be seen that with two persons occupying the same room and also obliged to study in that room, a crowded or stuffy atmosphere results—a situation not at all conducive to rigid concentration. Therefore, on the basis of one room to each student, the opinion reached by those most acquainted with conditions is that the double bedroom with the study adjoining is the ideal arrangement. The result is, in their estimation, neither too luxurious nor too crowded.

Is Electricity Dangerous?

NOT if properly safeguarded. Not if the inexperienced realize and understand its danger.

A great many municipalities and State departments, realizing the necessity for compelling the careless user to protect himself, have officially ruled that no installation shall be made in their jurisdiction unless approved by city or State authorities. Some even go so far as to specify that certain types of protective devices must be used. The following extract taken from a general order issued by the Department of State Fire Marshal of Ohio shows this tendency.

"In an effort to safeguard the lives and property of the State of Ohio, I hereby make and promulgate the following ruling with reference to the installation of approved safety electric switches. In order to reduce to a minimum the loss of property by fire, caused through the utilization of open knife switches and automatic cut-outs, this department will refuse to approve any new or altered electrical equipment unless the same complies with the following requirements:

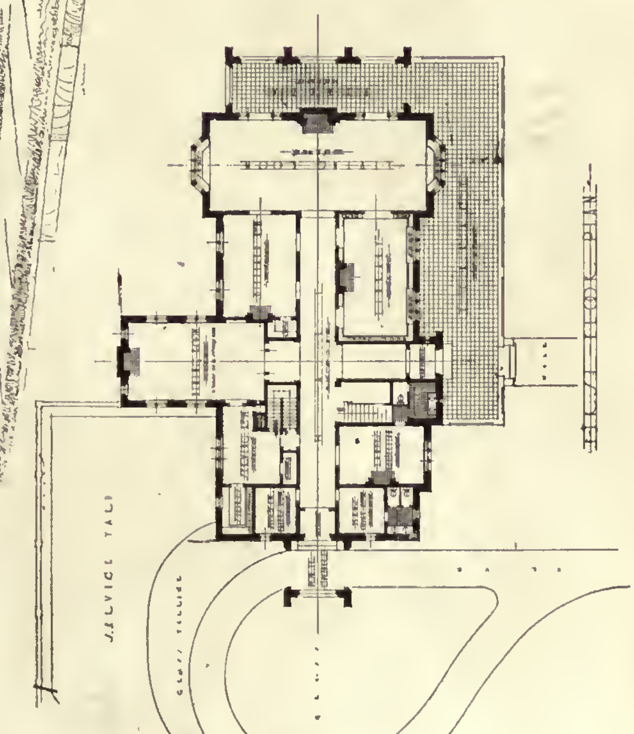
"1. That the service switch be of the enclosed safety type.

"2. That it operate outside of enclosure.

"3. That the 'on' or 'off' position be marked.

"4. That it can be locked in 'off' position.

"5. That all starting devices on motors be of the enclosed switch type."



PROPOSED FRATERNITY HOUSE FOR SMALL COLLEGE.
A. Raymond Ellis, Architect.

Philippine Architecture

By Carlos P. Romulo

MODERN architecture is finding its way in the Philippine Islands. There is not one town in that country that does not boast of two or more structures designed in accordance with modern ideas of architectural art. The Philippine Government, under whose auspices all of the public buildings are being constructed, is doing away with the old standards of government building, and following a more picturesque and attractive style of architecture.

Provincial building, Lingayan, Pangasinan.

The costs of the different public buildings vary according to their size and the sites where they are located. A building built in Manila, with all labor facilities and modern machines for construction, may cost more when built in one of the inland towns where transportation facilities are not as adequate as they are in the city, for more expense will be involved in transporting the materials and the machines necessary for the work. The Pangasinan capitol building was built at an expense amounting to about $185,000. Over 8,000 barrels of cement, nearly 1,100,000 kilograms of reinforced steel, and approximately 50,000 cubic metres of crushed stone were used in the concrete work. Of the total amount spent in the building the labor cost was $54,000.

While the ancient ecclesiastical structures that abound in the Philippines cannot be considered to be types of architectural art, when compared with the cathedrals of mediæval Europe, they stand as monuments to the untold sacrifices made by conscientious unskilled friar craftsmen who were responsible for the creation in the face of difficulties unknown in our times. These buildings are masterpieces of solidity that have defied the elements, and some of them have survived even the destructive earthquakes that have so frequently laid low all around them.

Catholic cathedral, walled city, Manila.

The present Roman Catholic cathedral was dedicated December 8, 1879. It is noted for its exceptional height. Its roofing timbers, especially those of the dome, were the best to be had in Luzon, more than usual care being taken in their choice and also in their inspection before use. The San Augustin church and convent, the most solid structure of its kind in the Islands, is 321 years old, its foundations having been laid in 1599. It is the only church in the Philippines known to be built with a crypt. A notable feature in the construction of this edifice is the massive stone ceiling over a metre thick. A terrific earthquake in 1645 opened a crack in the ceiling into which a hand could be inserted, but subsequent shocks so closed it that to-day it is almost impossible to insert a sheet of paper. The San Sebastian church is the most unique church in the city. The present Gothic structure is a "knock down" one constructed in sections in Belgium and shipped f. o. b. to Manila where it was erected on the site of the ancient structure ruined by the earthquakes. It was completed in 1891. The cupola is majestic in height; the stained glass windows brought from Europe, and illustrating events in the life of Christ, are the finest in the city, rich in tone and in the wonderful variety of the figures they contain. There are about ten more ancient churches in Manila and a score of others all over the country, all of which are beautiful structural antiquities of great interest to tourists.

The Masonic Temple and the Uy-Chaco building, the Manila skyscrapers, were built during the American administration. They are both privately owned, just as the Manila Hotel, the Kneedler and Lack and Davis buildings, the La Campana, and many others. The material used is concrete with iron and steel framework. The direction and supervision of the work is done by privately employed engineers, the government engineers taking charge only of the public buildings constructed by the government.

All of the present concrete public as well as private buildings were constructed only after the establishment of American sovereignty in the Philippines. Manila, the capital, and many of the provincial towns, boast of scores of beautiful structures of the modern type.

Girls' Dormitory, Manila.

"La Proteccion de la Infancia" Building, Manila.

Municipal Building, Batangas.

Tanauan Intermediate School, Batangas.

Philippine General Hospital.

Courtyard, Philippine General Hospital.

The Manila Hotel.

Main Office Hallway, Manila Hotel.

The Uses of Glass in Modern Buildings

By H. Vandervoort Walsh

Instructor in Architecture, Columbia University School of Architecture

ALTHOUGH considered to be one of the unessentials during war, yet, as we regard it in peace times, glass is a necessity to modern life. In fact, it is so intimately a part of the average building that we wonder, sometimes, why we pass such vast quantities of it without scarcely turning the head. On all sides of us, as we pass down the streets of the city, we see entire stories of plate glass, for block after block, and above, thousands upon thousands of windows; some are ordinary sizes, while others give the appearance of walls of glass. In one great office-building in New York, the Equitable Building, there are 5,000 windows, and to enclose these it required 160,000 square feet of glass. Now this did not include the doors of the interior halls or the enclosures of shafts and stairs, transoms, mirrors, skylights, domes, lighting fixtures, reflectors, glass tile and a thousand other things where glass entered into the structure. The more detailed becomes the picture the more impressed are we with the importance of this material in its relation to building.

Glass is by no means a new material, but never in the history of architecture has so much of it been used in construction. We can realize what once was the conception of the window when we look at its etymology, as being a place or slit primarily for ventilation by the wind. The great value of glass is its power to separate us from the wind and elements and yet at the same time allow the daylight to come in. But the extent to which we use even glass in such vast quantities is because of our improved heating systems that counteract the warmth lost through the glass by radiation and conduction. Every square foot of glass that we use means the loss each hour of one British thermal unit of heat for each degree of difference between the inside and the outside temperatures. It is estimated that for the average office-building, using the typical arrangement of windows, that the ratio between the heat lost through the walls to that lost through the windows is as 4½ is to 1. It is also commonly considered that in one hour one square foot of glass will cool 75 cubic feet of air. Therefore, it is quite evident that the larger amount of glass we use in a building the larger will have to be our heating-plant and the greater will be our coal bill.

But against this is the ever-increasing appreciation of the value of daylight. Not only does the lack of good daylight increase the cost of artificial illumination necessary to take its place but its absence causes most of the evils of disease and fatigue in work and play. It has also been calculated that 59.5% of the accidents in industrial buildings are the result of improper illumination. The tendency, therefore, is to use more and more glass in the building, rather than hesitate about the increase on the coal bill.

The various kinds of glass which are used are made from nearly the same substances. Some form of silica, such as river or ocean sand, combined with salt-cake, soda-ash, limestone, and carbon make window-glass. Plate glass is made of the same ingredients, with sometimes a little arsenic added. All these materials are melted together in a great pot furnace by gas until the whole becomes molten, when it is run into the purifying part. At the end of this part, or refining tank, the glass metal is ladled from the top at the refining end where floaters are used to separate the unrefined from the refined. Where window-glass is made, the molten mass is blown and whirled into long cylinders by compressed air, and these are cut open along the sides by a diamond or hot point after they have been placed upon a flat table. When these cylinders are reheated, they are made to flatten out, and while they are still warm are polished. This method of manufacturing gives to the common window-glass a slight bent and wavy surface which is the unavoidable result of the original cylinder. In glazing, it is always necessary to put the convex side out, in order to reduce the effect of this waviness as much as possible.

This window-glass is known as sheet glass, and is graded as *Double Thick* and *Single Thick*. The former is $\frac{1}{8}$″ thick and slightly less; the latter is $\frac{1}{12}$″ thick. The usual stock sizes vary by inches from 6″ to 16″ in width, and above this they vary by even inches up to 60″ width and 70″ length for *Double Thick* and up to 30″ × 50″ for *Single Thick*. However, it is customary to use the *Double Thick* in all window-panes over 24″ in size. Both of these grades are classified into AA, A, and B glass according to the defects of manufacture. Such defects are termed blistery, sulphured, smoked stringy, stained, etc. In all cases of sheet glass, however, in spite of certain names given to special grades, there is present the wavy texture of the surface which is due to the method of manufacture.

Most window-glass is now put in the sash by the lumber mills, and the painter is not called upon to do this, as in the past. The usual method of holding the glass in the rebated sash is with zinc triangles, spaced 8″ or 10″ on centres and finishing with putty. As the cost of glazing is materially reduced by the mill system, a safe rule to follow in considering cost is that the larger the pane the greater the expense. In large buildings it is much cheaper to divide the panes into small units.

Plate glass is made in quite a different way to sheet glass. It is really a cast and rolled glass which is ground and polished to a plane surface. The molten glass is poured out onto a large table, where by means of rollers it is flattened to the required thickness, this thickness being maintained by metal strips over which the rollers pass. These sheets are then annealed, and become what is known as *Rough Plate*. To make the polished plate glass, the rough sheets are examined for defects and the largest and most perfect pieces are cut out and fastened by plaster of Paris to a revolving table. Many heavy shoes of cast iron are then revolved over the glass, and with the aid of an abrasive material the surface is worn down to a plane. To polish, felt shoes are substituted for the iron ones, and the abrasive material is made finer, generally being liquid rouge.

Plate glass is cut into stock sizes, varying in even inches from 6″ x 6″ up to 144″ x 240″ or 138″ x 260″. The usual thickness is from ¼″ to $\frac{5}{16}$″. A thinner glass can be obtained, $\frac{3}{16}$″ or $\frac{1}{8}$″, but it costs more than the standard thickness, because it must be ground down from them.

In order to meet this difficulty, a sheet glass was put

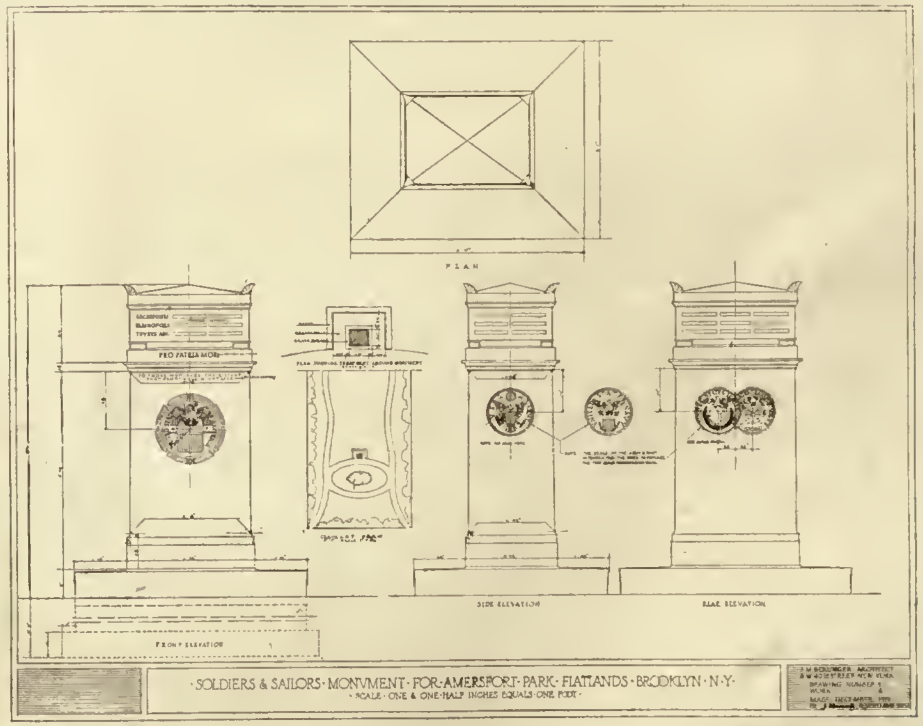
(Continued on page 249.)

Small local war memorials are often the despair of our Art Commissions, conditions attending them, due to the limit of scope, leaving them open to the tendencies of being stereotyped and taking the form of private cemetery memorials. The exercise of a little care and thought, however, may prove the difficulty to be not so great.

The little memorial for Flatlands, Brooklyn, for deceased soldiers, has as its theme the ashes on the altar of sacrifice, a pedestal supporting a small casket on which are inscribed the names. The constituent parts are so expressed, however, as more to be felt than to be distinctly apparent, each in its function, so as to form a unit to which both parts are complementary by lines and material, with inscription expressive of the sentiment:

"PRO PATRIA MORI

TO THOSE WHO GAVE THEIR LIVES THAT DEMOCRACY MIGHT LIVE."



Joseph M. Berlinger, Architect.

(*Continued from page* 247.)

on the market which was heavier than the ordinary, and called crystal-sheet, 26 ounces. It, however, has all the defects of waviness which characterize the cylinder-blown glass, and aside from its heavier appearance, it cannot be compared to plate glass.

The very finest specimens of plate glass are used for mirrors, because the use of anything but the smoothest surface is quite out of the question. Small mirrors made from the sheet glass are sold for the cheap trade, but the distortions which they produce bar them from any other field.

In the endeavor to secure more and more daylight in the building, a so-called prism glass has been developed to meet the conditions of the lighting of offices and stores located in the heart of our cities. When we consider the fact that the amount of daylight entering a window is from 40 to 75 per cent of that falling on the façade of the building, and that 25 to 60 per cent of this is cut off by the window-frame itself, and also that the thickness of the wall and the height of the building across the street or the depth of the court cuts off just so much more daylight, the need of some form of glass which will bring the light from the sky as much as possible into the building is quite evident.

For purposes of presenting these needs clearly, look at the following tables:

ILLUMINATION OF THE STREET FAÇADE

NUMBER OF STREET WIDTHS AT WHICH A POINT ON THE FAÇADE IS BELOW TOP OF BUILDING OPPOSITE.	PERCENTAGE OF ILLUMINATION LEFT.	FOOT-CANDLES OF ILLUMINATION.
½	0.	243.3
1	53.	128.9
2	19.2	46.6
3	9.4	22.9
4	5.5	13.2
5	3.5	8.6
6	2.5	6.2

ILLUMINATION ON THE COURT FAÇADE

NUMBER OF COURT WIDTHS AT WHICH A POINT ON THE FAÇADE IS BELOW THE TOP OF THE OPPOSITE WALL.	FOOT-CANDLES OF ILLUMINATION.	
	END-WALL	SIDE-WALL
1	103.9	109.9
2	34.3	25.9
3	14.2	9.0
4	7.0	4.0
5	3.8	2.1
6	2.3	1.2

If we look at the following ordinary example we will see what effect the thickness of wall has upon the light entering. Here the windows are supposed to be without frames to shut off the light. One of them is 2′ x 4′ and set in a wall 12″ thick, and we find that it has 53 per cent of its light cut off by the wall. For a window twice as big, 4′ x 4′, set in a 12″ thick wall, the percentage of light loss is only 40 per cent. On extended observations it has been found that for a window of constant size the percentage of light loss is proportional to the thickness of the wall, and for a given thickness of wall the percentage of light entering increases with the height and width of the window.

It is quite evident, then, that if we can secure a larger glass area, we will secure a greater proportion of light, and that if we can secure a glass which will deflect the daylight around the corner of the wall opening into the room, we will also secure more light. These two factors have developed two solutions: one is the use of large steel factory sash, where the entire wall is made of diffusing glass, and the other is the use of prism glass which deflects the angle of daylight, as it shines down on the façade, into the building. This prism glass has one side flat and the other corrugated with small prisms which are designed for deflecting the light at the particular angle at which it shines down from the sky onto the window. Angles from 70 to 40 degrees are capable of being deflected inward, and different prisms are made for different angles between.

In a room 30′ or deeper, an increase of light from three to fifteen times that which ordinarily would enter has been accomplished by using this prism glass in the upper sash of the window. In certain cases, an increase of fifty has been recorded. At the bottom of deep courts, where the angle of daylight comes down very steeply, canopies of prism glass are used with much satisfaction.

There are two kinds of prism glass. One type comes in small squares of about four inches across, and these squares are set together to form large areas of glass over store-windows and such places by fastening them together with copper bands which are electrowelded into one solid frame. This system of small units permits of the use of several different prisms to meet the conditions, and also makes possible a higher grade product.

The other type is made in large sheets, and can be placed in one piece in the upper sash of a window. This includes all those ribbed glasses which approximate the principle of the true prism glass. Imperial prism plate is polished on one side, and has a number of different prism patterns for the other. It is made in sheets of 54″ x 72″ and cut to smaller sizes. Imperial skylight prism glass is made in plates 18″ x 60″ and follows the requirement of the National Board of Fire Underwriters. There is an ornamental prism plate glass which has just enough of the prismatic qualities to make it diffuse the light and secure a semiobscure effect.

Another pattern, showing a combination of ribbed and prism design, and also a pattern showing this same combination running crosswise in squares have shown high diffusion and deflecting qualities for use in industrial buildings.

Along similar lines, sidewalk lights have been developed to give illumination to the basement. Some patterns use the principle of prismatic deflection in its pure form, but most are satisfied with a good infiltration of light, practical to the wear and tear that this glass is subjected to. Formerly, glass lights, used in connection with sidewalks, were simply heavy pressed or cast glasses which contained a considerable amount of manganese that gave a purple tint, and prevented a maximum amount of light to pass through. This glass was also brittle, and it scaled off or chipped under the wear. To-day, however, with a careful process of annealing, and the elimination of the manganese, a brilliant, tough and resilient glass is manufactured.

It has been found by experience that any sidewalk lighting must be designed along such simple and adaptable lines that its use is unlimited. It must give a minimum glass area for the strength of the framework, and the setting must be waterproof. When a glass is broken, it must be easy to replace, and an allowance for expansion must be made. Of course the glass used ought to be clear and tough and non-chipping.

The causes of failure of sidewalk lights are due to poor glass, expansion of concrete frame, vibration of the structure, and expansion of the adjoining sidewalk or street. To meet some of these difficulties, the walk should be designed to carry greater loads than those to which it will be subjected, and waterproof expansion joints should be used.

There are two patterns of glass used in sidewalk lighting. One is the square type which allows from 60 to 75 per cent glass area, and the other is the round pattern which allows from 30 to 50 per cent glass area. One make of the

(*Continued on page* 252.)

KING'S DAUGHTERS' HOSPITAL, MADISON, IND.

Herbert L. Bass & Co., Architects.

Herbert L. Bass & Co., Architects.

PLANS FOR KING'S DAUGHTERS' HOSPITAL, MADISON, IND.

(*Continued from page 249.*)

square-glass pattern is 3⅜″ square on the top and 4″ square on the bottom, making the concrete beam which supports them look in cross section like an inverted pineapple. Another make is 3¼″ square on the top, and the bottom consists of one to four prisms. Most of these square sidewalk lights run from ⅞″ to 1½″ in thickness and from 2¾″ to 5½″ square. The round make, although not capable of giving as great a glass area, are, as a rule, easier to replace. One manufacturer has a metal rim that is embedded in the concrete and acts as a holder for the glass, and when it breaks, it can easily be replaced by another. Still another is based on the screw pattern which permits the removal of the old and the replacing of it by the new. Most of them are 2⅝″, 3″, and 3½″ in diameter.

The material into which the sidewalk lights were formerly embedded was cast iron, but now it is reinforced concrete which has been waterproofed. A mixture of one part of cement to one or one and a half of sand is the general formula: "I" bars of 1¾″ average are set 4¾″ o. c. to reinforce the long beams, and the cross beams are reinforced with 5/16″ bars. Some makes have sheet-metal forms, and these use only ¼″ rods.

The usual load which a sidewalk light is supposed to carry is 300 pounds per square foot or a concentrated load of 5 tons on one point. As most of the makes exceed this strength, they may be considered safe, although the stronger they are the better they will resist the squeeze from contraction of adjoining sidewalks. For 6′ spans some are capable of sustaining 1,000 pounds per square foot.

Among other glasses used for the diffusing of light are ground glass, maze, Florentine or figured, rippled, and rough plate. They are not intended to deflect the light as prism glass but to give a translucent effect and diffused light.

Another one of the developments of glass is the use of an opaque milk-white variety of plate glass for structural purposes. This is a polished glass which is fused at a temperature of 3,000° Fahrenheit and thoroughly annealed. It gives a brilliant, sanitary, non-crazing, non-absorbent surface which is impervious to stains and has always a fresh appearance. It is excellent for wainscot and structural partitions in toilets, office-buildings, apartment entrances, hospitals, swimming-pools, tops of counters, linings for refrigerators, etc. It has a distinct advantage over the sanitary tile in that it reduces the jointing to a minimum and does not show any signs of crazing.

The use of colored glass in the building is now only for very choice decorative treatments, and should be handled by experts in this line, for nothing gives a cheaper effect than colored glasses used crudely. Only the most expert makers of leaded-glass windows have survived the gradual elimination of the general use of this art in the average building. The so-called art glass is of great variety, however, and a few of the important ones will be mentioned.

Most colored glasses which are inherently colored and not stained or painted appear as the richest, and they are given their colors by the presence in them of some metal oxide. The same oxide will give, at different temperatures, different colors. Oxide of iron will give all the colors of the rainbow, but the commonest are green and orange. Manganese gives pink or amethyst, but at higher temperatures brown, yellow, and green. Copper affords the cheap ruby glass, and at higher temperatures purple, blue, and green. Cobalt affords the blue or black. Gold makes ruby, violet, and amber, where one part is used in one thousand parts of glass. The opalescent glass is formed by cryolite, arsenic, or tin. Flashed glass is made by dipping the original glass bubble into a bath of molten colored glass, and then making the sheet glass from it in the ordinary way. Opaline glass is made by pouring colored glass upon white opaque glass, and then pressing the same together under rollers. Stained glass is secured by applying soluble metal oxides to the surface with a brush, and then burning them into the glass by placing in a kiln. Painted glass is produced by enamels applied to the surface, which are then fused to it.

Some other glasses, used to a certain extent in connection with art glass, differ on account of their method of making and composition. For instance, crown glass is a relic of the past, but for ornamental purposes is often used. The glass is blown into a spherical bubble, and then this bubble is opened and made to revolve at great speed. Centrifugal force causes the glass to take the shape of a flat disk, but the centre nodule always remains as a lump. Formerly, all the glass except this was used, but now it is this centre nodule which is used for the ornamental effect. Lead flint glass is used in all the finest cut glass, and is made from lead and potassium silicates. Bohemian glass is made from potassium and calcium silicates; Venetian from sodium, potassium, and calcium.

Probably the most far-reaching invention in glass for buildings was the development of wire glass. When an ordinary window is attacked by fire, the first thing that happens is the shattering and the falling out of the glass. Wire glass was invented to prevent this dangerous breakage, and its use as a fire-stop was an afterthought, although many believe the reverse is true. The National Board of Fire Underwriters defines wire glass as follows: glass not less than ¼″ thick enclosing a layer of wire fabric reinforcement having a mesh not larger than ⅞″, and the size of the wire not smaller than No. 24 B. & S. gauge. Frank Shuman secured the first really successful patent for making this glass in 1892. It is cast on steel tables, kept hot by gas flames beneath. The molten glass is poured over it in quantities of a ton or so. Wire mesh is also heated to a temperature nearly equal to the glass. A vehicle with four rollers passes over it then, feeding the wire into the glass. The first roller smooths out the molten glass, the next roller presses the wire deep into it, and the last two rollers smooth it out again. The glass is then in the rough-plate condition, and is often sold like this. It is generally polished, though, or its surface is stamped with one of the many figured patterns common to pressed glass, such as ribbed, maze, cobweb, etc. The customary extreme sizes are 720 square inches and not more than 48″ wide. A standard of 5/16″ thickness is adopted, but there are also thicknesses of ¼″ and ⅜″.

Wire glass is practical to use in any window, door, or enclosure where it is desirable that, in case of fire, it should not be shattered. It should not, however, be used in skylights, over elevators, stairways, dumbwaiters, or vent or light shafts. In these places a thin glass should be used which is protected with wire at least 6″ above it, and having a mesh of not more than 1″. No glass has had more influence on the safety of buildings than this wire glass. It has made possible many changes in plan that would not have been thought of if this distinctly modern invention had not been placed upon the market. Along a similar line, new inventions are being developed for non-shatterable plate-glass show-windows which will resist the shock of objects striking them. Such glass will mean the elimination of large insurance on plate glass and reduce the vast wastage which goes on in this direction every year.

Notes on Steel Construction

By DeWitt Clinton Pond, M.A.

MY last two articles were about theoretical considerations which form the basis for many engineering calculations. In this article the practical applications of these principles will be given. Although the articles which will appear later will deal largely with concrete construction, and will be written for architects who will be interested in this type of work, this one will be devoted to steel construction, as even in buildings which are considered as being built entirely of reinforced concrete there will be places where steel shapes will be used.

Formulas and methods have been given which will enable the architect to determine the tendency toward bending in a beam if this tendency is caused by an external load. The resisting tendency in the beam has been considered only in the case of a wood beam, and this formula was given as $M = S \times \frac{1}{6}bd^2$. This formula was derived from a more complex one, known as the *flexure formula*, and which forms the basis for the design of all steel beams. The flexure formula is $M = S \times I/c$. M is the bending moment, which may be found by the formula $M = \frac{1}{8}Wl$, or by the methods given in the last two articles. S is the safe working strength of the material in the beam. In the case of a wood beam this was taken as 1,200 pounds per square inch. In the case of a steel beam this is universally considered as 16,000 pounds per square inch. The architect should consult the building code, or ordinance, of his city or State to verify these amounts.

It might be noted in passing that the amount of 16,000 pounds is arrived at by pulling a steel bar, having a cross-sectional area of one square inch, apart. It is found that the force necessary to do this varies from 54,000 pounds to 67,000 pounds, with the average force determined as 64,000 pounds. A factor of safety of 4 is always used for steel, so the *safe working stress* of steel is considered as 16,000 pounds, or 8 tons per square inch.

The next factor in the formula is the fraction I/c. This fraction is given the somewhat mysterious name of "section modulus," and I is known as the "moment of inertia." The author has found that these names do more to discourage students than much of the hard work encountered in the study of engineering. One could take a large amount of space in deriving the flexure formula, in discussing the moments of inertia of different cross-sections, but the limits of this article will not permit of this. The actual application of the formula and the methods of finding the moments of inertia of steel shapes are very simple, and this discussion will be confined to these items.

When the architect desires to design steel structures he must make use of the Carnegie "Pocket Companion" or the Cambria handbook. There are tables in "Kidder" which also give the necessary information. The handbooks are revised and edited every year or so, as it will be impossible to refer to specific pages, but reference will be made to headings in the indexes.

Referring to the index of the "Pocket Companion," the heading "Elements of Sections" can be found, and the pages devoted to tables giving the various dimensions and elements of I-beams, angles, and channels are listed in such a manner that the architect can speedily find them. In the Cambria book the same tables are listed under the general heading of "Properties."

In all the tables the properties or elements are listed in much the same manner. First, the depth of the I-beam or channel, or the dimensions of angles are given. In the next column in Cambria are tabulated the various weights of I-beams and channels and the thicknesses of angles. These two columns might be considered as index columns, as I-beams are always referred to by their depths and weights, as are also channels, while angles are referred to by the lengths of their legs and their thicknesses. As an example of this an I-beam is referred to as a 24-inch, 100-pound I-beam, and a channel will be known as a 15-inch, 40-pound channel. An angle might be designated as a $6 \times 6 \times \frac{1}{2}$-inch angle. By looking through the tables the reader can find all these shapes listed.

Among the other headings listed under "Properties" or "Elements" will be found one listed as "Moment of Inertia," or I in Carnegie, Axis 1–1, and in the next column, "Section Modulus," or S in Carnegie, Axis 1–1. This moment of inertia is the "I" referred to in the flexure formula, and this can be found for any steel shape by simply referring to the handbooks, and the same is true of the section modulus. A brief explanation of this last term might not be out of place, however.

It will be noted that the section modulus is designated by the fraction I/c. c is known in engineering parlance as the distance from the neutral axis to the most remote fibre of a cross-section. In the case of a beam having a section that is symmetrical with regard to its neutral axis, c will equal one-half the depth. In the case of a 24-inch, 100-pound I-beam, or, for that matter, any 24-inch beam or girder, c will equal 12 inches. The moment of inertia of a 24-inch, 100-pound I-beam is given in the handbooks as 2379.6. As c has already been found to be 12 inches for such a beam, the fraction I/c becomes $2379.6 \div 12 = 198.3$. By referring to the column headed "Section Modulus" in the Cambria, or S in the "Pocket Companion," the amount 198.3 is found to be this property for the beam under consideration.

Such calculations are simple for I-beams and channels, as these sections are symmetrical with regard to their Axes 1–1. As such beams and channels are only occasionally laid flat, Axis 1–1 is the one that is usually used.

With regard to angles, either leg might be turned up, and it might be well to determine the section modulus around both axes. As an example, a $6 \times 4 \times \frac{1}{2}$-inch angle will be selected, and it will be found by referring to the table that the distance from the 1–1 Axis to the back of the longer leg is .99 of an inch, and from Axis 2–2 to the back of the shorter leg is 1.99 inches. The distance from Axis 1–1 to the most remote fibre will be found to be $4 - .99 = 3.01$ inches, and from Axis 2–2 to the most remote fibre $6 - 1.99 = 4.01$ inches. The moments of inertia around these two axes are 6.27 and 17.40, respectively, and the section moduli can be found by dividing the moments of inertia by their respective distances, or $6.27 \div 3.01 = 2.08$, and $17.40 \div 4.01 = 4.33$. These results can be verified by reference to the tables.

The question might properly be asked, what is the practical value of all this? By glancing back at the flexure formula, it can be seen that with S always regarded as 16,000 pounds, and the section modulus given for any particular beam, the bending moment can be easily determined. Usually the reverse process is used, however.

Let it be assumed that in a storage warehouse all the partition walls are to be built of 8-inch brick. In some of the partitions it is desired to insert metal sash, and in some cases this sash is 15 feet long. It will be assumed that there are 6 feet of brickwork above the sash, and this must be carried on two angle-iron lintels.

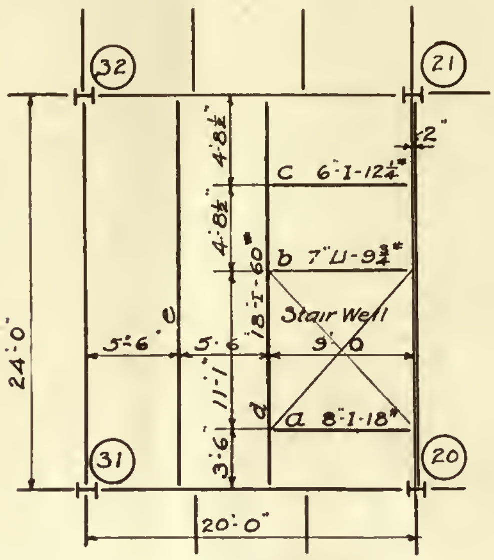


FIGURE XIII

In this case the span, l in the formula, is 15 feet. The load—W—can be found by multiplying the cubic feet of brickwork by the weight of a cubic foot, or by 120 pounds. $15 \times 6 \times \frac{2}{3} = 60$ cubic feet. $60 \times 120 = 7{,}200$ pounds. This load is the "W" in the formula $M = \frac{1}{8}Wl$. As the span "l" equals 15 feet, or 180 inches, the tendency toward bending can be found to be $M = \frac{1}{8} \times 7{,}200 \times 180 = 162{,}000$ inch-pounds. All this is worked out in accordance with the methods given in the last two articles. Once the external tendency toward bending is determined in this manner, it is only necessary to equate it with the flexure formula to determine the size of the angles. As S, in the flexure formula, is always taken as 16,000 pounds, the equation becomes $162{,}000 = 16{,}000 \times I/c$. It will be noticed that I/c is the only unknown quantity, and by carrying out the proper calculations, this can be found to equal 10.1. As there will be two angle-iron lintels used to carry the wall, each angle will have to have a section modulus equal to one-half this, or 5.05. By looking in the table for "Elements" or "Properties" of angles with unequal legs, and by glancing down the column marked "Section Modulus," Axis 2–2, three angles will be found having section moduli slightly more than 5.05. A 5-inch by $3\frac{1}{2}$-inch by $\frac{11}{16}$-inch angle, or a 6-inch by $3\frac{1}{2}$-inch by $\frac{5}{8}$-inch angle, or a 6-inch by 4-inch by $\frac{5}{8}$-inch angle might be used. The second one, however, having a section modulus of 5.19 and a weight per foot of 18.9 pounds, should be selected.

It will be seen that there is nothing particularly intricate or involved about this work. Another method of solving the above problem is by use of the safe-load tables. Referring to the index, the heading "Safe loads, tables of, for angles used as beams," in Cambria, or "Angles, safe loads, tables," in Carnegie, will be found, and in the tables on the pages listed in the index the safe loads for different angles for various spans are given. As in the problem, the angles were placed with their long legs in a vertical position, the table giving the safe loads for angles with unequal legs with the neutral axis parallel to the shorter leg will be used. The total load of brick was found to be 7,200 pounds. The load carried by one angle will be 3,600 pounds, and the span is 15 feet. In the tables of safe loads the first columns are used to list the spans in feet. Looking down these first columns for spans of 15 feet, and then across to the safe loads, the angles that will carry 3,600 pounds are the ones given above, and only the last two will have the safe loads listed above the horizontal black line.

These horizontal lines are important, as any load listed below them will cause too great deflection, which is given in most building codes as $\frac{1}{360}$ of the span. Methods of determining the deflection in beams will be given later.

The reader can see that by the use of the safe-load tables he arrives at the same result as he did by the use of the flexure formula, and the process is much simpler. He may ask why he should not always use the safe-load tables in preference to the more complex method. In problems involving uniform loads such as the one just given, the use of the safe-load tables is to be recommended, but where concentrated loads are encountered these tables cannot be used, and the flexure formula is the only one that will answer.

As an example of such a problem, it might be well to investigate the design of the beams in the floor panel shown in Fig. XIII. The architectural plan for which the steel is designed is shown in Fig. XIV. In this panel the columns are spaced 20 feet by 24 feet, and there is an opening for a stair-well. The floor load will be considered as 200 pounds per square foot, including both dead and live loads. The load on the stair panel will have to be taken as 100 pounds live load, according to the New York code, and as the dead load—the weight of the stair construction—will probably

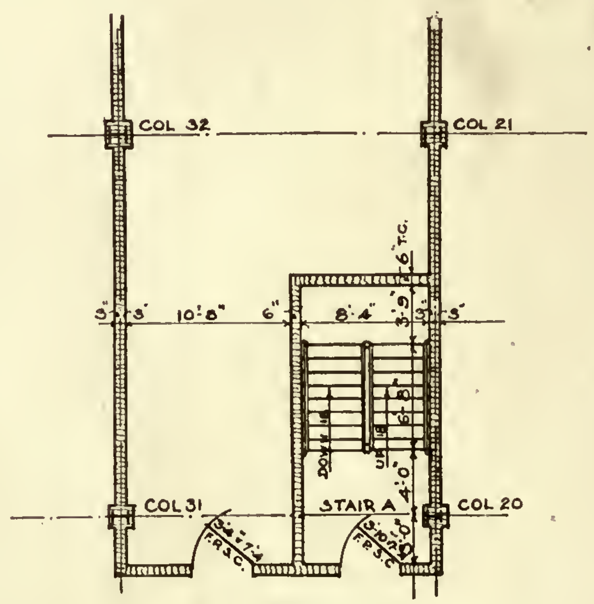


FIGURE XIV

be about 100 pounds per square foot, the load on this panel will also be taken as 200 pounds. The diagram shown in Fig. XIII will have the beams designated as a, b, c, d, and e, and 20–21 and 31–32. The girders will be designated as 32–21 and 31–20.

The load on beam a can be found very easily by determining the area of floor that the beam will carry, and multiplying this area by 200. This area will measure 7 feet $3\frac{1}{2}$ inches by 9 feet and 2 inches, and will contain 66.5 square feet. It will weigh 13,300 pounds, and the beam that will carry this load will be an 8-inch, 18-pound I-beam, as determined by consulting the safe-load tables. Beam *b* will carry

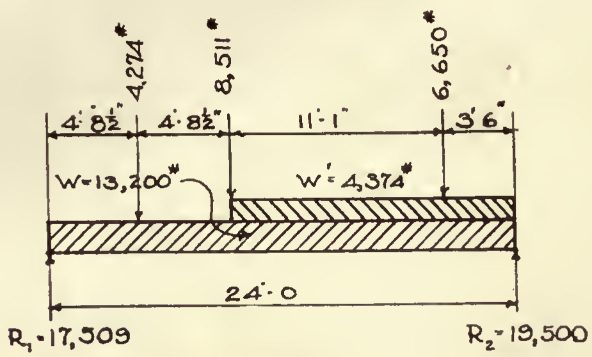


FIGURE XV

a smaller floor panel, but will have to carry a 6-inch terra-cotta wall. The floor will weigh 4,274 pounds, and the partition, which is 9 feet 2 inches long, 10 feet high, and weighs 30 pounds—plastered—per square foot, will weigh 2,748 pounds. The total load will be 7,022 pounds, and the safe-load tables will show that a 7-inch, 9.75-pound channel will carry this load over a span of 9 feet. Beam *c* will simply have to carry twice the floor load on beam *b*, and will be a 6-inch, $12\frac{1}{4}$-pound I-beam.

All the beams designed above were found by means of the safe-load tables. Beam *d*, however, must be designed by means of the flexure formula and the section modulus. There will be a uniformly distributed load over this entire beam due to the floor load between beams *d* and *e*. This floor panel will measure 2 feet 9 inches by 24 feet, and will have an area of 66 square feet and a weight of 13,200 pounds. The terra-cotta wall will extend over 14 feet and 7 inches of the beam and will weigh 4,374 pounds, and beam *a* will add a concentrated load of one-half its total load, or 6,650 pounds. Where beam *b* frames into *d*, one of the hangers carrying the stair construction will also be framed to *d*. This hanger will carry one-fourth of the stair load, or 5,000 pounds. The total load where *b* frames into *d* will be 8,511 pounds. Beam *c* will add one-half of its load, or 4,274. The conditions of loading are shown in Fig. XV.

The first consideration in the design of the beam is the finding of the reactions. The methods used in the last article should be used, and the loads listed and multiplied by their respective lever-arms as follows:

	4,274 × 4.7	=	20,088	foot-pounds
	8,511 × 9.42	=	80,173	"
	13,200 × 12.0	=	158,400	"
	4,374 × 16.7	=	73,045	"
	6,650 × 20.5	=	136,325	"
Totals	37,009		468,031	"

By dividing the total moment by the span—24 feet—R_2 can be found. $468{,}031 \div 24 = 19{,}500$ pounds $= R_2$.

By subtracting R_2 from the total load, R_1 can be found. $37{,}009 - 19{,}500 = 17{,}509 = R_1$.

The next step is the drawing of the shear diagram. This is shown in Fig. XVI, and it can be seen that the shear changes sign at a point where beam *b* frames in. This will be the point of maximum bending moment. In order to find this it will be necessary to determine the upward of positive moment caused by R_1. $17{,}509 \times 9.42 = 164{,}934$ foot-pounds.

The negative moments will be caused by the downward loads, or the uniformly distributed load at the left of the point of zero shear, or 5,181 pounds, and the concentrated load where *c* frames into *d*, which is 4,274 pounds. When these loads are multiplied by their respective lever-arms and the total subtracted from 164,934, the maximum bending moment is found to be 120,497 foot-pounds, or 1,445,964 inch-pounds. By dividing this amount by 16,000 the section modulus of the beam is found. I/c is found to be 90, and the beam will be an 18-inch, 60-pound I-beam.

Beam *e* can be easily designed. The load on it is a uniform one, as it carries a floor panel measuring $5\frac{1}{2}$ feet wide by 24 feet long. The area of this panel is 132 square feet and the weight is 26,400 pounds. In the uniform load tables it will be found that a 15-inch, 45-pound I-beam will be strong enough to carry this load.

The only other members of this panel will be the girders, but the type of calculation that will be used for the determination of the sizes of these is exactly the same as that used in the case of beam *b*, and no further explanation will be given.

Reference was made above to deflection in beams. This is sometimes important, as it is the practice of some architectural offices to use a standard size for all angle-iron lintels. In one office it is customary to use 4 inches by 3 inches by $\frac{5}{16}$-inch angles in all cases where it is possible. This size, either used as a single angle or as two angles back to back, can be used in almost all cases for windows having openings up to 5 feet wide, but when long spans are encountered there might be too great tendency toward deflection. If a steel member is loaded to its carrying capacity, with a uniform load, it is not difficult to determine whether the deflection is too great. The loads listed below the horizontal black lines in the safe-load tables will cause this, and it is only necessary to refer to these tables. When, however, it is desired to use a standard-size angle that is more than strong enough to carry its load, but which might

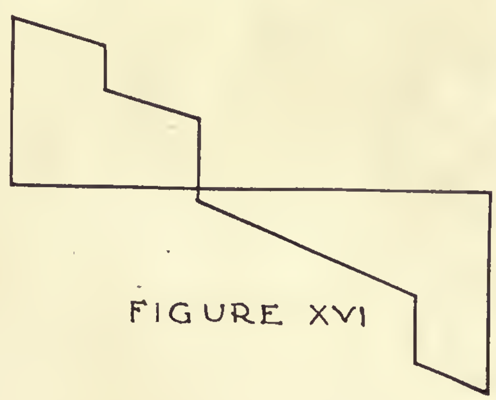


FIGURE XVI

have too great deflection on account of a long span, then it will be necessary to use the formula:

$$D = \frac{5}{384} \times \frac{WI^3}{EI}$$

This formula looks complicated and is a long one to work through, but is not as difficult as it appears. D is used to designate the deflection, W is the total uniform load, and E is a complex sounding thing, entitled the Modulus of Elasticity, in pounds, per square inch, while I is the now familiar moment of inertia.

The Modulus of Elasticity is always taken as 29,000,000 for steel. This is all that the reader has to know about it unless he happens to be of an inquisitive turn of mind, in which case he is referred to any standard text-book on engineering. An actual example will show how the formula can be used.

Suppose it is desired to use a 5-inch by $3\frac{1}{2}$-inch by $\frac{5}{16}$-inch angle to carry a load of 1,000 pounds over a span of 15 feet. By looking at the safe-load table it is possible to determine that the angle will easily carry this load, but as the safe load for a span of 15 feet—1,380 pounds—falls below the horizontal line, it is doubtful whether the angle will carry 1,000 pounds without deflecting too much.

By substituting in the formula the actual deflection will be obtained.

$$D = \frac{5}{384} \times \frac{1{,}000 \times 180 \times 180 \times 180}{29{,}000{,}000 \times 6.6} = .39$$

The allowable deflection is $\frac{1}{360}$ of the span, or $180 \div 360 = .5$, so the standard angle will carry the load within the allowable deflection. It might be noted that the span in the above formula is given in inches, and that the moment of inertia of the angle is taken around its 2–2 Axis, and was found to be 6.6.

The formula looks difficult to work through, but it will be found to be very simple if one is at all familiar with the process of cancelling.

This article deals only in a cursory manner with the subject of steel construction, but as this subject has been given a much more extended discussion in the original articles on "Engineering for Architects," this is all the space that can be given to it here.

The next articles will deal with reinforced-concrete construction. This subject has already been treated in articles appearing in ARCHITECTURE in 1916–17. If the reader is not familiar with these, it would be well for him to glance back over his old volumes before attempting to investigate the problems presented in the following articles. These will deal with actual problems encountered in the design of one of the largest reinforced-concrete buildings erected in the country.

Announcements

We acknowledge with pleasure the handsome and comprehensive catalogue of "Architectural Interior and Exterior Woodwork Standardized," published by The Curtis Companies. Its profuse and admirable illustrations of correct architectural woodwork, designed for all types of homes, should prove a welcome reference in every architect's library. It covers every detail of various type houses, both exterior and interior. Doorways, windows, mantels, panelling, china-closets, sideboards, stairways and stair parts, door and window frames, porches, mouldings, etc. The work shown was developed under the general direction of the well-known architectural firm of Trowbridge & Ackerman in collaboration with other leading members of the profession.

The appointment of Doctor F. H. Newell, head of the Department of Civil Engineering at the University of Illinois, and past president of American Association of Engineers, as director of field forces during the summer months was one of the most constructive measures passed at the quarterly meeting of the Board of Directors of the American Association of Engineers on June 19. Doctor Newell will spend a large proportion of his time in travelling, and will assist the chapters in solving their problems of organization and expansion, and assist them to prepare for rendering greater service.

The national employment committee was instructed to formulate a personnel card and prepare plans for the expansion of employment service.

Samuel A. Hertz, architect, announces that he is now located in his new offices at 15–17 West 38th Street, New York City.

Mills, Rhines, Bellman & Nordhoff, architects, 1234 Ohio Building, Toledo, Ohio, announce the admission to partnership of Chester B. Lee, July 1, 1920.

The consolidation is announced of Westinghouse, Church, Kerr & Co., Incorporated, and Dwight P. Robinson & Co., Incorporated, under the name of Dwight P. Robinson & Company, Incorporated, engineers and constructors, with general offices, 125 East 46th Street, and down-town office, 61 Broadway, New York. Branch offices are in Chicago, Cleveland, Pittsburgh, and Dallas.

Bollard & Webster, architects, Omaha, Nebraska, advise us that they have removed their office from 303 McCague Building to 521 Paxton Block.

We regret to announce the recent death of Russell A. Griffin, general sales manager of the National Pole Company. Mr. Griffin was well known among telephone people. He was for many years connected with the American Telephone and Telegraph Company, and later with the Western Electric Company, before going into the pole business.

Rossel Edward Mitchell & Company, Ltd., Norfolk, Va., have moved their main office to 817 Fourteenth Street, N. W., Washington, D. C. Manufacturers' catalogues for filing purposes are requested.

In answer to a number of inquiries, we take pleasure in saying that the beautiful photographs of the reredos and woodwork of St. Thomas's Church published in the July number were made by Kenneth Clark.

Three Mental States that Lead to Accidents

THERE are three mental conditions which have a vital bearing on the prevention of accidents. The first is the widely prevalent taint of epilepsy which may cause a man to lose consciousness momentarily and put his hand into a place of danger. The second is the curious effect of habit noted by Doctor D. H. Colcord, in the *Scientific American* for June 12: "A man operating the levers of a crane, oiling a lathe in motion, driving an automobile, or crossing a crowded thoroughfare, may at a dangerous moment continue to act as accustomed by habit, thus occupying the nervous machinery with habit-chains which present conscious control." The third is another mental twist, known to all of us, by which the fear of what would happen if a man should jump off a high building, or drive an automobile into a tree, becomes an uncontrollable impulse to do that very thing.

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Frontispiece to September 910.

POPLAR HILL, PRINCE GEORGE COUNTY, MD.

From a photograph by Albert G. Robinson, author of "Old New England Houses."

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLII SEPTEMBER, 1920 NO. 3

A Post-War Impression of the Cathedral at Reims

By Kenneth John Conant

ONE sees the buff-brown towers of the cathedral long before the train pulls into the battered station at Reims, and the traveller who is approaching the city for the first time since the beginning of the war cannot help regarding the old pile with an anxious interest. The barbed wire, the newly-filled trenches, the half-effaced shell-holes, have their counterpart elsewhere, but the fascination of the old church is in its way unique. Standing high above the broken town, it all too evidently shares the curious unkempt look which all the devastated countries have: a curious neglected air quite different from what is usual in France. Once out of the station, it is the first thing to seek. The way lies past the narrow fringe of habitable buildings about the station square, and into a melancholy district of hopeless ruins. Their silhouette against the sky is the crazy zigzag of roofless gables and fallen walls, interrupted here and there by smokeless chimney-pots. Where a house has two walls, its interior, blackened and tenantless, will show nothing but scattered débris and perhaps a few sagging and rusted iron beams. The avalanche of broken rubble which once blocked the streets has been piled waist-high to either side, resembling (for the stone, like the dust inch-deep underfoot, is white) the piled-up snow after a heavy fall. Curiously dull and unreal, the occasional foot passengers add very little cheerfulness.


The north tower.

It is therefore with a kind of relief that one comes upon the cathedral, which is still tolerably complete and not so very different, at first glance, from what it was in happier days. There are broken shafts and pinnacles; there is the tell-tale stain of calcination at the north, and one feels immediately that the whole is bruised—has lost its crispness and freshness. But it is undeniably a great relief to see the huge bulk of the building still very much in place in spite of five years of bombardment and enforced neglect. It towers over the puny ruined constructions around it as mightily as ever, and the glimpses one catches of it through breached walls and collapsed houses are the best assurance that the old giant stood the ordeal very well. The square in front suffered extensively from shells and fire; it is now bordered with flimsy post-card booths. The cathedral itself is closely invested by a picket fence which encloses piles of broken stone taken from the cathedral and round about as well.

Visitors are not allowed within except to make the regulation visit in the care of a didactic guardian. This really amounts to little more than a glimpse, being limited to the first nave bay, and from there much of the important damage is invisible. The sensation is therefore again of relief, in spite of the calcined aisle portals, the punched and discolored vaults, the scarred tracery, and the dismantled choir. Though obviously in no condition for use, it gives the impression that its rehabilitation will, after all, be a simple matter. The tourists are properly impressed by the collection of shells to be seen just beyond the railing, one of them a large one which entered the building but failed to explode. It is on the exterior, and particularly the exterior of the chevet, that the work of the shells is apparent. While examining this portion of the building the most sanguine optimist is sure to cool a little.

As a matter of fact, the casual visitor does not get anything like a true idea of the injury to the building. There are two reasons for this—first, he cannot realize its colossal size, for the scale is deceptive; and second, because, being surrounded by all sorts of ruin and destruction, he thinks of the injuries to the cathedral in terms of thickly-scattered

Looking across the ruins.

shell-bursts rather than in terms of the slow, patient work which will be required in the carving of new stones to take the places of the shattered ones, and the tedious labor of remaking, one by one, all the multiplicity of broken details. To arrive at an understanding of the sum of the damage calls for intimate study. And curiously enough, the first relief and optimism fade away as one returns again and again to the building. A sober realization of the immense task—of the amount of effort in detail which will be needed to repair the thousands upon thousands of damaged items is enough to abate the most ardent hopefulness. The writer had entirely unusual privileges about the building and was allowed to study it bay by bay, inside and out, freely and at leisure. As the basis of this article a complete detailed catalogue of the damage was drawn up; a copy of this catalogue, the first such list to be made, was given to and acknowledged by the authorities. In making it, the author climbed galleries, turrets, and towers, and examined the condition of all parts of the structure close at hand.

The losses the building has suffered are inevitably divided into three classes: first, essentially unimportant superficial damage and injury to minor parts; second, heavy damage to the essential frame, and third, damage to the valuable decorations. These will be treated in order.

The more one studies the state of the structure, the more one is amazed at the amount of small damage there is—damage that would attract little notice but for the appalling quantity of it. Small broken pinnacles, finials, and crockets, pitted mouldings, plain surfaces raked by shell fragments, disfigured capitals and other carvings, scarred shafts, dislocated copings, shattered canopies are seen by the hundred, in every direction. They make only a general impression in the effect as a whole because of the vastness of the building, but as one becomes more and more familiar with it, one is overcome by the incredible extent of this sort of thing. How many shell-scars there are it would be difficult to say. The shells left no corner of the exterior untouched, and the interior is scattered with their traces (though much more sparsely) from portal to apse. To get some basis for an estimate, a count was made of the marks on a buttress that had been liberally cut up by flying fragments. The lower part of this buttress had no less than 1,115 scars on the outer surfaces, ranging from the size of a thumb-print to that of a pie-plate. There can therefore be no less than 100,000 in all, and 10,000 of these of some size. Another example of the extent of this small damage is furnished by the parapet. The portion over the nave walls had nearly 200 small pinnacles, of which hardly 50 remain complete. There are five breaches in this portion, but that is not all of the damage, for most of the stones on the inner face were split or cracked by the fire which destroyed the great wooden roof. Of all the coping-stones on the battlements which crown the continuation of this parapet around the choir, only two are still perfect. Small as this parapet appears from the ground, it will take several carloads of stone to replace what has been blown away: there are eleven breaches in all. Again, most of the exterior face of the triforium wall was calcined by the fire which destroyed the aisle roofs, and the carving on the clearstory string-course was quite ruined. Many of the bases of the great interior colonnade were calcined by the blazing straw stored in the building during the fighting, and by the fire which destroyed half of the stalls. Examples like this could be cited from any series of details, and it is difficult to insist too much on the uncanny thoroughness of the shells and fire in injuring small details. By patient work a great deal of this can be repaired. It is not the kind of work which can be done rapidly or wholesale, and a great part of the surfaces will have to be left as they are, disfigured. What repair work is done is likely to injure the patina of the building gravely.

As regards the heavy damage, the situation is oddly different. Most of it can be repaired almost at leisure with little hurt to the appearance of the building. It is confined to severe injury to one pier and a number of buttresses, damage to most of the vaults, and the loss of the roof with its belfry and flèche. The destruction of the old charpente is deplorable, but it was perfectly documented and can be rebuilt just as it was unless the authorities decide to replace it in steel. This latter is the sensible thing to do, for any wooden construction will give up sooner or later to fire or decay. This is the second such fire at Reims. Had the old roof been of steel, the damage to the walls, to the vaults, and to the stained glass (from the blazing side roofs), would have been very much less, while the beautiful flèche might have been saved.

The heavy high vault, twenty inches in thickness, was punched in several places. As shown by its discoloration, it was unfavorably affected by the fire, so that stones have kept falling continually, loosened by the rain. There are now considerable holes in five or six places. The vaulting of the crossing and adjacent bays to the south and east has fallen in almost completely, but this is no misfortune, as will appear. There are fissures in almost all of the vaults at both levels, but few of these are threatening. Too much admiration cannot be given the original construction, which, after centuries in place, resisted destruction so sturdily. Ordinary vaults would have dropped like a shot. In spite of the fall of tons of block stone upon them, some of it from sixty feet above, only two of the lower series of vaults failed badly. Although cracked and loosened by exposure to the weather, they will not have to be taken down. The scheme to be followed in general is to rake out the old mortar from the joints and carefully repoint them, supplying the missing parts as the work progresses. As a great deal of fallen stone can be used over again, this work will be comparatively easy.

The repair of the vaults about the crossing will naturally be linked up with that of the southeastern great pier, the only pier to suffer. It is still mostly in place, though somewhat precarious. The shells struck it at the clearstory level, and in addition to numerous vertical cracks, caused horizontal sliding on five or six joints, so that the body of the pier, cracked free from the main walls, is tipped inward toward the nave. The fall of the three vaults it supported may have prevented its failure. The plan of the architect is to put the centring and the new ribs of the vaults in place and then replace the unsound portion of the pier, working around it bit by bit. That done, it will be a simple matter to renew the vaults, the smashed tracery, and the broken mouldings. It is evident that the interior will not show the effects of its evil days as far as construction goes. Probably a great many of the minor scars will be left as they are.

The flying buttresses by no means escaped their share o injuries. Direct hits were made on a considerable number and nine were thus shot away. Nothing has been done toward their repair; the bulk and inertia of the construction will enable it to stand for some time without them, but of course the sooner they are supplied the better. Much work will have to be done on the great pinnacles at the same time. Their condition shows that they intercepted many shells which might have done more vital damage elsewhere; some of them are a good deal smashed up. Something will have to be done also for a number of the chapel buttresses below, and for the towers at the south and west ends, all of which show considerable dislocation due to direct hits.

The third kind of injury is that to the decoration. There is much to be thankful for, for the injury is less than is generally supposed; moreover, the lost items are perfectly documented. Nevertheless it is impossible to be resigned to the loss which has occurred. It will always be regretted because it is irreplaceable. A multitude of minor carvings, such as gargoyles, small figures, and leafage, have been spoiled, and at least half of the more important pieces have received noticeable injuries. A good part of this dates from 1914. To the burning of the roof is due the ruin of the back faces of the western towers; to the burning of the scaffold about the north tower is due the most deplorable injury of all, that suffered by the northern half of the façade; and to shell-fire is due the damage suffered by many fine sculptures around the rest of the building. A number of the kings in the great gallery are in a more or less hopeless condition, but their merit was very moderate and their loss is correspondingly less regrettable. Thirteen of the attractive canopied angels are badly damaged. Every one knows, too, that the great western portals have suffered seriously. The damage to the canopied groups on the reveal of the arches is rather extensive. Just what will be done about the great figures below is uncertain. Many heads have been picked up and it would be possible to reproduce existing casts of destroyed portions, but whether a restoration of this sort will be attempted remains to be seen. Of the thirty-five fine statues at the sides of the doors, only three (all on the north porch) are a total loss. Five are badly wrecked, four are much broken, but still attractive, fifteen have minor injuries, and eight are untouched. The effect of the portals from a little distance is not bad even now, and they can be made fairly presentable by supplying the numerous missing crockets, pinnacles, and other minor carvings, but of course they will never again be what they were.

The glass of the cathedral is another loss of capital importance. It is perhaps less than is generally supposed, however. The aisle and chapel windows were all modern, mostly of plain glass, so that they can perfectly well be replaced. The same cannot be said of the clearstory windows. They were all old glass of great value, and all suffered very regrettable damage from fire, from shell-fragments, and from concussion before they were finally taken down. A few of the windows are fairly presentable; half of the western rose still exists, and something was saved of almost every other window. It has been said that about half of the substance of the windows was rescued. That we have even so much is due to the Paris firemen who, suspended on ropes, climbed about the lofty windows and dismounted the frames during bombardment.

At the crosing of the south transept.

Aside from all the obvious damage some account must be taken of cracking and dislocation throughout the mass of the masonry generally, the result of shock. My attention was particularly called to this by the architect in charge. It is not the sort of thing one notices from the ground. But it will be a large item in the restoration. The scheme is to rake out weakened joints and repoint them very carefully. This, the administration believes, is essential in order to reconsolidate the building. That it will prolong the work goes without saying. I have tried to make it clear, however, that most of the work to be done about the cathedral is tedious detail work of just this character, rather than a wholesale rebuilding. In this fact is at the same time the hope and the despair of those concerned with the structure.

The restoration is in the hands of M. Henri Deneux, whose title is Architecte en Chef des Monuments Historiques. He is a grave, unassuming gentleman admired by all who come into contact with him. He knows the building better that any one else, having worked about it for many years and made a splendid series of measured drawings of it. During the war he had charge of protective works at Reims and elsewhere, and indeed received a shower of broken stone while at work one day during a bombardment of the cathedral. Not long after Reims was finally out of range of the enemy he took up the work of rehabilitation. A gang of prisoners was set to work at cleaning up. A temporary roof was supplied, a considerable undertaking, involving 60,000 square feet of corrugated iron and much wooden truss-work. The latter could not be made up on the spot because of the lack of all things essential, but was prepared in Paris and shipped up by rail. Work was finished in August, 1919. That it took so long will surprise no one familiar with the situation in the devastated districts, where the labor and transportation situation is so difficult that some begrudge even the small crew at work on the cathedral. Theoretically the restoration will be paid for by the Germans, but the French state can give it only a minimum allowance while whole populations are still living in shacks and cellars. Yet an effort was made to install the clergy in some corner of the church. The parish has worshipped in a very modest hall two or three squares away. Excavations have been undertaken in the choir for the investigation of the foundations and a series of old tombs known to exist below the pavement. They have accomplished more than was expected, for they have brought to light a beautiful flamboyant jubé that was broken into thousands of pieces at some time and used as fill. How any one ever had the heart to smash up such an excellent piece of carving is hard to understand. The toy vaults, the graceful tracery, the tiny crocketed finials are beautifully cut. A vine which runs through part of the ornamentation has charming little leaves, and bunches of grapes no larger than a franc piece. As the fragments are found they are laid out in the near-by chapels, where a patient man is working day in and day out trying to put this Humpty-Dumpty together again.

Next the nave will be closed off, to become a workshop, and the slow work of restoration will begin. How long it will take not even M. Deneux can say. That will depend on the credits and the number of workmen the government can spare and upon the success of the Société des Amis de la Cathédrale de Reims, newly founded under the patronage of President Poincaré and Cardinal Luçon, in soliciting voluntary contributions. But it can hardly be less than fifteen or twenty years.

Housing Shortage and Health

A SCARCITY of housing facilities directly tends to lower quality and to induce cheap and undesirable substitutes. And these affect the social life, comfort, and health of the family. It may not have occurred to the average person, but it is true, that there are housing substitutes as there are substitutes for food, leather, and clothing. Among the substitutes for proper and adequate housing may be mentioned tents, shacks, and house-boats, and not forgetting, either, the doubling-up evil, which means the housing of two or more families where space, light, air, and sanitary provisions are wholly inadequate.

Housing shortage also tends to lower housing standards, and unless watched carefully permanent deterioration in the character, comfort, and safety of home dwellings will follow.

All this is prefatory to the statement that at the present time the shortage of houses is so wide-spread and so evenly distributed over the whole country that the really alarming character of the situation is not, it is feared, generally recognized or understood. In this connection, and giving almost at a glance the housing situation, the following statistics compiled by Mr. Wharton Clay, showing the proportion of families to dwelling-houses for the last thirty years, tell a most significant story. While the figures from 1890 to 1920 are well worth study, for the purposes of this article those from 1916 on must suffice. Here they are:

In 1916 there were 20,263,051 dwellings for 23,292,887 families; in 1917, 20,672,051 dwellings for 23,799,275 families; in 1918, 20,808,562 dwellings for 24,305,662 families; in 1919, 20,829,039 dwellings for 24,872,051 families, and for the year 1920 the proportions are 20,900,000 dwellings for 25,319,443 families. This means an existing shortage of 4,419,443 houses for family dwellings, and on a basis of five members to a family, 22,097,215 persons in this country to-day are not being properly or adequately housed.

According to the editor of *American Building Association News*, who has charted by years the housing situation in this country, the shortage in housing facilities has shown a sharp and decided upward swing since 1917. He also is authority for the statement that in 1918 only 20,000 new houses were built when there should have been twenty times that number. Last year showed some improvement with a little over 70,000 houses completed, according to the estimates of the U. S. Building Corporation. This slight increase in building has by no means kept pace with the increase of population, which is far ahead of any building programme, until now it is estimated that for every 100 existing houses there are at least 121 families to be provided for.

A situation like this means but one thing and that is acute congestion, which is certain to have a direct and unfavorable influence on both the health and morals of family life. In order to meet this evident and wide-spread shortage, the authority already quoted estimated that at least 2,139,000 homes must be constructed by or before 1926. And even this programme will not insure a return to pre-war conditions by any means. To bring this about 3,340,000 dwellings will have to be built during the period named. This would mean that in a town of 25,000 people 150 homes must be built every year for five years; and, of course, in like proportion for cities of larger size. That this housing situation as revealed by the facts and figures given has an important bearing on community life and health is quite apparent. It in fact constitutes a serious and ever-present menace to the public health and safety even under normal disease conditions. But in the event of outbreaks of any of the more dangerous types of communicable diseases, this menace then would be greatly increased both as affecting sickness and death rates and in more than doubling the work of health authorities in their efforts to bring and to keep such outbreaks under control.

The Alvin T. Fuller House

Robert C. Coit, Architect

AMONG the fine residences that line the shore drive which links the old historic city of Newburyport with its New Hampshire neighbor, Portsmouth, there is no more interesting summer home than that of Hon. Alvin T. Fuller, at Little Boars Head.

It stands back from the main road, only the high-road lying between its wide sweeping lawns and the sea.

The house which stands the central feature of the home grounds is an effective combination of white paint and red brick. This contrasts charmingly with the green lawn and the darker green of the dwarf evergreens which are massed, not only against the terrace, but around the house. The planting is formal, for, owing to the exposed location, evergreens have been utilized to a great extent, as they endure the severe winter much more successfully than do less hardy shrubs and plants.

The sun-room with brick wall and tile floor.

At the left a charming pergola curves to follow the line of the boundary wall. Beyond the pergola the graceful curve of the wall is defined by rows of specimen spruce-trees.

Still another ornament to the grounds is an old well with carved stone base showing quaint figures. Above is a canopy of wrought iron and the whole is set in a border of day-lilies, surrounded by a circular bed planted in sections with geometrical precision, producing a desired color effect.

The grounds, attractive as they are, however, are only the fitting and worthy adjuncts of such a house as this. Mr. Robert C. Coit, of Boston, the architect, has designed a house to fit cleverly into the landscape. An especially interesting feature is the porch at the motor entrance which is supported by unusually beautiful columns and flanked by pyramidal evergreens in painted tubs. The picturesque feature is the gable that appears like the end of an old-time house with Dutch lean-to roof, over which the main body of the house is superimposed. The effect of the larger and more pretentious house so artfully concealing the quaint old-fashioned small one is very unusual and delightful.

Everywhere is found excellent treatment of details. The leader pipes are ornamental and the blinds, with their cut-out crescent motifs and unique "S" hinges, are also good. But perhaps the novel feature of this side of the house is the variety of windows that are used and their arrangement. Windows of various sizes are introduced wherever it is necessary or convenient. A group of three windows in the circular tower indicates the ascent of the stairway within, while another group of four windows affords light at the summit of this stair-tower, where it breaks through the roof. Other odd windows are placed in this tower. The lines of the steeply pitched roof have been broken by single and grouped dormer-windows, which let in an abundance of sunshine and air. An open-air sleeping-porch has no windows at all, but there are attractive white lattices which are sufficient to soften any effect of bareness which would otherwise be felt.

In the sun-room, which is in the brick gable, the apertures are charmingly curved at the top with fanlight effects, while the casement windows, like all the others, are composed of small panes above and a single large one below.

At the right of the hallway, before one enters the living-room, is the master's den.

From the master's room we may pass on directly into the large living-room, which occupies the whole of the length and a goodly portion of the width of the main body of the house. Opening on the one side into the sun-room in one of the wings, and on the other into the dining-room in the opposite gable, it affords pleasing vistas which give added homelike effect.

The sun-room, in the right wing, has walls of faded old brick, and the windows are unshaded save for the odd-figured oddly colored linen hangings which frame the casements.

The rooms on the second floor are interesting in their way as the rooms on the lower floor.

The nursery on this floor, for two little girls, is an ideal room of its kind. White furniture with cane insets and dainty floral decoration could not be improved upon, while the screen to match, with its bluebird decoration, the quaint Brownie andirons and Bunny door-stop, provide articles of never-failing interest to the child.

Similarly located, but on the third floor, is the baby's nursery. Here the walls are covered with a blue figured paper, while the big braided rugs on the floor show a predominance of the same color.

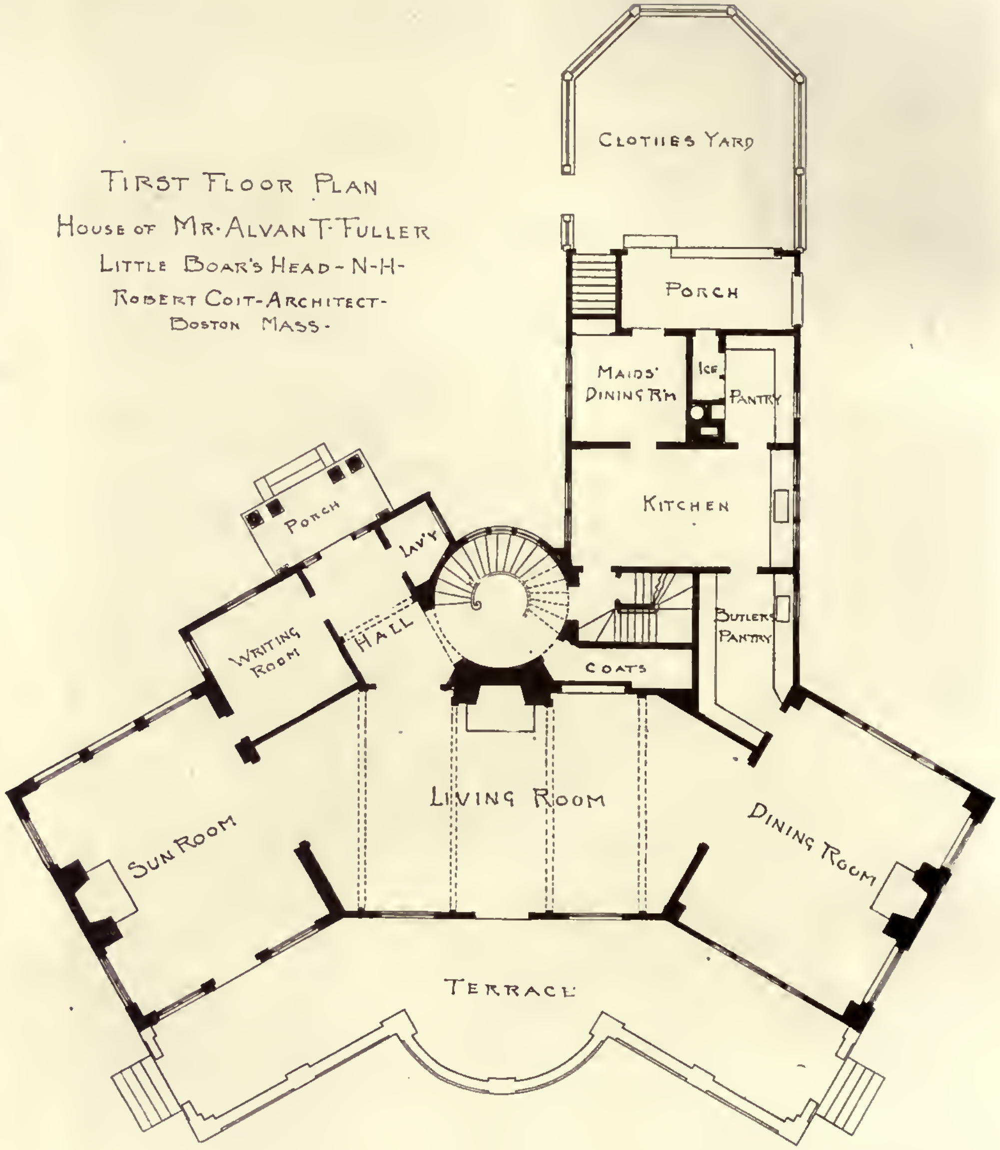
Attic or third-floor rooms are always interesting, and the master's room, in the opposite wing from his young son's, shows that quiet taste combined with practical comfort.

The dining-room.

RESIDENCE, ALVIN T. FULLER, LITTLE BOARS HEAD, N. H.

Robert C. Coit, Architect.

THE CIRCULAR STAIRWAY AND HALL.



Robert C. Coit, Architect.

RESIDENCE, ALVIN T. FULLER, LITTLE BOARS HEAD, N. H.

PORCH AND ENTRANCE TO HALL.

TERRACE AT THE BRICK END OF HOUSE.

RESIDENCE, ALVIN T. FULLER, LITTLE BOARS HEAD, N. H.

Robert C. Coit, Architect.

Book Review

THE ENGLISH INTERIOR. A REVIEW OF THE COURSE OF HOUSE DECORATION FROM TUDOR TIMES TO THE END OF THE XVIIITH CENTURY. By ARTHUR STRATTON, Architect. Containing Upwards of 100 Full-page Plates, Presenting Many Illustrations Printed in Collotype, Including a Series of Measured Drawings, and Numerous Illustrations in the Text from Photographs, Sketches, Drawings, and Engravings. Large quarto. New York: Charles Scribner's Sons.

There is stately dignity in the size and beauty of this handsome volume in keeping with the subject. Through its pages you enter the great as well as many of the minor homes of old England, and follow in text and illustrations the development of English social manners and customs, in the environment of architecture and the allied arts that were developed in the various periods discussed.

In early Tudor times the Englishman's home was indeed his castle, and massive walls and dungeon-like towers and a great central hall, where family and servitors might dine in common, were features of the times. In the centre of the hall was the fire, and the smoke found its way out through the roof. This was the period of the huge timber roofs, when the massive oak beams served both a utilitarian and a decorative purpose.

Various structural features were used as decoration, and tapestried walls, moulded ceilings, and great fireplaces marked the best Tudor structures.

In the days of Elizabeth began a more exuberant manifestation, and architecture, no longer influenced by the need for defensive structures, became freer and more ornate. Walls were beautifully panelled, chimney-pieces elaborately carved, ceilings covered with plaster ornament, and windows filled with leaded patterns on colored glass.

Under the Stuarts foreign influences began to be much in evidence.

It was Inigo Jones who first started English architecture in new ways, brought the classic traditions and the spell of Italian art to bear upon both exterior and interior, and his great successor, Sir Christopher Wren, nobly carried on the good work thus begun.

The Georgian Period Mr. Stratton calls "the most clearly defined and homogeneous period in our architecture"; certainly it was a period of great richness and variety, of affectations of the classic, of the reign of the cultivated amateur—a period of elegance, of building for the purpose of social occasions, of a sacrifice of the elements of home comfort to halls and salons in which to display beautiful clothes and carefully trained manners.

What were the principal features of English interiors, considered in detail? We ask the question because the author has so admirably answered it in Part IV of this volume, where he takes up such details as Wall Treatment, Decorations in Color, Ceilings of Wood and Plaster, Fireplaces and Chimney Pieces, Doors and Doorways, Staircases.

All of the famous designers and architects are represented—Inigo Jones, John Webb, Sir Christopher Wren, Sir J. Van Brugh, Gibbs, William Kent, Isaac Ware, Robert and James Adam, and others. The comprehensiveness of the many illustrations in the text, and the splendid full-page plates make the volume a complete reference of incalculable value to every architect or specialist in interior decoration.

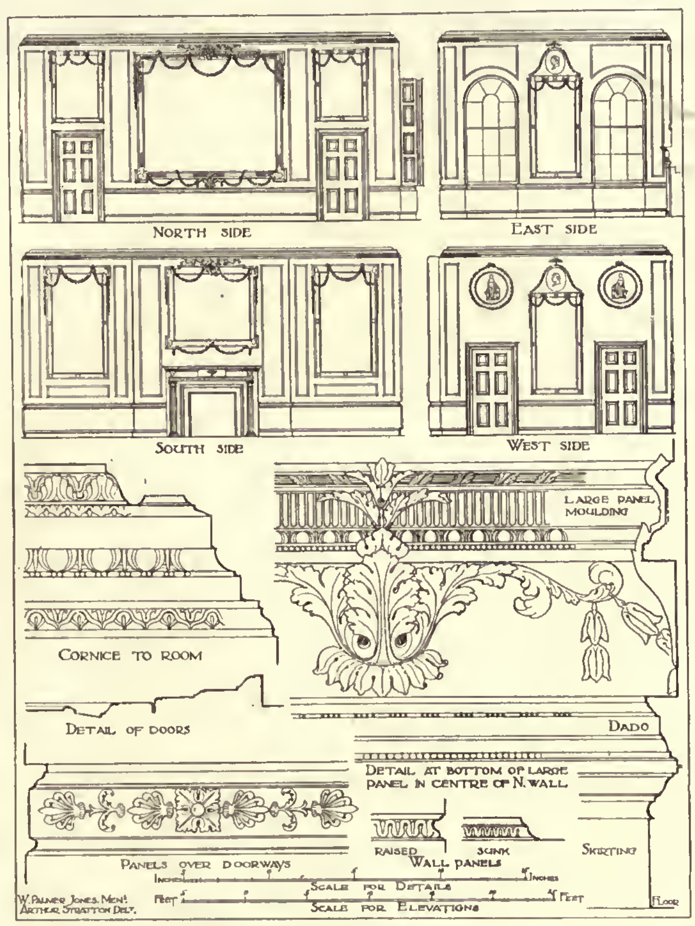
The following is a condensed contents, showing the great scope of the book: Section I. INTERIORS OF THE TUDOR AND EARLY STUART PERIODS.—Significance of the Interior. The Beginnings of English Interior Decoration. Characteristics of the Early Tudor Type. Exuberance of Elizabethan and Jacobean Rooms. Early Interior Planning. Section II. LATER STUART AND EARLY GEORGIAN INTERIORS.—The Renaissance Wave and Transitional Decoration. Inigo Jones and his Influence. Wren, Gibbons, and the Craftsmen of the Period. Eclipse of the Stuart Type and Gradual Evolution of the Georgian Interior. Section III. INTERIORS OF THE TIME OF THE LATER GEORGES.—Characteristics of the Georgian Period: Its People and their Houses. Splendid Georgian Salons. English Rococo Decoration. Reaction to the Delicacy and Simplicity of the Brothers Adam. The Empire Style and the Victorian Decadence. Section IV. THE CHIEF FEATURES OF INTERIOR DESIGN AND THEIR TREATMENT.—Wall Decoration. Ceilings. Fireplaces and Chimney Pieces. Doors and Doorways. Staircases. Section V. SERIES OF UPWARDS OF 100 PLATES ILLUSTRATING THE PROGRESS OF ENGLISH INTERIOR DECORATION.

The senate of the University of London have recently conferred the title of Reader in Architecture upon Mr. Stratton, F.S.A., F.R.I., B.A. For some years he has held the post of Lecturer in the School of Architecture at University College, and his new appointment is tenable at the same college.

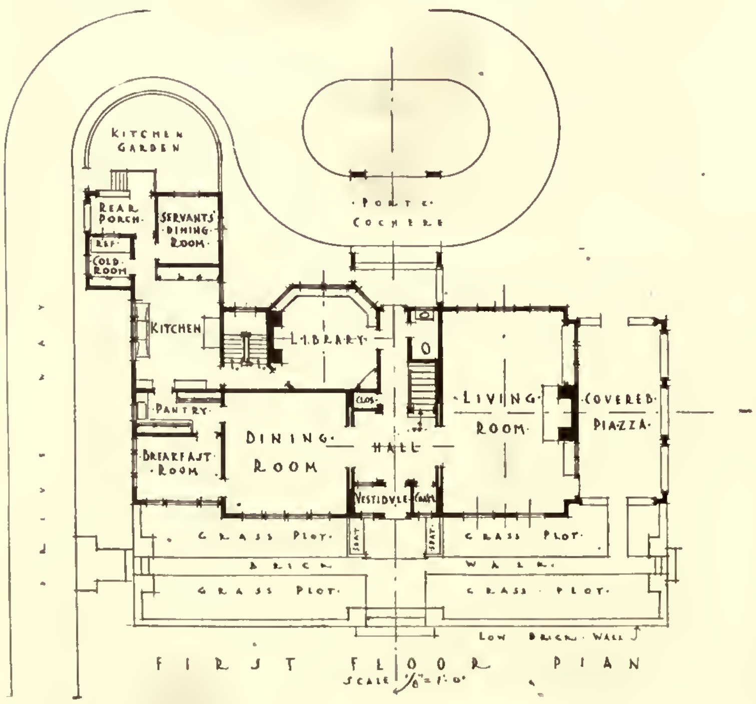
Mr. Stratton's other literary work is well known. Some years ago he published an interesting monograph on Sir Christopher Wren. Later he completed the monumental work on "Tudor Architecture in England," commenced by the late Thomas Garner, and he also edited the most recent edition of Anderson's "Architecture of the Renaissance in Italy."

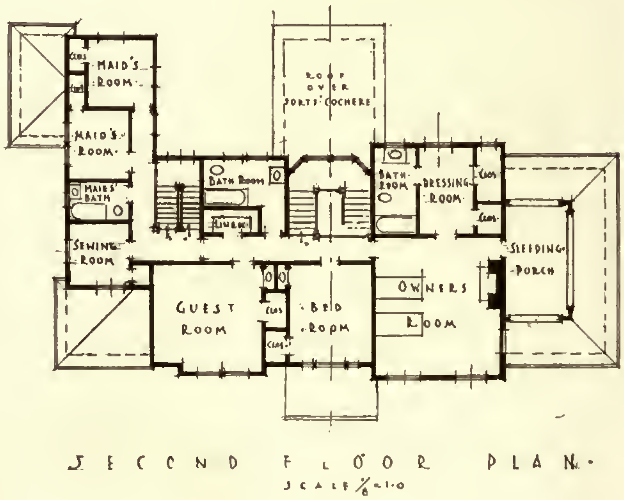
Great Dixter, Northam Sussex. The great hall.

Plate CIV



ELY HOUSE, DOVER STREET, LONDON.
DETAILS OF THE DINING ROOM.





HOUSE, WINTHROP WITHINGTON, JACKSON, MICH.

Leonard H. Field, Jr., Architect.

Editorial and Other Comment

Working Together for Better Conditions

TO preach an optimism we can't practise is an affront to our readers, an open challenge of our sincerity and understanding of actual conditions, but if we cannot with candor predict good times in sight, we may at least unite in the old Spartan virtue of making the very best of bad conditions. We have had plenty of time to realize that conditions are quite beyond the solving of the individual, and that we are in a tide of affairs that no ordinary resistance will stem, and that we can only turn on our backs and float, waiting for a favorable current to bring us safely to land.

It is mighty hard to accept our failures and recognize the fact that the old ways of doing business, old standards of living, old standards of morals, have gone, that we must adjust ourselves to something entirely new. We do a lot of talking, use a lot of words that bear a strong accent of condemnation, use up a lot of vitality in useless kicking, and settle down to a more or less placid resignation.

What is the use! We are helpless, so let us just stand and wait while the world goes on, while the profiteers grab the plums, and the congestion of population, due to the housing shortage, becomes a dangerous national menace, a disintegrating power in everything that makes for progress and the restoration of normal conditions.

We are told that at the bottom of trouble in the building trades is primarily the lack of adequate transportation, shortage of cars, of all kinds of rolling-stock, and yet some of us can't help wondering why it is that we pass so many empty cars on sidings everywhere and see so many loaded ones waiting days to be discharged. The other day we saw several hundred cars, representing railroads all over the country, empty, and we wondered if they were not lost and forgotten, and waiting for some friendly railroad man to wake up and start them loaded on a journey toward home. No doubt the gigantic problem of resystematizing our railroads will take a lot of time (years, we hope not), and we must be as patient as our training will permit. But there does seem to be a lot of waste motion, and to pass a train of empty freight-cars now and then, makes us wonder why they are not loaded and put to some use on their return journey. Surely there are plenty of things to be carried, coming and going.

We are inclined to believe that the war, while no doubt the leading factor in bringing real conditions to a climax, and making manifest a general condition of unpreparedness, is by no means to be blamed for all our ills. We have grown tremendously in the past twenty years, and the war taught us, as nothing else could, how little we had appreciated the growth of our population and the wide-spreading influence on our social and industrial life of great masses of unassimilated and un-Americanized aliens. It has been this element that has been largely responsible for the disorganization and instability of industries identified with the housing problem.

The trail of the profiteer, too, leads through all things, and materials for home-building are diverted into channels where the profits are greater and the return on the investment more immediate.

Maybe we can only sit tight and wait, and in the meantime pull together in the determination to find a practicable way of better equalizing the distribution of both materials and labor. None of the professions have felt the stress of the times more keenly than the architects as a body, and many of them have been compelled to turn their experience and energy temporarily into other fields. There is no going back to pre-war conditions, but there must be a way devised for meeting the new conditions, of making it possible for the architect to obtain supplies for the hundreds of minor buildings so grievously needed everywhere. The big things will take care of themselves, if permitted, but the building of homes for people of modest means is more vital than any other form of present-day building, and the architects must stand as one demanding that the problem receive first consideration.

New York's Housing Problem

THE housing problem in New York probably is typical of conditions generally, so that some of the proposed relief measures in that city should be of interest and value everywhere. That this problem is beyond solution by any single group of men has become obvious, and that a broader view than is possible under ordinary business conditions will be necessary is also very evident.

There can be no effective arguments or plans based on other than on strictly business results, of course. Capital in these days demands and receives a reward commensurate with increased costs. Senator Calder has made the following proposals:

"(1) The exemption of mortgages up to the sum of from $40,000 to $50,000 from the provisions of the State and federal income tax;

"(2) The exemption from all federal and State income tax for a period of ten years of all profits of builders while engaged in actual construction, providing these profits are invested in the construction of new dwellings;

"(3) The exemption from the federal income tax of mortgages on all new dwellings, regardless of the amount; and,

"(4) The creation of a commission to modify the building code of the City of New York, removing the restrictions and difficulties in the way of construction of cheap houses."

Senator Calder also suggested an inquiry into prices to determine whether or not building material manufacturers are combining into groups to raise prices.

The lack of building is attributable to many causes, chiefly to a shortage of materials, transportation, and the high price of labor.

Measures to remedy the situation by tax exemption, according to an editorial in the *New York Evening Post*, will "greatly puzzle those at both ends of the range of opinions: those who attribute all housing troubles to the cussedness of house owners, on the one extreme, and those who advocate the single tax, at the other. Single-taxers will fail to see why some improved property should pay and other be exempted. Those who have it in for tenement owners in general will rage at the idea of exempting any of them.

"Actually the drawbacks to exempting new houses from tax extend further than at first appears. A writer in *The Sun and New York Herald* calculates that the tax exemption on new tenements will amount to some $40,000,000. If all the housing required shall be built, and shall obtain tax immunity, it may well come to some such great figure. But the State and local governments will need a corresponding sum in order to take care of the added property and inhabited area.

"From where, then, shall the money come? Perhaps some genius could devise a new form of taxation to provide it. More likely it will come from an increase in the rates of the present realty tax—the obvious proceeding. But to tax some property in order to exempt other property, to tax one tenement owner in order to exempt his neighbor, to tax old buildings already heavily burdened with up-keep in order to exempt new ones, would savor of unfairness. It would at the same time raise, by the amount of the added tax, the cost of the least desirable living quarters, which by the rule of marginal utility sets the price for the rest."

Building Costs

NO doubt there are many clients, or possible clients, who look upon the architect's estimates of probable building costs with more or less suspicion, classing him with the general run of profiteers. It is hard to convince a would-be home-builder that the architect, like himself, is simply the victim of conditions.

The increase in the percentage of cost of building materials from 3 per cent in 1915 to 140 per cent in 1920, with labor costs varying in their increase from 60 to 300 per cent, is the answer.

A War Memorial for California to be a Home of the Fine Arts

From an address by Willis Polk to the Faculty and Students of the California School of Fine Arts

ALL have heard the old story of the bully who disputed the sidewalk in Jamestown with George Washington. The bully said: "I never get out of the way of a blackguard." George Washington, with his best smile and in his most amiable manner, politely stepping aside, replied with a gracious wave of the hand: "I always do."

It was said that we were too proud to fight, but we did!

We entered the war to make the world free for Democracy. Up to date it appears that the war has only made part of the world free for Bolshevism. But have no fear, the war has made several million Americans sit up and take notice. There will be no Soviet Bolshevism, no autocratic rule, in this country, the spirit of Democracy will not perish from the earth—the American Legion will attend to that.

The American Legion is going to build in San Francisco a monumental group of buildings in memory of the men and women—soldiers, sailors, and civilians—who died that Democracy might live. This group of buildings to commemorate the victory of Democracy will be a nurturing place for all the highest ideals of a free people. It will be a home of the Fine Arts—painting, poetry, sculpture, music, and architecture. It will be a fitting temple for those ideals for which we waged the war!

The faculty and students of the California School of Fine Arts and their successors will find in this memorial a home and be provided with facilities for study. Will they be worthy of it? This year your student body was awarded 6 out of 10 of all the honors available to art students throughout the country. Next year you ought to get 7 out of 10. The year after 8 out of 10, and thereafter 10 out of 10, for California is really and truly the true home of real art.

In the War Memorial, the Art Association will have its galleries, the school its ateliers. Students from all the world will, in time, seek this school for instruction rather than will our students go forth for enlightenment. That is, if nature, temperament, and determination are no less strong with us than were these characteristics with the Egyptians, Greeks, Italians, and other predecessors of present-day ideals of civilization, order, and art.

As far as the students, and the faculty, too, for that matter, are concerned, it must be remembered that success in any vocation means patient, unending plodding. There is no short cut to success. Impressionist, cubist fads are entertaining, but usually are uninstructive and detrimental to healthy artistic development. The students must study the methods of the old masters, not to copy them, but to seek inspiration.

Michelangelo, Rubens, Rembrandt, Raphael, Leonardo, Velasquez—all the masters—were artisans as well as artists. Their work was complete in the last detail.

Can you match the incomparable finish of the "Winged Victory of Samothrace," or the immortal sculptures of Phidias, with the works of Rodin! I say no, a thousand times no!

The Lumberman's Attitude Toward a Forest Policy

PUBLIC-SPIRITED lumbermen are not opposed to a forest policy. They recognize that both national and industrial welfare demand early development of an American forest policy which shall substitute for indifference and accident an intelligent, practical, equitable, and concerted programme for the perpetuation of the forests:

The lumbermen believe—

That growing future timber crops must be largely, though by no means wholly, a government and State function;

That government and States should be permitted to condemn any deforested land classified as suitable chiefly for forest-growing, and pay for it at prices comparable to those paid in voluntary transactions.

That land classification and studies should be undertaken jointly by industry, States, and government.

That the Forest Service should be the recognized leader of public forestry thought and effort along general lines.

That wise conservation requires the determination of better methods of waste prevention and of utilization of the forests we already have.

That a successful forest policy means much more than tree-growing. It means confidence and security in every legal and commercial phase, to industry and public alike.

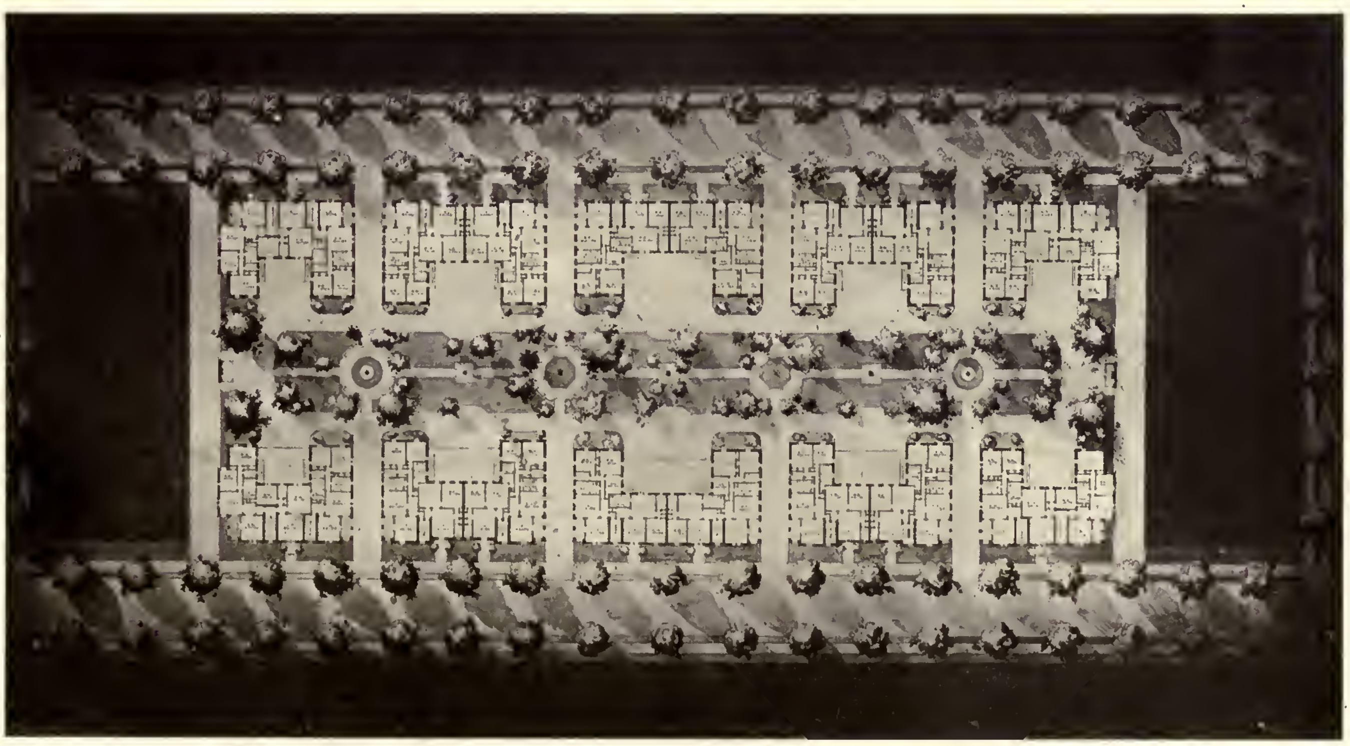
Plates CXXIX — CXXXIV to follow page 268

ENTRANCE DETAIL.

Andrew J. Thomas, Architect.

GARDEN APARTMENT BUILDINGS FOR THE QUEENSBORO CORP., JACKSON HEIGHTS, QUEENS, NEW YORK.

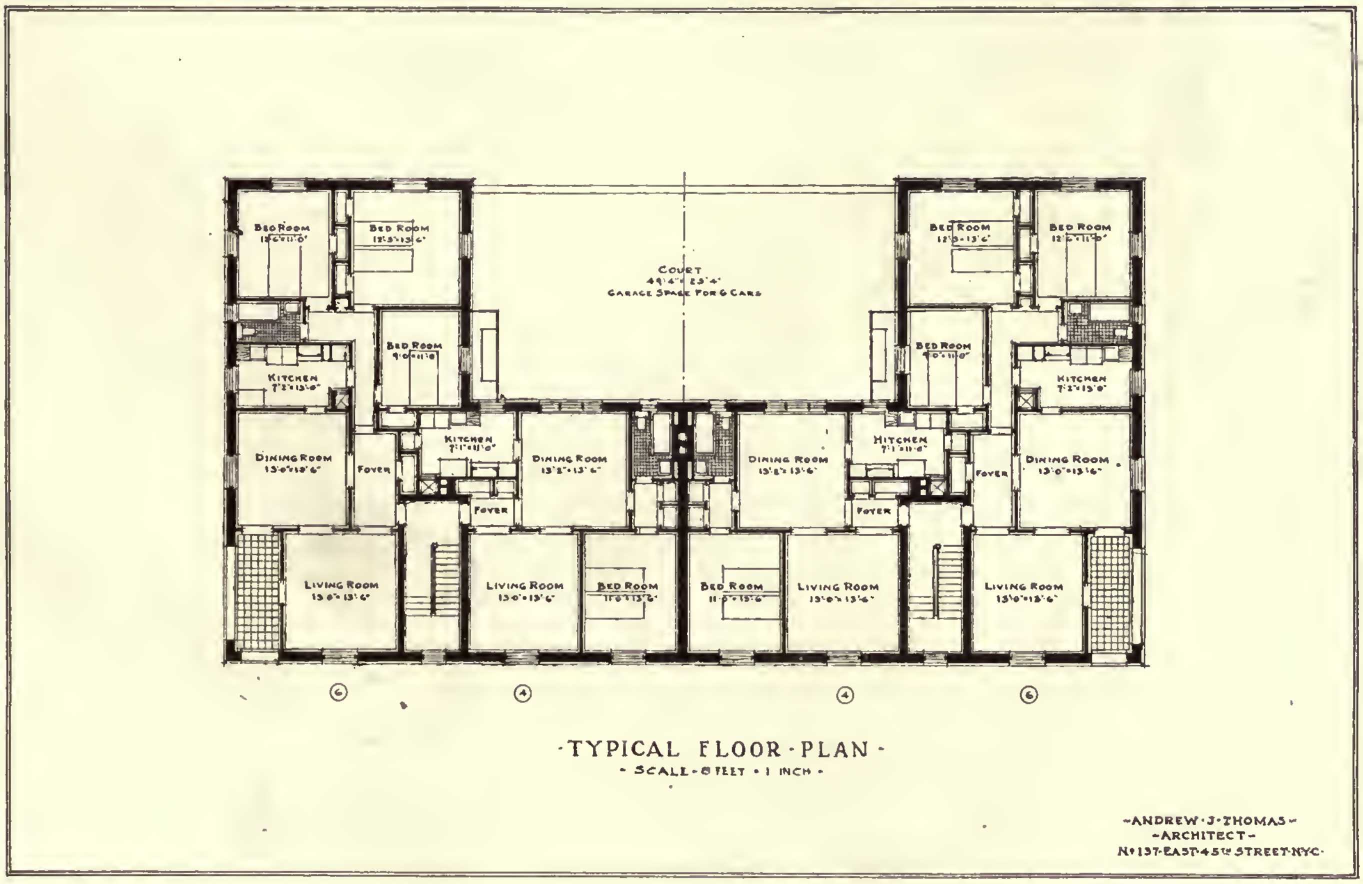
THE GARDENS.



PLOT PLAN. Andrew J. Thomas, Architect.

GARDEN APARTMENT BUILDINGS FOR THE QUEENSBORO CORP., JACKSON HEIGHTS, QUEENS, NEW YORK.

FRONT ELEVATION.



CENTRAL UNIT.

Andrew J. Thomas, Architect.

GARDEN APARTMENT BUILDINGS FOR THE QUEENSBORO CORP., JACKSON HEIGHTS, QUEENS, NEW YORK.

HOUSE, C. C. MERRITT, LARCHMONT, N. Y.

Sterner & Wolfe, Architects.

REAR.

DETAIL.

Sterner & Wolfe, Architects.

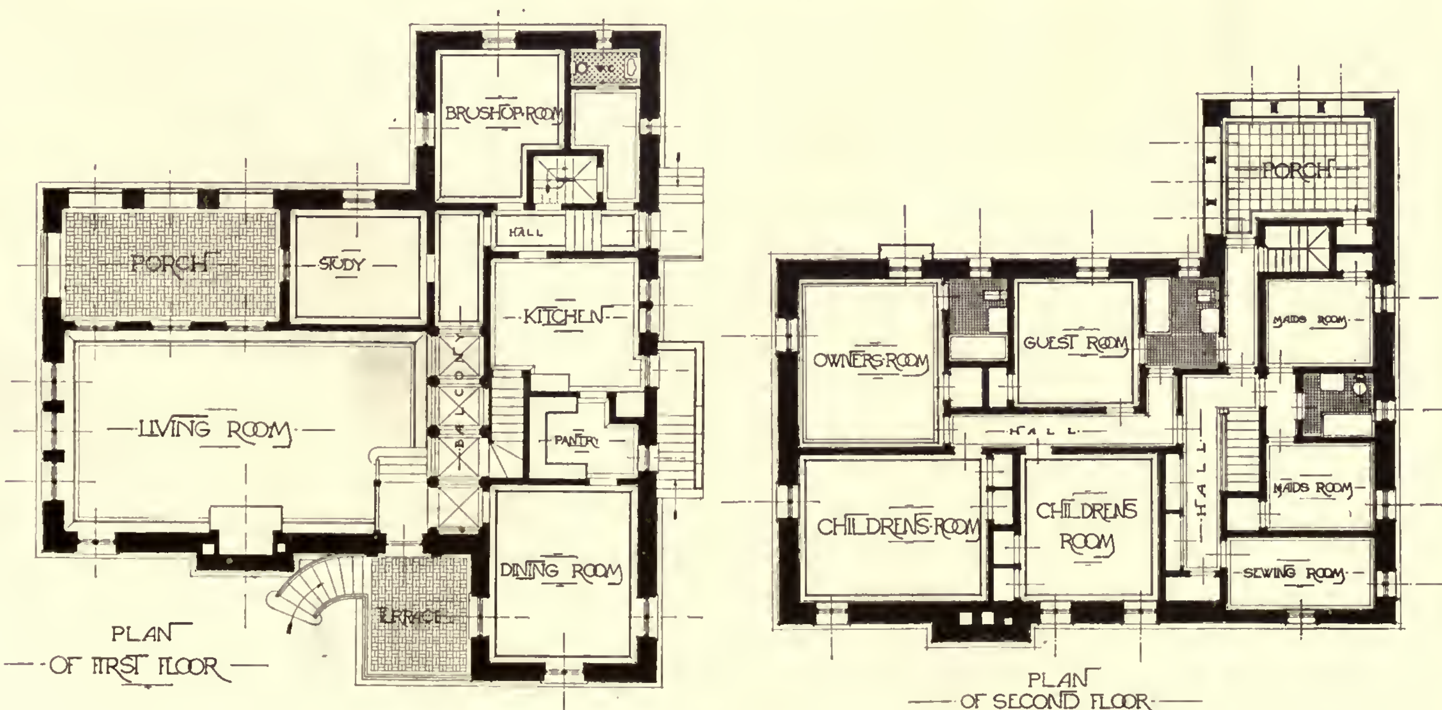
HOUSE, C. C. MERRITT, LARCHMONT, N. Y.

LIVING-ROOM.

HOUSE, C. C. MERRITT, LARCHMONT, N. Y.

Sterner & Wolfe, Architects.

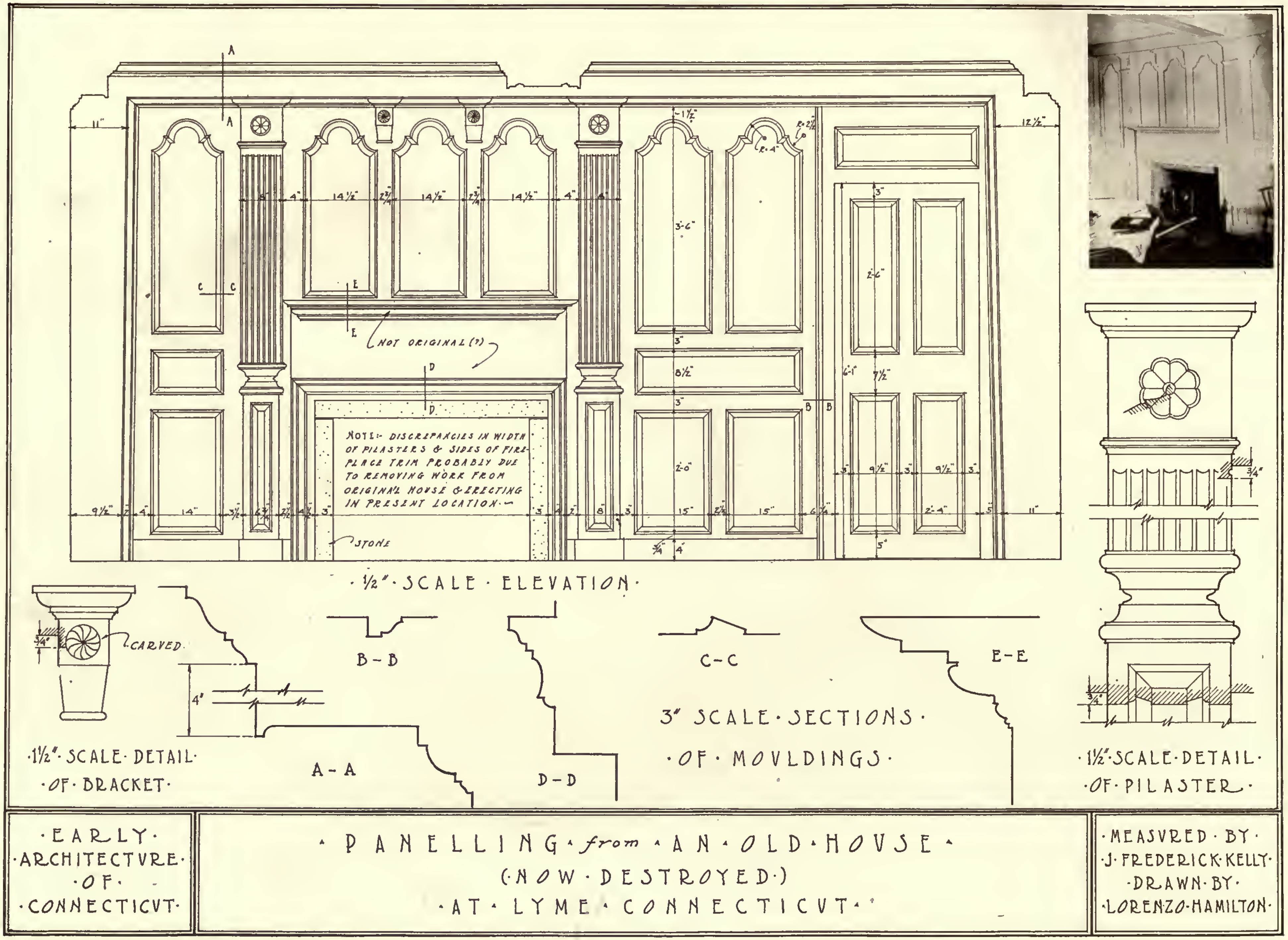
DINING–ROOM.



PLANS.

Sterner & Wolfe, Architects.

HOUSE, C. C. MERRITT, LARCHMONT, N. Y.


·1/2"·SCALE·ELEVATION·
NOTE:- DISCREPANCIES IN WIDTH OF PILASTERS & SIDES OF FIRE-PLACE TRIM PROBABLY DUE TO REMOVING WORK FROM ORIGINAL HOUSE & ERECTING IN PRESENT LOCATION.—
NOT ORIGINAL (?)
STONE
CARVED
·1½"·SCALE·DETAIL·
·OF·BRACKET·
A-A
B-B
C-C
D-D
E-E
3" SCALE·SECTIONS·
·OF·MOVLDINGS·
·1½"·SCALE·DETAIL·
·OF·PILASTER·
·EARLY·
·ARCHITECTVRE·
·OF·
·CONNECTICVT·
·PANELLING·from·AN·OLD·HOVSE·
(·NOW·DESTROYED·)
·AT·LYME·CONNECTICVT·
·MEASVRED·BY·
·J·FREDERICK·KELLY·
·DRAWN·BY·
·LORENZO·HAMILTON·

HOUSE, ANDREW J. THOMAS, SCARSDALE, N. Y.

Andrew J. Thomas, Architect.

LIVING-ROOM WING.

SERVICE AND GARDEN ENTRANCES.

Andrew J. Thomas, Architect.

HOUSE, ANDREW J. THOMAS, SCARSDALE, N. Y.

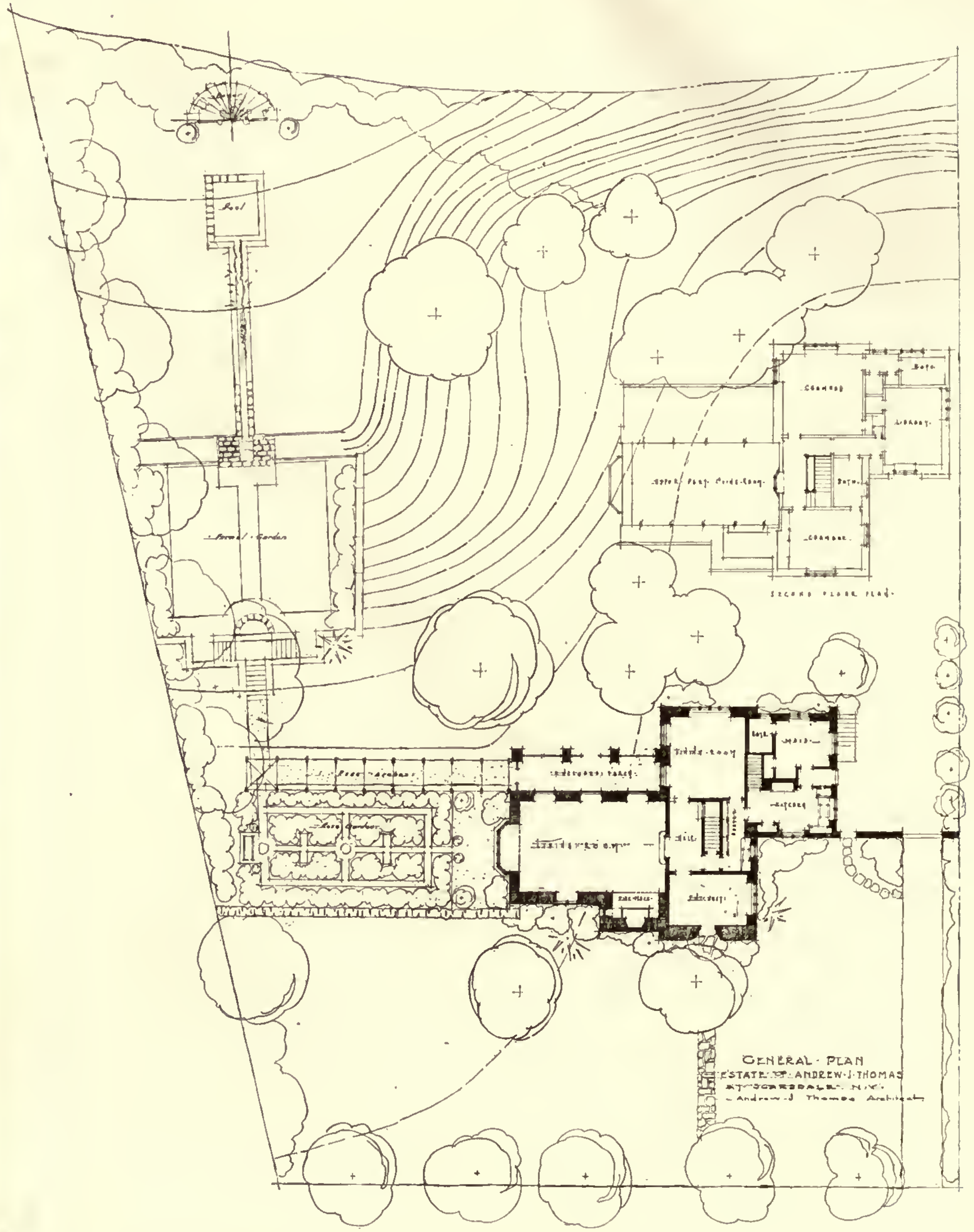
MAIN ENTRANCE.

POOL IN GARDEN.

Andrew J. Thomas, Architect.

HOUSE, ANDREW J. THOMAS, SCARSDALE, N. Y.

ENCLOSED PORCH.

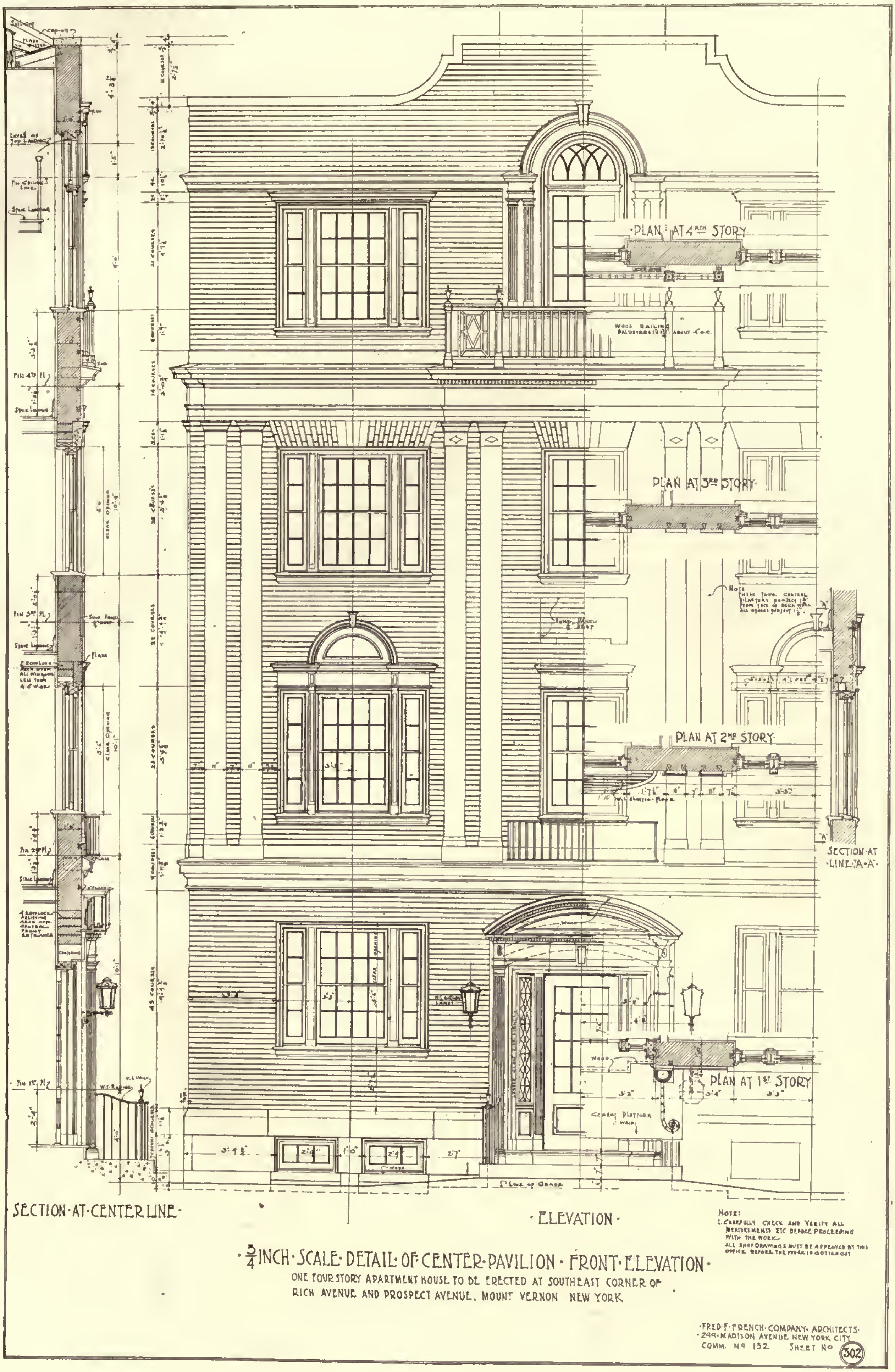


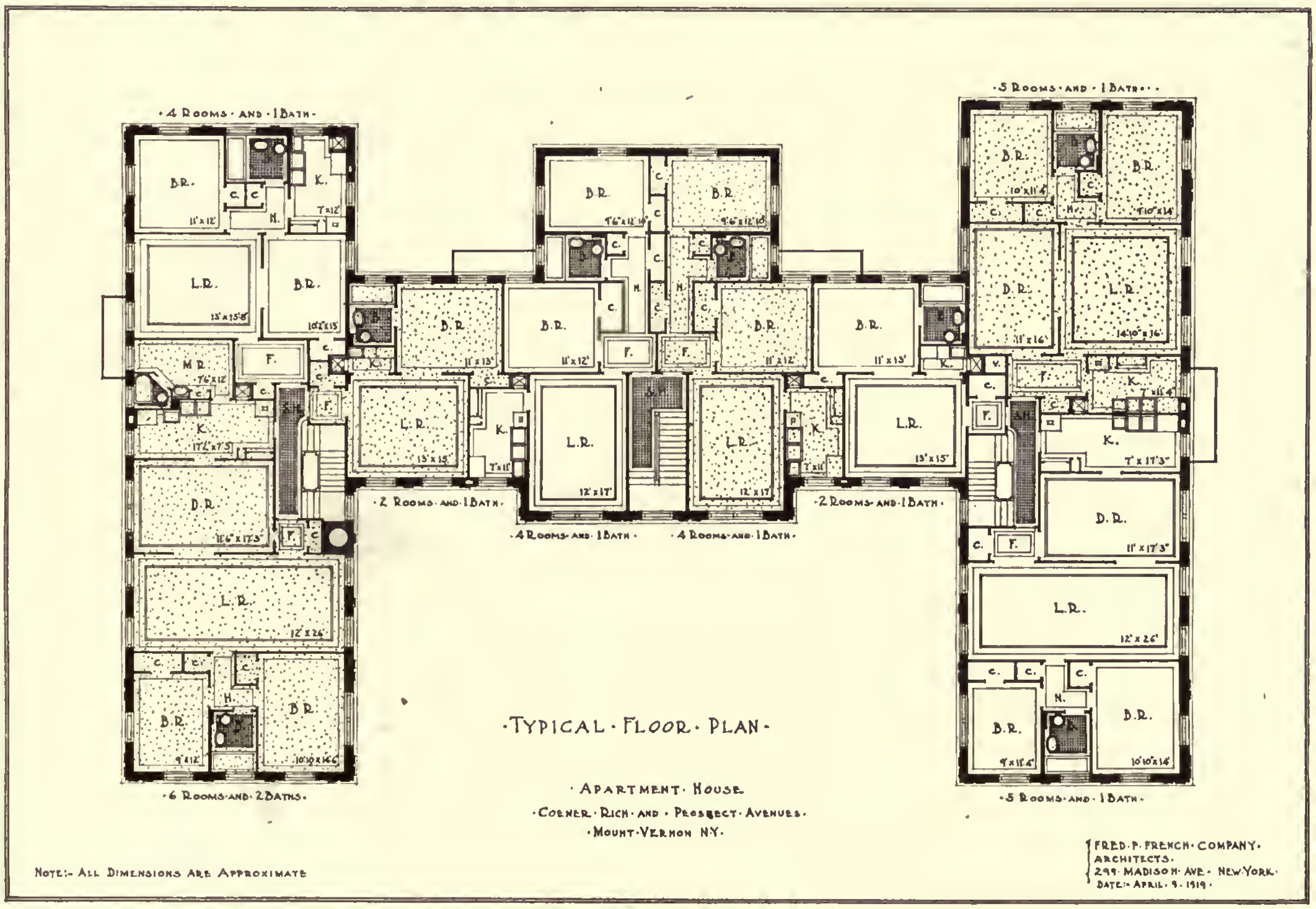
Andrew J. Thomas, Architect.

HOUSE, ANDREW J. THOMAS, SCARSDALE, N. Y.

LIVING-ROOM. Andrew J. Thomas, Architect.

HOUSE, ANDREW J. THOMAS, SCARSDALE, N. Y.


PLAN AT 4TH STORY
PLAN AT 3RD STORY
PLAN AT 2ND STORY
PLAN AT 1ST STORY
SECTION AT LINE "A-A"
SECTION AT CENTER LINE
ELEVATION
NOTE:
1. CAREFULLY CHECK AND VERIFY ALL MEASUREMENTS ETC BEFORE PROCEEDING WITH THE WORK.
ALL SHOP DRAWINGS MUST BE APPROVED BY THIS OFFICE BEFORE THE WORK IS GOTTEN OUT
3/4 INCH SCALE DETAIL OF CENTER PAVILION FRONT ELEVATION
ONE FOUR STORY APARTMENT HOUSE TO BE ERECTED AT SOUTHEAST CORNER OF RICH AVENUE AND PROSPECT AVENUE, MOUNT VERNON NEW YORK
FRED F. FRENCH COMPANY ARCHITECTS
299 MADISON AVENUE NEW YORK CITY
COMM. Nº 132 SHEET Nº 302

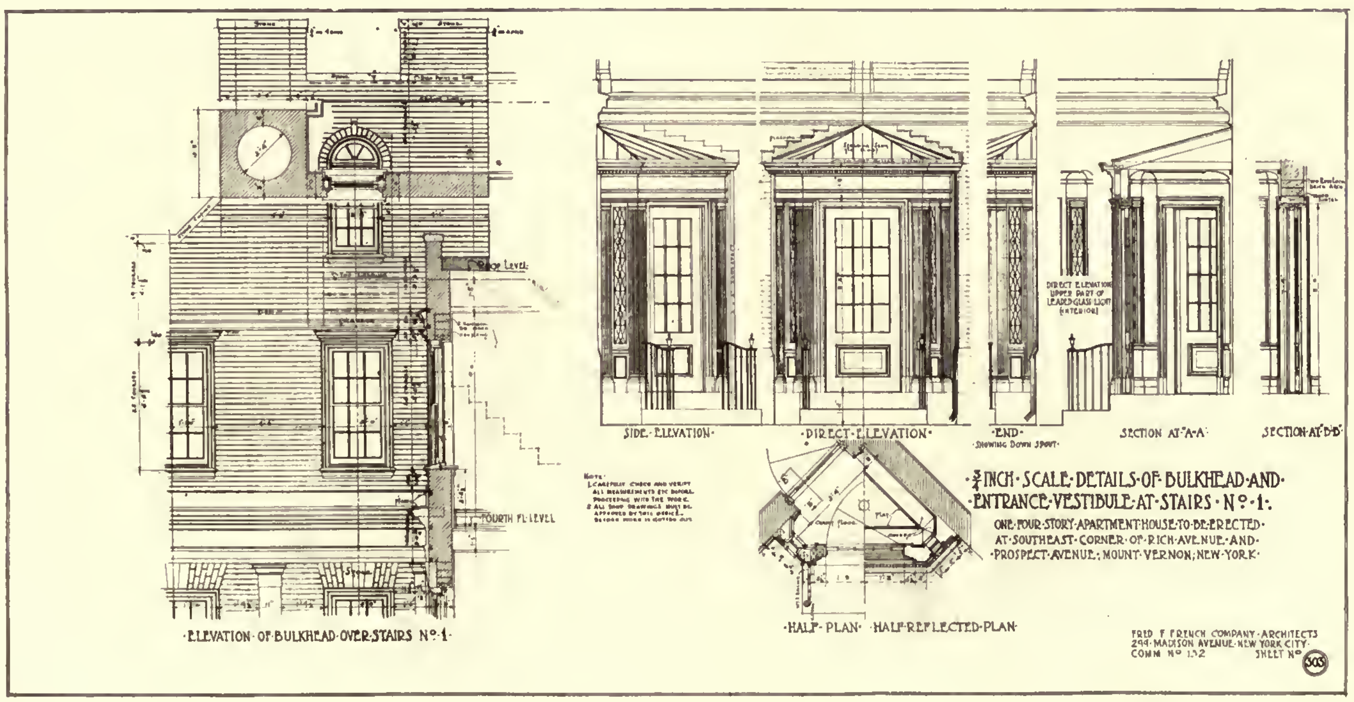

·4 Rooms · and · 1 Bath·
·5 Rooms · and · 1 Bath··
·2 Rooms · and · 1 Bath·
·4 Rooms · and · 1 Bath·
·4 Rooms · and · 1 Bath·
·2 Rooms · and · 1 Bath·
·6 Rooms · and · 2 Baths·
·5 Rooms · and · 1 Bath·
·Typical · Floor · Plan·
·Apartment · House
·Corner · Rich · and · Prospect · Avenues·
·Mount · Vernon N.Y.·
Note:– All Dimensions Are Approximate
Fred · F · French · Company·
Architects·
299 · Madison · Ave · New · York·
Date: · April · 9 · 1919 ·

Mount Vernon's First Large Apartment-House

THE Fred F. French Company drew the plans and constructed the thirty-two-family apartment-house of colonial design situated at the southeast corner of Rich and Prospect Avenues in the heart of Mount Vernon's best residential section. Macombs-Nelson, Inc., which is controlled by Charles L. Adams of New York and Mount Vernon, is the owner. The operation which was completed last fall was partially financed by the Mount Vernon Trust Company, who made the owners a conservative building and permanent loan. This is the first apartment building of this magnitude to be erected in Mount Vernon. There are three distinctive entrances and three separate public stairs, each serving two or three apartments to a floor. The entrances are set back from the curb about 75 feet, in addition to which ample grounds extend entirely around the building, which is built 130.6 feet on Rich Avenue and 84 feet on Prospect Avenue on a plot 175 feet x 112 feet.

The typical floor comprises two 2-room apartments, three 4-room apartments, two 5's and one 6.

In the larger suites a large living-room running through the entire wing, with windows at both ends, insuring cross ventilation, has been featured.



The Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, Columbia University School of Architecture

ARTICLE I

THE PRESENT-DAY ECONOMIC TROUBLES

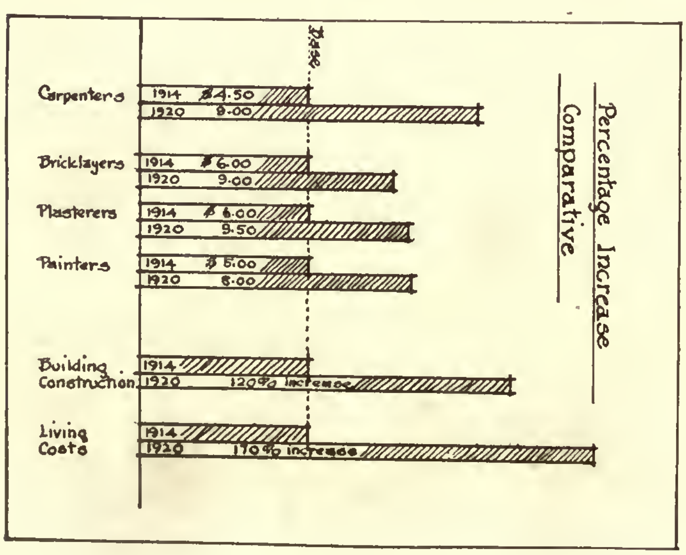
THE PROBLEM

THE designing of the small house is one of the most fascinating of all problems in architecture to the young man, and yet it is one of the most elusive, for economic forces seem to be very persistent in keeping the first-class architects from this field. Although in the next five years it will be necessary to construct about 3,300,000 new homes, if we expect to reduce the congestion of housing to a pre-war basis, yet the country seems to be about to face a famine of well-designed houses in filling this building programme.

The general conditions in the profession show that only the very wealthy clients carry out their schemes, while the vast majority of people with moderate means are turning to other channels for securing their homes. Mr. Average Citizen finds that the home he has been saving his money to build has flown from his hand, like a bird. The sketches and plans he had prepared for a nice little $10,000 home, now represent an investment of $20,000 or more. Once having calculated upon a building loan of 60% of the value of the house and lot, he now finds he can secure only about 40%, if he can manage to draw any money away from the great speculative schemes which have been so attractive during the last few years. In fact, if he expects to build at all, he must be reconciled to a small six or seven room house which will cost him $10,000 or more, or as much as the large house which he had planned originally to build. On account of the servant shortage this may not be so bad a proposition.

He brings his trouble to the architect in this manner: "But I can buy a house and lot at 'Heavenly Rest Real Estate Park' for that price, and on the instalment plan, too. I don't see why the cost of a house built from your plans should be so much greater than this." And the worst of it is, that the facts which he states are true.

A dwelling built from an architect's plans is more expensive, to-day, than the speculative house, for the very reason that it is carefully planned and requires good materials and construction; but Mr. Average Citizen cannot see this difference, because he cannot understand the poor quality of materials and construction in the speculative house, nor has he been educated to appreciate the artistic difference. Moreover, the contractor who bids on the plans of an architect in these days of chaotic prices, plays well on the safe side. He estimates as near as he can to the actual costs and then adds a large per cent to cover the risk of possible increase in wages, materials, costs, and delays. If he built the same house for speculation, after it had been completed he would know the exact cost, and be safe in setting his selling price which in most cases could be lower than an estimate on the same house in plan form, since the element of risk has been removed.



To show to what exaggerations this danger of risk carries the estimates, a well-known architect in New York City had bids taken for a small, four-room and bath, frame, gate-house for a large estate on Long Island. This house was only 19′ x 28′, and was very plain. The lowest estimate was $11,000 which is about $1 per cubic foot. Now the chief reason for this excessive cost was that the plans and specifications of this architect were exact and binding, but the wages which the contractor had to figure on, and the cost of material were rising. Some will say that the contractors knew that the owner was wealthy, and that this was the cause, but if this was partly the motive, nevertheless the other was the prime motive, for there have been too many similar cases. Each contractor was afraid of his own estimate, and therefore played well on the safe side, yet, if they had built this small cottage themselves, they could have found its exact cost, and sold it cheaper than the bids which they turned in to the architect. In fact, cheap stock plans drawn by incompetent architects which have a minimum number of lines on them, and which are accompanied by brief specifications will bring in lower bids, because of the fact that they are not binding and the builder is permitted to "get away with things." Carefully drawn plans and accurate specifications are not desirable, if low bids are wanted, provided the owner does not care what kind of a house he gets.

Many architects have conscientiously tried to solve the cost problem by inventing cheaper methods of construction, but to little avail. The estimates come in just as high, because the average small contractor is afraid of any new innovations, since there is too great an element of risk, and he is very conservative. One of our leading architects developed a new system of partition construction for the small house which in materials and labor saved about 50% over the ordinary type, but when he first introduced it, the estimates were just as high as ever. As he was interested in seeing these partitions tried out, he endeavored to get the contractor to build them in this new way, and received the same high price as was charged for the older and more usual type. In fact the architect was showing the contractor how to make some money, but he was so conservative that he

A house of this type, before the war, could have been built for about \$10,000.

would not do it. It is gratifying to know that at last the architect has built some of these partitions himself and found that they are exactly what he had estimated them to be.

SOME SOLUTIONS

In endeavoring to find the solution to these problems, which the young architect must face in this field of design if he wants to handle any of the small-house work of the next five years, a few suggestions have been collected which seem to have some practical merit.

1. First of all the architect must eliminate as far as he is able the large element of chance which the average contractor must take in making bids upon his plans. If he can reduce this to a minimum, then he will automatically reduce the bids. This has been successfully accomplished by having a written agreement with the various contractors who are competing, that, if they receive the contract, the owner will be responsible for and pay for any increase in labor or materials which may take place during the period of erection. Likewise the contractor is made to agree that the owner will benefit, if there is any reduction in the costs of labor or materials during the same period.

This simple understanding relieves the nervousness of the contractor who is bidding, while at the same time he is made aware of the fact that he is competing with other contractors on the same basis. Architects who have tried out this system of agreement have found that excessive estimates have been reduced to a minimum.

2. More radical means have been tried by certain firms which may not be approved by the profession, and yet which have brought very successful results. The architect has connected with his office a department which handles the construction in the same manner as a contractor. Outside bids may be taken, if the owner desires, in order to check up the estimates of the architect. This is not a difficult system of handling the small house, for neither the work of planning nor construction is so great as to overwhelm one organization. Of course this is not so practical with large buildings, but then we are all aware of the phenominal success of great construction corporations which supply the plans and put up the building, and handle the whole project even to securing the furniture. Such firms have frightened some architects into the feeling that the profession would be absorbed by such developments. But as a counteraction to them, it is not bad for the architects to work in the reverse way and absorb the contractor's end of the business, especially in the small house.

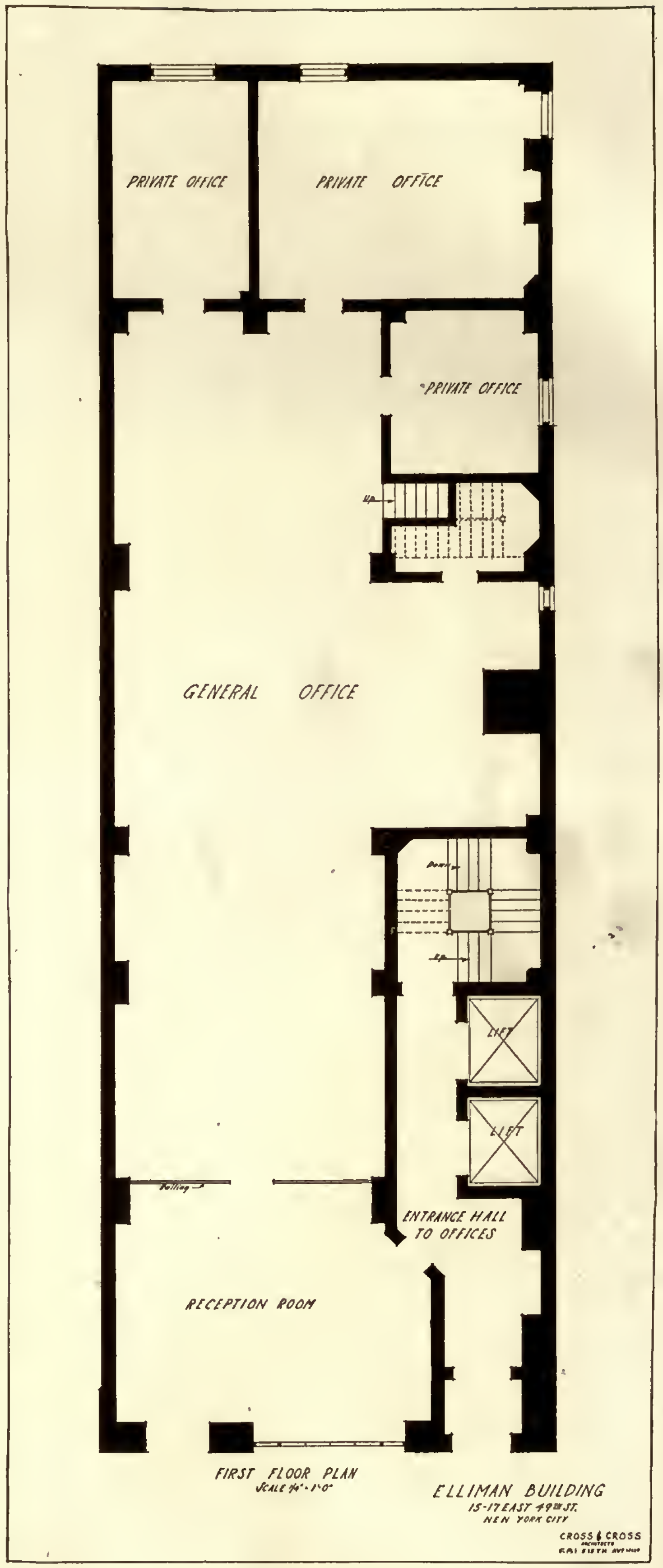
3. Still another attempt has been made to reduce costs by designing entirely with stock details and forms. Certain mills have secured high-class talent to design stock doors, cornices, windows, columns, and the like, which are very beautiful, and a careful use of them results often in much saving; but there is much doubt whether this can ever be made a satisfactory system, for some one must originally form these details, and after a while they will go out of the public style, and will revert back to the speculative builders to use in an awkward manner, as they have always done in the past. However, the use of standardized parts may be very successful in the hands of a good designer.

4. There is still another suggestion as a solution of the problem, and it is rather gloomy, yet it has many excellent points. One must frankly assume that the day of the small inexpensive house has gone beyond recovery. Conditions in the building trades have made it impossible, and most of the "own your own home propaganda" is bunk. It is pointed out that the average family cannot afford to own its own home as constructed to-day, but that it must join in co-operation with other families. In other words, the semi-detached house or the two-family house built in well-planned groups by large co-operative associations is the only practical solution for the individual house. Such groups will eliminate much of the expensive street paving as ordinarily required and cut to a minimum the water-supply lines and sewerage systems. Semi-detached houses in groups are capable of saving the cost on one outside wall, one chimney, one set of plumbing pipes for each house in the group. The heating may also be reduced to a community basis, and the land so distributed that the best air and light can be had with the miminum waste.

Whatever is the best solution, this fact stands out clearly, that the young architect who is going to compete in this class of work must be absolutely certain of the various forms of construction and materials which go into making a good house and how these may be abused by the speculative builder to underbid his honest design. If he is not well posted on this subject, he cannot hope to convince his client.

(To be continued.)

It requires \$10,000 to build a house of this type to-day. Compare it with former house.



ELLIMAN BUILDING, 15 EAST 49TH ST., NEW YORK.

MR. ELLIMAN'S PRIVATE OFFICE.

RECEPTION-ROOM. Cross & Cross, Architects.

ELLIMAN BUILDING, 15 EAST 49TH STREET, NEW YORK CITY.

The Functions of Lighting Fixtures

By M. Luckiesh

Director of Applied Science, Nela Research Laboratory

IN the broader view of lighting the lighting-fixture is considered chiefly as a means to an end. It is a link in the chain from the meter to the final lighting effect, but being visible it should be a satisfactory object from an artistic point of view. The usual view of lighting has been a superficial one, because fixtures have been considered too much as objects of art and too little attention has been given to the results which they are able to produce in a room if they are designed with lighting effect in mind. The chief criticism which may be directed toward lighting-fixtures is that they are aimless from a lighting view-point. The design of fixtures has been left to the artist, and artistic or supposedly artistic fixtures have been the product of the designer. However, here is a field for the correlation of science and art. The fixture should be designed scientifically for obtaining certain results, then the artist should be commissioned to clothe it in a satisfactory artistic exterior. However, in this discussion attention will be given only to an analysis of the functions of fixtures in lighting.

Fig. 1.

Of course, there are many fixtures used in lighting purely or predominantly for their beauty as ornaments. This practice will always continue because they cannot be excelled as decorative objects.

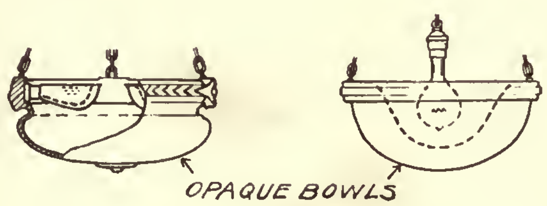


Fig. 2.

There are many thousand fixtures on display and illustrated in catalogues. One may enter a dealer's store and see hundreds of them massed on the floor, walls, and ceiling, but from the standpoint of lighting effect this vast number dwindles to a bare dozen types, excluding those that are purely novelties. The primary function of fixtures is to distribute light and, although no two of different design but of the same general class would distribute light in exactly the same manner, their general lighting effects are similar.

Fig. 3.

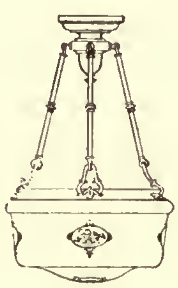


Fig. 4.

Fig. 5.

It is difficult to devise terms which satisfactorily describe the lighting effects produced by the various classes of fixtures, but an attempt will be made to utilize terminology in use despite its shortcomings. In the terminology associated with science it is strikingly true that progress is continually revealing errors and misconceptions of the past. For instance, many cling to the terms electricity and magnetism as though they were unrelated, as supposed years ago. Likewise, when the great divisions of physical science were first made, none of the learned men of that time suspected any relation between light and electricity. Hence, light has long prevailed as a distinct division despite the fact that light is now considered to be electromagnetic energy. It is well to reflect that all the fences are artificial and that they have been created for practical purposes and for reasons which may not appeal to the more mature and capable judgment of later years. In some cases it is difficult to find any traces to-day of barriers that in earlier ages seemed natural and inevitable. Even the formidable science of chemistry is fundamentally a science of physics, that is, it merges finally into physics. If it will be remembered that artificial divisions merge into each other, there will be no difficulty with the terminology.

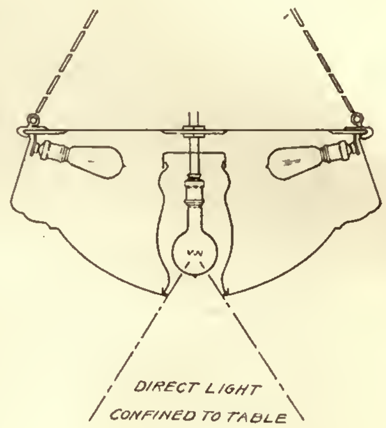


Fig. 6.

A similar condition exists at the present time in the terminology used in classifying lighting-systems. Direct lighting is fundamentally that produced by a fixture which directs most of the light generally downward upon the important area and is exemplified in simple form in Fig. 1. Indirect lighting is that in which the light reaches the important area indirectly, that is, the light is usually directed to the ceiling and upper walls to be reflected to the places where it is utilized. It commonly consists of an opaque bowl containing silvered reflectors surrounding the lamps, as in Fig. 2. Semi-indirect lighting is a combination of these two, and is usually accomplished by means of a diffusing glass bowl open at the top. Examples of semi-indirect units are shown in Figs. 3, 4, and 5, although the proximity of the bowl to the ceiling in Fig. 5 makes it approach a "direct-lighting" fixture. Fig. 4 represents a transition between Figs. 3 and 5. From such lighting-units some light reaches the important area, such as the reading-table, directly from the bowl, and some of the light escapes from the top to the ceiling to be reflected.

Certain fixtures might be considered to be "direct-indirect." For example, an opaque inverted bowl with a hole in the bottom, such as illustrated in Fig. 6, emits an upward component which reaches the place of utilization indirectly, and a direct component escapes from the aperture in the bottom of the bowl. Some fixtures are provided with pendant shades surrounding an inverted bowl, as that illustrated in Fig. 7. These are direct-indirect units. In indirect lighting the primary light-sources are completely concealed, and the light in effect comes from secondary light-sources such as the illuminated ceiling. Furthermore, in so-called "concealed" lighting no fixtures in the ordinary sense are used, the lamps being concealed behind a cornice or moulding. This has been termed "cove" lighting.

This classification into direct, semi-indirect and indirect lighting has grown to be quite inadequate, owing to the tremendous progress and increasing complexity of the science and art of lighting. While it is convenient to use these terms in the absence of better ones, it is well to reflect that these divisions are quite artificial. From a scientific view-point it would be better to classify all fixtures in terms of the upward and downward components which they emit; however, for the present purpose this method would be unsatisfactory, because it would involve numbers or values which could not be visualized except by the expert.

As already shown, it is impossible to define accurately direct, semi-indirect, and indirect lighting, but a further discussion of this difficulty should help the reader to visualize the functions of fixtures. A bare lamp amid dark surroundings and a search-light projecting its beam into space are extreme examples of direct lighting, but a bare lamp in a room with light surroundings is also classified as direct lighting. Enclosing the lamp in a diffusing glass sphere reduces the brightness of the lighting-unit very much, but we still have a system of direct lighting. If these units are multiplied so that there are a dozen or a hundred in the same room we still have direct lighting. Now let us take an inverted glass bowl, which would be the basis of a semi-indirect system. If it is of clear glass, sand-blasted on one side, nearly as much light will be emitted generally downward as upward, but if it is made of thin marble very little light will be emitted downward by the bowl. However, both these extremes and all the intermediate conditions are termed "semi-indirect lighting."

Another example which may aid in appraising fixtures is illustrated in Fig. 8. A diffusing bowl is suspended a few inches below a circular white surface. Some of the light escapes directly from the bowl, and most of the remainder which is emitted upward from the source to the white surface is reflected generally downward. Thus it is seen that the fixture involves the principles of so-called semi-indirect and indirect lighting. However, the bowl, which in semi-indirect lighting is usually suspended at a considerable distance from the ceiling, is in this case hung close to the circular surface, which may be considered to be a very much contracted ceiling. The final result, as determined by the appearance of shadows and by other means, is quite similar to that of direct lighting from a large lighting-unit.

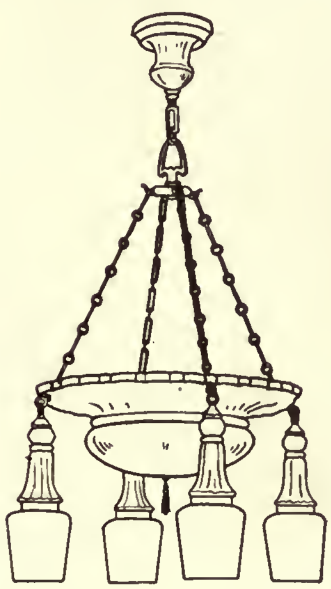


Fig. 7.

In the home this fixture can be fastened on the ceiling or it may be suspended from it. In large interiors it has the advantage of bringing a clean white "ceiling" close to the light-source.

A fixture which has the appearance of a semi-indirect bowl, but in effect is an indirect fixture, is illustrated in Fig. 9. The opaque bowl of an indirect fixture has been replaced by one of diffusing glass or of other translucent material, and a small lamp has been added to illuminate this bowl. This type of lighting-unit arose to meet the objection sometimes raised to the effect that we expect to see the bowl of the fixture luminous and are disappointed if it is not. In fact, this is one of many examples in lighting which demonstrate the influence of habit and usage. In this case it is interesting to note that the objection to the dark bowl of an indirect fixture generally wears off in time. Luminous bowls can be very beautiful and desirable fixtures, but they do not meet the chief objection to totally or predominantly indirect lighting in the home. Some indirect light is desirable, but direct light from proper fixtures is indispensable to the best effects in general in the home.

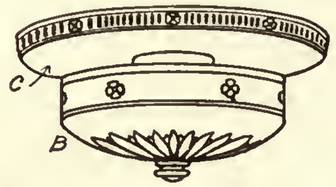


Fig. 8.

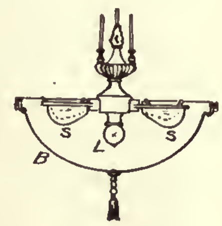


Fig. 9.

In indirect lighting-systems in which lamps are concealed in a cove or in an opaque bowl, the ceiling is the secondary light-source. If we imagine such an illuminated ceiling to contract and to increase in brightness until it becomes very small and very bright, we witness in the mind's eye an evolution from indirect lighting to direct lighting. If we follow this evolution, classifying it the while, at what point does one system end and the other begin? Wall-brackets are commonly considered as direct-lighting units, but if they are upright they usually omit an upward component because the upper part of the shade is open. This would provide direct and indirect light. In fact, nearly all fixtures desirable in the home omit upward and downward components, and it is safer to visualize their distribution of light in terms of these two components of varying proportions. However, it is necessary to have terminology in which to discuss or to classify lighting-systems, so that the foregoing will serve the purpose if they are understood to be general terms.

Regardless of these terms, the final appraisal of lighting-systems must be in terms of such factors as diffusion, tint, and distribution of light; the brightness of the shades and of the backgrounds; the relative amounts of scattered and direct light; the character of the shadows; the distribution of light upon the important areas of the room; the suitability of the intensity for reading or for other purposes; and the general mood of the room. No system is a catholicon. There is a place in residences for all that is good in lighting. The æsthetic problems or desires of taste are so varied that for their satisfaction a variety of fixtures must be available. However, there is a need for fixtures with more definite aims in meeting the demands occasioned by a broader knowledge of the possibilities of lighting. Light is a wonderful tool, important and useful beyond the conception of most persons. To use it successfully it is necessary to study that which is to be illuminated and to know the functions of fixtures.

Purely utilitarian lighting is sometimes the first consideration, but it is at least a by-product in all cases where artistic effects dominate. Lighting-fixtures should control light as efficiently as is compatible with the desired effect, but efficiency involves satisfactoriness. Beauty and utility overlap; they cannot be considered separately in the home. Usefulness is a part of beauty and therefore a lighting-fixture cannot be beautiful if it does not fulfil its intended purpose regardless of the grace of its lines or of its expressiveness as a work of art. Beauty is the result of harmony—the accord of all the elements; therefore, when a lighting-fixture is intended to fulfil the double purpose of an object of art and of a distributor of light, the fulfilment of the latter aim is essential to harmony and hence to beauty. And, finally, to those accursed by miserly dispositions which do not permit them to see the usefulness of the rose, let us state that the utility of beauty is recognized by those who *live*.

Most lighting-fixtures distribute light symmetrically although by no means is the control of light confined to such distributions. In fact, many lighting-units are in daily use which provide asymmetrical distributions. For example, the show-window reflector is placed at the upper front of the window, and although it hangs in a pendant position it directs light downward and backward. Such units are in use for illuminating pictures on walls, and have even been designed for wall-brackets so that the light is directed predominantly away from the wall. On the other hand, half-shades are in use on brackets and portables to illuminate pictures or ornaments, or to provide an indirect lighting by reflection from the walls. The reflectors used behind cornices in imitation of flower-boxes on the wall should be of the asymmetrical type, so that the light is directed away from the wall and upward instead of being confined to a spot on a portion of the adjacent wall. For the concealed units of this type the silvered and metal reflectors are usually satisfactory, but where they are not concealed the so-called prismatic glass reflectors satisfy utilitarian purposes. The latter are useful, for example, in the kitchen, if light is to be directed predominantly toward the cooking range or work-table. It would be tedious to read the detailed uses for such units, so they will be passed by with this brief mention. It is sufficient to know that such are available, so that they may be utilized when they best serve the needs.

In this general view of the functions of fixtures a discussion of details would lead far afield. There are numberless designs available, and it is surprising how many fixtures widely differing in appearance will produce approximately the same lighting effects. On the other hand, fixtures appearing quite similar may produce very different lighting effects. Herein lies one of the potential features of lighting, for a desired lighting effect is not limited by the appearance of the fixture. In choosing fixtures the lighting effects which they produce are of primary importance, and if these effects are not obvious from the construction of the fixtures the purchaser should demand that they be demonstrated under conditions which are favorable to the formation of a judgment concerning them. In general, a fixture which contains two or more circuits, each providing a lighting effect distinctly different from the others, is a more potential factor in lighting than aimless fixtures which produce only one effect.

It is not difficult to appraise a fixture. If it is a shower the shades should be deep enough, and of such shape that the lamps are concealed. Even a satisfactory fixture of this sort, if hung too high, for example, over a dining-table, becomes undesirable. Owing to the variation in the heights of ceilings this factor becomes important. Many beautiful brackets are equipped with frosted lamps, but these cease to be beautiful when lighted. In fact, they are usually very glaring. This is an excellent example of lack of foresight and slavishness to "art" on the part of the designer. The fixtures are too often visualized by him only as objects; if he visualized them lighted he would not be guilty of their design without shades. In a similar manner the candelabra with its cluster of unshaded frosted lamps evolved. In general, such lamps are usually glaring and, therefore, can have no place in an artistic lighting-scheme in the home. If such fixtures are hung high in large exteriors with light ceilings they may not be glaring. By equipping them with shades the annoying condition is replaced by a charming restful effect. In general, there is no place in the home for unshaded lamps. They are satisfactory under some conditions in large interiors when glittering splendor is desired, but rooms in ordinary homes are too small to afford escape from the glare of unshaded lamps.

If the appraisal of fixtures progresses in this manner, gross mistakes will not occur in the choice of fixtures. A judicious use of common sense combined with focussing the attention upon the manner in which fixtures distribute light will be productive of satisfactory results. But it should be remembered that lighting effects do not depend solely upon so-called fixtures. Lamps are easily concealed in architectural and other ornaments and special construction often yields results which are novel and interesting. In general, then, lighting effects are of primary importance, and, excepting in those cases where fixtures are purely ornamental, the appearance of fixtures is a secondary though important consideration. It is always possible to satisfy the latter requirement without sacrificing the desires as to lighting effects. In fact, the uninitiated are likely to be surprised at the similarity of lighting effects which can be obtained from fixtures apparently differing widely in construction.

The C. C. Merritt House

THE idea was to get an architectural effect with simple, inexpensive materials put together in an inexpensive way. There was a large quantity of stone on the premises, and it was laid up just as a foundation wall would be from start to finish. All of the joints were slushed and pointed up roughly, and on completion given a coat of whitewash of half parts of white Atlas and limoid with a percentage of waterproofing compound in it.

You will note that there are no sills and that the outside steps, etc., are of brick and blue stone flagging.

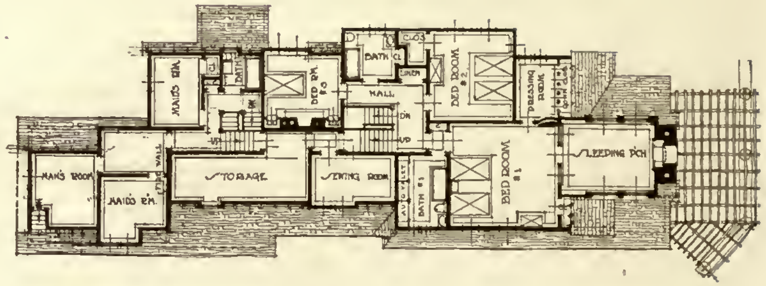
The flat roof is tar and gravel, and the others tile. Unfortunately, the variations in colors and the cement beds these are laid in do not show in the photographs. There is a minimum of trim used throughout the house—none to the windows except a stool. A very small, plain base and only a mould at the door-casings. The wide-board floors throughout the first floor are white pine of variable widths. Inexpensive hardware is used. Plain T hinges and ordinary thumb latches throughout. What little ornament there is, such as the doorways, mantels, and stairs, was concentrated on and well done. The service part of the house—kitchen, laundry, and pantry—were more extravagantly treated, because I used steel dressers, cork tile floors, and considerable electrical equipment.

All the plastering throughout is in the brown finish, just trowelled up a little smoother than usual, but showing the trowel marks.

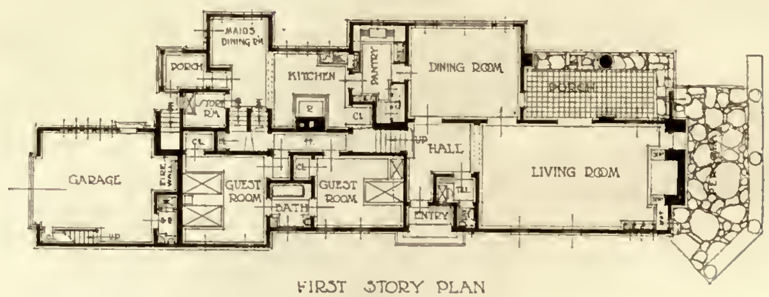
RESIDENCE FOR CHARLES INGRAM, GREENWICH, CT.

Warren & Clark, Architects.

DINING-ROOM.



SECOND STORY PLAN



FIRST STORY PLAN

Warren & Clark, Architects.

RESIDENCE FOR, CHARLES INGRAM, GREENWICH, CT.

Warren & Clark, Architects.

RESIDENCE FOR CHARLES INGRAM, GREENWICH, CT.

Concrete Construction

By DeWitt Clinton Pond, M.A.

IN the previous articles on reinforced-concrete design, principles were investigated but their practical application was only vaguely hinted at. For the purpose of summing up all the foregoing information an actual problem in design will be taken, and all the principles and their applications will be thoroughly discussed.

A building, known as the No. 395 Hudson Street Building, is, at the time of this writing, being erected in lower Manhattan. This building is to be one of the largest reinforced-concrete structures in the Borough of Manhattan, and perhaps one of the largest built for commercial purposes in the country. In plan it will cover an entire city block, and its longest dimension will be 339 feet 9¼ inches. Its width will be approximately 200 feet.

The firm of McKenzie, Voorhees & Gmelin are the architects and the Turner Construction Company the contractors for this structure. The author wishes to acknowledge the help which he has received from the architects and engineers.

The building will be used for several purposes. One portion, which will be five stories high, will be used for a garage on the first floor and for a shop on all the other floors. The other portion, which will be nine stories high, with a large two-story penthouse above, will be used as a warehouse on the first, second, third, fourth, fifth, sixth, and part of the seventh floors. The other part of the seventh and the eighth floors will be used for a shop. The ninth floor will be utilized as an office floor, and the first floor of the penthouse will be given over to use as a dining-room, kitchen, conference room, and also a rest-room for the women employees. The penthouse will be large, but there will be a fair roof area around it which will be used for recreational purposes. It is probable that handball courts will be installed, or bowling-alleys. The second floor of the penthouse will be used for tanks for the sprinkler, house, and stand-pipe systems. These tanks will have a total capacity of 72,000 gallons of water. On this floor there will also be elevator machinery, fans, a refrigerating-plant, and other mechanical equipment.

Owing to the several uses that the different floors will have, there will be variations in live loads as well as in types of construction. Most of the construction will be flat slab construction, but owing to the fact that over a portion of the first floor there will be stored electric conduit, the live load on this portion of floor will be considered as 1,000 pounds per square foot, and beam and girder construction will be used to support it. As the ninth floor will be used for office purposes, it is desirable that columns be eliminated as much as possible, and so, many of the columns stop at the ceiling of the eighth floor, and forty-foot spans are encountered in the tenth floor and roof construction. Here again it is necessary to use beam and girder construction. In order to conceal these girders and beams a hung ceiling is used over the ninth floor.

It will be seen that a study of the engineering problems involved in the design of such a building will furnish a very complete résumé of all the information given in the second series of articles of "Engineering for Architects."

The method employed by the engineers in attacking the problem of design has been to first determine the column loads and develop a tentative column schedule. Then these loads have been brought down to the footings, the footings designed, and then the columns and floors have been designed from the basement up. This method has been used in order to enable the actual work of construction to proceed almost as soon as the floors and columns have been designed.

Owing to the very large size of this building it will be impossible to undertake the design of all the slabs, beams, girders, bands, columns, and footings. Only a section of the floor plan will be discussed, and this will include nine bays at the corner of plan which is located at the intersection of Clarkson and Hudson Streets. In these nine bays most of the different types of construction used in the design of the building will be found.

Fig. I shows the architectural plan of the first floor for this portion of the structure. It will be seen that the

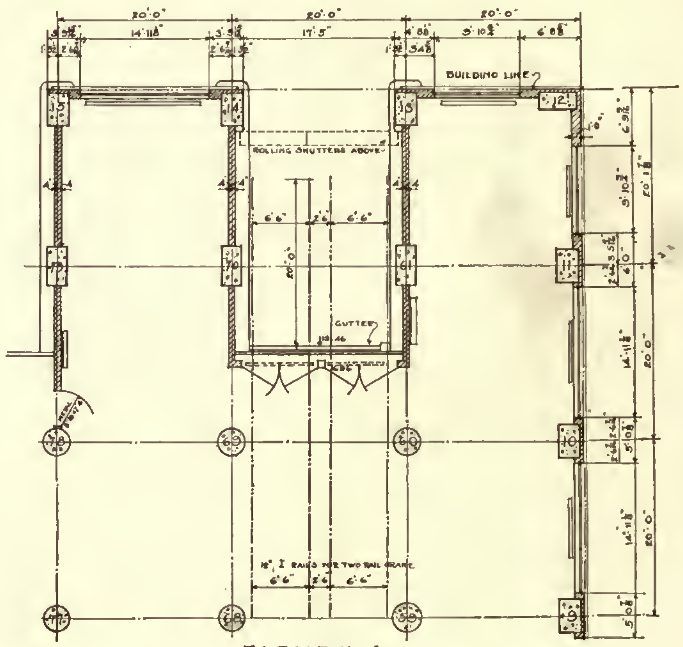


FIGURE I

nine bays, or floor panels, measure 20 feet by 20 feet, except those along the north side of the building, which measure 20 feet 1⅞ inches by 20 feet. In the centre panel there is a wagon court. Above this are four crane beams, which will be carried on the second-floor construction. Between each pair of crane beams motor-operated hoists will be suspended. These hoists will be used to lift bodies off trucks and carry them into the building, where they will be unloaded. The floor level of the wagon court pitches toward the back, and a gutter is located under the loading platform. In general the loading platform and first floor are 3 feet and 6 inches above the level of the wagon court. This will mean that certain beams and girders will be at different levels, as noted *G5*-below and *B40*-top, in the structural plan, Fig. II.

This structural plan shows the spacing of beams and girders. Slabs are designated by the letter *S*, beams by

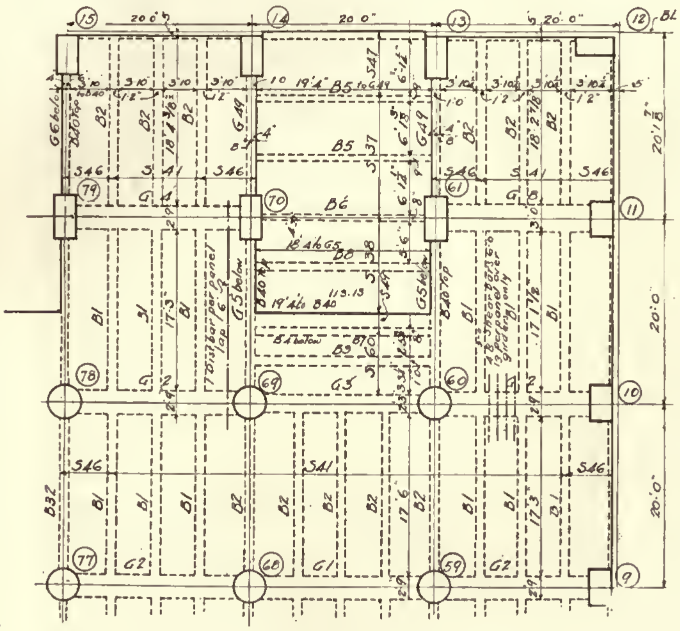
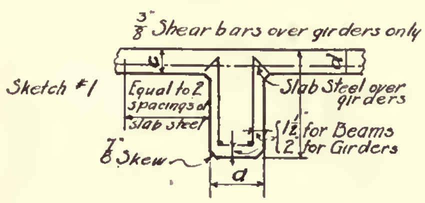


FIGURE II

B, and girders by *G*. The lists which are shown in Fig. III and Fig. IV give the depths and other dimensions of the structural members, and it is only necessary to refer



List of Beams & Girders												
Mk	Total No	Size				Square Steel				Stirrups	Sk.	Near
		a	b	c	d	D.B	Str.	No. Layers	In Top	Plain Steel	No.	Col.
B1	12	1'2"	2'6"	5"	5"	2-1 1/8"	2-1 1/8"	1		10-1/2"ϕ	1	60
B2	11	1'2	2'6"	5"	5"	1-1 1/8 1-1 1/4	2-1 1/4	1		10-1/2"ϕ	1	59
B4	1	1'1	2'6"	0	4 1/2	2-1 1/4	3-1 1/4	1	2-1"□	14-3/8"□	14	60
B5	2	9"	2'6"	4 3/4	4 3/4	1-1 1/4"	2-1 1/4	2		10-3/8"□	1	13
B6	1	8"	2'6"	4 1/2	4 3/4	1-1 1/4	2-1 1/8"	2		10-3/8"□	1	61
B7	1	8"	1'0"	4 1/4"	9"		2-3/4"	1		4-3/8"□	13	60
B8	1	8"	2'6"	4 1/2"	4 1/2"	1-1 1/4"	1-1 1/8 1-1 1/4	2		10-3/8"□	1	61
B32	1	1'0"	2'6"	10 1/2	5"	1-1 1/4	2-1 1/4"	1		10-3/8"□	1	77
B40	3	10"	1'0"	0	5 4 3/4		2-3/4"	1		4-3/8"ϕ	24	60
G1	1	2'9	3'8"	5"	5"	5-1 1/4	5-1 1/4	1		14-3/8"□	1	59
G2	4	2'9	3'8"	5"	5"	6-1 1/4	6-1 1/4	1		14-5/8"□	1	59
G3	1	2'3"	3'2"	5"	4 1/4	5-1 1/4 2-1 1/8	5-1 1/4 2-1 1/8	1		6-1/2 [illegible] 6-3/8 [illegible]	1	60
G4	1	2'9	3-8	5"	5"	7-1 1/4 1-1 1/8"	7-1 1/4 1-1 1/8"	2		14-3/8"□	1	70
G5	2	1'8	3'6"	4 1/2	0	3-1 1/4	2-1 1/4 2-1 1/8	1		20 3/8"□	20	69
G6	1	1'0"	3'4"	4 3/4	0	1-1 1/4 1-1 1/2 5/8	2-1 1/4	1		20 3/8"□	15	70
G8	1	3'0"	3'8"	5"	5"	4-1 1/4 2-1 1/8"	7-1 1/4 1-1 1/8"	1		14-5/8"□ 6-3/8"□	1	61
G49	2	1'0"	6-10	5"	4 3/4		3-1 1/8"	1		20-3/8"□	9-34	14

FIGURE III

to these lists to find out the amount of steel used, or any other bit of necessary information.

The first problem in design to be investigated will be the design of a typical slab. It will be noticed that the majority of the panels are framed alike. The panel enclosed by columns 68, 69, 77, and 78 can be considered as typical.

The beams run north and south and the girders east and west. The beams divide the panel into four parts, and there is one beam in the centre of the panel. Usually beams are spaced farther apart, but the live load is so heavy in the present case that it is better to space them closer on centres in order to avoid thick slabs and deep beams.

The spacing shown on the structural plans gives a span of 3 feet 10 inches for the slab, 17 feet 3 inches for the beams, and 20 feet for the girders. The structural plan shown in Fig. II is the actual one used in the work of constructing the building, and it is obviously not the regular method of procedure to have the plan before one when the actual design is worked out. It is something like having the answer given to the problem before the problem is stated. However, the author will endeavor to approach the

Slab Schedule					
Mk	Total No Slabs	Slab Thickness	Steel Bars — Size and Spacing	Remarks	Near Col.
S 37	2	4 3/4	1/2"ϕ Rods 8 1/2" o.c.	1-3/8" Dist Bar per panel	14
S 38	2	4 1/2	1/2"□ Bars 8 1/2 o c	1-3/8" Dist. Bar per panel	70
S 41	18	5"	1/2"ϕ Rods 7 1/4 o c.	1-3/8" Dist. Bar per panel	59
S 46	10	5"	1/2"ϕ Rods 6" o c.	1-3/8" Dist Bar per panel	9
S 47	1	4 3/4	1/2"ϕ Rods 8 1/2" o c.	1-3/8" Dist. Bar per panel	13
S 60	2	4 1/4	3/8"□ Bars 5" o.c.	1-3/8" Dist Bar per panel	

FIGURE IV

design of the structural members in the spirit of a new problem, and the reader can check the results by referring to the dimensions and sizes given in the plan.

The engineer in first laying out his work would probably divide the bay in four parts, spacing his beams 5 feet on centres. The beams would then be considered as being 1 foot wide, leaving a span of 4 feet for the slab. The typical slab would then be 1 foot wide and 4 feet long.

The next step in the design of the slab will be the determination of the load upon it.

The load per square foot upon the slab will be the usual combination of dead and live loads. The live load has already been given as 1,000 pounds per square foot. The dead load, or weight of the slab, depends upon the thickness of the slab, and this will be assumed as 5 inches. By referring to the first article on concrete it can be seen that for every square inch in the area of the cross-section there will be a pound added to the weight of a square foot of floor slab. In other words, as there are 60 square inches in a slab measuring 5 inches by 12 inches, there will be 60 pounds of dead weight for every square foot of slab. To this must be added the weight of the flooring. This is wood block paving and will be considered as having a weight of 25 pounds per foot. The total weight per square foot of floor area will be 1,085 pounds, and the total weight on the slab will be $1{,}085 \times 4 = 4{,}340$ pounds. Applying the formula $M = \frac{1}{12} Wl$, and considering l as 4 feet plus 5 inches, the maximum bending moment will be $\frac{1}{12} \times 4{,}340 \times 53 = 19{,}168$ inch-pounds.

To find the actual effective depth, equate this with $1{,}279.7d^2$.

$$19{,}168 = 1{,}279.7d^2.$$
$$d^2 = 14.9.$$
$$d = 3.8.$$

Allowing for fireproofing, the thickness assumed as 5 inches is found to be satisfactory.

(*Continued on page* 284.)

BUILDING AT RESERVOIR.

RAILROAD STATION. Study & Farrar, Architects.

BUILDINGS FOR WATER DEPARTMENT, CITY OF SAINT LOUIS, MO.

PUBLIC COMFORT STATION, COMPTON HILL.

DISTRIBUTION STATION, CHESTNUT STREET. Study & Farrar, Architects.

BUILDINGS FOR WATER DEPARTMENT, CITY OF SAINT LOUIS, MO.

(*Continued from page* 281.)

The next step is to find the stress in the steel. $M =$ 19,168 inch-pounds. Also $M = S \times \frac{7}{8} \times d$, or, by transposing, $S = M \div (\frac{7}{8} \times d)$. By equating these two equations the following result is obtained:

$$S = 19{,}168 \div (\tfrac{7}{8} \times 4).$$
$$S = 19{,}168 \times \tfrac{2}{7} = 5{,}479 \text{ pounds}.$$
$$5{,}479 \div 16{,}000 = .34 \text{ square inches}.$$

The area of a $\frac{1}{2}$-inch round bar is .1963 square inches. $.34 \div .1963 = 1.74$ bars in 12 inches of slab, or $12 \div 1.74 = 7$ inches on centres. The slab will be 5 inches deep, and will have $\frac{1}{2}$-inch round rods spaced 7 inches on centres.

The next step will be the design of a typical beam. It will be remembered that in the preliminary study it was decided that the beams would be 5 feet on centres and 1 foot wide. Owing to the unusually heavy live load, the beam will be assumed to be 2 feet 6 inches deep, and the girders will be assumed to be 2 feet 6 inches wide. These dimensions may be modified after calculations are carried through. If the girders are 2 feet 6 inches wide, the beams will be 17 feet 6 inches long. It must be remembered that all figures given so far are only tentative.

As in the case of the slab, it will be necessary to find the load on the beam. The load on the slab was found to be 1,085 pounds per square foot. To this must be added the weight of the beam. If the beam is 2 feet 6 inches deep, it will project 25 inches below the slab, and as it has been assumed to be 1 foot wide, the weight of the concrete below the slab will be $12 \times 25 = 300$ pounds. The load per square foot of superficial floor area will be $300 \div 5 = 60$ pounds. Adding this to the load of the slab, the total weight per square foot of floor area carried by the beam will be 1,145 pounds.

The total weight on the beam will be $17.5 \times 5 \times 1{,}145 = 100{,}187$ pounds. $M = 100{,}187 \times 240 \times \frac{1}{12} = 2{,}003{,}740$ inch-pounds. From the equation $S = M \div (\frac{7}{8} \times d)$, and taking the *effective* depth as 28 inches, the stress in the steel can be determined.

$$S = 2{,}003{,}740 \div (\tfrac{7}{8} \times 28) = 81{,}656 \text{ pounds}.$$
$$81{,}656 \div 16{,}000 = 5.1 \text{ square inches of steel}.$$

By referring to the table in the first article on concrete construction or to any steel handbook, the areas of bars can be found. If it is decided to use four bars, each bar must have an area of $1\frac{1}{4}$ square inches. It will be seen that four $1\frac{1}{8}$-inch bars will be sufficiently strong. Two will be bent up and two straight.

Shear must next be investigated. The load on the beam has been found to be 100,187 pounds, and each reaction will equal 50,093 pounds. The effective area of the beam will be $\frac{7}{8} \times b \times d$. Substituting for b and d, this expression becomes $\frac{7}{8} \times 12 \times 28 = 294$ square inches. $50{,}093 \div 294 = 170$ pounds per square inch. As the Building Code only allows a unit shear of 150 pounds, the result obtained above is too large. Rather than increase the depth, it will be better to make the beam wider.

$$\tfrac{7}{8} \times b \times 28 \times 150 = 50{,}093.$$
$$b = 50{,}093 \div (\tfrac{7}{8} \times 28 \times 150).$$
$$b = 13.6 \text{ inches, or approximately 1 foot 2 inches.}$$

The slight increase in width will cause the dead load on the beam to increase slightly, and it might be well to check the calculations over to see if the steel will be overstressed. The steel will be found to be strong enough.

In accordance with the calculations already carried through, a typical beam will have a width of 1 foot 2 inches and a depth of 2 feet 6 inches. It will have for reinforcing against bending two $1\frac{1}{8}$-inch double-bent square bars and two $1\frac{1}{8}$-inch straight bars.

As a matter of checking, the next item to be investigated will be the compression in the concrete. The beam being a T beam, the cross of the T will be 74 inches long, and the distance from the top to the neutral axis $10\frac{1}{2}$ inches. There will be no attempt made to explain the calculations given below. They can be checked by referring to the earlier articles on concrete.

Arm of the T = $6 \times 5 = 30$ inches.
Total width of cross = $30 + 14 + 30 = 74$ inches.
Area of cross = $74 \times 5 = 370$ square inches.
Distance to neutral axis = $\frac{3}{8} \times 28 = 10\frac{1}{2}$ inches.
Compression at top = 650 pounds per square inch.
Compression at neutral axis = 0.
Compression at lower side of slab = 310.
Average compression above lower side = 480.
Total compression in cross = $480 \times 370 = 177{,}600$ pounds.
Total compression in stem of T = $155 \times 77 = 11{,}935$ pounds.
Total compression in concrete = 189,535.

This is much greater than the stress in the steel, so the beam is safe as far as compression in the concrete is concerned.

In following articles the design of stirrups will be taken up, as well as the design of other members in the floor design.

Announcements

Mr. Clarence E. Wunder, announces that owing to increased business the architectural and engineering firm started by Mr. Kurt W. Peuckert in 1894, changed in 1910 to Peuckert & Wunder, and since Mr. Peuckert's death, in 1914, continued by Mr. Wunder at 310 Chestnut Street, Philadelphia, will move on July 21, 1920, to larger and more convenient offices at 1415 Locust Street, where the business will be continued with the present efficient personnel under the new firm name of Clarence E. Wunder, architect and engineer.

Coffin & Coffin, architects, announce the removal of their office to 522 Fifth Avenue, New York City.

C. Howard Crane, architect, Elmer George Kiehler, associate, Cyril E. Schley, announce the opening of a Chicago office at 127 N. Dearborn Street, to be in charge of Mr. H. Kenneth Franzheim.

Peacock & Frank, architects and engineers, announce the opening of offices at 520–521 Colby-Abbot Building, Milwaukee, Wisconsin.

The Road Back to Human Ideals

IT is not enough to be born healthy and happy into this world; we must in addition be nourished and trained in order to reach maturity and to enjoy the fulness of life itself. Without training we lack judgment, and without experience we shall grow up warped and narrow, incapable of appreciating our fellows and unable to make the best of our own lives. It is unfortunate that modern education utterly fails to enlarge the vision; indeed, in its general effect it seems definitely to narrow and impair the faculties of perception. The old humanistic touch has gone; materialism has thrown its dull shadow over the ancient sunlit places, and the fruit of the mind does not ripen as of old. How otherwise can we explain the lamentable shortcomings of to-day? In an age of marvellous mechanical achievement, of perfect and unparalleled technic, scarce an artist can be found, save one or two who painfully search in the track of the acknowledged masters of the past; and the multitude who take our galleries and museums for granted are content to leave their faculties undeveloped, and are not even perturbed by their inability to appreciate or discriminate the work of men who lived in life's fulness and spent their days in interpreting its joy.

Yet the men and women of to-day are not without the full tide of life in their veins. Joy and sorrow, the divine beauty of human character, as well as its attendant foils, and the lines and color of human and natural beauty, engage their lively interest; passions, impulses, and even inspiration, are yet strong and insistent. But judgment in the larger sphere is strangely lacking. Ideas are in disarray. The wildest theories gain currency. Fantastic opinions are thoughtlessly uttered. All that is expressed in the word "design"—the synthetic and creative genius which is instinct in the created universe—this, the very breath of art, seems aloof and distant from the modern mind. The masterpieces of mankind are tolerated, bought and sold for large sums, even made the occasion for fashionable parades of dress, and honored by the dry and incomprehensible disquisitions of eminent *virtuosi*, but never arouse the people to a passion of admiration or a frenzied attempt to rival their beauty.

The labor sickness in the country at the present time is not traceable in the main to any of the causes commonly held to explain it; it is symptomatic of a lack of interest in craft. A man's work is no longer the natural outlet for that part of his nature that cries for expression.

It is so strange a circumstance that the most essentially human organs should cease functioning that most people refuse to believe it and seek refuge in an attempt to prove that the whole condition of life has altered. That the conditions of life have changed there is no question, but these people deceive themselves if they judge that any change of condition, however apparently revolutionary, will in the smallest degree modify the need which men feel for art and all that it means.

We have said that education has lost its old potency, and there is very little doubt that the paralysis of the art-interest is largely due to the completely changed orientation in life caused by natural science.

It is not that modern science and modern art are antagonistic. They are of the same blood, and there is too much of a family compact between them to admit of antagonism. The analytic genius of a century has been busy on a minute examination of the structure of natural forms and of the exact working of the dynamic forces of nature which have been harnessed to our use. Our mental forces exhaust themselves on objective research. We even attach ourselves to the natural processes and regard ourselves objectively and dispassionately. Yet we have solved none of the greater mysteries of life; we have resolved none of the paradoxes which are involved in the passions and deep desires implanted in our hearts. The desire to reconcile good and evil, and the yearning for immortality, are not satisfied by the deftest of mechanical devices, nor is the principle of natural selection a touchstone which will transmute the thousand perplexing riddles of daily life into golden harmony. But music and poetry, painting and architecture, when loved and fashioned by men and women of all classes, act like a charm and bind the broken fragments of our experience into a thing which satisfies the mind and heart. For in these arts man is not merely exploiting nature for his material advantage, nor seeking knowledge for material ends; he is using the divine instinct of creation within him, forming and devising in his handiwork the harmony which he believes and wants to believe to be the underlying principle of all life.

To some it will seem that a considerable mental effort is required to gain that simple, trusting attitude toward life which makes for beautiful craftsmanship for its own sake. But nothing of the kind is required. The road back to human ideals is by the study of the work of the artists of the past, of a time untouched by the particular disease that vitiates modern production. Many people are obsessed with the notion that the study of old work can only lead to the fettering of originality and the enslavement of the mind. Let us dismiss the idea utterly. Good craftsmanship yields to the student innumerable secrets of the means of expression, and inspires him to emulate, not copy, the artist. In the days of apprenticeship a gifted master will have a great following, and among his pupils there may be some who will never rise above the standard of competent journeymen. Yet even these will not be servile copyists; they will content themselves with the discoveries of their master, and perpetuate the principles of his technic.

It is not a fanciful theory that the measure of our means of expression is largely dependent on our knowledge of the work of the great artists of the past, for without the language built up by them we must remain largely inarticulate. The church, it is true, in ten centuries invented and brought to perfection a language of art which we call Gothic; but this could not become permanent, and the Renaissance proved the necessity for the world-wide conventions which we know by the name of the classical style. If we would invent a new language we must postulate an entirely new civilization, and one superior in staying power to the Christian community of the Middle Ages. Moreover, in order that we should have the benefit of the vast experience of the race, nature has arranged that all human activities should be governed by the convention of time, instead of providing that everything should happen contemporaneously. So through the records and monuments of each age we are able to know the result of life under all conditions, and gain wisdom and judgment by their comparative study.

From an article in The Architectural Review, London, on "Should London Preserve her Churches."

Artist's Drawing of the Big New Warehouse and Loft Building Now Under Construction at 395 Hudson Street, New York

McKenzie, Voorhees & Gmelin
Architects

Turner Construction Co.
Builders

This building, when complete, will be occupied jointly by the Western Electric Co. and the New York Telephone Co., and will occupy the entire block surrounded by Hudson, West Houston, Greenwich and Clarkson Streets. The building furnishes a most interesting side-light on the trend of building design in Manhattan. For many years it has been popular to assume that reinforced concrete, although an ideal material for industrial structures, could not be used for loft and office buildings and apartment houses. With the present cost of labor and material, however, the economy in favor of reinforced concrete is so big that many owners are now turning to this material as the only way out of their difficulties. In this time of building shortage many office and loft buildings 12 stories and less in height could be efficiently, economically and expeditiously built of reinforced concrete.

"TURNER *for* CONCRETE"

Turner Construction Company, New York City

ATLANTA • BOSTON • BUFFALO • CLEVELAND • PHILADELPHIA

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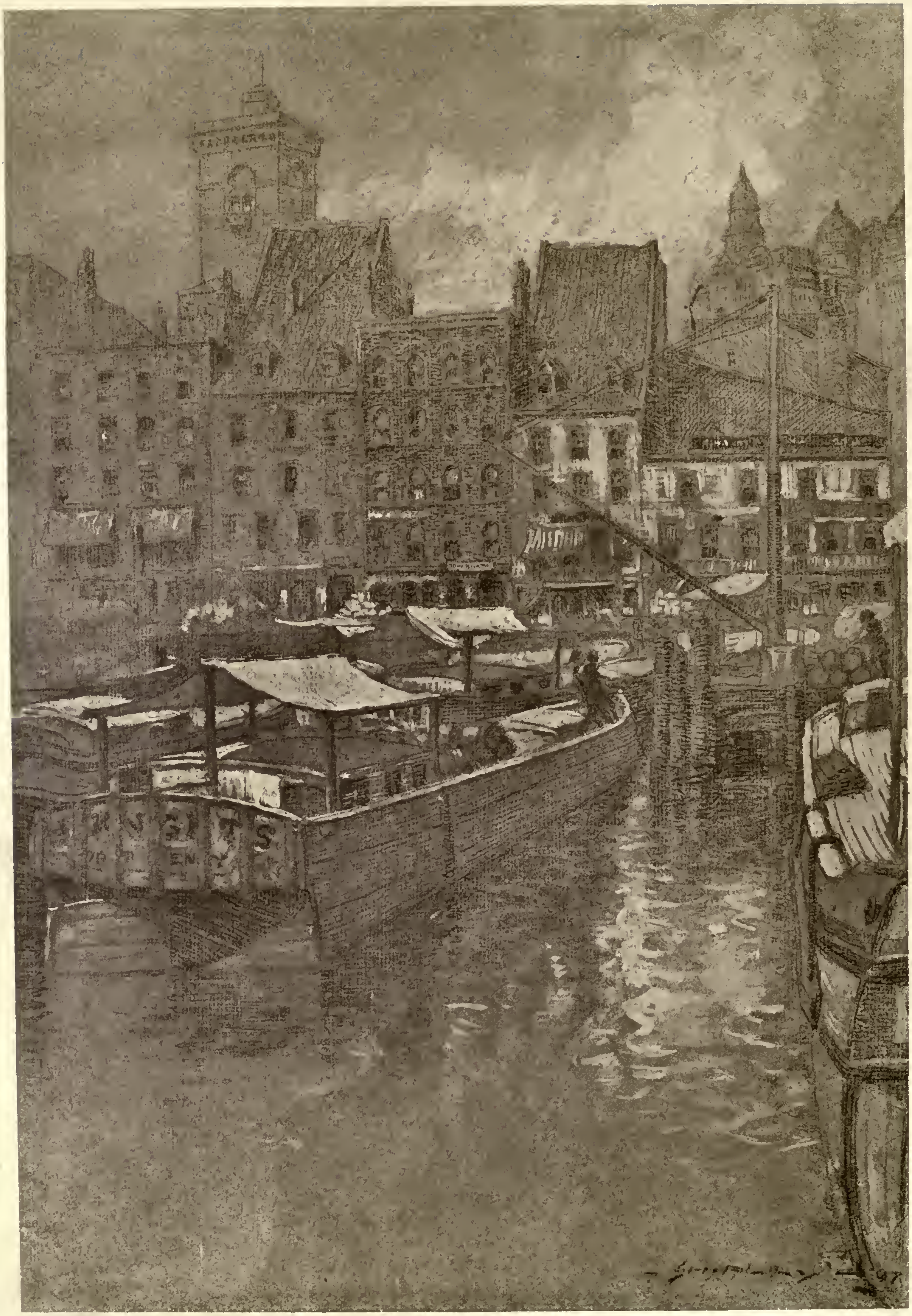
Frontispiece to October No.



"OLD NEW AMSTERDAM" (BETWEEN SOUTH FERRY AND THE BRIDGE). Drawn by G. A. Shipley.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
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Making Over Old New York

A Modern Development in Turtle Bay

Edward C. Dean, William Lawrence Bottomley, Associate Architects

By Ernest Peixotto

ONE of the most interesting problems confronting our architects in connection with the scarcity of apartments and domiciles in New York City has, undoubtedly, been the remodelling of blocks of old residences to meet the needs of modern life—houses, dating for the most part from the hideous brownstone period, bought in groups of ten to twenty and treated as a single unit to serve as co-operative community centres.

Detail in garden, Turtle Bay.

In my opinion the happiest solution of this particular problem, to date, is that known as Turtle Bay. Turtle Bay takes its name from an inlet of the East River that is so designated on the old maps of Manhattan Island. Its houses face on 48th and 49th Streets between Second and Third Avenues—ten houses on each street.

The stupid brownstone fronts have been scraped and stuccoed and relieved, on the 49th Street façade, with iron balconies and tall gables that recall the old houses of Antwerp or Bruges. The 48th Street front has been treated in a more severe style, with simple rows of windows surmounted by a long cornice and an attic story suggesting some row of Georgian houses in London or Liverpool. Both façades are enclosed by iron palings of simple design, whose spikes are, however, surmounted in places by turtles that recall the name of the place.

The architects associated in the remodelling of Turtle Bay were Edward C. Dean and William Lawrence Bottomley. Both are known for the picturesque quality of their work. Both love color; they both love the unexpected in design, the accidental. Mr. Dean's remarkably interesting work in the Women's Cosmopolitan Club has already been presented to readers of ARCHITECTURE. His more recent reconstruction of a group of Neo-Greek houses on the old London Terrace in West 23d Street for the New School for Social Research has added greatly to his reputation, as in this able piece of work he has achieved a remarkable result with the use of the utmost simplicity of design and materials.

In Turtle Bay, however, he has found the best opportunity that has thus far come his way, and it is in the garden and in the interiors of the houses that his talent has found its best expression.

The plan of each house has been reversed, so to speak. That is to say, the living-rooms, dining-rooms, and the more important bedrooms face into the gardens, while the kitchens and rooms of lesser consequence front upon the street. The large interior garden is the unique feature of Turtle Bay. The high "back-yard" fences have been removed and replaced with low stone copings that mark the limits of each private yard.

But down the centre of the garden a broad passageway has been left that is common ground, and this has been embellished with a number of charming features: pergolas,

Garden loggia, Turtle Bay.

Detail in Cosmopolitan Club. Edward C. Dean, Architect.

Loggia of dwelling, Turtle Bay.

fountains, gate-posts, and runlets of flowing water. The individual gardens have also been planted with cedars and handsome trees and decorated with pools and fountains and with stone and terra-cotta pots placed along the wall tops, which, by a clever treatment of brick and stucco, already look quite old and weathered.

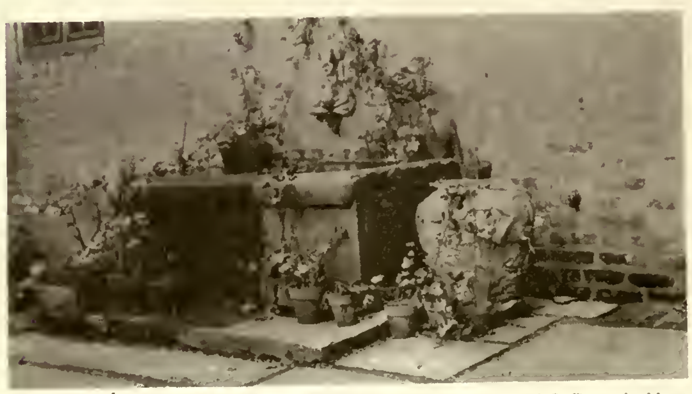
In order to cut off the view of the adjoining houses, loggias have been built at the east and west ends of the garden, consisting of sturdy arcades surmounted by terraces backed with high walls adorned with flower-pots. These loggias have been stained a warm salmon pink that recalls the garden walls of the Italian Riviera, while all the houses that face into the garden are painted in pale pastel colors—pink, gray, mauve, blue, and light ochre—that remind one of the gay streets of Nervi or Rapallo.

Yet, strangely enough, Turtle Bay, in spite of these features, does not seem too exotic nor out of place in busy New York City. Perhaps this is in some measure due to the people who live in it, for they are, for the most part, well-known writers, architects, or artists whose background is cosmopolitan rather than provincial.

The individuality of the owners is also indelibly stamped upon the interiors of the houses. Some of these are quite simple, depending for their effect upon plain wall spaces and old-fashioned furniture. Others are treated with the most modern of colorings and hangings, while others again are decorated in an oriental manner with Chinese carvings and stuffs, and with rare, exotic *bibelots*. One owner, who occupies two houses, has created a great living-room, a lofty chamber whose coffered ceiling is supported by sixteen-inch beams and corbels and decorated in the manner of the Italian

(*Continued on page* 290.)]

Alterations to rear of dwellings, Turtle Bay.



A wall fountain, School for Social Research, New York City. Edward C. Dean, Architect

A VICTORIAN RESTORATION IN LONDON TERRACE.

LECTURE-ROOM.

COURTYARD.

DETAIL OF COURTYARD.

NEW SCHOOL FOR SOCIAL RESEARCH, NEW YORK CITY.

Edward C. Dean, Architect.

A Spanish balcony, Turtle Bay.

(*Continued from page* 288.)

Renaissance. The frieze is treated in similar fashion and the walls are hung partly with superb tapestries and partly built in with tall bookcases that accommodate a library of several thousand volumes. The effect of these rich tapestries and handsome bindings and of the stained and painted ceiling and frieze, combined with beautiful and carefully selected furniture, is really magnificent, and one can scarcely believe that this great room, with its Old World atmosphere and rare *patina*, was created only within the past few months.

The same may be said of Mr. Dean's own residence. With his love of the unusual, he has produced a remarkably interesting series of apartments, that cannot be classified under any of the well-known "styles," yet constantly suggest the rooms in European houses, for in them he has utilized antique columns and capitals, gilded caryatids, painted panels and icons, brocaded lambrequins fringed with gold galloon—yet using all these features with notable restraint, contrasting their richness with perfectly plain wall surfaces of beautiful texture; suggesting in his combinations of richness and simplicity the work of the Hispanic builders who loved to display their elaborate bits of detail against perfectly plain and simple walls.

The central garden-path, Turtle Bay.

This, indeed, is the key-note of the work at Turtle Bay: a union of simplicity with the beauty of unusual things; a picturesqueness that would make an artist want to run and get his sketch-book; a personality and an atmosphere of quiet charm, combined with a feeling of "rus in urbe" that will make of each of its inhabitants a lover of his own particular home.

Study for a French farmhouse to be built in Maryland. Edward C. Dean, Architect.

The Fletcher Building

A Fine Example of the Use of Reinforced Concrete

By Frank J. Helmle

The Fletcher Building. New York City. Helmle & Corbett, Architects.

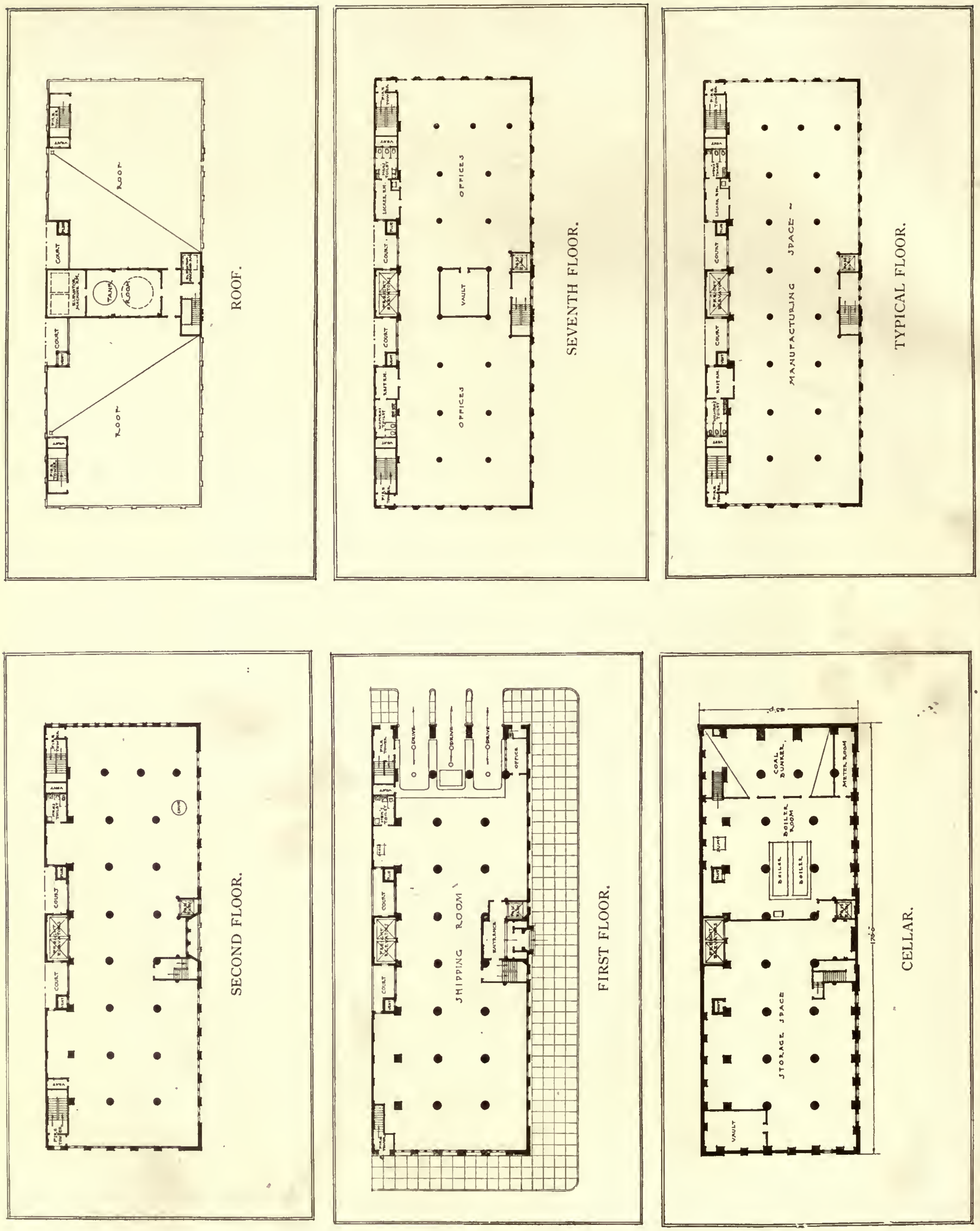
REINFORCED concrete has for several years been the standard material for the construction of factories and warehouses. It has also been used extensively for hotels, offices, and loft buildings, but this use has been much more general in the South and West than in New York.

There are several reasons for the backwardness of New York architects in adopting reinforced concrete for the above uses. One reason is that in the case of buildings over twelve stories in height reinforced-concrete columns, if used in the lower stories, would be of excessive size. Another reason is that it is difficult, if not impossible, to obtain for the exterior surfaces of a concrete building the absolute perfection of texture and alignment which can be obtained with cut stone or brick. A third reason is that structural steel has been the established material for use in buildings in the metropolitan area for a great many years. Architects, owners, and contractors have all been familiar with the details of structural-steel construction, and a considerable amount of inertia has had to be overcome in changing from one standard and satisfactory method of construction to another.

Reinforced concrete has probably been the most economical form of fireproof construction ever since it passed the experimental stage. Prior to the present period of inflated prices the margin in favor of reinforced concrete as against structural steel fireproofed was probably not over 10 or 15 per cent of the cost of the structural frame of the building. This was equivalent to possibly 5 per cent of the total cost of the building, and was, except in the case of the most progressive architects and owners, not sufficient to overcome the inertia above referred to. At the present time, however, the margin in favor of reinforced concrete is approximately 40 per cent of the cost of the structural frame. This increase in margin is partly due to the constantly widening experience of the reinforced concrete contractors' organizations and their workmen, partly due to improvements in standardization of methods, and partly due to the high cost of structural steel and brick as compared with reinforced-concrete materials.

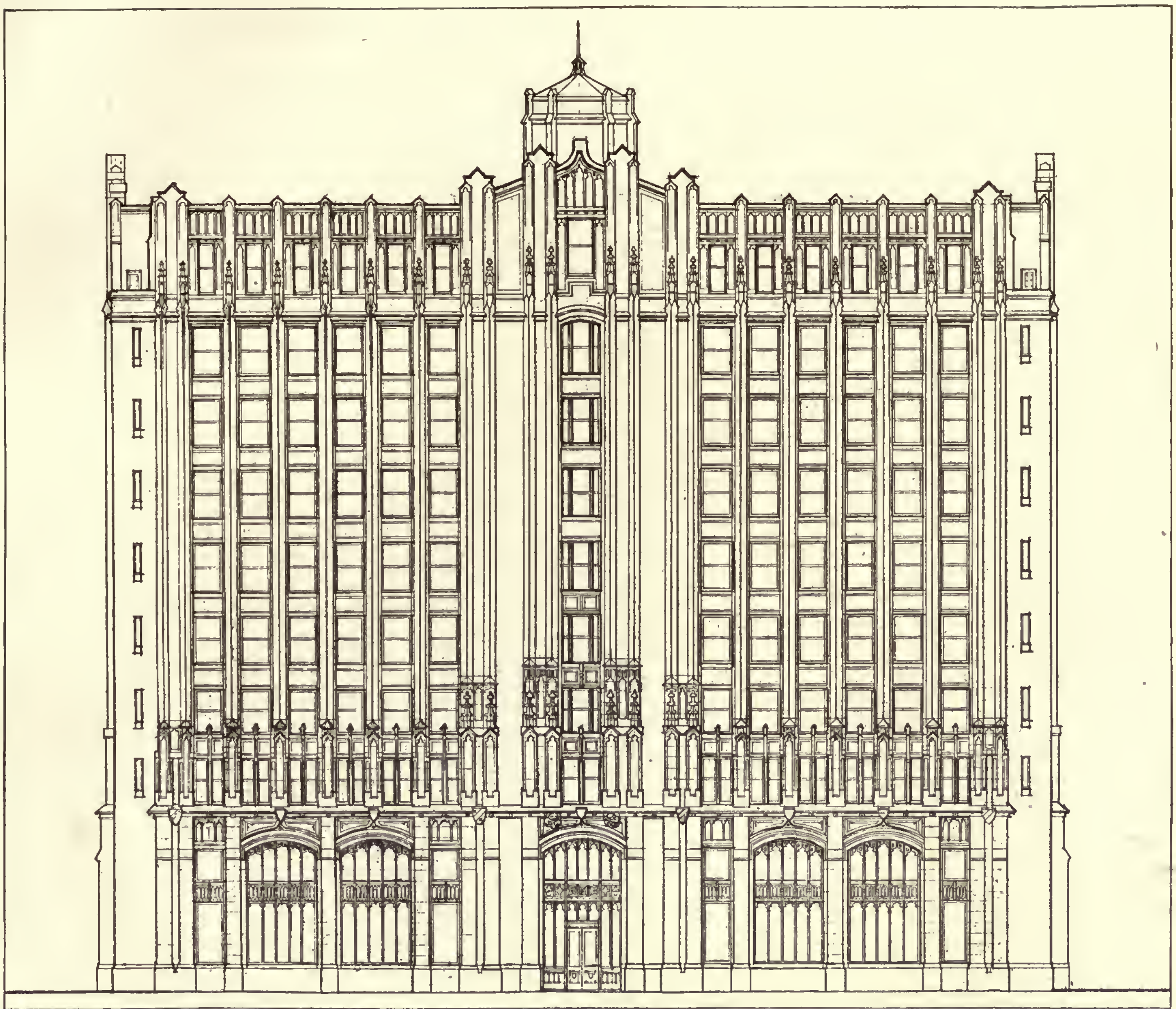
It has therefore become necessary that architects, in the interests of their clients, should consider seriously the

(*Continued on page* 293.)



PLANS, FLETCHER BUILDING, VARICK, GRAND, AND WATTS STREETS, NEW YORK CITY.

Helmle & Corbett, Architects.



VARICK ST. ELEVATION
FLETCHER BUILDING
VARICK - GRAND - AND - WATTS - STREETS
NEW YORK CITY
HELMLE AND CORBETT - ARCHITECTS - BROOKLYN - N.Y.

(*Continued from page* 291.)

use of reinforced concrete. As a matter of fact, the disadvantages referred to in the early part of this article, namely, column sizes and exterior appearance, are far less serious than many have supposed. A reinforced concrete column in the first story of a twelve-story building, having columns 18 inches on centres in both directions and designed to carry live loads of 150 pounds per square foot, would be a round column 30 inches in diameter. If, for some special reason, it should be necessary to make the columns in the lower stories even smaller than this, structural-steel cores could be used at an additional expense, which would use up only a very small part of the saving effected by the use of reinforced concrete for the balance of the structural members.

Regarding the external appearance of a reinforced-concrete building, the accompanying cut of the Fletcher Building on Varick Street, New York, shows what can be done. The exterior of this building is entirely of reinforced concrete, but there are endless possibilities in the combination of brick, terra-cotta, or stone with concrete surfaces.

An important point for consideration is that with an all-concrete exterior the expense incurred for architectural effect is very small, as most of the architectural members are also structural members. It is probable that in the cost of the Varick Street building the cost of the exterior walls, including ornamentation, is no greater than the cost of the structural-steel wall columns, lintel beams, fireproofing, and backing would have been if this building had been constructed of structural steel. In other words, the entire cost of the face brick or stone work which would have been necessary with structural steel has been saved.

Another way of looking at it is that if an owner insists upon a brick or stone exterior this face work can be applied to a concrete frame as cheaply as to a steel frame, and the economy of using reinforced concrete in place of structural steel for the interior columns and floor systems will still accrue to the owner's advantage.

Alterations of Buildings for Commercial Uses

AN alteration is always a special problem, as well as an interesting study for the architect who likes to take advantage of difficult and unusual opportunities. The details involved are quite different from those of a new building, and are really in a class by themselves. The client says: "Mr. Architect, I have an old ramshackle building on Q Street, and I do not know how to make it over so that I may get the proper income from it." He turns the question over to the architect and, if the result is a failure, only the architect is to blame. He may be either incompetent or careless of his client's interest, or sometimes both. To some architects a job is merely a job—they work only for the money that they may make out of it. Others who have an interest in a particular piece of work take pride in doing their utmost to produce a finished and successful building, not only for the client's sake but for the reputation of the architect and the profession generally. If a client has a definite object to obtain, the problem requires very careful consideration.

The costs, of course, are always a serious item, and only careful attention to essentials and the ultimate profitable rental of the premises can compensate for these. Too often there are architects who will undertake such work with the idea that almost anything is good enough, not realizing that even in alteration work they have fine opportunities for originality and manifestation of their special knowledge. The speculative builder is usually anxious only to get the job finished. The architect with a proper sense of responsibility will carefully consider financial returns based on right planning that make for better renting values and a larger use of space. The radical, queer, and unusual thing is not to be tried, but the conservative and dignified styles with everything carefully designed and proportioned to the character of the building. The successful architect of to-day is one who not only looks at the money end of it, but who also takes the broader view of the public interest, of the advantage to the community of the properly designed and constructed building.

New York Galleries, 419 Madison Avenue, New York City. (Alteration.) Geo. Mort Pollard, Architect.

A room in New York Galleries.

In remodelling 419 Madison Avenue for the New York Galleries every detail was carefully taken into consideration. Materials on hand and the materials available in the market had to be considered. Special attention was given to the adaptability of the old buildings for their new and special use, and for an agreeable and attractive façade that would have commercial value in its appeal to the interest and the taste of the public. The building is clearly founded on Italian models, with broad masses attractively relieved by the placing of the doorway and the windows.

It is intended to carry out the interior of the building in a series of rooms carefully studied for the display of furniture groups,

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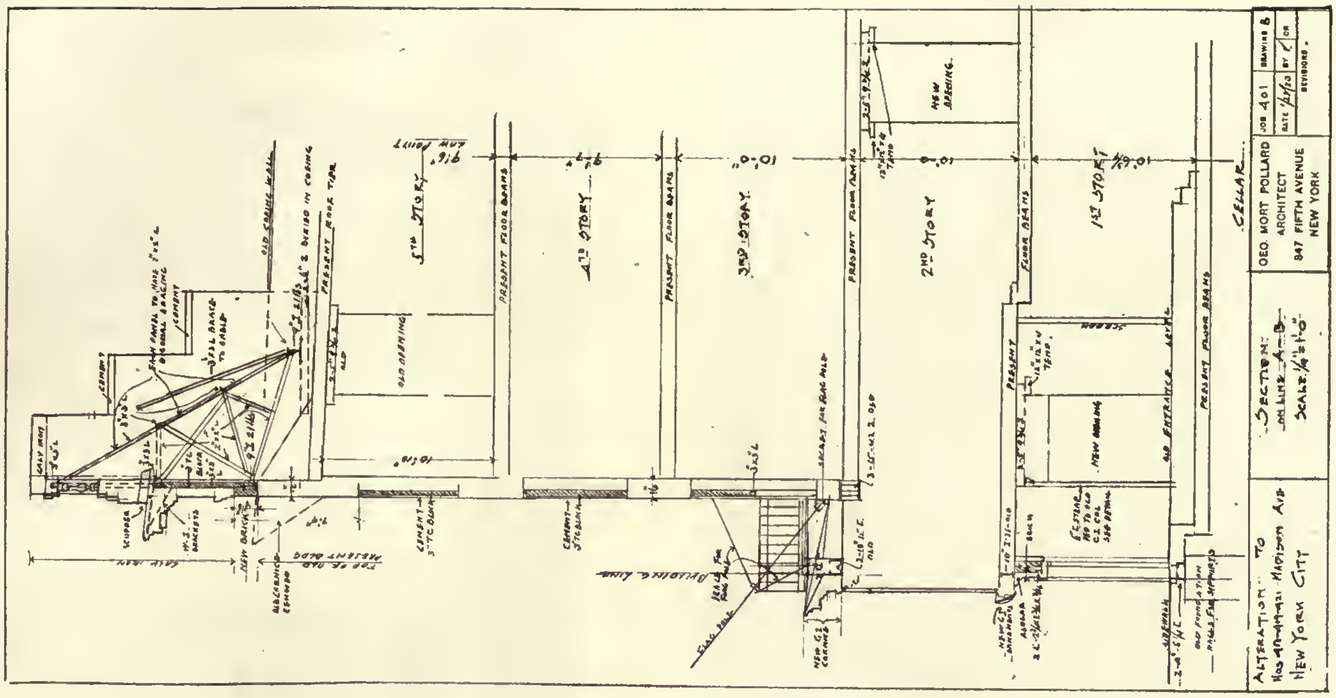
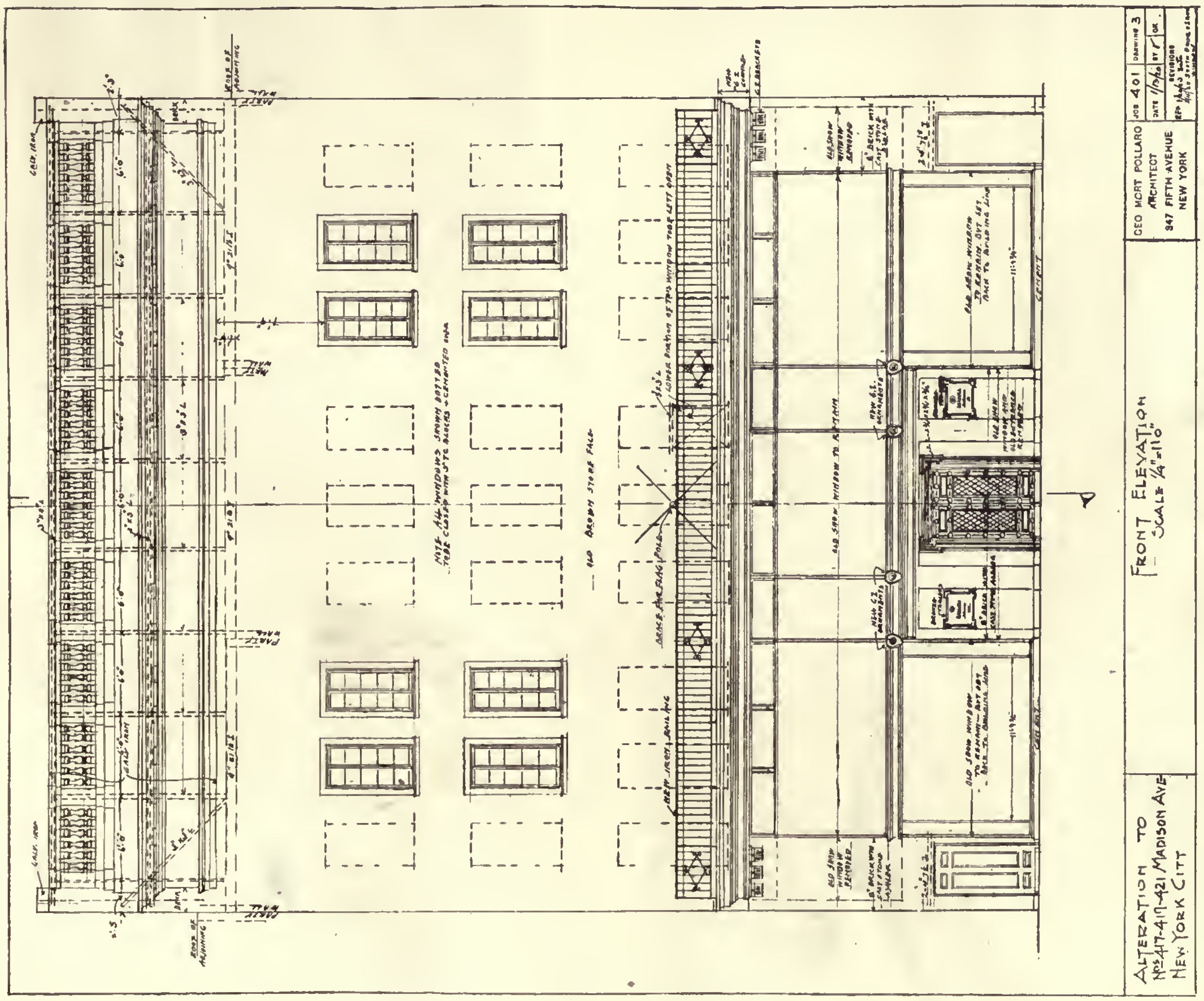




Geo. Mort Pollard, Architect.

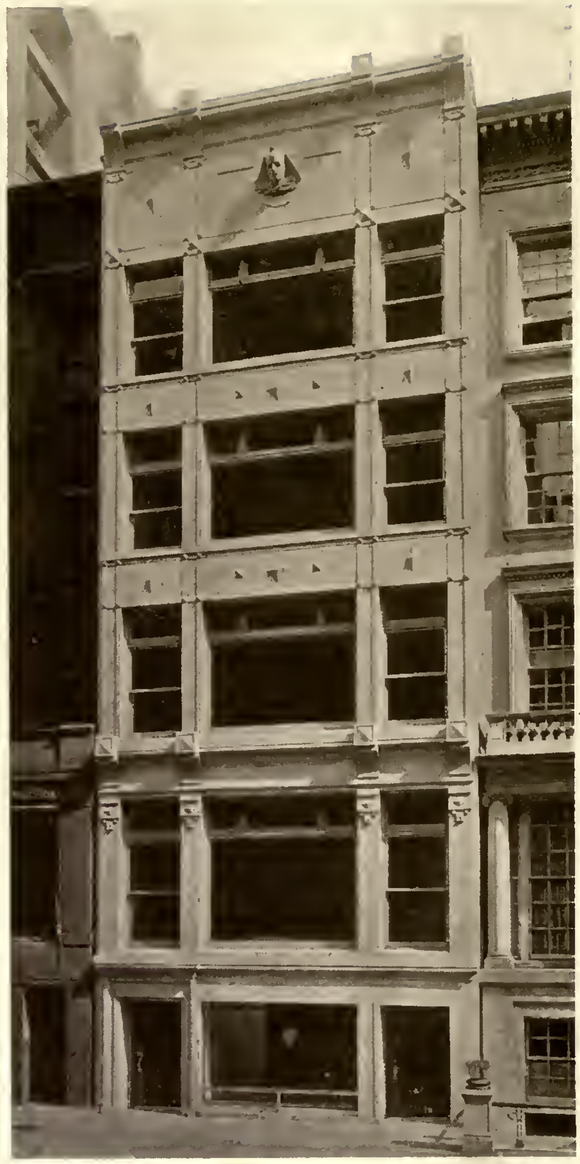
BUILDING FOR NEW YORK GALLERIES, NEW YORK CITY. (Alteration.)

Doorway, New York Galleries, 419 Madison Avenue, New York City.

(*Continued from page* 294.)

providing such backgrounds adequately to express and harmonize with various periodic styles. The room shown is

Doorway, 5 East 40th Street, New York City.



Egyptian Lacquer Co., 5 East 40th Street, New York City. (Alteration.) Geo. Mort Pollard, Architect.

one of six in course of construction. The basement below the sidewalk is to be in Caen stone, with flooring of broken flagstone set in cement. There will be a fireplace of artificial stone, with fifteenth-century fire-tools and implements. The space will have an area of 58 by 50 feet. On the top of the building, back of the balustrade, will be constructed a solarium for the display of garden furniture.

No. 5 East 40th Street, which was done for the executive office of the Egyptian Lacquer Company, required a very different study for the special needs of this business. The old house was remodelled from top to bottom, always with a view to the future development of the company and to the possibility of its outgrowing this building and the need of renting or selling it advantageously. Both these buildings are therefore types showing special consideration for stylistic details.

There is a refreshing and pleasing aspect in the result of such alterations, and in time promise the almost complete passing of the old brownstone era, rows of buildings of uniform ugliness, and inefficient planning. We owe the change to the opportunity offered by present needs and the fact that architects are given a chance to show that merely from a commercial point of view an attractive and individual exterior is the best of investments.

Editorial and Other Comment

Our New Architecture

IF there was ever any doubt in the minds of the profession or the public as to the wisdom of New York's new zoning laws, with regard to their influence upon the quality of our architecture, it is being dissipated rapidly by the obvious success and distinction of the new business buildings that have been and are being constructed under its wise provisions.

There have been new problems presented for the architects to solve, and they have generally met them with the intelligence and good taste that might be expected of them. Fortunately, they have in most cases had the sympathetic co-operation in their problems of the business concerns which have supplied the capital.

The great masses of straight walls reaching skyward, that have always been so difficult to handle, now broken up into separate planes above a certain height, add a new element of the picturesque, as well as new elements of light, air, and protection for neighboring buildings. There is every promise of a great new development in which mere size and bulk will be subservient to a larger consideration for both beauty and fitness. The high building will make a new appeal to the artistic sense, as well as the practical one, of all concerned.

Taking It Seriously

WE have awakened apparently to the increasing menace and dire need of housing all over the country. For a long time the shortage, with its consequent congestion and dangerous unrest, has been very much in evidence, and a lot of words have been spilled in discussing ways and means of remedying conditions; but it has taken the imminence of the beginning of a new renting season and the prospect of thousands of evictions, the consequent legal complications and downright hardships, not to say possible riots, involved, to bring about any real, concerted legislative action.

New York has decided against mortgage exemption on new building, and has decided to let savings-banks mind their own business. The part of the discussion that seems worthy of the minutest examination is the question of profiteering in essential building materials.

There has been too much meddling with the natural laws of supply and demand, but these are abnormal times and old ways have been forgotten in the insatiable greed that has governed the control of certain kinds of business. Competition has been at a standstill, for why compete when there is not enough to go around, and the smallest merchant can vie with the big one and follow his lead in the general game of making hay while the sun shines?

No one needs to be told that the mood of the time is: "Get it—never mind how, but *get it*." The following, from a recent editorial in *The American Contractor* of Chicago, admirably expresses the attitude of thousands of workers:

"The 'go to h—' attitude toward the job is so universal that those who realize productive effort is the foundation of society cannot escape the keenest anxiety for the future of this and other nations. When it becomes the rule rather than the exception that workers everywhere are dishonest in their attitude toward work and employment, quite as a matter of course, our system is not 'threatened,' with decay but already is crumbling.

"The labor-unionist and the liberal economist will explain that the wage scale and working conditions are chiefly to blame. There is involved something more than this, something vastly more fundamental and dangerous. There is involved an ethical code and a concept of honor and honesty. Granted that a wage may be too low, or too high for that matter, when an individual has agreed to do a specific task for a specific wage, accepting the wage without doing the task to the best of his ability is a dishonest thing and nothing else can be made of it.

"The attitude is not limited to organized labor by any means. Everywhere one finds evidence of a determination on the part of producers to render the least service for the most pay without doing the service agreed on.

"Are we reaping the results of an educational system which overemphasizes material success and measures respectability in terms of bank rolls? The law of business as it is taught everywhere is to buy as low as possible and sell as high as possible, and when that formula is translated into the attitude of producers it is bound to kill our pride of workmanship and ideals of service."

A Grave Question

THERE is one aspect of the present congestion of population in our cities that seems to need the gravest thought and consideration of what it means in the future. The gate of our country is again wide open, and the officials at the Ellis Island Immigration Station are literally overwhelmed by aliens who are coming to us in great hordes—thousands upon thousands—a large part of them destined to stop at already congested centres, where they will swell the dangerous and unassimilable groups of foreign-language-speaking people that segregate in their own particular sections and add to the already seemingly insoluble problem of housing. Would it not be well for us to first try to put our house in order before we open the doors to guests we have no room for?

The war taught us no greater lesson with regard to our home affairs than that, in making our American army, we had first to teach thousands the meaning of the simplest words in our language primer; and need we have a greater lesson in caution regarding the character and quality of a new immigration than such a horror as the recent Wall Street explosion? Do we not owe something to the people already here? Is not our problem of making the world safe for democracy dependent first upon the regulation of our own affairs? Is there justice or charity or right in permitting the steamship companies to profit at the expense of thousands of deluded people who are led by their specious propaganda to forsake Europe and come to a land that already needs time to absorb and educate in our own ways of thought the millions of aliens already with us?

We should at least be in a position to select our associates with some regard for what is good for this loved country of ours. It is a heritage of freedom that we should pass on, but a freedom that must respect our laws and our traditions, with a regard for our language and the thought of our national unity, made up of *Americans* either native or foreign-born. We permit the adult alien, who too often can neither speak nor write our language, to become a voter in too short a time. We keep open house for those we cannot accommodate nor begin to assimilate—for many who neither understand us nor try to.

One of our newspapers said recently in an article upon the conditions at Ellis Island:

"The State Department may send instructions to American consuls abroad to exercise greater care in giving permission to aliens to come to the United States. The parasitic element is more noted among the recent arrivals than heretofore. The consuls are not having very much difficulty in halting radicals, but it is the shiftless element and the destitute that will be stopped before they embark."

The labor problem is already a grave one and should we not be sure there is work ahead for all those here before we go on adding a greater mass of people who with present conditions only make the difficulty of solution greater?

Home-Building and Labor

IT is labor in the guise of carpenters and masons and others who are making home-building for thousands impossible. There is an evident downward trend in the cost of materials, lumber, cement, brick, but labor stands pat, and those who might build are appalled by the cost of labor calculated in day's work. If labor worked with the zeal of honest craftsmen in honest work, the day's accomplishment in speed might offset the heavy toll in the cost per hour. But the conscience of labor in the mass seems to have become atrophied. It is no longer how much can be done, but how little; and the old pride in good work, the self-respect that belonged with an honest day's work honestly done and as far as it could be done, no longer governs; the lazy, the inefficient, and the trouble-makers, who would live as the lilies of the field, are at par with the men of real skill and special knowledge.

In figuring the cost of building any sort of a house in these days, one should begin with the cost of labor, and add to any estimate of before-war times anywhere from thirty to forty cents an hour for every man employed, and remember also to deduct about the same ratio for inefficiency.

It is labor that must be awakened to the need of greater production within a given time, if wages are to be maintained and the work of rehabilitating the world, of making life easier for labor and for us all, are to be realized.

There are already signs that some wise heads are beginning to see light. A new association to be known as "The National Industrial Commerce of Building and Construction" was organized recently in Chicago, representing both capital and labor, pledging that they would "pull in harness until the shortage of one million homes in America is filled." Verily we may yet be in sight of balm in Gilead, and the sound of the hammer on the million homes may be as the ringing of glad bells.

Go to it!

The National Council of Architectural Registration Boards

THE first formal meeting of the National Council of Architectural Registration Boards will be held in St. Louis, Missouri, on November 18 and 19, 1920.

All architectural registration or licensing departments, boards or committees throughout the United States are invited and urgently requested to send representatives to this meeting in St. Louis.

While membership in the council is restricted to the legally appointed representatives of the registration or licensing authorities of States having registration or license laws, the council would be glad to welcome the attendants at the council meeting of committees of architects from States having no registration or licensing laws.

Legislative committees from States having laws pending will find the proceedings of the council very helpful and instructive. Among the papers to be presented will be a report of a committee appointed at the Washington conference to make a careful, analytical, comparative study of the various registration laws now in force in the various States. Efforts will be made to harmonize these various requirements so as to make easy reciprocal transfer from State to State and thereby facilitate interstate practice.

A desirable outgrowth of the conference will be the formation of some sort of clearing-house of information with reference to the records of architects asking extension of registration from one State to another. It is hoped that the council may be able to recommend a uniform law, which may be adopted by the various States.

Committees and registration officials are urged to make arrangements for representation at the earliest possible date and notify the secretary of the council, furnishing the names and credentials of their official representatives.

The Money Value of France's Loss in Art Treasures and Historic Monuments

ONE of the most interesting items in the latest inventory of the losses of France through the war is that which tells of the extent of the damage to her art treasures and historic monuments. The official estimate for this loss, which has been obtained by the Paris Information Service of the Bankers Trust Company, is placed at over $125,000,000.

This figure, which has been recently calculated for the information of French minister delegates to forthcoming international conferences, has been arrived at after an exhaustive examination of the ruins of historic monuments, statues, churches, museums, and their contents. The irreplacable nature of these losses is indicated by the sum of 600,000,000 francs which is set against "moral injury."

"This sum of 600,000,000," explains the official text, "is an approximation of the loss the French people have sustained by having lost forever works of peculiar value because of their beauty and historic associations."

In order that a fair statement of values might be made the art commission sets forth the losses in terms of both pre-war and post-war currency as follows:

	1914 value		1920 value	
Historic buildings (750 in all)	300,000,000	francs	1,200,000,000	francs
Historic monuments	25,000,000	"	50,000,000	"
Museums	15,000,000	"	30,000,000	"
Moral injury	300,000,000	"	600,000,000	"
Total	640,000,000	"	1,880,000,000	"

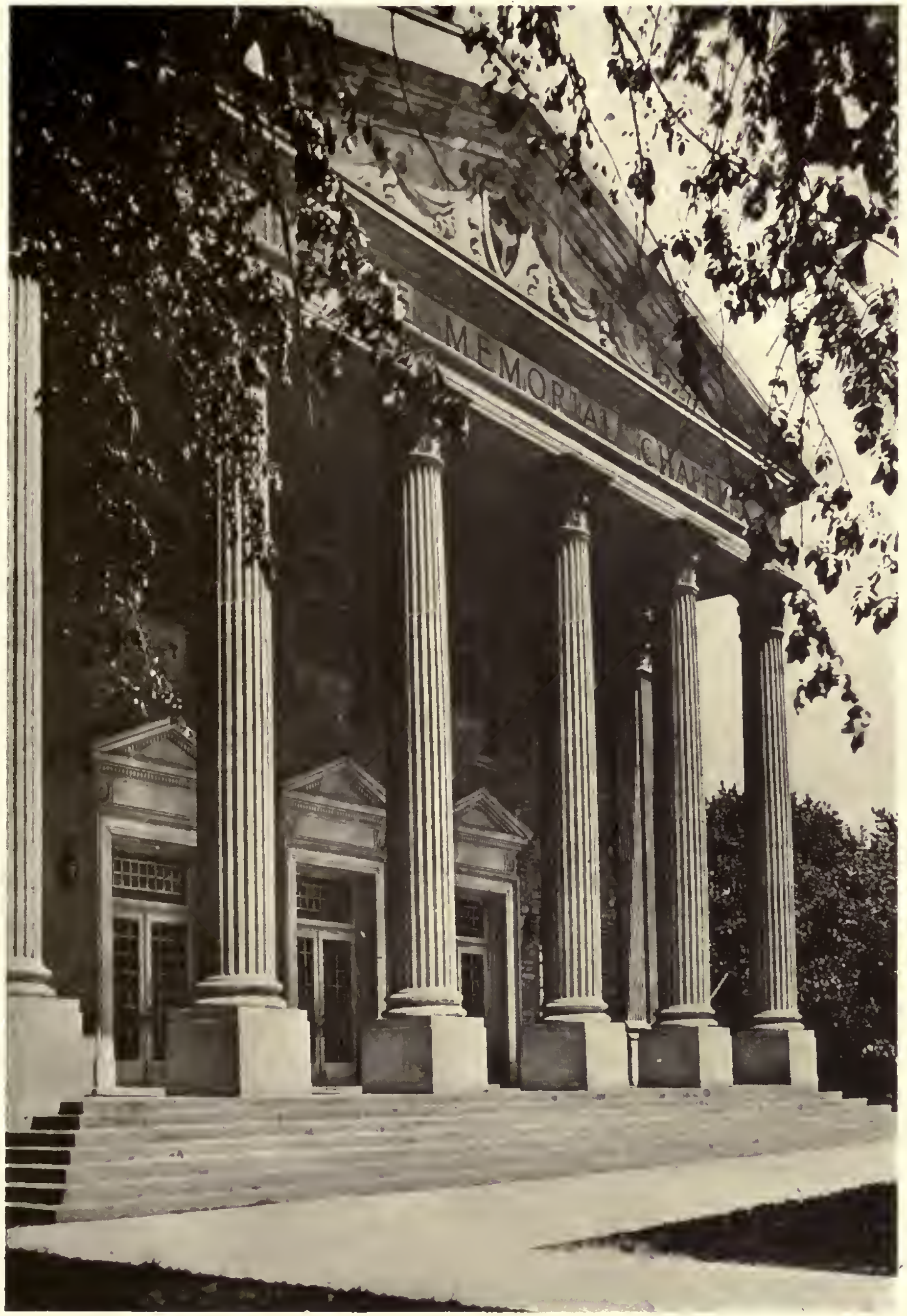
The 640,000,000 francs of losses, on the basis of pre-war values, are equal at normal exchange, which then prevailed, to about $128,000,000.

An estimate of the loss in stolen or damaged jewelry and precious stones is placed at 1,119,000,000 francs, present values.

The loss in personal property and objects of art owned by private individuals has been placed at 4,500,000,000 gold marks.

Plates CXLV – CLX to follow page 298

LAWRENCE MEMORIAL CHAPEL, LAWRENCE COLLEGE, APPLETON, WIS. Childs & Smith, Architects.

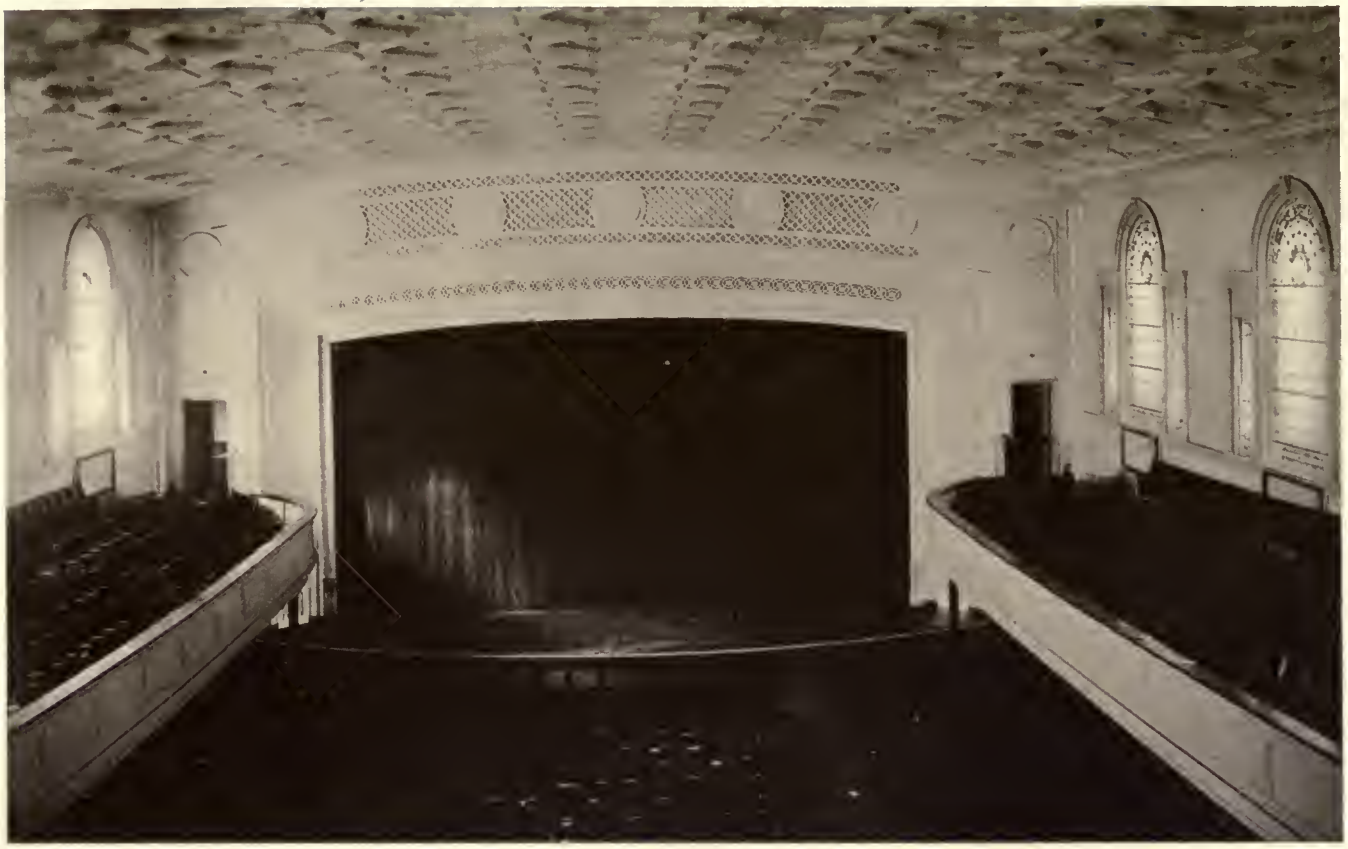


PORTICO.

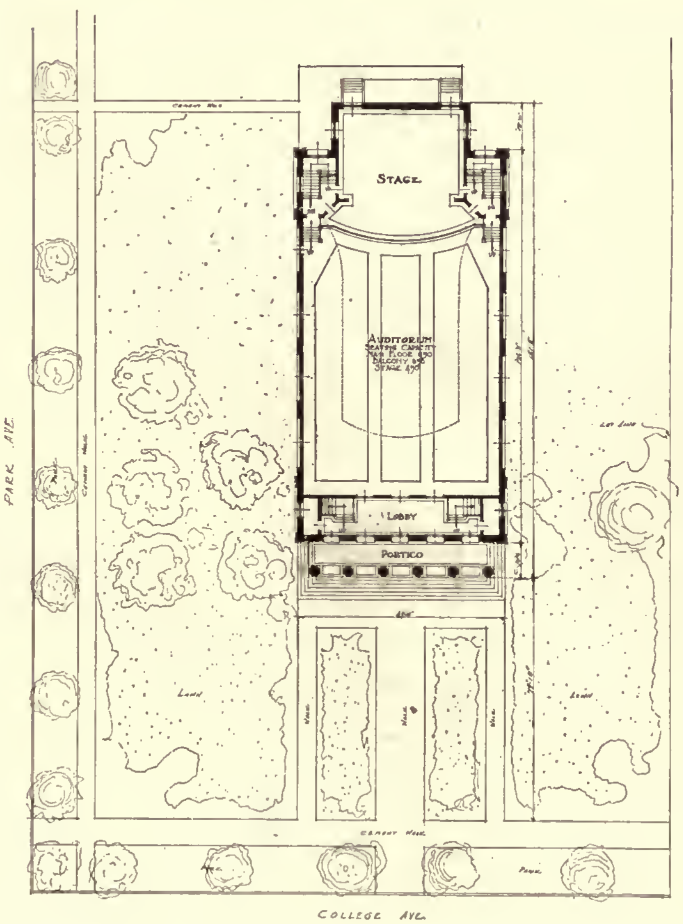
DETAIL OF WINDOWS ON SIDE.

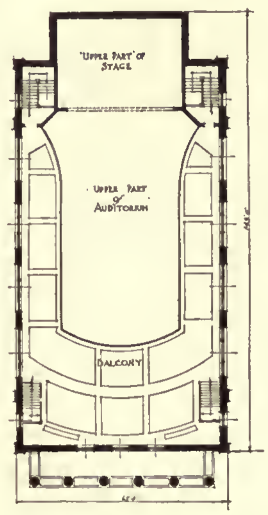
Childs & Smith, Architects.

LAWRENCE MEMORIAL CHAPEL, LAWRENCE COLLEGE, APPLETON, WIS.



AUDITORIUM.

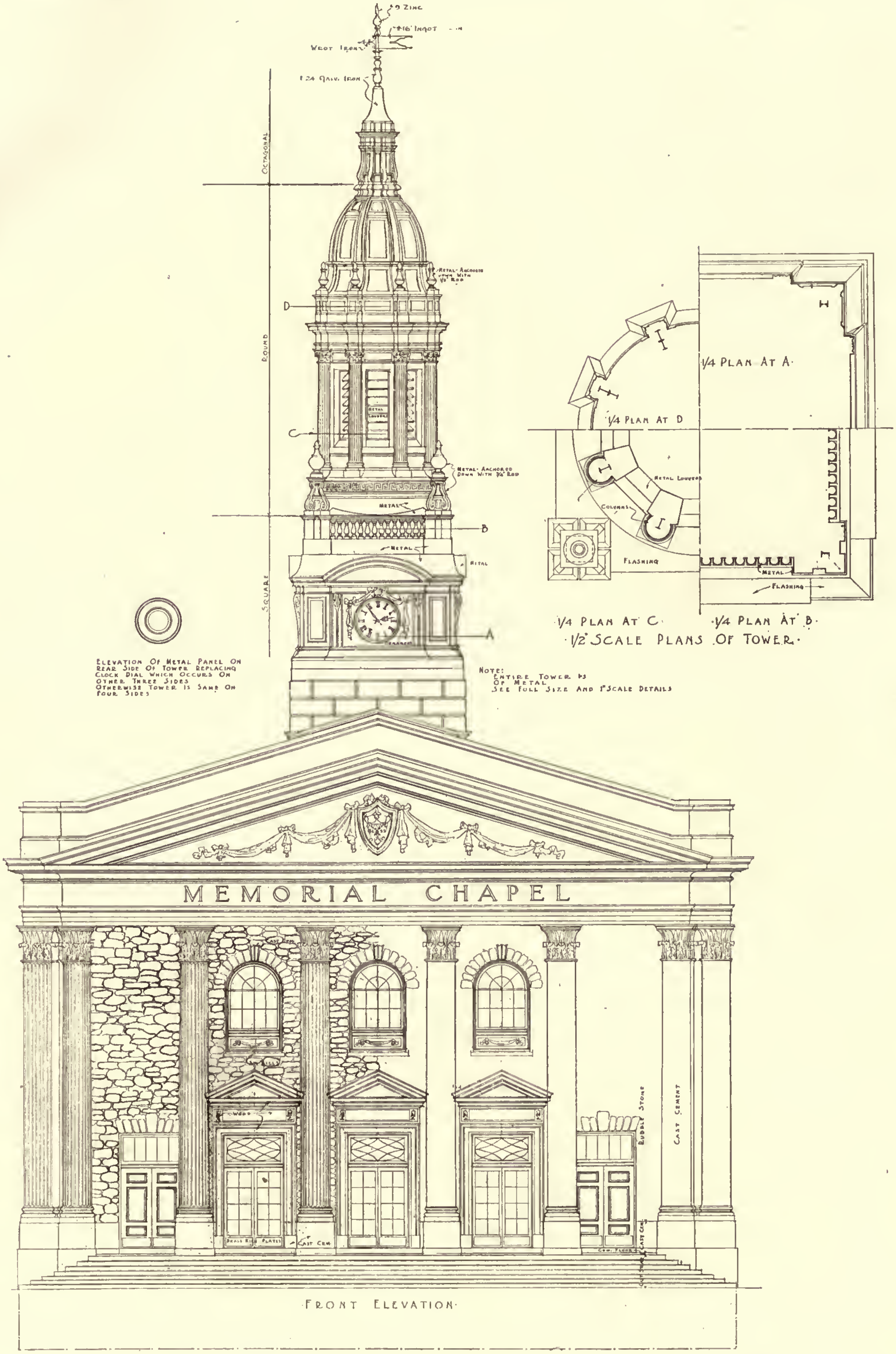




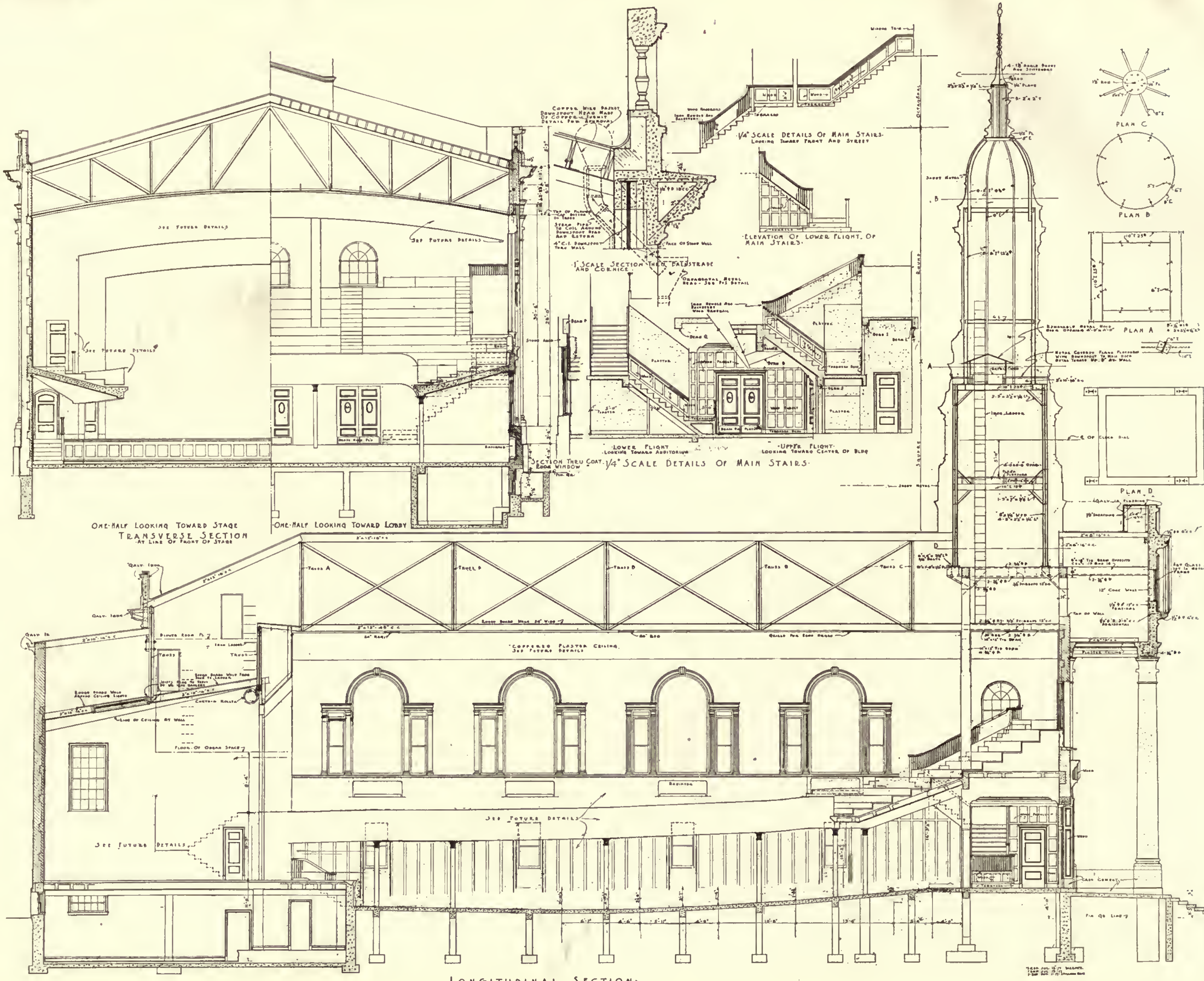
PLANS.

Childs & Smith, Architects.

LAWRENCE MEMORIAL CHAPEL, LAWRENCE COLLEGE, APPLETON, WIS.



LAWRENCE MEMORIAL CHAPEL, LAWRENCE COLLEGE, APPLETON, WIS. Childs & Smith, Architects.



LAWRENCE MEMORIAL CHAPEL, LAWRENCE COLLEGE, APPLETON, WIS.

Childs & Smith, Architects.

THE END OF THE GARDEN ALTERATIONS, TURTLE BAY, NEW YORK CITY.

Edward C. Dean, William Lawrence Bottomley, Associated Architects.

LIVING-ROOM, RESIDENCE, E. C. DEAN.

DINING-ROOM, RESIDENCE, E. C. DEAN.

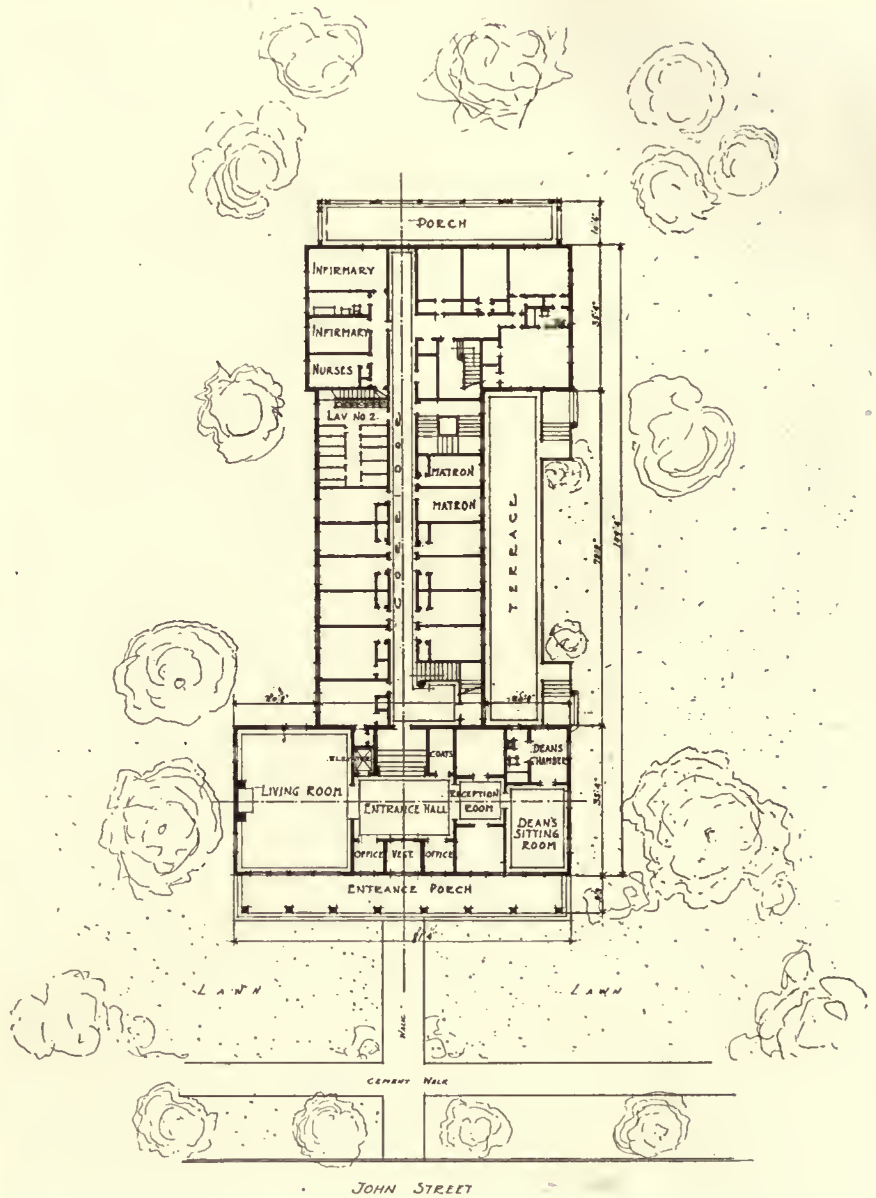
Edward C. Dean, Architect.

ALTERATIONS, TURTLE BAY, NEW YORK CITY.

RUSSELL SAGE DORMITORY, LAWRENCE COLLEGE, APPLETON, WIS.

Childs & Smith, Architects.

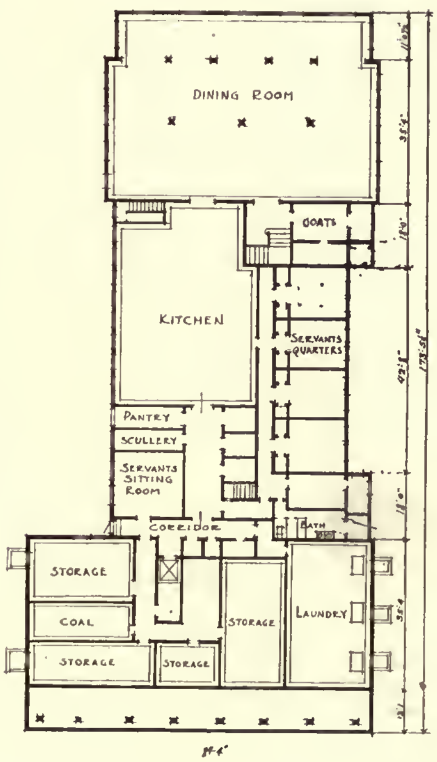
REAR OF RUSSELL SAGE DORMITORY, LAWRENCE COLLEGE, APPLETON, WIS.



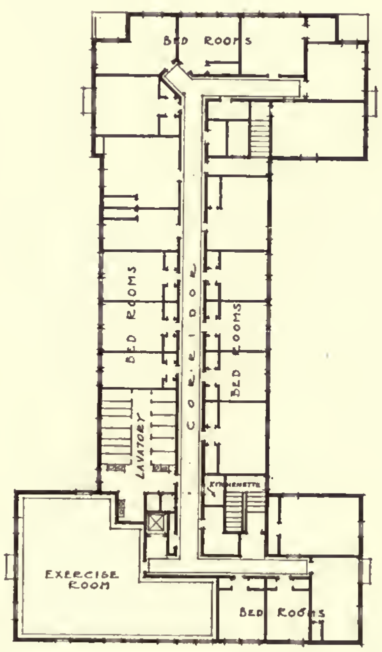
FIRST FLOOR PLAN

Childs & Smith, Architects.

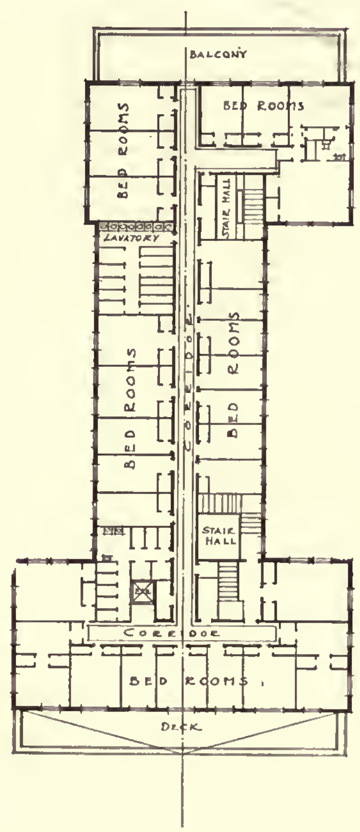
ENTRANCE-LOBBY.



BASEMENT PLAN.



ATTIC PLAN



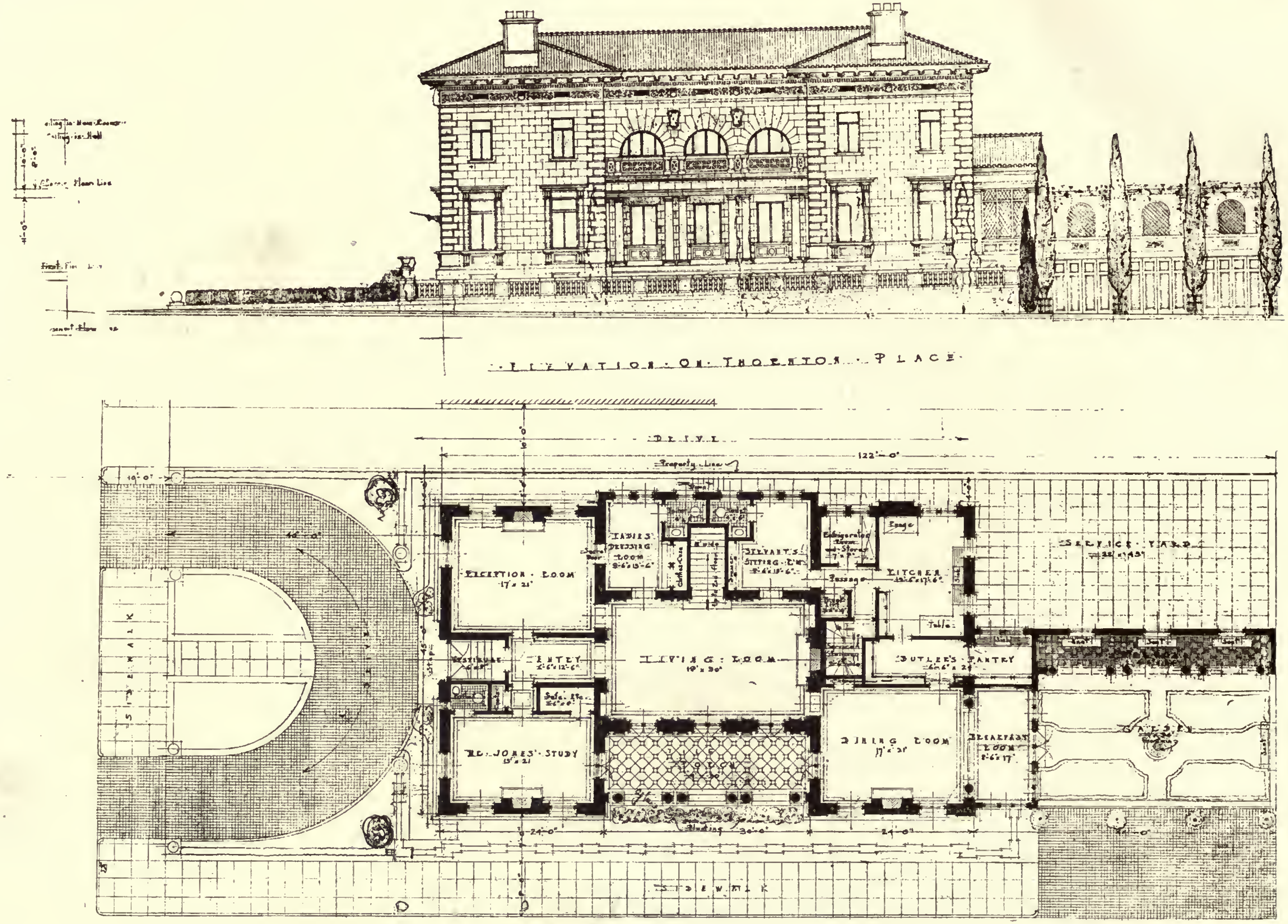
TYPICAL FLOOR PLAN.

RUSSELL SAGE DORMITORY, LAWRENCE COLLEGE, APPLETON, WIS.

Childs & Smith, Architects.

RESIDENCE, B. B. JONES, WASHINGTON, D. C.

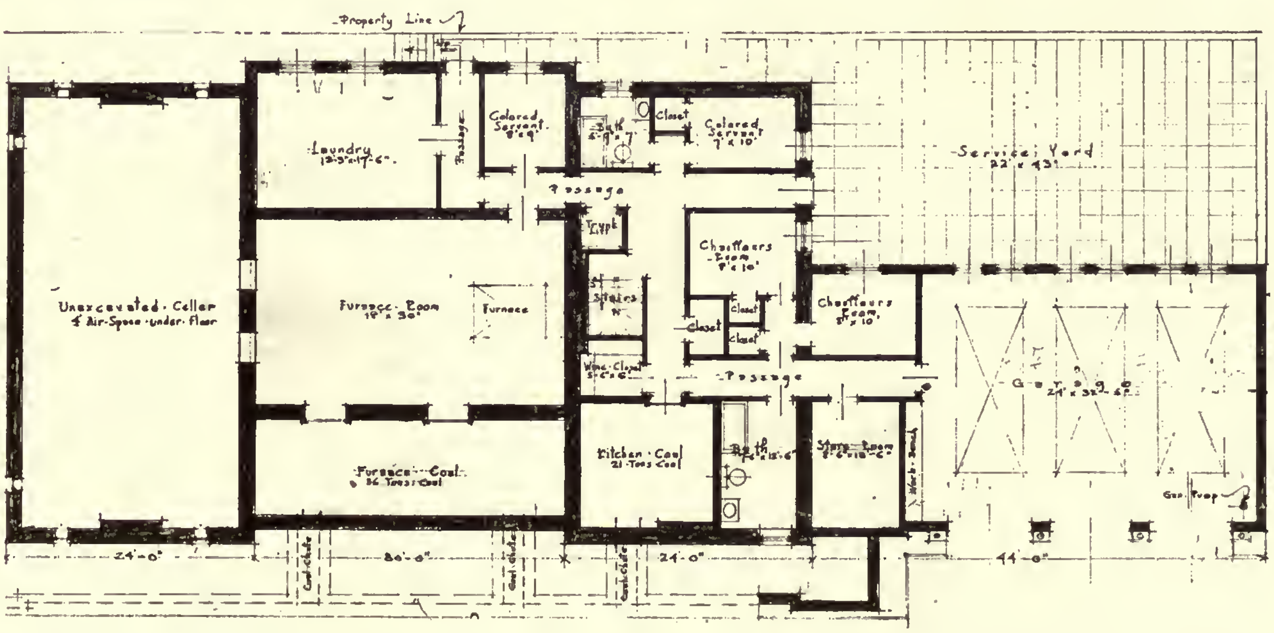
Waddy B. Wood, Architect.



GROUND-FLOOR PLAN, RESIDENCE, B. B. JONES, WASHINGTON, D. C.

Waddy B. Wood, Architect.

LIVING-ROOM.

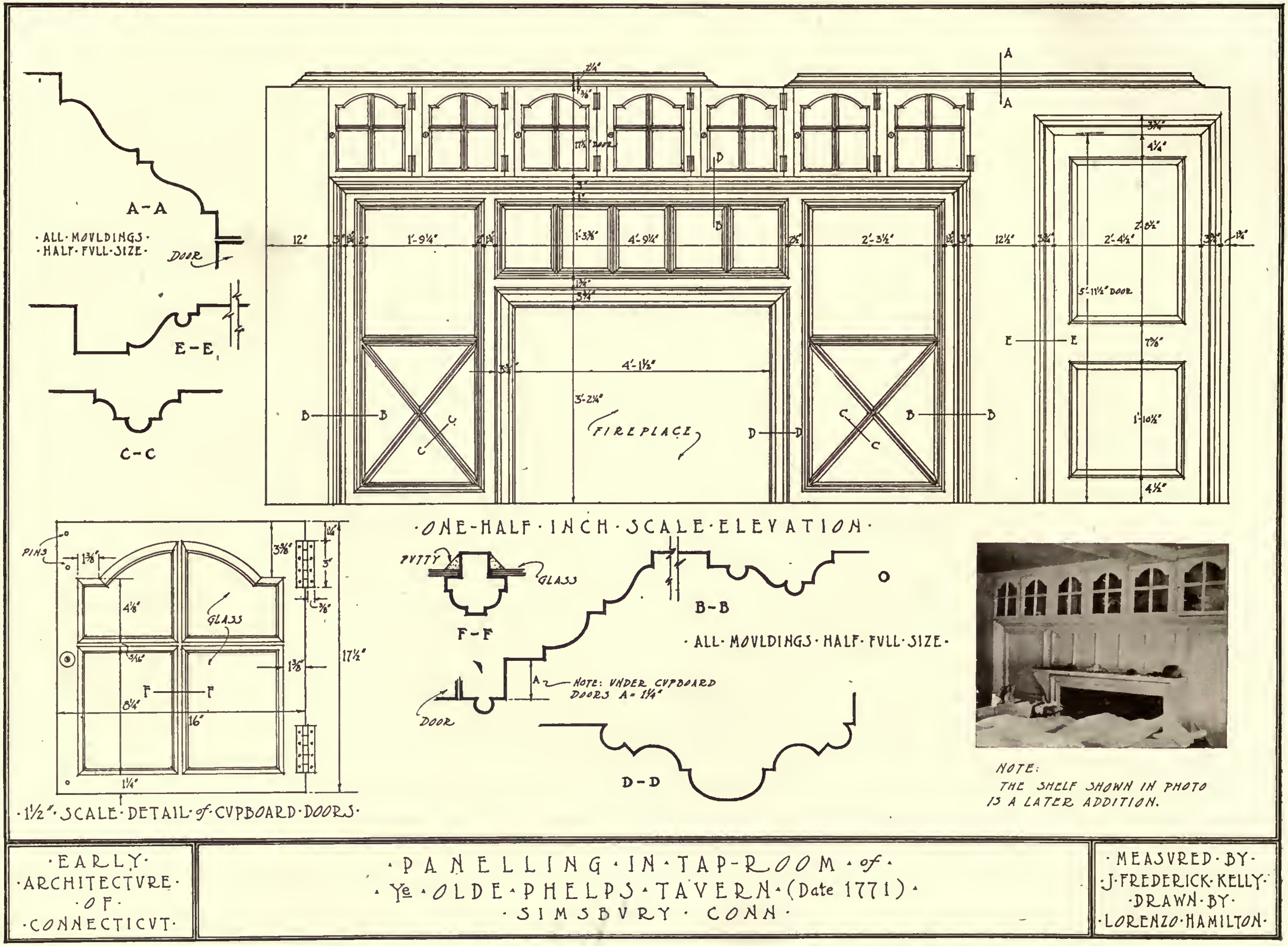


BASEMENT PLAN, GARAGE, ETC.

Waddy B. Wood, Architect

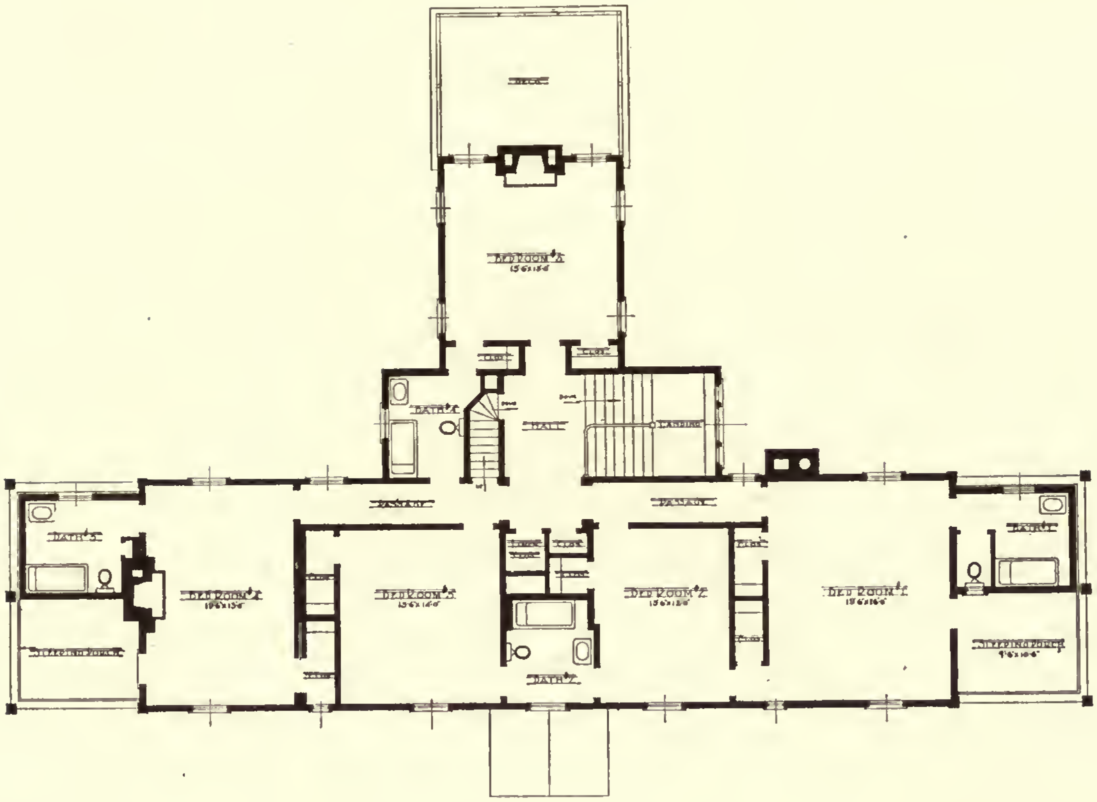
RESIDENCE, B. B. JONES, WASHINGTON, D. C.

DINING-ROOM, RESIDENCE, B. B. JONES, WASHINGTON, D. C. Waddy B. Wood, Architect.

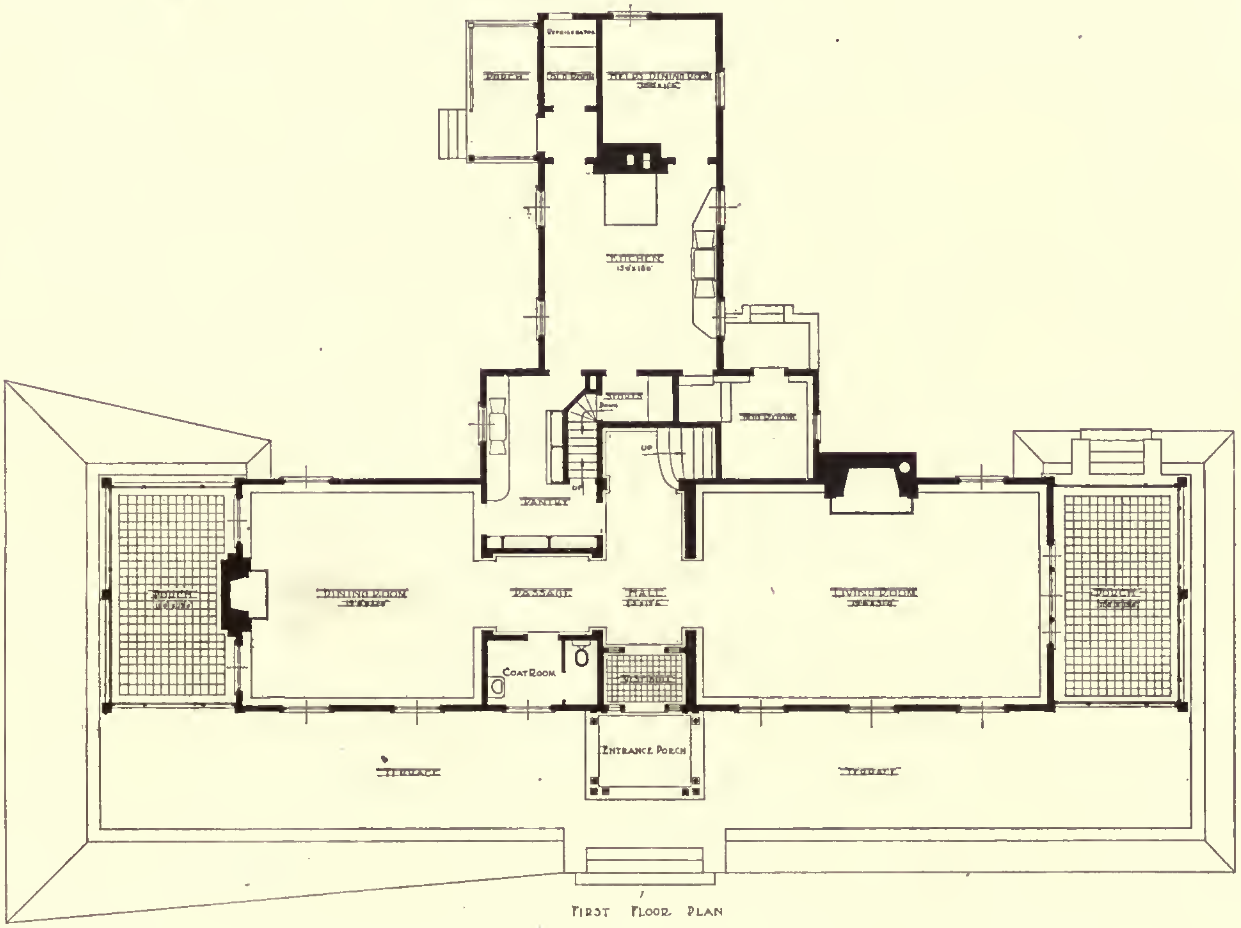


A–A
· ALL · MOVLDINGS ·
· HALF · FVLL · SIZE ·
DOOR
E–E
C–C
FIREPLACE
· ONE-HALF · INCH · SCALE · ELEVATION ·
PINS
GLASS
F–F
PVTTY
GLASS
B–B
· ALL · MOVLDINGS · HALF · FVLL · SIZE ·
NOTE: VNDER CVPBOARD DOORS A = 1¼"
DOOR
D–D
NOTE:
THE SHELF SHOWN IN PHOTO
IS A LATER ADDITION.
· 1½" · SCALE · DETAIL · of · CVPBOARD · DOORS ·
· EARLY ·
· ARCHITECTVRE ·
· OF ·
· CONNECTICVT ·
· PANELLING · IN · TAP-ROOM · of ·
· Ye · OLDE · PHELPS · TAVERN · (Date 1771) ·
· SIMSBVRY · CONN ·
· MEASVRED · BY ·
· J · FREDERICK · KELLY ·
· DRAWN · BY ·
· LORENZO · HAMILTON ·

HOUSE, H. B. TREMAINE, ALLENDALE, N. J. Lucian E. Smith, Architect.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

·HOUSE·OF·H·B·TREMAINE·ESQ· ON·FRANKLIN·TURNPIKE·
·ALLENDALE·N·J·
LUCIAN E. SMITH ARCHITECT No 2 W. 47th ST NYC

Competition for Milwaukee County General Hospital

Including Nurses' Home, Laboratory Building, Power-House, Garage, and Laundry

Van Ryn and De Gelleke, Armstrong and De Gelleke, Associated Architects

MAIN hospital building is to be planned to take care of 515 beds, with a view to future extension to take care of an additional 500 beds. The following departments in this building must be planned at once so that they are of sufficient size to take care of a 1,000-bed hospital: administration department, operating department, culinary and dining-room department, and check-room.

Nurses' home is to be planned to accommodate 100 pupil nurses and 36 graduate nurses, with a view to future extension to take care of double this number of pupil and graduate nurses. The large sitting-room or amusement-hall on first floor, toilet accommodations, gymnasium, swimming-pool, private laundry, and trunk-room are to be planned at once to accommodate the additional nurses.

The power-house and laundry are to be planned at once to take care of a 1,000-bed hospital.

Jury of Award

The owner agrees that there will be a jury of award consisting of nine (9) members as follows: 3 architects, selected from names as suggested by the Wisconsin chapter, A. I. A.; 1 physician, 1 surgeon, 1 superintendent of nurses, the chairman of the county board, 1 member of the board of administration, and 1 other member of the county board. The personnel of the jury of award shall be as follows: architects, Arthur Peabody, A. I. A.; Elmer Jensen, A. I. A.; Irving Pond, A. I. A.; physician, surgeon, and superintendent of nurses not yet selected; board of administration, William L. Coffey; chairman of county board and 1 other member of county board to be selected.

Compensation to Competitors

The owner agrees to pay to the successful competitor, as determined by the jury of award, within twenty days after such determination, the said sum of $5,000, being the amount of the first prize in said competition. If said competitor is selected as architect of the building, the said sum shall be considered as part payment of his total fee. In case of delay in building operations on the part of the owner, such delay shall not rescind any former action of the owner as to the selection and future employment of the architect to whom the work has been awarded.

In full discharge of his obligations to them the owner agrees:

To pay the following prices to those ranked next to the successful design: to the design placed second, $1,500; to the design placed third, $1,200; to the design placed fourth, $1,000; to the design placed fifth, $750, within ten days of the judgment.

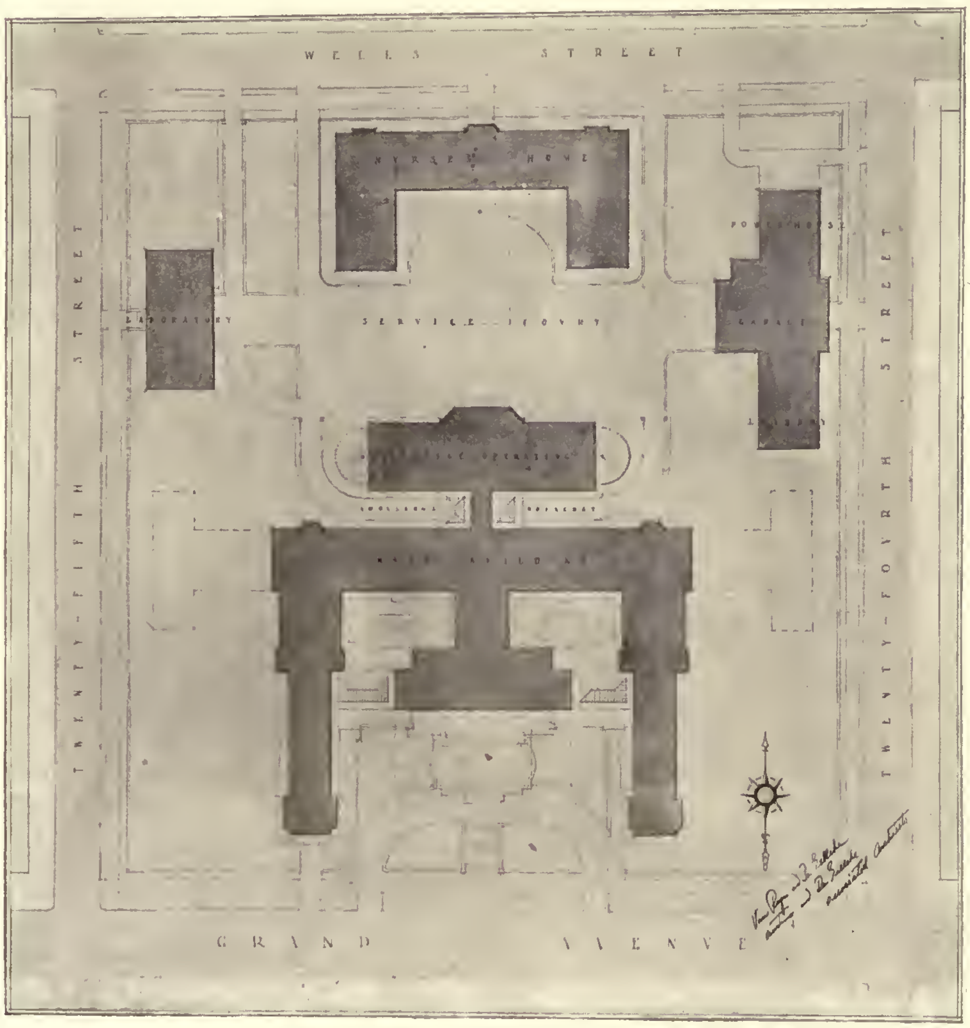
Requirements of the Buildings

The buildings are to be built of good available materials in accordance with good practice, with a view to rigid economy consistent with good lighting, ventilating, sanitation, and good taste.

A compact design is desired.

The exterior should be a combination of brick and stone, or brick and terra-cotta, or a combination of the three. Sheet-metal or wood exterior architectural treatment will not be acceptable. The entire buildings should be fireproof and corridors should be made as noiseless and soundproof as possible.

DESIGN FOR MILWAUKEE COUNTY GENERAL HOSPITAL.



List of Departments of Buildings to Accommodate 515 Beds

Medical; Surgical; Maternity; Pediatrics, Orthopedics; Eye, Ear, Nose, and Throat; Genito-Urinary; Psychopathic; Nurses—Indisposed; Doctors—Indisposed; Administration Department, first floor, central wing; Operating Department, fourth floor, rear wing; Out-Patient Department, ground floor; Psychopathic Out-Patient Department, ground floor; Culinary Department, unit on ground floor, and kitchen, basement, and first floor, rear wing; Dining-room Department, second and third floors; Isolation Department, eighth floor.

Tunnel

A tunnel of sufficient size and conveniently located is to be provided for, to connect the main hospital building with the laboratory building and the building containing power-house, garage, laundry, and workshop.

The Jury made the following awards:

1st—Van Ryn and De Gelleke, Milwaukee, Wis., Armstrong and De Gelleke, New York, Associated Architects. 2d—Schmidt, Garden & Martin, Chicago. 3d—Eric Gugler, New York. 4th—Clare C. Hosmer, Chicago, William H. Furst & R. G. Wolff, Associated Architects. 5th—Robert Messmer's Sons, Milwaukee, Wis.

Town Planning for Convenience and Health

By Louis Lott

THERE is not a community in the United States that cannot, by scientific analysis of the problems contained within its city plan and in its industrial and commercial expansion, so regulate its future developments and improvements that these will prove permanent assets. Problems definitely and well solved, by taking them up in the order of their importance, gradually work toward the definite goal of an orderly, beautiful community.

A comprehensive town plan co-ordinates all of the diversified interests and activities within a community, both public and private. It provides for adequate street traffic, transportation, and safety. It groups all business and other activities of a kind in given districts. It protects the home and private property from depreciations. It provides for parks, boulevards, playgrounds, and play-fields, and for school and building sites. It also provides for city extension and increased population, and protects a community from such losses and shortcomings as were caused by the lack of such a plan in the past. It furthermore does away with duplication of public and private efforts and waste, provides for maximum, intensive use of all community facilities, serves as a common tie of all interests, as a guide to public officials and private investors, and finally establishes definite objectives and goals. Thereby it co-ordinates all efforts toward a better, more healthful, more prosperous, and more attractive-looking community, creates order where there is chaos, and in the end will make as smooth-working a machine of the physical city as it is possible to make, for, being comprehensive, it takes all features and questions of the community into consideration, according to their degree of importance, and harmonizes them with each other. The plan beomes homogeneous and lop-sided development is avoided.

In this manner the industries of a community, for example, will receive the utmost assistance, for such features as docks, streets, traffic, railroads, etc., that have a bearing upon them, as well as the transportation, housing, and recreational facilities for their employees are studied: not only in relation to the community as a whole, but also to those industries, so as to enable them to reduce their overhead expenses to a minimum and thereby effectively compete in the world's markets. It must be borne in mind that if physical defects in the city plan prevent such industries from doing their business in the most economical and efficient manner, or if the lack of housing, or the quality of the same, etc., handicap such firms in procuring adequate help of the best quality, then all of this is not merely a matter that concerns these industries only, but it is also vital to the community as a whole, since its welfare and prosperity is more or less dependent upon the welfare and prosperity of its industries and commercial activities.

It follows, therefore, that both public and private efforts must be correlated, and that there must be team-work of the highest order that will work toward the greatest benefit for all, which can only be accomplished by having some definite plan to work by that will take care of all interests and secure their support and co-operation.

In these fast-changing times it is not wise to plan for more than about thirty years ahead, and then the plan should not be considered as an absolutely definite, immutable law, but as a sort of community constitution that, after due and deliberate consideration, is subject to amendments and changes when unforeseen conditions arise.

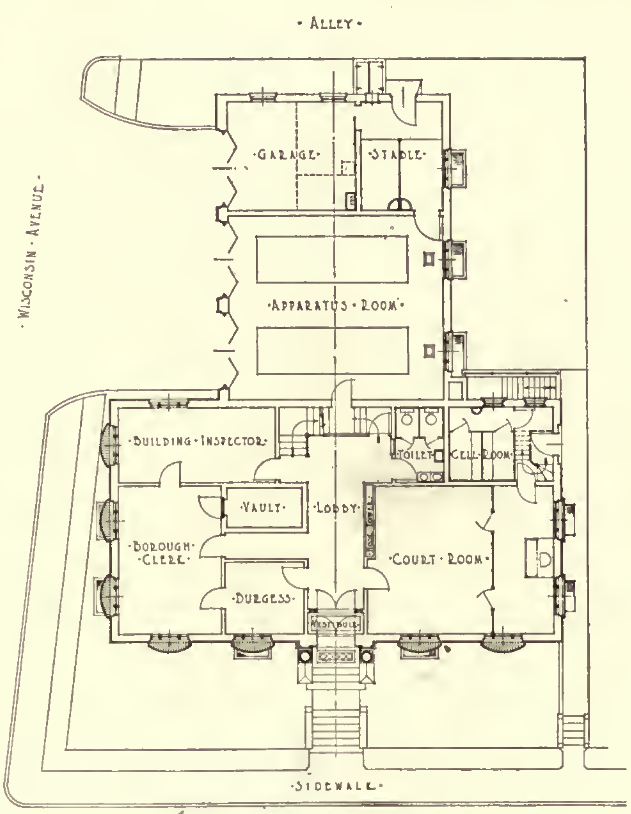
After the plan has been prepared, then follows the approximate computation of the cost of execution of the features of the plan, and upon this a budget is made; then, it being obvious that some things are more important and pressing than others, these are first undertaken and continued as fast as available funds will permit.

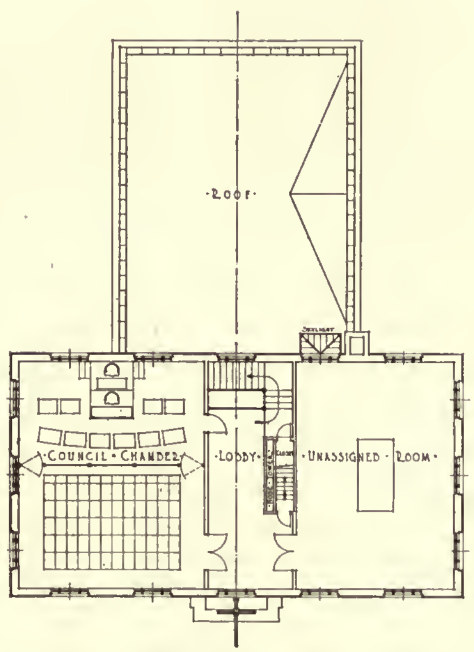
Some communities being more or less awake to their future possibilities, or having been forced into it by necessity, have in recent years, following the lead of European cities, undertaken to prepare corrective plans for some particular evil or for some immediate necessity. Some have a zoning plan, which is explained later; others have a park-and-boulevard plan, or a civic-centre plan, a railroad plan, a street-correction plan, or a city-extension plan, but only a few have to date undertaken a "comprehensive-development plan" that combines all of the above, and which embodies a complete analysis of a city's problems, both as regards its future needs and its immediate requirements. In some these improvements are steadily proceeding from year to year, according to their plan; in others little is being done, because there is no team-work, which is mostly due to the fact that the public was kept in ignorance while the plan was being prepared, and therefore there is no enthusiasm, co-operation, team-work. Consequently the public should be enlightened upon this subject, and, furthermore, be made to understand that comprehensive community development is not a matter of a spurt, "and have it over with"—our favorite way of doing things—but is a steady, determined, conscious effort for city improvement that goes on through generations, being practically a perpetual effort toward a definite end.

New York City is several times referred to in the course of this article, because this city furnishes the most striking town-planning examples for comparison that can be found. True, New York presents an abnormal, unique case, without a parallel, yet its conditions and the evils of its city plan pertain to a lesser degree to every community in this country. As an example, its surface traffic conditions have at this time reached a stage where they have gotten almost beyond control, in spite of all efforts of the authorities to regulate them, and will become worse and worse from year to year as the density of the population increases. This eternal jam, especially that within the down-town financial district, and also within the hotel and theatre districts, may fascinate the occasional visitor who remains a week or two, but as an every-day experience no perfectly sane person could term such conditions as normally healthy, or conducive to a maximum conservation and enjoyment of life and its bounties. New York may therefore serve as a warning to many of our smaller and younger communities, not to wait, in characteristic American fashion, until an intolerable condition is upon them and has obtained a strangle-hold, before a remedy is attempted that will then be prohibitive in cost, but to plan *now* to avoid conditions that may in future years work hardships upon the community.

Chart No. I (p. 304) is general and shows the subcharts in their order. At the base of the preparation of a comprehensive town plan must be the desire and necessity for a better-

(*Continued on page* 304.)





·FIRST·FLOOR·PLAN·

·SECOND·FLOOR·PLAN·

·WEST·LIBERTY·AVENUE·

MUNICIPAL BUILDING, DORMONT, PA.

Harry S. Bair, Architect.

(*Continued from page* 302.)

looking and more efficient community, and by collective effort to make it such. Then follow the charts of arguments in favor of such a comprehensive plan, then those of the comprehensive plan itself and of zoning, with their various features explained in detail, then that of the local problems of the community that must be solved, and finally the chart of the goals to strive for.

This chart deals with the reasons why a comprehensive city plan should be prepared: First, to provide present and future generations with a thoroughly well-worked-out, scientific document and sound principles, that will guide them in their efforts toward development of the community from every angle and from year to year, until such documents and principles require revision in order to meet changed conditions. Second, to make your community a better place in which to work, live, and prosper. A better place in which to work, for one thing, because of better street traffic and transportation facilities that are afforded through an adequate street system, that will allow the fastest and most direct traffic, thereby conserving time, human effort, and resources of the community. The appalling losses of time and energy from this source to pedestrians, surface-cars, busses, and vehicles of all descriptions will foot up to an enormous total in most communities in the course of a year, and will increase from year to year in proportion to the increased use of motor cars and trucks, and again be it remembered that such losses are not only of concern to the individual, but to the entire community as well, since he is a part of it, and any reduction of his earning power is a loss of potential wealth to the community.

In planning for an adequate street system, the width and number of major through-going, traffic-bearing arteries

CHART I

GENERAL

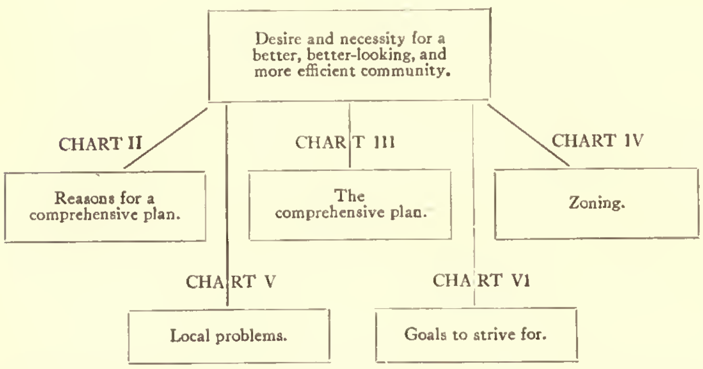
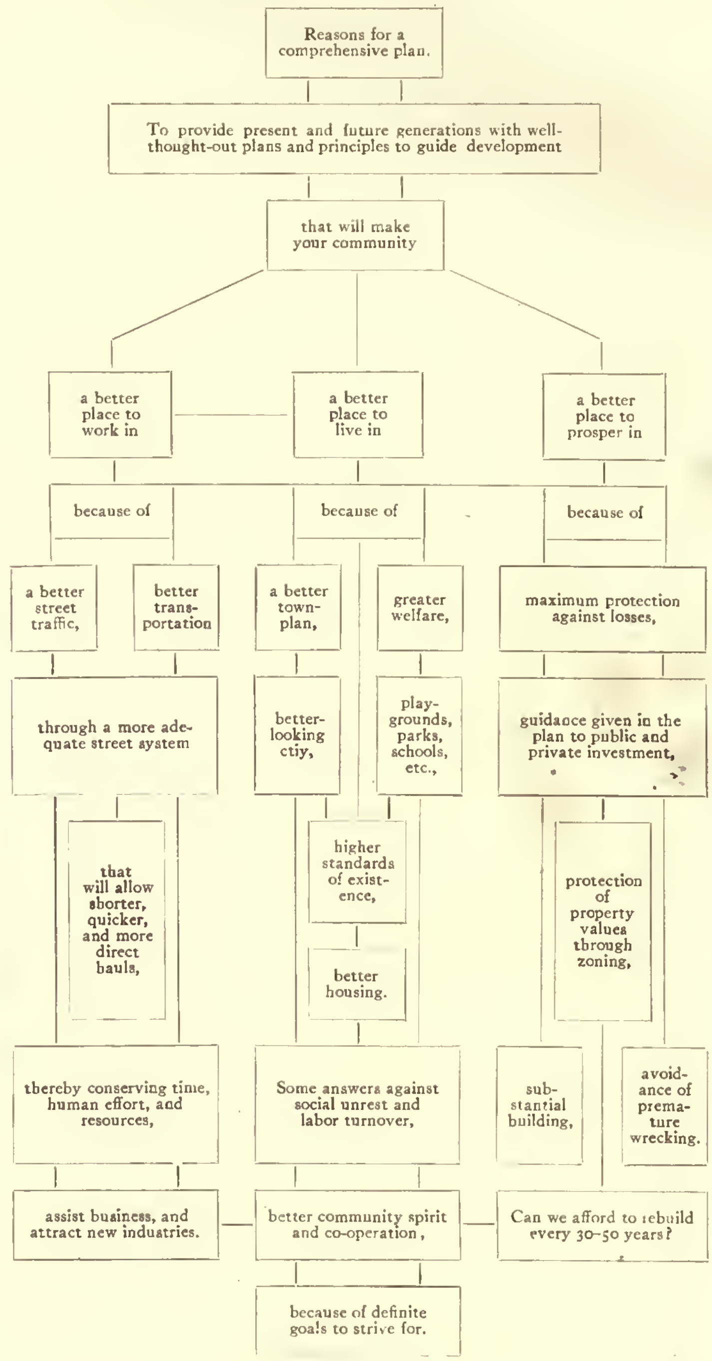


CHART II



MAIN STREET, DAYTON, OHIO.

This shows a very favorable example of a modern business street in course of development. At present it has but a few moderately high buildings, yet even this street, which is 132 feet wide and has the additional advantage of running north and south, will in course of time be lined from end to end with tall buildings. At certain times of the day and year it will then cast a shadow 1,000 feet long, thus creating conditions similar to those existing in some down-town New York streets to-day.

The lower floors of the buildings lining such streets will inevitably lose renting value, and undesirable working conditions will be created as a result of the lack of direct daylight. In the following figures the approximate percentage of available direct daylight is given for buildings of various heights upon streets 60, 80, and 100 feet wide.

Assuming the windows to be within 8 inches of the ceilings, the clearstory heights to be 10 feet, and the rooms 25 feet deep, the lower three floors of a five-story building facing a 60-foot street will receive 65 per cent of direct daylight; in an 86-foot street, 86 per cent; and in a 100-foot street, over 100 per cent.

In eight-story buildings the lower three floors will receive approximately 30 per cent, 40 per cent, and 50 per cent respectively; in eleven-story buildings 21 per cent, 27 per cent, and 35 per cent; in fourteen-story buildings, 13 per cent, 17 per cent, and 20 per cent, etc.

The curve of per cent according to height of building is parabolic, whereas direct daylight increases in direct ratio to the width of the street, for the widths here assumed.

These figures apply only to direct daylight, and do not take into account any reflected light, which varies according to color and texture of outside walls, and of floors, walls, ceilings, and furniture used.

The relation of the width of streets to the height of buildings should receive the most careful consideration from city-plan commissions, architects, and property owners. City-plan commissions should likewise remember that each additional story allowed upon a given street width will increase the tenancy of the buildings and consequently add to the burden of traffic.

should be scientifically determined to take care of a peak load traffic at maximum speed that is compatible with safety, and that will cause the least amount of confusion, through provision of ultimate widening of such major streets, and opening up, if necessary, of parallel streets to properly take care of this traffic. This may also require the breaking through of some connecting-links.

The actual widening of such streets can be spread over a great number of years, and in most cases need not cost the community a penny. In some communities the strip of ground needed for street-widening has been donated by the adjacent property-owners; in others, where this voluntary co-operation cannot be had, the improvement is either charged against abutting and near-by properties that directly benefit through such an improvement, or the taxable values of these properties are raised in proportion to the increased value caused by the development, so that the increased income from taxation will ultimately cover the cost and interest charges of the improvement.

Besides the difficulties and handicaps of traffic and transportation, New York also presents the worst working conditions in many of its office and loft buildings, as far as light and sunshine are concerned, that can be found. In many of these artificial light must be used upon the brightest days, not a ray of sunshine being able to enter into many of the rooms of these buildings because they have made canyons of the streets, especially in the down-town financial district. However, as far as possible, the zoning law of 1916 has put an end to the further spreading of this evil.

Surely, such conditions cannot be considered satisfactory standards under which to work or to expect this and future generations to discharge their duties to the best and fullest extent! Other American cities are to a degree gradually acquiring this same evil in their business sections, and will eventually be as bad in this respect as New York's financial district, if they do not protect themselves through the laws against the possibility of such conditions.

The foregoing should prove the necessity for a comprehensive city development plan, because it provides for better working and business conditions, thereby assisting business and attracting new industries and people.

In every community there is much useless duplication of effort. For example, the statement is made by experts that an average of thirty per cent of the mileage of street-car lines is wasted because they have not been comprehensively planned.

Furthermore, the protection and guidance given through the comprehensive plan to public and private investments in permanent improvements will be a great factor in the avoidance of waste and in the stabilizing of values, for, are not in every community improvements constantly undertaken that are ill-considered, in that they have been planned without due consideration or good judgment as to the probable general development of the community, and, in the end, prove to be only temporary, or subsequently depreciate in renting value because the improvement is not in the right location?

Eventually such buildings that were intended to be more or less permanent are prematurely wrecked and have served only a fraction of their possible usefulness, in some instances less than ten per cent; in others the buildings remain, and make the corrections in the plan or a public improvement impossible, because the wrecking of one or more expensive buildings makes the cost prohibitive. In either case community resources and opportunities are wasted.

Can the nation, with all its resources and wealth, afford to rebuild a large percentage of its ill-considered buildings every fifty years or so?

The guidance given to public and private investment in a comprehensive plan is extremely important. It conserves capital, assists business in various ways, and stabilizes realty values. As later shown under zoning, New York City has lost untold millions because of the lack of zoning ordinance, and has saved this and future generations perhaps billions through this ordinance that went into effect in 1916.

In attacking this problem the community must make clear to itself that present standards will soon become out of date and that badly planned, unattractive, and poorly constructed housing becomes, from the start, not only a liability to the owner but to the community as well, since it will soon turn into low-class property and eventually slums, a scrap-heap of society and human endeavor, and a blot upon the community, and, furthermore, just so much resource and effort gone to waste. Accordingly, will your community be satisfied to accept as a standard the commonly seen long, dreary rows of detached apartment-houses, one like the other, without any individuality or merit in regard to looks; or will it accept as a standard spaces between detached houses that will not even let in sufficient light and air, let alone sunshine, or permit privacy; or will it allow dingy, insufficient courts in apartment-houses; or will it allow skimping in construction, that does not afford sufficient protection from temperature changes that cause discomfort and waste of fuel, or such construction that easily falls into decay and soon presents a dilapidated appearance?

The questions of quality of construction and sufficient air and sunshine can easily be solved by ordinance regulations, but the remedy for bad planning and ugliness can only be secured by engaging the best professional services obtainable, and since the low-price property-owner or speculator cannot and will not go to the legitimate expense of engaging such services, these must be furnished by the government, either national, State, or municipal, such as the United States Government furnished in its war-housing activities, or as the State of Wisconsin is doing in furnishing small-house plans, or as the chapter members of the American Institute of Architects of various cities have recently done, when each member donated a set of well-worked-out, low-cost house plans to the public. However, the latter must be looked upon in the light that "every little bit helps," and not as a remedy. In the absence of governmental or municipal initiative it must devolve upon individual, or upon collective, responsible citizenship to furnish such services to the low-cost home-builders, if we are to have better-looking residential districts, and in the long run better investments to the owners of such property; and here again the question must be answered, Can the nation, with all its wealth and resources, afford to rebuild a large percentage of its housing every fifty years or so?

The proper consideration of all of the above items cannot help but increase local pride and patriotism and the spirit of co-operation and team-work of all classes and interests in the community, and ought to be one of the answers to the solution of the social unrest that is prevailing all over the land. It will prove a material factor in lessening the floating population and consequent labor turnover. The ultimate attainment of the goals inspired by a comprehensive plan and principles that a community sets for itself can only be had through the closest community spirit, co-operation, and team-work.

(*To be continued.*)

Tau Chapter House, Hamilton College, Clinton, N. Y.

R. E. Slyter, Architect.

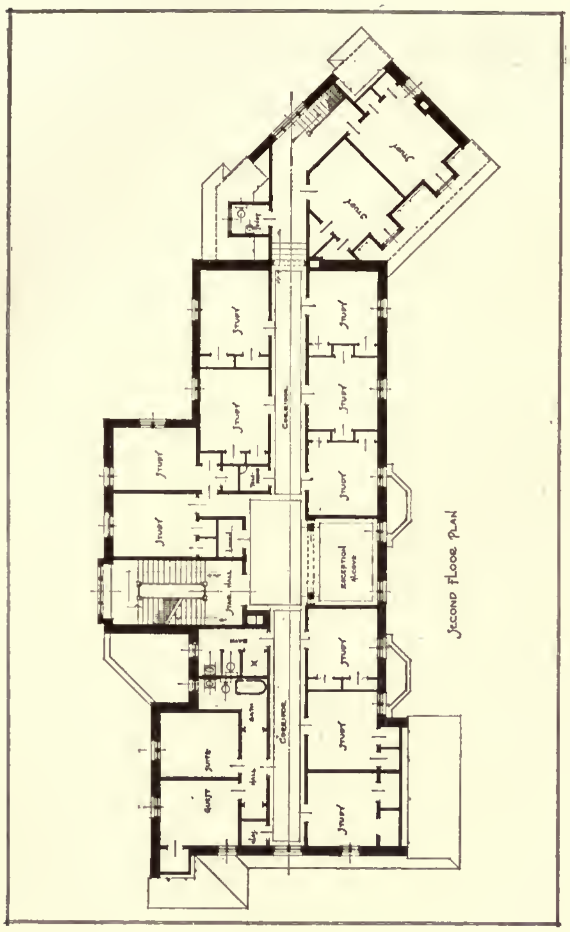
ON main floor note accessibility of all rooms and utilities from the hall without using any of general living quarters as run-way; the adequate and convenient entrances, coat-rooms, etc.; enclosed stair-shaft for fire protection, this enclosed stair-shaft being most effectively economical in control of heat; the two-front porch which can be glazed if desired; the unobstructed view from the living-room bays; the ample sun terrace; the dining-room down five feet to put it on same level with kitchens, etc., and thus avoid dumbwaiter service; the economical but convenient reception nook; the ample library to be used as sitting-room during dances; the well-arranged axes; excellent wall spaces; lounging spots in bays; ample windows, etc.

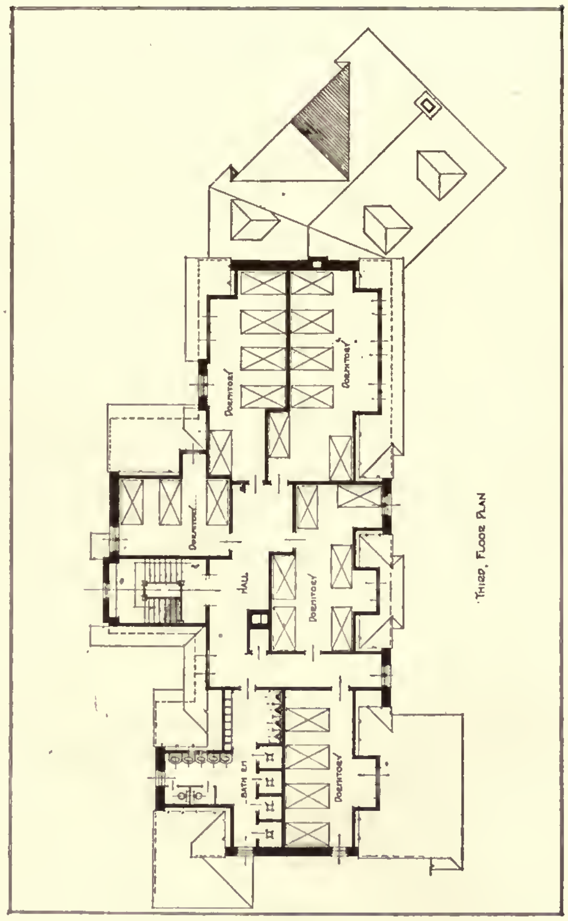
The second-floor plan calls for two-man studies of modest dimensions but carefully planned for special study furniture; a sitting-alcove at the head of the stairs; an alumni suite, with bath, so arranged that two rooms, with bath, can be shut off from the rest of the floor for house-party chaperons, or to allow an alumnus—even with his family—suitable lodging. Wash-rooms are intended to be sufficient for needs of house-party guests, as the second floor would be turned over to them. The enclosed stair-shaft, in addition to its fire protection, makes a second stairway to the third floor really unnecessary at house-party time. It is intended that individual living arrangements be distinctly not luxurious, but simple, plus much-needed adequate sanitary facilities.

The third floor is divided into small dormitories according to the generally adopted and most approved plan in modern fraternity houses—and the plan approved by the active chapter. Showers and wash-room facilities are concentrated on this floor. Ample cross ventilation will be secured through transoms. This floor will be kept cool for sleeping, though ample heating will be provided. Finish and floors can be as economical as judged proper. The enclosed stair-shaft is a great addition to the safety of the sleeping-floor in event of fire. At house-party time the third floor will be occupied by the men. Bed equipment will be partly single cots, partly double-deckers. Sleeping quarters so arranged will also enable alumni returning to Commencement to be adequately housed in larger numbers.

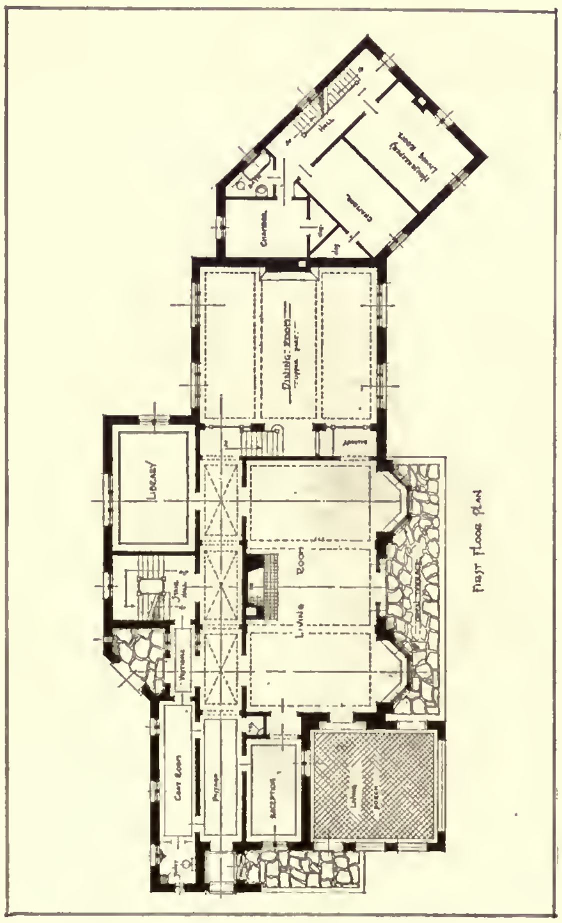
The basement floor includes on one level the dining-room and service with sufficient room for live storage; on the other ample coal and provision storage, heater-room, etc., and the large Lodge Room—which can be decorated and furnished at convenience—with separate stair from main floor. Some of this floor could be utilized for billiards, etc., if desired.

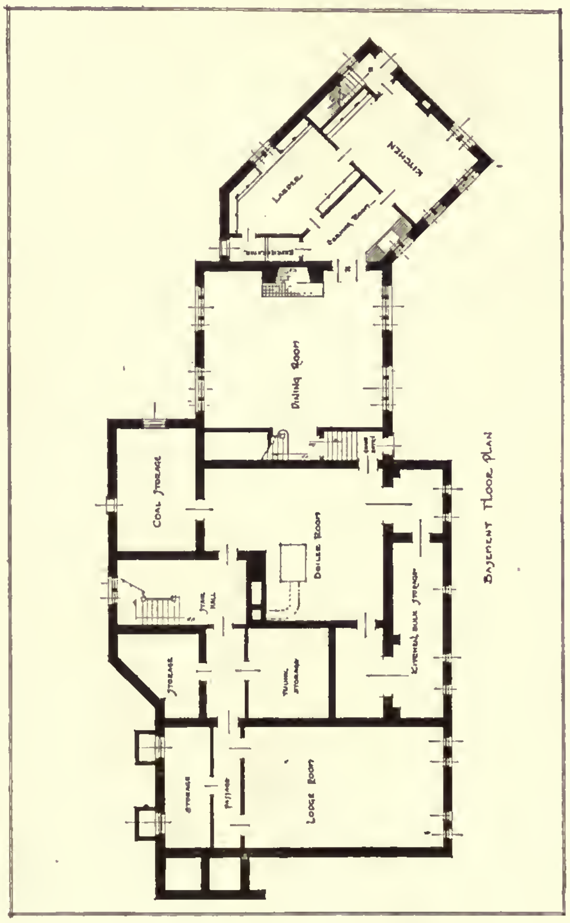
The sun terrace, lowered dining-room level, low service wing will keep the house to the slope and hide artistically the great drop on which the house will stand. This general arrangement seems the only wholly satisfactory one on this site—one that will give light and air to the service quarters, dining-room, and basement.





R. E. Sluyter, Architect.





TAU CHAPTER HOUSE, HAMILTON COLLEGE, CLINTON, N. Y.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, Architectural School of Columbia University

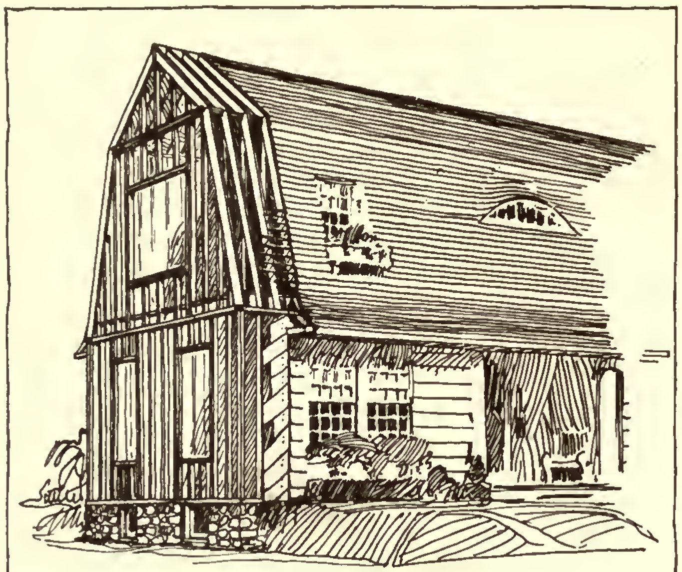
ARTICLE II

GENERAL TYPES AND COSTS

Types of House Construction

Type I

ALL small houses may be classified into four types, according to their construction. The first type is the commonest and is the wooden-frame structure. This has exterior walls and interior partitions built of light wooden studs, and the floors and ceilings framed with wooden joists.

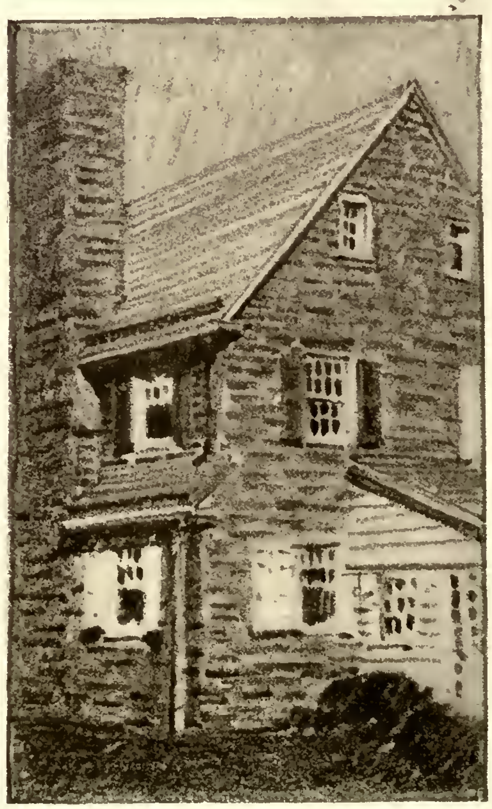


Type I Wooden Frame

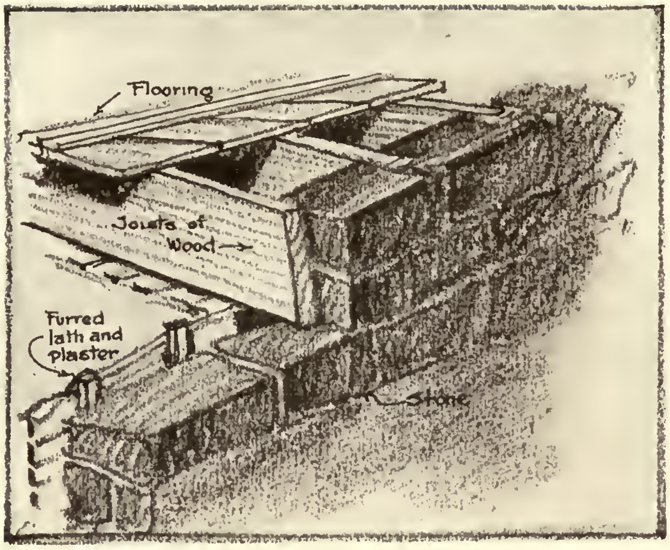
The exterior walls may be covered with clapboard, shingles, stucco, brick veneer or stone veneer. The roof is generally covered with wooden shingles, although slate, tile, asbestos, and asphalt shingles are often used. These houses are the most numerous, because the cost of wood in the past has been so much less than other materials that they appealed to the average builder's financial sense. However, the cost of such dwellings to the country has been very high, for they are extremely dangerous when attacked by fire. More than twenty-two millions of dollars are wasted in fire each year in these houses. These dwellings also cost us a great deal in up-keep. It would be interesting to see what was the total cost per year to repaint them and keep the roofs in order. It certainly would run into the millions. Although wood has increased from about $30.00 per thousand board feet to about $85.00 in the Eastern markets from pre-war days, yet the wooden house is still listed as the cheapest, for the cost of other materials has also increased, as brick from $10.00 per thousand to $25.00 until very recently, and cement from $2.00 to $4.50 per barrel. In any comparison the wooden-frame building is taken as the base or cheapest type of construction, although it is the most expensive in up-keep and fire-hazard of all. Until the price of wood increases in excessive proportion to other materials, there is no doubt that this type of house will be the commonest. However, there is much that can be done to make them more fire-resisting, and although we cannot look to the speculative builders to use such methods, since they increase the costs slightly, yet the architect should not overlook them.

Type II

The second type of dwelling which is next in vogue has exterior walls of stone, brick, concrete, or terra-cotta, and interior floors, partitions, and roof of wooden-frame construction. These are very slightly more fireproof than the wooden-frame structure, and as a class they are more costly in the beginning, but require less expense in up-keep. They resist attack from external fires better than the wooden-frame building, but if the fire starts within, they will burn just as readily. Although the fire loss per year of this class is not nearly as great as for the first type, yet it must be appreciated that there are not so many of them. The chief advantage of the masonry house of this second type lies in the lowered cost of up-keep, longer life, and saving of heating-fuel in the winter. A great deal of literature has been circulated by brick, cement, and hollow terra-cotta tile manufacturers by which the public has been educated to believe that this type of structure is much more fire resisting than it is. Of course this campaign of education was intended to stimulate interest in their product, and it had no unselfish motive back of it. The result of this propaganda is evident in the public belief that such houses are fireproof houses, while as a matter of fact they are not.



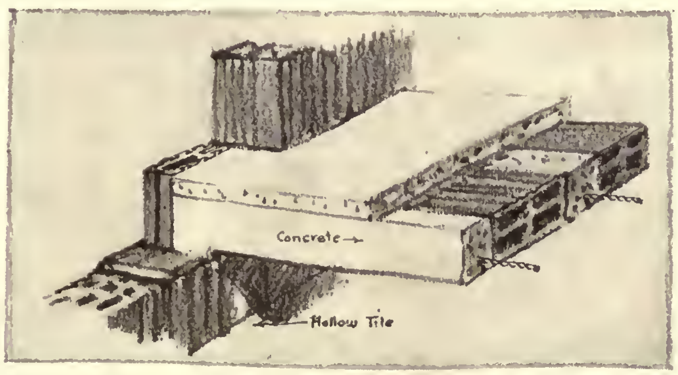
Type II Masonry and Wood



Type II · Masonry walls · Interior Wood

Type III

The third class of dwelling is quite rare, and very few small houses are built that could be classified under it. Some builders call them fireproof houses, although this is erroneous. These buildings have walls, roofs, floors, and partitions built of incombustible materials, but the finished floors, the trim, windows, and doors are of wood. The exterior walls are of masonry construction, and the construction of the floors and roofs consists of steel beams with terra-cotta arches or concrete floor slabs, spanning in between them, and the partitions are of terra-cotta, gypsum, metal lath and plaster, or other similar materials. They may also be built of reinforced concrete throughout, or any other combination of these materials. There have been very few



Tye III Walls, floors, partitions fire-proof, but windows, doors and trim of wood.

examples of this kind of construction used in the small house. It is an unfortunate condition that it is more adaptable to the costly mansion than to the average house of the middle-class citizen, for the high cost of construction of this character, in most cases, permits it to be used only by the wealthy man. Examples where such houses have been built generally show an investment of $30,000 or more, or, if they were built to-day, $60,000 or more. Those attempts to use this form of construction in the small house have been made by large building corporations, and have been chiefly represented by concrete houses of very ugly design.

Type IV

The fourth and last type of dwelling is the ideal fireproof house, but it is so costly that very few examples exist. This type can be termed fireproof with accuracy, for all structural parts, including doors, windows, and trim, are of incombustible materials. Metal trim is used or wood that has been treated to make it fire-resisting. This latter class of construction is so out of the reach of the average home-builder, on account of its cost, that its value cannot be thoroughly appreciated. Practically the only examples in existence are large mansions, built by wealthy clients.

Cost Does not Indicate Fire-Resistance

In this classification of buildings, it would almost seem that the cost of a building indicated its fireproof qualities. This is not true, however. There are many expensive dwellings which are just as great fire-traps as the less expensive ones. In both cases the fire hazards are the same, if they are built of the same type of construction. In fact, we could build a $60,000 dwelling according to Type II, and also a $10,000 one according to Type II, and make the latter more fire-resisting than the former by using certain precautions of construction in which the spread of fire is retarded.

Except in unusual cases, then, it can be seen that the construction of the ordinary dwelling will be either according to the first or second type, and that any fire precautions that are desirable must be applicable to them. Most comparisons of relative costs are made between the dwellings included under these two types, and the difference will be mostly a difference in the kind of exterior walls used in the construction. In fact, if any comparisons are made between different kinds of buildings, as to their relative costs, it is essential that only one feature be made variable and that all others be kept the same.

Comparative Costs

In order to appreciate the difference in cost, due to the kind of exterior wall used, the following estimates are given.

Comparative Costs of Houses of Types One and Two

Pre-war Conditions

TYPE ONE	
1. Wooden frame, covered with clapboard	100 per cent
2. " " " " shingle	101.6 per cent
3. " " " " stucco	102.9 per cent
4. " " " " brick veneer	105.8 per cent
TYPE TWO	
1. Exterior walls of hollow terra-cotta tile and stucco fin.	106.3 per cent
2. " " " brick—10-inch hollow type	109.1 per cent
3. " " " hollow tile, brick veneer	110.7 per cent
4. " " " 12-inch solid brick wall	113.0 per cent

The following comparative costs were made for the present unstable conditions of the market, and their accuracy is only relative.

Comparative Costs of Houses of Types One and Two

Present-day Conditions

TYPE ONE	
1. Wooden frame covered with stucco on metal lath	100.0 per cent
2. " " " " siding and sheathing	100.05 per cent
3. " " " " brick veneer on wooden sh.	105.87 per cent
TYPE TWO	
1. Exterior walls of hollow terra-cotta tile, brick veneered	106.5 per cent
2. " " " 8-inch thick brick	106.75 per cent

These two tables are enlightening, to show that, although materials have advanced in price, they have advanced in almost similar proportions, and that the comparative values between the different kinds of exterior walls are almost the same as before the war.

Approximate Costs

Besides desiring to know the relative costs between different kinds of houses, the architect is constantly up against the problem of approximating the cost before he starts his plans. His client comes to him and tells him that he wants a house to cost about $12,000, and then asks how much of a house can be had for this sum. In order to approximate this figure, the architect must use the cubic-foot system of estimating. Now, while formerly this system was fairly accurate, to-day it is almost impossible to give a snap judgment as to cost on the cubic-foot basis. The only safe way is to take the cost of last month's houses and add about 20 per cent, say some contractors. Others say it cannot be done at all.

Not only does the constant change in prices make the cubic-foot system of estimating inaccurate, but there are variations in cost due to the difference in interior trim and arrangement of the same type of building. For instance, the four-room cottage requires the same amount of plumbing as the eight-room house, both having one bath, and the cost for this equipment will be the same in each case, yet the difference in cubage will be double in the larger one over the smaller. A house which has much built-in furniture, like bookcases, linen closets, buffets, etc., is going to cost more per cubic foot than one without them. All of these factors must be taken into consideration when using the cubic-foot system of estimating.

Cubic-Foot System of Estimating

It is necessary to have the same uniform system of determining the cubage, if the same results are desired. The following is the generally accepted method:

1. Determine the total building area of the ground floor, extending from outside wall to outside wall. This should include accurately all offsets and projections.
2. Determine the average height of the building from the cellar floor to the average height of the roof. Where gambrel roofs are used, the average height is taken to a distance one-half the height from the top floor to the peak of the roof.
3. Multiply the above together for the cubage.
4. Porches should be added at one-quarter of their cubage, but if the second floor of the building projects over the porch, it should be figured in with the building.

The costs which are given here for the cubic foot are for the eastern section of the country, and cover a building having hardwood floors, cement basement floor, plastered walls, steam heat, modern plumbing, electric lights, and an unfinished attic. It must also be appreciated that the figures are for a two-story house, and they may be slightly reduced for a one-story. This is because the two-story house has proportionately more of its interior finished than the one-story.

Prices per Cubic Foot for Two-Story Dwelling

(*June* 1, 1920, *near New York City*)

Type I

1. Wooden frame building covered with siding, stucco, etc., costs from 40 cents to 45 cents per cubic foot.
2. Wooden frame building covered with brick veneer costs from 44.5 cents to 49 cents per cubic foot.

Type II

1. Exterior walls of brick, hollow tile, or concrete blocks cost from 45 cents to 50 cents per cubic foot.
2. Exterior walls of monolithic concrete cost from 48 cents to 55 cents per cubic foot.

If any elaborate work is designed for the interior, the costs will run up as high as 75 cents per cubic foot, and in large houses often as high as $1.00 per cubic foot. It is almost impossible to judge the value of a house design without having a few recent examples to compare, since there is required a considerable amount of common sense in using the cubage cost.

Factors Influencing the Selection of Materials

From what has been previously stated, it will be noticed that, as a rule, the architect in selecting the kind of material with which he will build his house is limited on account of expense to the first two types of construction—namely, the frame dwelling and the masonry house with wood interior. The latter two fire-resisting types are better fitted to the larger mansions where expense is not so important an item. Undoubtedly the comparative costs between the various kinds of exterior walls will have much to do with the selection; but more often the local conditions will outweigh these considerations. In some places, a house built of stone will be the best and most economical, in others, where there is an abundance of good sand, the cement house will be suitable, while those located near brick centres will find this material adaptable.

The ideal method, of selecting a material of construction purely from an æsthetic point of view, is not always possible. But, after all, is not the most abundant local material the most harmonious to use for any one locality? Nature adapts her creations to the soil and the scenery into which she places them. All her animals are marked with colors which harmonize with the woods or fields in which they live. In fact this harmony is their protection, and in the war we imitated it in our camouflage painting. It is astonishingly evident, in the New York Museum of Natural History, how far more beautiful are animal tableaux which are set in painted scenery, representing accurately their natural habitat, than those which are exhibited alone in the cases, without a suggestion of their surroundings. Their marks and colorings seem ridiculous when they are separated from their natural surroundings. The same principle holds true in selecting the material for the small house. A stone house, built of native stone, in a stony, rugged region is the most harmonious of all. A cement house in a flat, sandy country always seems in accord with the scene. A brick house in hills of clay most certainly appears the best, and a wooden house, near the great outskirts of the timberland is a part of the inspiring picture. Why are so many of the old colonial houses so charming? One of the reasons is the careful use of local materials.

Some Principles of Economical Design

In the first architectural studies of the house, since this problem of cost is ever with us, it is well to be familiar with some of those broad and general principles of economical design.

The lower we keep our house to the ground, the less will be the expense of labor, for, when work must be done above the reach of a man's hands, it means the construction of scaffolds and the lifting by special hoists of the materials. This is not so important a consideration with the light wooden frame building as it is with the masonry house. Wherever we have brick, stone, or concrete exterior walls, for the sake of economy they should be built low. Mr. Ernest Flagg has found this to be so very true that, in houses which he is constructing at Dongan Hills on Staten Island, he has carefully limited the height of all walls to one story, and starts the construction of his roof from this level. Of course, at the gable end of the house, it is necessary to carry them up much higher. Now, the starting of the roof from the top of the first floor makes all the second floor come within the roof, and this heretofore has been impracticable, on account of the great heat generated under the roof and the inability of dormer windows to ventilate the rooms properly. Mr. Flagg has solved this problem by inventing a simple roof ventilator which is located on the ridge of the roof, and serves the purpose of both lighting and ventilating. So successful has this been, that the space which in most houses is called the attic, and is wasted, has been made available and livable. What he has accomplished by these ventilators is the ability to start the roof at the top of the first floor, and thus lower the exterior walls and set the attic in the place of the second floor and make it very livable. Not only does this principle of design save considerable money, but it follows one of those great laws of beauty, so prevalent in nature. It makes the house low and nestling in the landscape, thereby harmonizing it with the surroundings. The house of the uncultured speculator stares blatantly at you and is proud of its complete isolation and difference from the landscape; but the house of those who have taste is modestly in harmony with the surroundings. The ugly house thrusts into the air without close connection with the ground, while the comely one cuddles in nature's lap. Is it not strange that this principle of economy is a law of beauty?

There are other features of economy in design which should be observed. The simpler and more straightforward the design, the cheaper it is and the more beautiful it can be made in the hands of the good artist. Simplicity is the highest art, as it is also the most economical thing. Likewise the cost of a house can be reduced by shaping as nearly to a square as possible, and reducing the outside walls to the minimum. The semi-detached house in the group plan accomplishes this in the best manner, and gives to the whole structure that low, long sky-line that is so very pleasing. This also makes one soil line and one chimney do for both houses, a great point in economy. As was said in the last article, some architects believe these group houses are the only solution to the problem of the small house.

The Nebraska State Capitol Competition

We are in receipt of the following letter from Mr. Willis Polk, of San Francisco:

"To the Editor of Architecture:

"Referring to your comment on the State Capitol Competition in your August number, your conclusions in that comment seem to coincide with the opinion of the late D. H. Burnham, as expressed by him in a letter twelve years ago:

"'We are not ourselves believers in the value of competitions and it is our custom not to engage in them. Our belief is that an Architect, properly trained by experience in the class of buildings he is called upon to undertake, when once fully informed as to the particular conditions of the problem, can produce as many different sketches as could be produced by a number of Architects; and that in any case the real solution can be arrived at only by the process of successive elimination through a series of studies in which the Architect and the Owner work closely together.'"

Announcements

Arthur Dahlstrom, architect, formerly located at 612 Andrus Building, is now occupying offices at 305 Essex Building, Nicollet at 10th Street, Minneapolis, Minn.

Harold Holmes, architect, announces that he is now located in his new studio building, 151 East Chicago Avenue, just east of the drive.

Mr. C. Frank Jobson, architect, of Chicago, announces his office is now incorporated under the name of Jobson & Hubbard, with offices at 225 North Michigan Boulevard, Chicago.

The Boston Varnish Company is following a progressive idea in having had prepared a series of practical detail sheets showing the use of their products in colonial architecture. They cover a variety of subjects and are carefully measured and drawn by Edgar and Verna Cook Salomonsky. Architecture will reproduce one sheet each month in its advertising section. The series of twelve, enclosed in a folder, will be mailed to any architect who will make a request for same to the Boston Varnish Company.

A partnership for the practice of architecture has been formed by Henry T. Barnham and Charles L. Hoffman, under the firm name of Barnham & Hoffman, architects and engineers, Chamber of Commerce Building, Richmond, Va.

Japanese Old-Timers in Electrical Industry

STUDENTS of the growing American enterprises in the Far East will be interested in the statement issued by the Nippon Electric Company of Tokyo, the Japanese subsidiary of the Western Electric Company of New York. Organized under American supervision less than a generation ago to manufacture the telephone and many of the other electrical requirements of Japan, the Nippon Company had 1,340 native employees in its personnel when its fiscal year closed recently. Of these, 143 had been employed by it over ten years, 29 over fifteen years, while 11 had seen over twenty years of service. All of these Japanese electrical workers were men with the exception of 7.

Following the system used by the Western Electric Company in America in rewarding length of service among its employees, the Nippon Electric Company gave a dinner to its old-timers at Sanyentei. Gold buttons and certificates of service were presented to all those who had passed the ten-year mark.

Book Reviews

OLD NEW ENGLAND HOUSES. By Albert G. Robinson, author of "Old New England Doorways." With nearly a hundred illustrations from the author's unique collection of photographs. Charles Scribner's Sons, publishers, New York.

Mr. Robinson's former book on doorways, of which a new and enlarged edition uniform with "Old New England Houses" has been made necessary to meet a wide demand, met with instant approval by both architect and layman.

In the new volume, for which he writes an introduction that is a brief but illuminating review of the development of the various architectural types of New England, are included nearly one hundred examples of old houses gathered from all parts of New England. These represent not only some of the stately old mansions of the well-to-do, but as well many of the simpler smaller houses that line village streets or perch here and there on the warm shoulder of some far-seeing farm hillside.

The author says that these old houses may be divided into four groups, the difference being marked by the roof. One group includes the buildings, whether of one or two stories, with sloping roof of equal length in front and back, mere rectangular boxes of varying size and proportions, with a doubly sloping cover. These are commonly known as "gable" or "pitch" roof houses. Not a few of this type show an attached ell, but in most cases, if not in all, this is a later addition. A second group shows the "lean-to" with the extension of the roof-line in the rear. While much more common to houses of two stories in front, the long back roof appears occasionally on houses of a single story. A third group includes the "gambrels." In his poem "Parson Turell's Legacy," Doctor Holmes gives the origin of the term:

> "'Gambrel?—Gambrel?' Let me beg
> You'll look at a horse's hinder leg,—
> First great angle above the hoof,—
> That's the gambrel; hence gambrel-roof."

I am not prepared to say whether this is reliable information or a product of the genial autocrat's fertile imagination. But old houses with gambrel roof are abundant in New England. The form is used in quaint cottages and in stately mansions like the "Dorothy Q" house in Quincy and a number of others. The design appears to have been borrowed from the Dutch, but it was used in New England as early as the last quarter of the seventeenth century. While the use of the dormer-window, common enough in the South, was unusual in the North, it is of frequent occurrence on houses with the gambrel roof, both one and two storied. But there is a material and not fully explained difference between the New England gambrel and its prototype. The latter is quite the more graceful. Its upper slope is much shorter and its lower slope less steep than is the New England roof. While grace is lost, the New Englander gained in area of headroom in what was, in effect, a second story. The fourth group consists of the pyramidal type or "hip" roof, usually square boxes with the roof sloping from the four sides to a common centre. This also shows variations in roof angle as related to the wall of the house. Also, while in many cases the four slopes met at a central peak, or stopped at the walls of a large central chimney, in many other cases they terminated at the edge of a flat platform around which, frequently if not usually, a low railing or fencing was built.

Many visitors to old Mystic will remember a whole row of these square boxes on "Skipper Street" (we protest against the reported change of such a quaintly descriptive name of the street to such a commonplace one as something or other avenue), on top of which may be observed "The Captain's Walk," a little square or round observatory surrounded by a railing.

The architect will find these Old Houses a useful and suggestive book as a reference with their many variants of the Colonial style.

With the "Doorways" it gives him a very comprehensive presentation of the period dealt with.

AN EPITOME OF HYDROTHERAPY, FOR PHYSICIANS, ARCHITECTS, AND NURSES. By Simon Baruch, M.D., LL.D., Consulting Physician to Knickerbocker and Montefiore Hospitals, Consulting Hydrotherapeutist to Bellevue Hospital, New York City, formerly Professor of Hydrotherapy, College of Physicians and Surgeons, Columbia University. 12mo of 205 pages, illustrated. Philadelphia and London: 1920. W. B. Saunders Company.

The chapter on "Hydrotherapeutic Instalments," including plans of existing institutions and observations on common defects, will be of interest to architects who are planning hospitals or who want to be informed as to the best modern methods in hydrotherapy. The author emphasizes the importance of hydrotherapy in the curriculum of the nurses' training schools and of its great usefulness in our reconstruction hospitals.

A MANUAL OF FACE BRICK CONSTRUCTION. American Face Brick Association, Chicago.

A book intended to show the value of brick as a building material and to serve as a manual for the builder. The introduction includes an interesting story of brick from primitive times. It is, above all, a book of practical value and the many fine plates in color, with plans and details of construction, should prove a useful reference in the architect's library.

BRICK FOR THE AVERAGE MAN'S HOME. A Selection of Thirty-five Designs for Practical and Artistic Homes, including Cottages, Bungalows, Houses, and Apartments. The Common Brick Manufacturers' Association, Cleveland, Ohio.

Another book of practical service. Its many attractive drawings of typical houses of brick with working drawings and specifications belong in the architect's library with the book referred to above.

The two books admirably supplement each other.

FORM PROBLEMS OF THE GOTHIC. By W. Worringer. Authorized American edition. G. E. Stechert, New York.

This book may well be called an attempt to arrive at the principles of Gothic by way of æsthetic theory, a study of art as human psychology. "The history of architecture is not a history of technical developments, but a history of the changing aims of expression, of the ways and means by which this technic conforms and ministers to the changing aims through ever new and different combinations of its fundamental elements."

This edition is translated from the third German edition, according to a preface written in Berne in 1912.

Wooden Doors Dating Back to Middle Ages

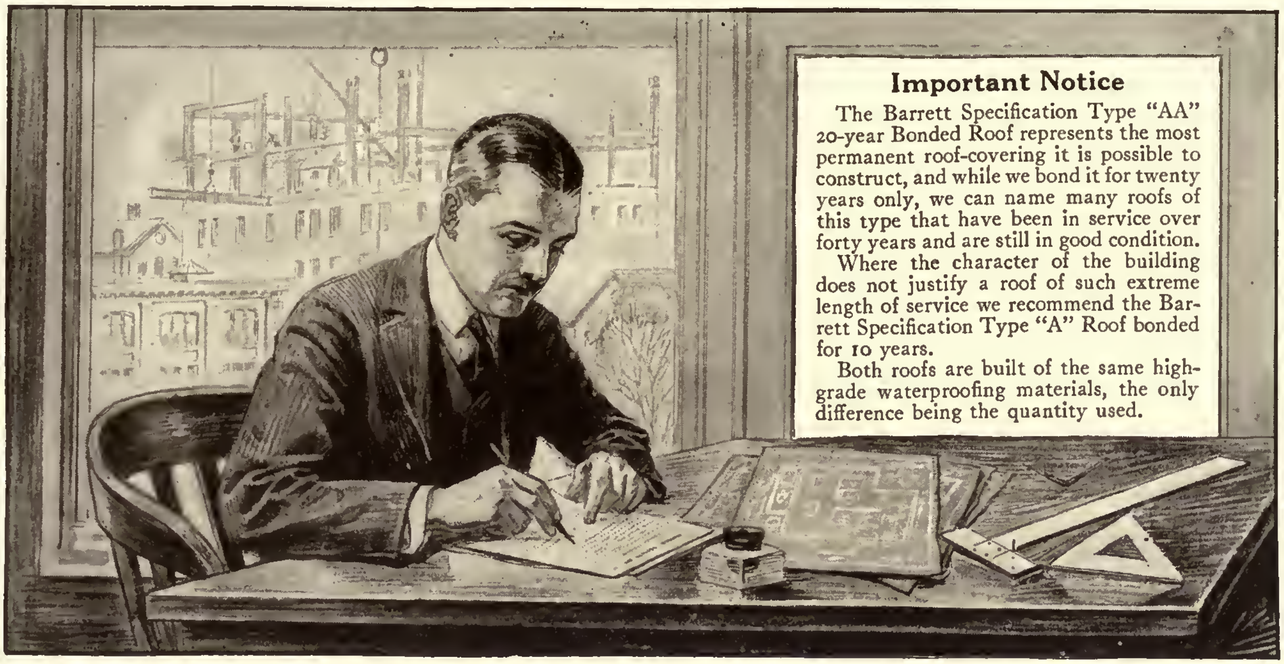
AMONG the famous doors of history are the carved wooden doors of the church of Santa Sabina, Rome, depicting, in relief, scenes from the Old and New Testament. These are one of the most remarkable examples of early Christian sculpture extant.

In the earliest times, as in Babylon, doors swung on sockets instead of hinges. In Roman days wooden doors were decorated with bronze and inlaid, and throughout the Middle Ages richly carved doors of wood adorned the churches. In the Gothic period, wooden doors were decorated with wrought-iron hinges which were often elaborated into intricate ornamentation covering a large part of the door. The doors of the cathedral of Notre Dame in Paris of the thirteenth century are the finest examples of this class. During the Renaissance in Germany and France elaborately carved doors were among the most beautiful products of wood sculpture.

Some of the old English doors were formed of narrow planks placed side by side and in dwelling-houses generally in the Middle Ages the doors were small and fairly simple, meant for strictly practicable purposes and often provided with some means of defense. The doors of the Norman period were round-headed, while with the thirteenth century came the doorway with the pointed arch and later the flattened arch.

In the case of interior doors, splendid old polished mahogany doors were important features in some old English homes, and there were old oak doors of wonderful beauty, especially when found in oak-panelled rooms.

Haphazard selection of doors of the ready-made variety should not be allowed in the building of a fine home, but the doors should be designed by the architect who builds the structure that they may be in keeping with the general style of the house. Upon the attractiveness and distinction of the door and doorway depends the visitor's first impression of the home he is about to enter.



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Our sixty years' reputation in the roofing business enables us to place at the disposal of the architect and his client a "definite" Roofing Specification that has been proved by the most exhaustive experience to give those "better results" advocated in the American Architect editorial herewith.

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The Definite Specification

From Editorial Page, American Architect, N. Y.

"THE physician who made a practice of prescribing certain drugs or others whose * * * * properties were similar—would soon lose the confidence of his patients, and yet that is in effect what the architect is doing who persists in the outworn and discredited practice of writing 'or equal' after the specification of a given material. * * * *

"Unless he entirely neglects to perform his function and leaves the decision to the builder, he must sooner or later determine what is to be used and, considered both from the standpoint of the client's interest and his own reputation, it would seem to be desirable that he * * * * make his decision *when the specification is written* rather than *after the contract is let.*

"The old argument, * * * * that a definite specification fosters high prices, has been effectually disposed of by leading architects. * * * * It is evident that no manufacturer of standing and responsibility would take advantage of a definite specification to increase his price. To do so as a policy would be business suicide. * *

"If there is but one article or material that will, in the opinion of the architect, give better results than any other, he should have the moral courage to specify it outright."

Barrett Specification Roofs

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The Competition for New York's Memorial Army and Navy Club

LEADING architects of the country will be asked to submit competitive drawings of the $3,000,000 club-house the Army and Navy Club of America is to build in New York in memory of the three thousand five hundred officers who died in the war. The memorial will be a national one, dedicated to the commissioned men in all branches of the service who made the supreme sacrifice.

Charles Dana Gibson, Edwin Howland Blashfield, Henry Bacon, and Benjamin Morris, with Admiral Bradley A. Fiske, president of the club, form the committee appointed to select the design for the building.

Notable contributions have been made to American art and architecture by members of the committee on design. Edwin Howland Blashfield decorated the great central dome of the Library of Congress. His war posters attracted international attention. His most recent important work was the design for the government's certificate of honor issued for every man who died or was wounded in service during the war.

The impressive Lincoln Memorial at Washington was designed by Henry Bacon. He formerly was a member of the firm of McKim, Mead & White. He is a member of the National Institute of Arts and Letters, and the National Academy of Design.

Benjamin Morris was the architect for the Junius Spencer Morgan Memorial at Hartford, the Westchester County Court House at White Plains, and is the designer of the new Cunard Building at 25 Broadway, New York. He is president of the Society of Beaux Arts Architects.

Charles Dana Gibson is known throughout the world as an illustrator. He has a wide personal acquaintance among artists and architects. *Life* was recently purchased by Mr. Gibson, and he is now its publisher.

The new club-house will be centrally located and will serve not only as a monument to the men who died but also as a home for living officers, active or retired, in the army, navy, or State militia. Civilians interested in the nation's defense are also eligible for associate membership.

The committee on design will decide the rules governing the competitive drawings the club will request of all the leading architects. Only tentative plans have been decided on, but interesting features of the new building are included in these.

The memorial feature will probably take the form of a central court or hall with bronze-panelled walls where the names of those who made the supreme sacrifice will be engraved.

In the new club-house there will be at least four hundred bedrooms. A large dormitory, furnished with cots, will also be provided for use on special occasions when the city is crowded with service men.

There also will be a large assembly hall and small rooms for meetings of patriotic societies. Women friends of members, or women relatives of the deceased men, will find a dining-room and reception-room for their exclusive use. Other features to be found in a modern club-house will be included in the plans.

The club recently broadened its scope so as to include in its membership all officers, ex-officers, and all commissioned men with the Allied armies during the war, numbering approximately two hundred thousand.

Among the men recently elected to life membership are: Henry P. Davison, who is chairman of the civilian committee; Vincent Astor, lieutenant in the navy during the war; Elmer A. Sperry, inventor of the gyroscope; J. P. Morgan, Arthur Curtis James, Charles H. Sabin, Brigadier-General Guy E. Tripp, Brigadier-General Samuel McRoberts, and others of equal prominence.

Mortgage Tax Exemption

WE are indebted to the *Metal Lath News* for the following clear statement on a vitally interesting question:

"The construction industry has been worried about the transportation situation, but the minute that the banks were unwilling to float loans, building activities stopped and railroad conditions and coal became only incidental.

"The banks were obliged to stop construction loans, not because of prices of materials, but because they could not dispose of the real-estate mortgages to their customers. This was largely due to the federal income tax which, with its heavy surtax on the larger incomes, makes mortgage buying at 6% absolutely impossible. Exactly how this works against the larger incomes—the sources of most of the investment money—is seen below.

"The present agitation to make mortgages on homes exempt from federal tax should, therefore, be thoroughly understood by those who are in the building business, and who are now powerless to aid in the housing shortage, because loans are not available.

"No one factor is as vital to the safety of the whole country as the building of homes, and it is, therefore, the privilege as well as the duty of every one connected with the building industry who understands this situation and whose very livelihood depends upon construction activity, to advocate legislation which will release vast sums for home-building.

"The government—that means the people—have within their reach a very powerful force to attract sufficient capital to the construction of homes if it is only called into play. To encourage American manufacture, a tariff was imposed, and to increase farm loans and municipal improvements, exemption from federal income tax was inaugurated.

"No one can blame the man with an annual income of $50,000 for refusing to make investments that will yield but $412 on $10,000 when he can get $600. It is good business for rich man or poor to make the investment that looks most profitable, so a unified appeal to every member in Congress for the tax exemption of mortgages is now the only logical solution.

"The bulk of new money for mortgages must come from estates and individuals having such excess funds as are not available until incomes of $20,000 or over are reached. As an example, an income of $30,000 is subject to a federal normal and surtax, totalling 21% in addition to the income taxes levied by several of the States. This income tax must be deducted from the gross return on the mortgage before the net return to the investor is found.

"To compete with the 6% municipal bond which is exempt from income tax, the banks cannot offer a $30,000 investor anything less than 7.6% on a taxable mortgage, or to the $50,000 investor anything less than 8.7% and have him come out even. With mortgages tax exempt, however, they could readily be sold at 5% and 6% bases."

Frontispiece No A to No. 5 November

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NOVEMBER, 1920

TEXT PAGES

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THE BUTTER TOWER, ROUEN. From the lithograph by Howard Leigh.

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VOL. XLII NOVEMBER, 1920 NO. 5

General Principles of School Planning and Construction

Tooker and Marsh, Architects

High School, Norwich, N. Y. Tooker & Marsh, Architects. Arthur W. Coote, Associate.

IT was formerly the custom in planning a school-building to combine a number of standardized units, sufficient only for the immediate needs of the community. In recent years the tendency has been toward a broader aspect, involving a comprehensive building programme. The subject is one which, through its interesting development, has enlisted the services of many of the best architects, who are striving genuinely toward the best solution of each problem rather than interesting themselves solely for the financial advantages to be gained by merely complying with the conventional requirements, without thought to future development.

Fortunately, the development of school planning has advanced rapidly of late years. There are certain features which have proved to be right and are standard. The days of the dark, unsanitary, ill-smelling schoolroom are, happily, in the past. The end of the present era of progress is not in sight. Architects all over the country are striving to improve present standards, and ARCHITECTURE intends to aid in the interchange of ideas by publishing, from time to time, special issues devoted to this subject. There is no greater need to-day than correct information on the matter of school planning and construction.

This article will deal with fundamentals only, and will, no doubt, be an old story many times repeated to architects who have had experience along this line, but there are many who are undertaking now, for the first time, or will shortly undertake their first school commission, and particularly for them are these few words written.

An architect who receives a commission from a municipality to design a school-building should not be content merely with the requirements given to him, but should consider it his duty, before proceeding, to make a thorough investigation of the following questions, providing such an investigation has not already been made:

(*a*) The percentage of growth of the school population over a period of from five to ten years.
(*b*) The geographical location of the probable growth of the community.

With this knowledge he is more properly versed in the requirements of the community and better able to meet its needs.

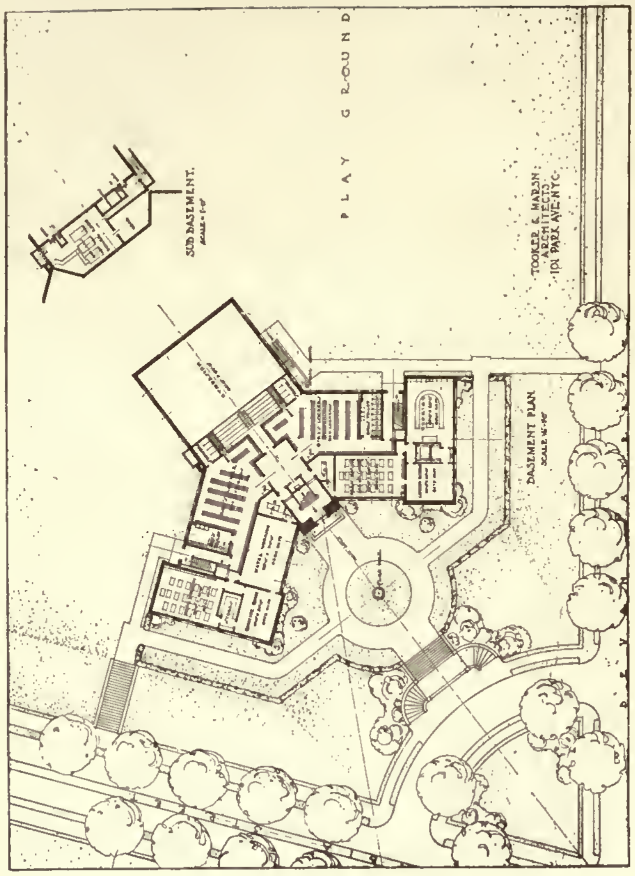
If his own investigation should dictate the wisdom of some change from the plan outlined to him in the beginning, he should place before the proper authorities such suggestions as he may have for betterment, and thus unite with them for the best ultimate results.

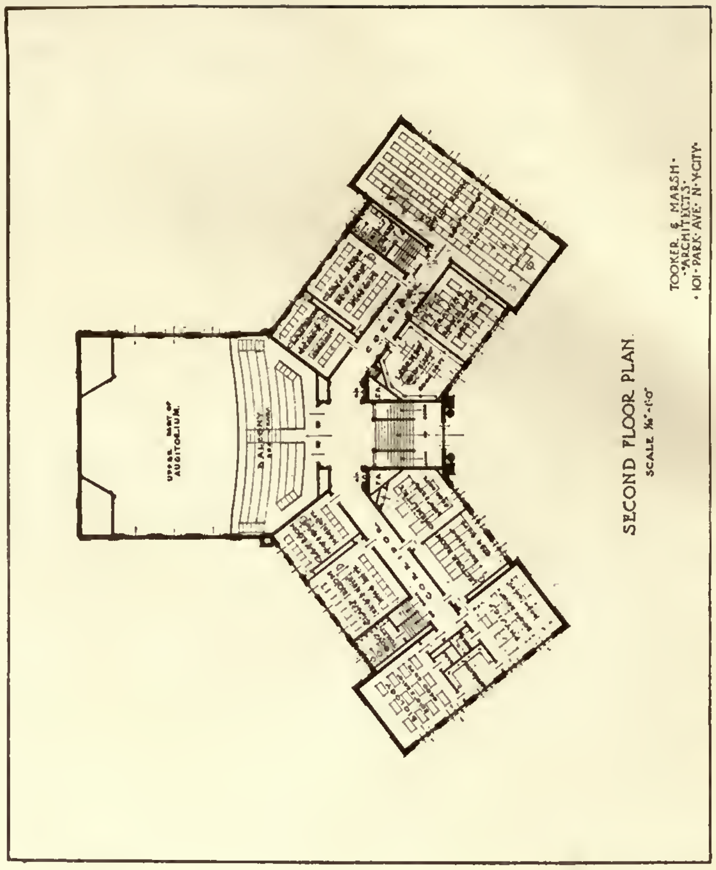
The architect must create a building not only of architectural merit, but also one which is practical within itself and in relation to the system of which it is a part.

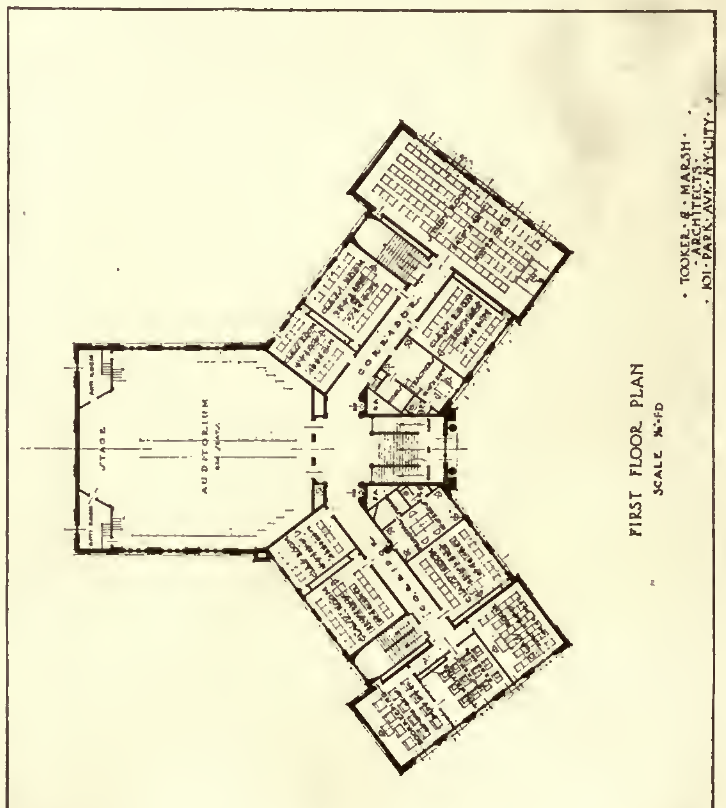
When an approximate geographical location for the new building has been determined, the next step is to select the site itself. The following points should receive careful consideration:

First.—Area. The plot should be large enough not only to provide for future additions, but also for ample play areas.
Second.—Orientation. Exposures should be selected so as to eliminate north light as far as possible, except in special rooms.
Third.—Sanitation. The plot should have good natural drainage, or lend itself to a modification of existing grades to accomplish same.

Each locality has its own requirements, which may differ in the number and variety of rooms, or may be due to the site itself. It is the exception, rather than the rule, that two schools can be built from the same set of plans. There has been considerable talk of standardizing schools, but this would not be feasible in the majority of cases. This statement does not, however, apply to some of the larger cities,







DESIGN FOR SCHOOL, COHOES N. Y.

Pupils' entrance, grade school, Hartsdale, N. Y. Tooker & Marsh, Architects. Arthur W. Coote, Associate.

where standardized plans have been perfected. In these cases the sites are uniformly level, rectangular, and the environments are similar. We are now speaking of the moderate-size building in an average town or city. The mistake in the past has been, to a great extent, that the environment of the site has not been given proper consideration, and, to put it mildly, the result has not been so successful as it might have been. School architecture is taking long strides to the front, and the public is being benefited thereby.

Frequently the problem of enlarging old buildings is presented, and, more often than not, the architect finds that the original scheme has not been planned for this enlargement, and considerable alteration becomes necessary. This lack of foresight has cost many communities large sums. In laying out the building for future extension, these points should receive major consideration:

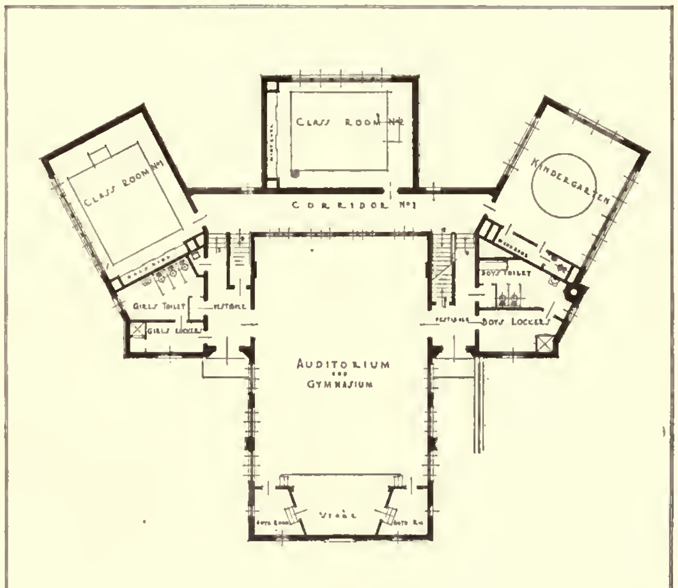
Stairways should be located so as to be independent of the additions.
Boiler and coal rooms should be of sufficient size to accommodate future boilers and coal storage.
Steam mains and ventilating ducts should be run to the points of future extensions, of ample size to supply the ultimate demand.
Administration and toilet rooms should be located with respect to the ultimate development, rather than the first unit.

Another problem which occasionally confronts the architect is the stone wall of fixed ideas wrongly instilled in

Auditorium, grade school, Hartsdale, N. Y.

the minds of his clients. This is a difficult situation to overcome, as the clients (boards of education) are usually composed of laymen who look to their paid assistants to administer the details of the school system and to make recommendations for its improvement and growth. Considerable tact must be exercised to overcome this situation, but it should be approached with the thought in mind that the result of an architect's work will outlive many boards of education and their assistants.

The subject of standardization is too broad to be fully

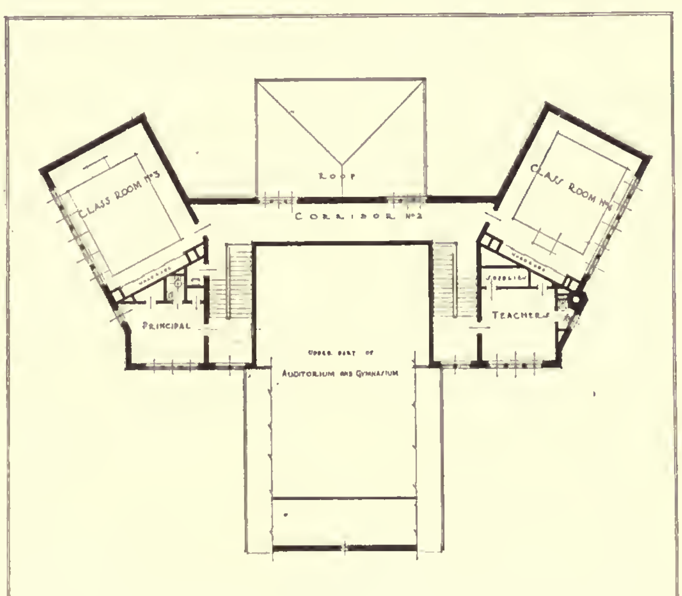


First Floor Plan
Grade School at Hartsdale N Y

covered in this article. There are many phases to this problem, and at present, in many States, incorrect standardization is doing fully as much harm as under-standardization in others. An instance that may be cited is that of classroom floor area per pupil. A minimum of 15 square feet is allowed in some States, without regard to age of student or use of the classroom. This area is not sufficient for proper seating of high school pupils, where 18 square feet should be prescribed as a minimum. In some States the requirements have been worked out separately for primary, grammar, or high school purposes. This point should be borne in mind when a programme for a competition is framed, so that the best plan may be obtained, which is not always the case when architects are arbitrarily held to a fixed area for all types of rooms.

Ventilation requirements should be uniform, but heating requirements should vary with the location.

Schools generally are coming into use as community centres, and this point should be given proper consideration by planning auditoriums with easily accessible entrances and



Second Floor Plan
Grade School at Hartsdale N Y

exits. A stage, of a size to accommodate scenery for amateur theatricals and dressing-rooms, should also be included.

All exterior exits should be equipped with panic bolts. Exterior steps should be eliminated as far as possible where snow and ice occur. All fool-proof devices possible, such as key switches controlling electric lights, fire-alarm system, etc., should be included.

The location of lockers is largely dependent upon the general scheme of the building, which may warrant centralizing lockers on the ground floor or in separate rooms on each floor, or in a row along the corridor walls. Individual

Combination grade and high school, Port Henry, N. Y. Tooker & Marsh Architects. Arthur W. Coote, Associate.

wardrobes are universally approved for "home seat" classrooms. These wardrobes should be located at the rear of the room to afford uninterrupted blackboard space at the front and to facilitate supervision of the students while using the wardrobes. Umbrella pans of zinc should be built in each wardrobe.

Sanitation and economy require a simple treatment of the interior of the classroom. This is effected by keeping woodwork at a minimum, by using plaster reveals for windows, and metal corner beads for other exterior angles, and by using no trim other than scribe mould, except for blackboards, picture-moulds, wardrobe fittings, etc. Door saddles should be eliminated and the joints between the classroom and corridor floors formed by means of a metal angle with top of leg flush with the floor. Walls should be finished with hard plaster rather than sand finish.

Classroom doors should be self-closing, to assure perfect ventilation and quiet. Transoms should be movable, for the purpose of ventilation when the plenum system is not in operation.

Unilateral lighting of classrooms is universally approved. Groups of windows are advisable, thus avoiding shadows from piers. There are a number of types of windows in general use, such as double-hung, unit, pivoted, and counterbalanced. The latter type has the advantage of allowing a partial opening without direct drafts on the students. It also permits of cleaning from within the room.

The most approved method of shading windows is by means of two shades located at the centre of the window, one overlapping the other, the lower shade to pull up and the upper to pull down. Shades may be boxed to darken the room while a stereopticon is in use.

Blackboards of natural slate are the most approved and should be placed at the front, side, and rear of the room. The height of the chalk-rail is determined by the age of the student. The blackboards should not be higher than necessary, as the larger amount of black surface means greater absorption of light.

Hardwoods, such as maple, beech, and comb-grained pine, are the best for classroom floors. Corridor floors and stairways may be treated in many ways, the most economical of which is by means of a cement finish which should be treated with a dust-proofing cement hardener. Terazzo, plastic composition, and tile are more expensive, but have a better appearance. Battleship linoleum, cemented over the entire surface, has proven very satisfactory. It is less expensive than either terazzo or tile and has the added advantage of quiet.

The wainscoting in corridors should be either tile or glazed brick. However, if the cost of same is prohibitive, Keene's cement will prove satisfactory.

It is advisable to have toilet facilities on each floor. Automatic water-closets are in universal use, some with pressure tanks and some with flush valves, where the water pressure is within workable range. The material for toilet partitions may be Alberene stone, slate, marble, metal, or wood; wood being the least desirable. Toilet-room floors should be of cement, plastic composition, terazzo, or tile, with the waniscot of tile or Keene's cement.

The matter of heating and ventilation should be placed in the hands of a competent engineer. To economize on the heating plant is a serious mistake. Vent flues should, preferably, be located at the floor, with no grilles, for better ventilation and for cleaning. Heat flues should have diffusers to distribute the flow of air at a lower velocity over the entire surface of the opening, avoiding a high velocity at the top. Heat flues should be sufficiently large to keep the air flow as near gravity as possible, in order to avoid cold drafts late in the day when, usually, the janitor allows his fires to drop.

This point was well proven in a city where the president of the board of education is a throat and nose specialist. When the schools opened he noted the great increase of children patients with head colds. When a new high school was built, two heat flues and two vent flues were installed for each classroom, but this did not prove entirely satisfactory. Uniform gravity distribution of tempered air was the solution, in his opinion. This, of course, was physically impossible. When the last grade school was built, however, a series of four heat and four vent flues was installed for each room, so arranged that they alternated the length of the room, and so designed that the air was forced into the room at a velocity of not over 210 feet per minute. This school has now been in operation for over four years, and the result has been almost perfection. This, of course, is an expensive construction, but proves that too great a velocity is a bad feature.

The foregoing article has, necessarily, treated the subject of school planning and construction in a most general manner. Architects will find much to interest them in the subject of modern school design. The field is large, and the problem varied.

Entrance detail, school, Glens Falls, N. Y. Tooker & Marsh, Architects. Arthur W. Coote, Associate.

The Importance of Good Design in School Building

Ernest Sibley, Architect

THERE is the obligation on the part of the school architect to thoroughly acquaint himself with the fundamentals of school organization and administration, and to keep pace with the rapid progress of modern school ideas, not only in study and recitation, in shop work and laboratories, but in physical training and social development.

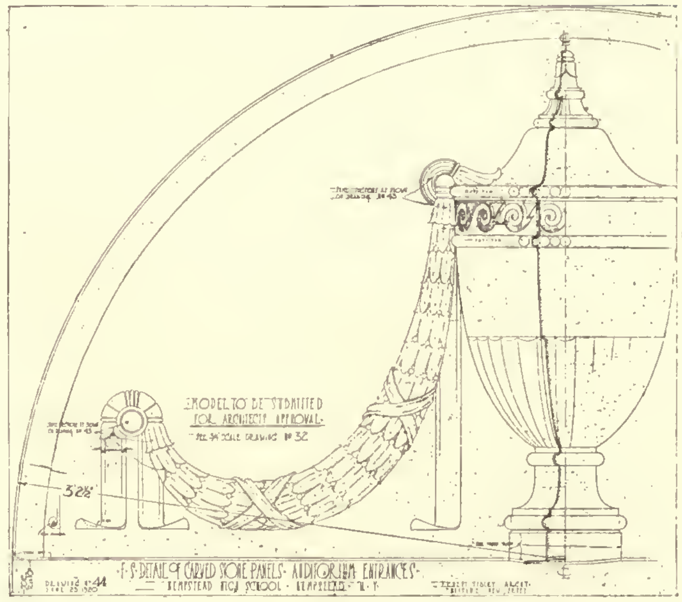
The school architect can plan successfully only if he has constantly before him as he works a vision of the completed building, equipped, occupied, and in full operation, fulfilling every mental, moral, physical, and social need of the students within its walls. Then, and only then, does school planning cease to be a mechanical problem, based on certain fixed standards, and become an important, interesting, and inspiring occupation.

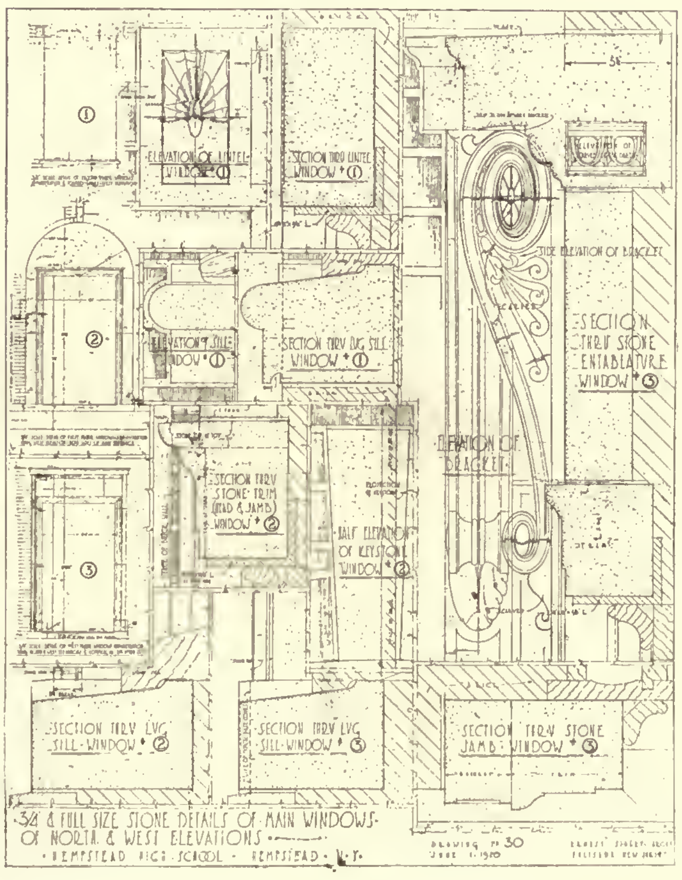
While school planning has advanced considerably in the past few years, school design has not always kept pace, for there is admittedly a smaller proportion of well-designed schools than almost any other type of buildings, notwithstanding the fact that good design is fully as important in this as in any other class of work.

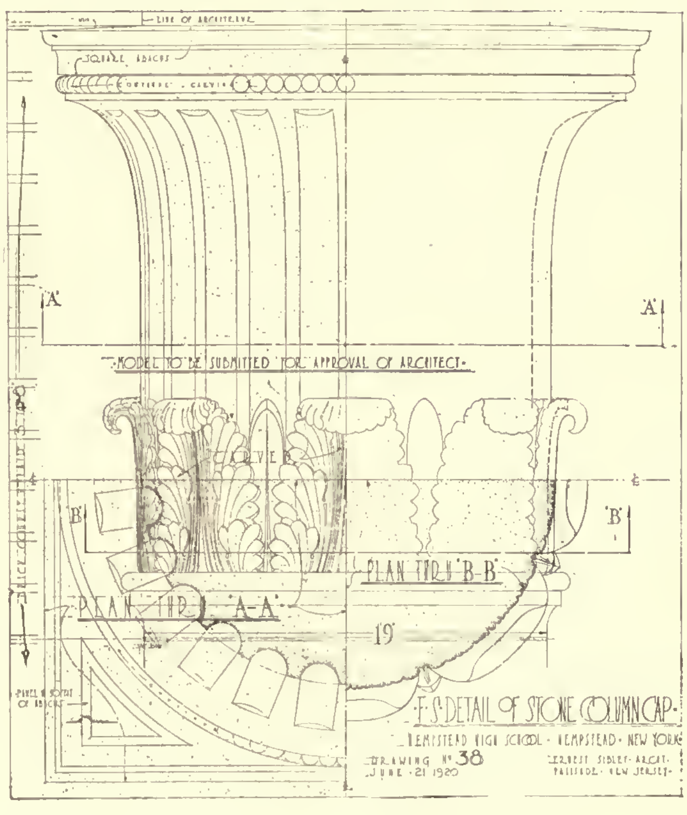
Children attend school during the formative period of their lives, when the impressionable, receptive mind is favorably influenced by beauty of design and pleasing color schemes, and in a logical and natural way may begin their education in the recognition and appreciation of good architecture, that least appreciated and respected of the fine arts.

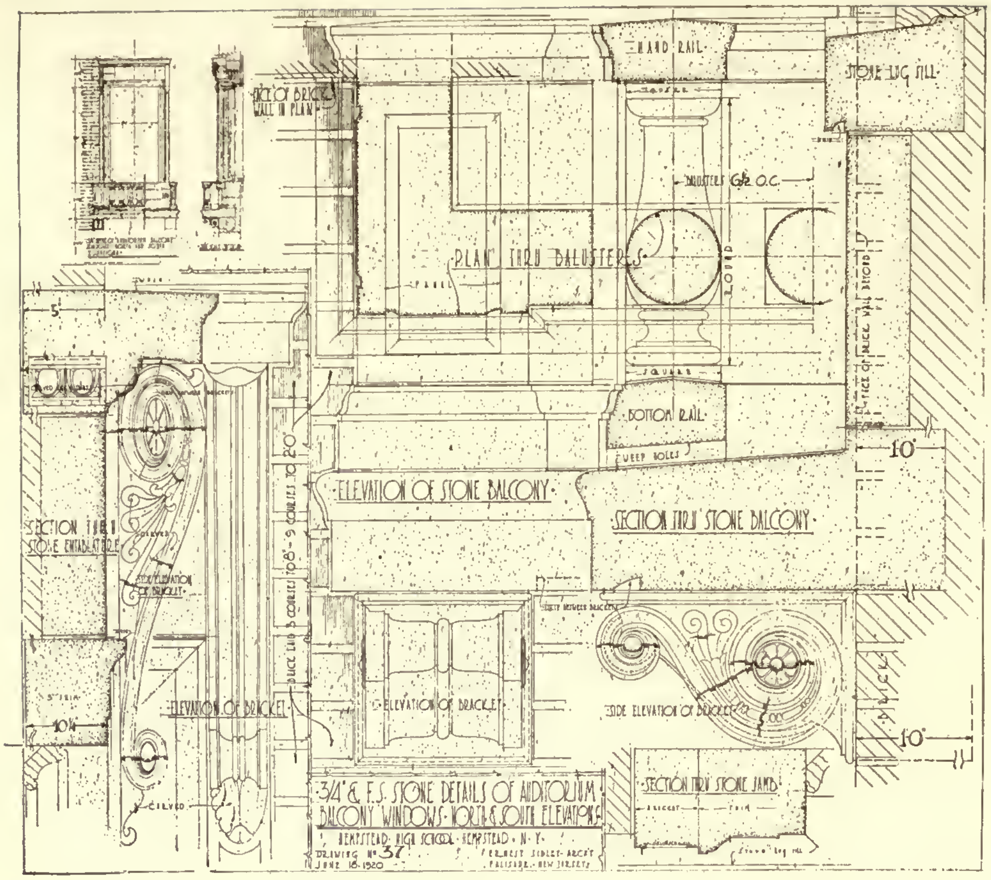
The plan of the Hempstead high-school building is a natural solution of a problem growing out of the expressed desire of the Board of Education and the Superintendent of Schools to give to the children of the district the best possible training in the scientific, commercial, industrial, and household arts departments, as in academic work, with every advantage, innovation, and convenience for obtaining such training that could be secured without building a vocational school. Coupled with this was the plan of making the school an educational and recreational, as well as a social, centre for all the people of the community.

The first step in the development of the design was the









study of the old Long Island architecture, and Hempstead itself furnishes many excellent examples of colonial work.

It seemed desirable to incorporate in the high-school building the feeling of this quaint and charming style, but the frame construction employed throughout this section was impracticable for proper adaptation. Inspiration for architectural motifs was sought, therefore, in the stately homes and public buildings of the Third Period, in Maryland and Virginia, which are in harmony with the local colonial work, and in addition express the dignity and ample proportions necessary in a high school building.

Considering the close association of home and school, it seemed consistent to refer to examples in domestic character as the key to the design.

In creating the design, studied effort was made to outwardly express the three important elements in the plan: the administration, assembly, and study, and to harmoniously correlate these elements in a well-proportioned and dignified façade.

In the customary school plan the administration and assembly are centrally located, giving small opportunity for appropriate individual expression in the design. But with the movement to make the school assembly-room the community centre, this element of the school becomes semi-public in character, and opportunity is afforded to make the assembly-room an important architectural element.

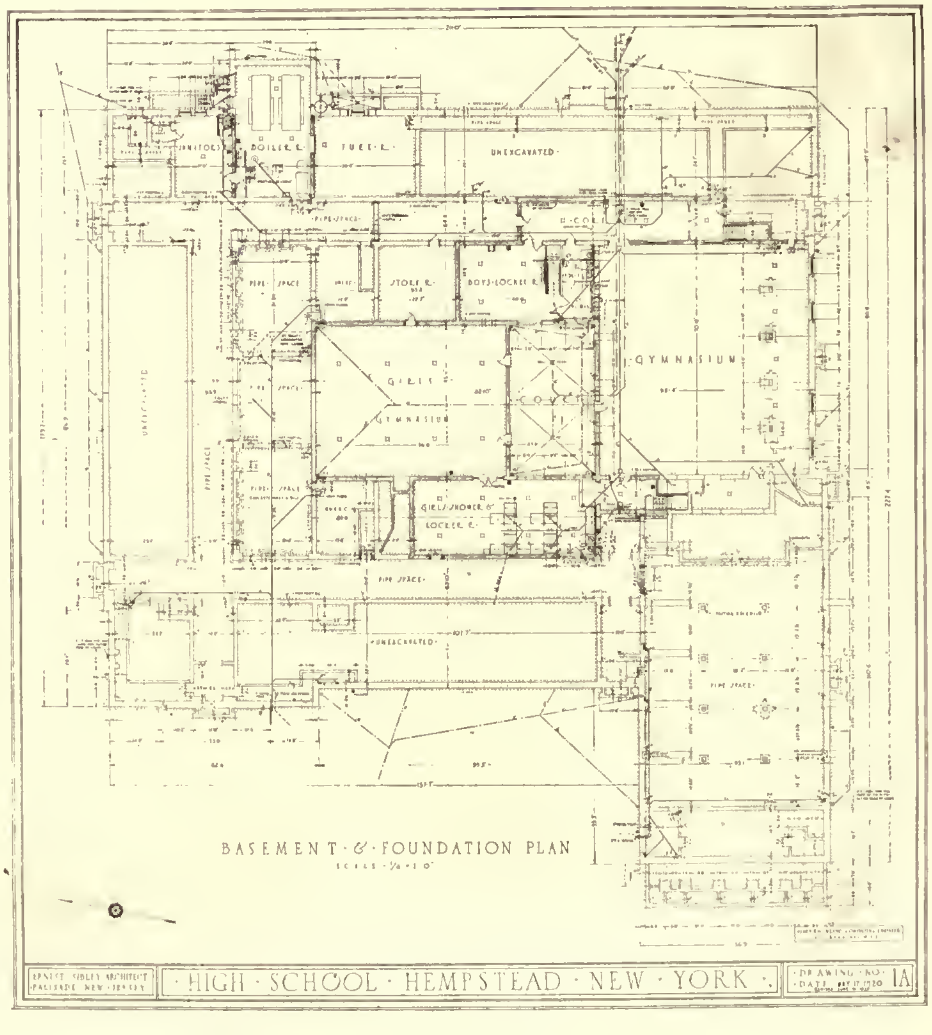
The administration, also, being to a certain degree public in character, is entitled to some importance in architectural treatment.

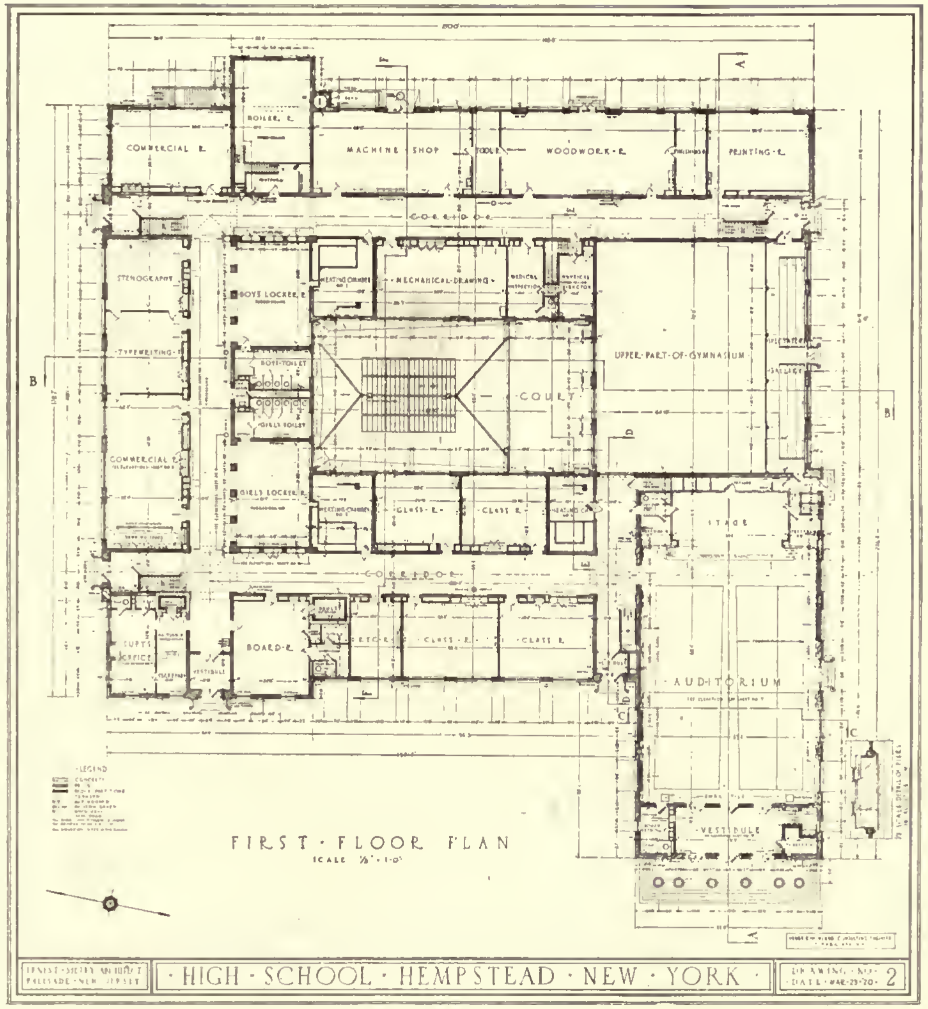
The location of the schoolrooms has been appropriately indicated by subduing the central motif, thus expressing the quiet and seclusion desirable for study and class rooms.

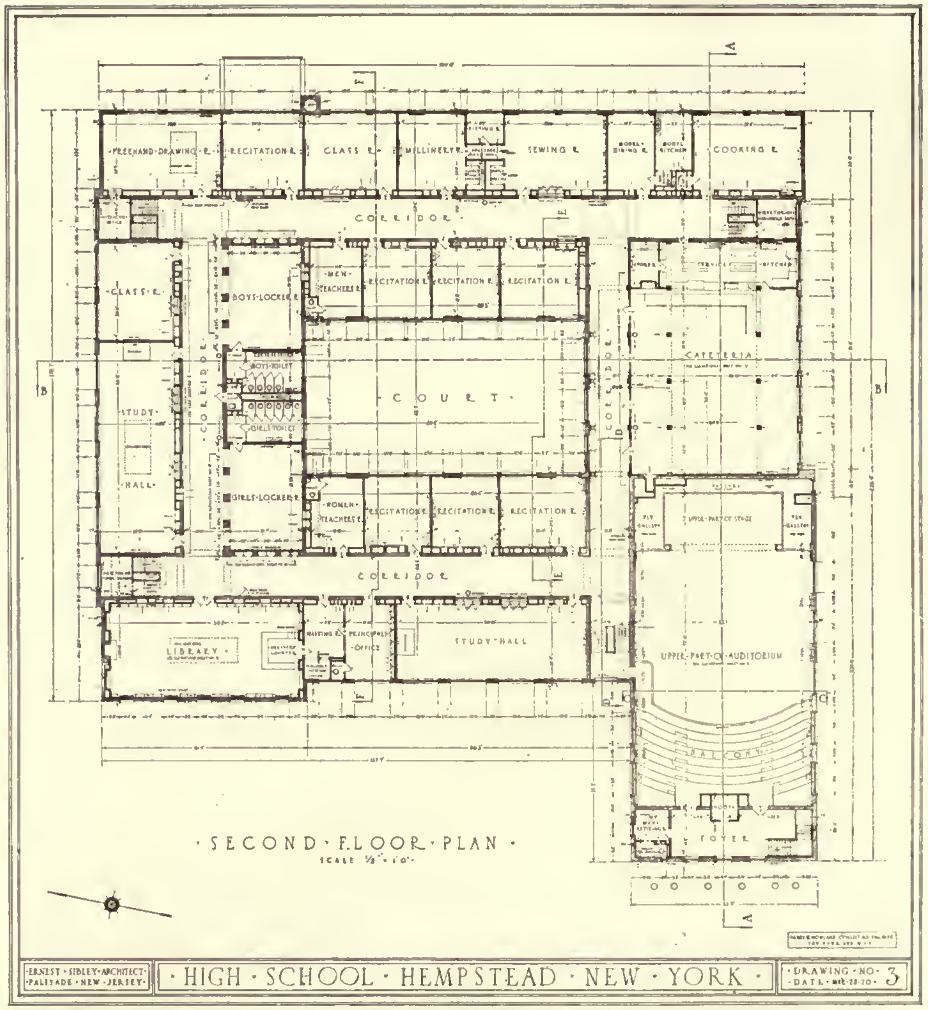
The portico silhouetted against the projecting auditorium wing, with its enriched doorways, constitutes the more important architectural motif. To secure harmony and express the secondary architectural importance of the administration, the pilaster treatment was employed, and the arches are unembellished. The entrance is accentuated with steps, wrought-iron railings, and lamp standards.

The simple, straightforward treatment of the classroom windows, with wide mullions and small panes of glass, and the carrying through of the stone base and cornice, are in keeping with the style and strengthen the feeling of unity in the whole.

Color plays an important part





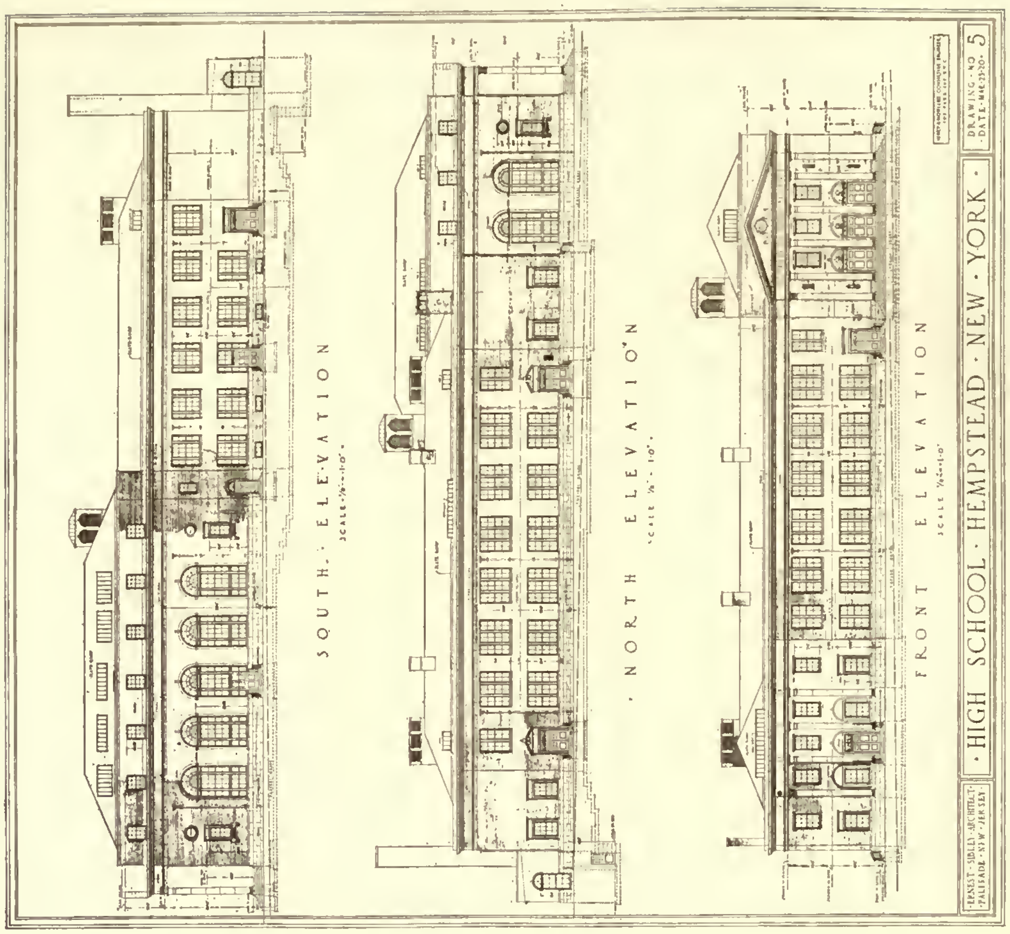


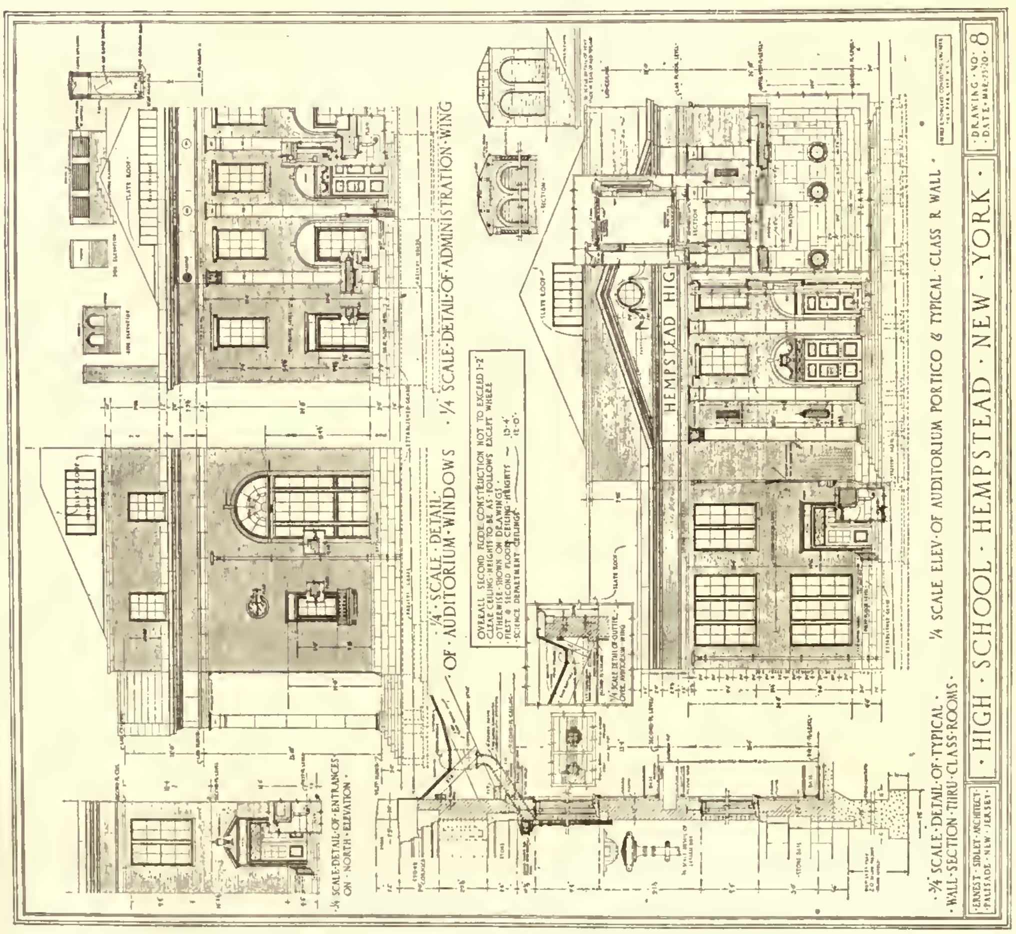
in carrying out the architect's intentions in the Hempstead school. The desire was to attain a pleasing first impression of the mass, quite apart from any consideration of the many details. The cut cast-stone base and cornice have the appearance of white marble, and the brick used are harmoniously varied in color ranging from light shades of red to salmon shades laid in Flemish bond. Above the cornice one gets glimpses of the slate roof in varied tones of green and purple.

The unsymmetrical treatment in plan and design is as charming as it is unusual in school architecture.

Consistent effort has been made to express in every detail of the building the simplicity and refinement of the best work of the period. All details have been carefully studied for character and scale, and models of the most important studied in the shops.

The planting about the school promises to be of unusual beauty, and as well of practical interest and value, as it will serve a special purpose in the studies of the classes in botany.


SOUTH · ELEVATION
NORTH ELEVATION
FRONT ELEVATION
· HIGH · SCHOOL · HEMPSTEAD · NEW · YORK ·
DRAWING · NO 5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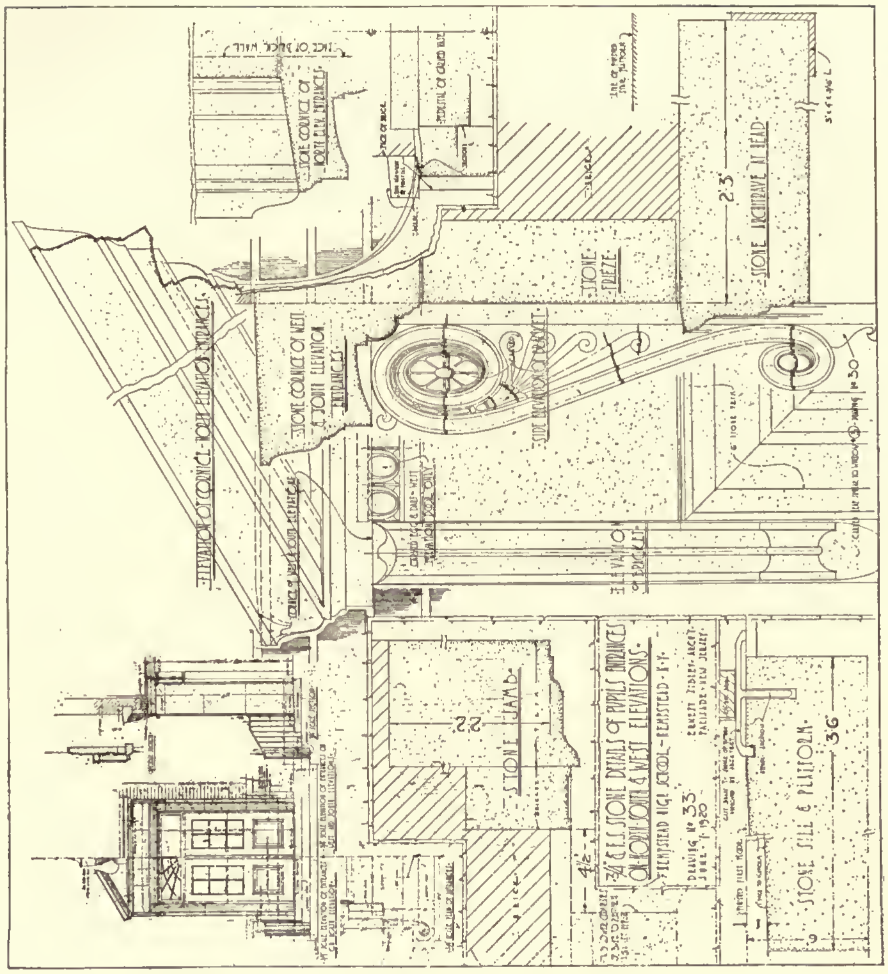
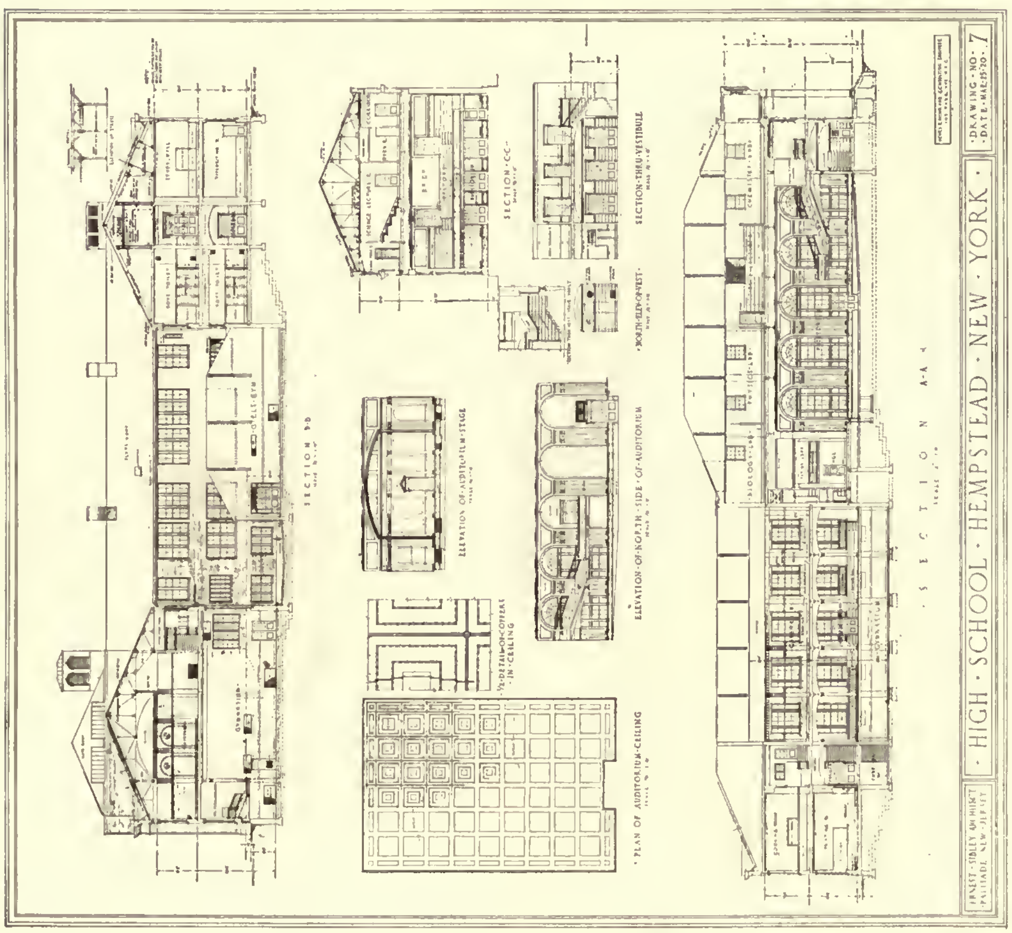
DRAWING · NO 8




· HIGH · SCHOOL · HEMPSTEAD · NEW · YORK ·

Wardrobes and Cloak-Rooms.—Separate cloak-rooms should be provided for each classroom and should have direct outside light, and should be heated and ventilated. The cloak-room should be connected to classroom only, so that it is constantly under the eye of the teacher. Two doors should preferably be provided.

Wardrobes may be used where it is desired to reduce size of building. They should be placed at the side or rear of the classroom.

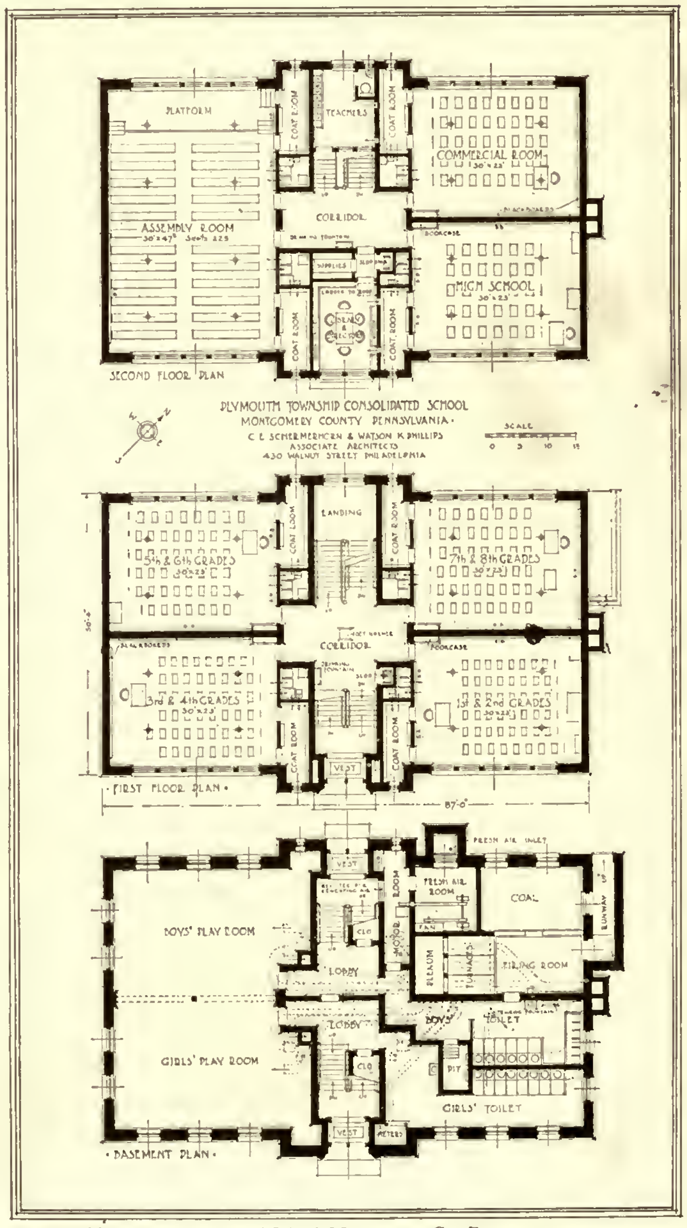
Blackboards may be provided in the doors.

Stairways and Halls.—Stairs should be not less than 4′ 0″ or over 5′ 0″ wide for each run. Treads should be 11″ wide and from 6¼″ to 6¾″ high on the carriage. Return stairways should have division walls high enough to prevent any one from climbing over.

Hand-rails should be about 2″ in diameter, supported on iron brackets and set about 2″ from wall. Ends should always be returned to prevent clothing from becoming caught. Rails should be from 2′ 0″ to 2′ 4″ above tread at riser line.

An inexpensive method of wainscoting halls and stairway walls is to use a semi-glazed brick, built in at the time the wall is erected.

Battleship linoleum makes a good floor-covering. It is quiet, easily kept clean, wears well, and looks well.



Plymouth Township Consolidated School, Montgomery Co., Pa.

Editorial and Other Comment

Our School Architecture

THERE is probably no class of buildings that has shown a greater advance architecturally than the public school. Certainly no buildings that are constructed can have a greater potential value in the cultivation of good taste and appreciation of good design, combined with adequate and thoroughly practical planning. The demand for new schools all over the country is insistent, and they are going up as rapidly as conditions will permit. With very few exceptions the new buildings show the desire, both upon the part of the architect and the community, to make the school something of a monument, a source of local civic pride in keeping with the part that education plays in our national life. Some of us who recall the old school buildings of the past, their generally ugly exteriors and dreary and ill-arranged rooms, their limited opportunities in the way of heating, will envy the young folks of to-day, whose privileges of study and places to study offer, it would seem, only pleasant ways in which to acquire an education.

The wonder of these modern schools lies not alone in their merely scholastic privileges, but in their really remarkable equipment for teaching practical things.

The problem of design has grown with the growth of the new needs of teaching, and certain fundamental needs are a part of every school building. In the article by Mr. Marsh these needs are made clear, and Mr. Sibley has admirably accented the care and knowledge and purpose with which the purely æsthetic aspect of the school building is regarded.

It would be well if the pupils who are fortunate enough to be taught in these beautiful modern schools could be told something of their architectural interest, to have pointed out the meaning and origins, for instance, of the decorative details, and something of the significance and meaning of the plan.

What better object-lessons for the classes in drawing, in the study of ornament, in the history of architecture, than the building in which they daily spend the hours in study. We hear too often that the architect has no place in the world any more, that his position is only that of a builder of buildings, that there has been too much prating here and there about his training as an artist and too little about his practical sense. These ideas have been expressed by architects rather than by laymen, but the times have been out of joint for the humanities in general. The only way to get old joints right is to come back to a belief that, after all, the true, the good, and the beautiful are as necessary in the progress of civilization, as practical in their ultimate results, as some more immediately cashable things.

We look to the teaching in public schools to help in the great problem of Americanizing our mixed peoples; why not make the buildings themselves a part of the teaching of an appreciation of architecture?

We regret that space limitations have compelled us to hold for the next issue several schools we had hoped to use in this number.

Graft

THERE is little new to be said to the architects with regard to the revelation of graft in the building trades. No one is surprised, we dare say, at the general statement of a system that is all-pervasive, that has been perfectly understood and accepted more or less as a necessary part of present-day conditions.

An architect was saying recently that some co-operation and organization among the manufacturers and sellers of building materials was necessary to prevent cutthroat competition and general demoralization. But this is quite a different matter from the buying and selling of privileges to actually do business at all. We shall all watch the various disclosures with interest, follow the ramifications of the graft bug to its lair, and probably, as in many other things that seem at the moment important, go on in the same old way. Apparently all the investigating in the world and the moderate punishment, now and then, of some specially flagrant dishonest procedure, will not do much good unless we can bring to life some better ways of doing business. We have not progressed evidently, nor learned better ways, since the times of the notorious Sam Parks.

Mr. Untermeyer, before the Joint Legislative Committee on Housing in New York, said, "There is enough here to keep us busy for six months," and *The New York Herald*, in an editorial, remarks:

"Indeed there seems to be, and evidently there is, enough there to keep somebody busy in Sing Sing prison for six or sixteen years. New York is awakened to the fact that although Sam Parks is dead, the infamous thing he personified is still alive and more active than ever. The public is not in as patient a mood as it was seventeen years ago. Then there was no building shortage. Now every strike that is declared for blackmailing purposes is a crime against public health and comfort. Let us see who runs the building business of this town. Is it the builder or the blackmailer?"

But when we see, what are we going to do about getting rid of a system that has been as much a part of our buildings as the materials that go into them?

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Some Practical Suggestions for the Draughtsmen

By David B. Emerson

AT the present time, in the general unrest which is affecting all industry throughout the country, we hear many complaints about the small rewards in architecture. This is naturally forced home by the high cost of living and the greatly decreased buying power of the dollar; but the fact is, architecture never was, and probably never will be, highly remunerative, and the architects who have made fortunes in the practice of their profession have been comparatively few.

A large number of young men, and some older ones, have left the profession of late, and many more are debating on doing so. Now, if any young man who is working in architecture feels no more enthusiasm for his work than he would if he were selling automobiles, or in the stock brokerage business, he would certainly do well to quit architecture at once and find some other employment where the monetary rewards are greater and come more quickly. But if a man can say, as the writer remembers hearing the late John M. Carrere say, at an atelier smoker, "Architecture is the bulliest thing I know of," then there is something in architecture which makes it worth while staying for, something which makes a man willing to make a little less money to be happy in his work. Of course, it is very nice to follow an enjoyable occupation, but every one, no matter how great his enthusiasm and how much he may be devoted to an art, is desirous of getting all that he possibly can in return for his labor. Therefore, the purpose of this article is to show the younger men, those who have recently left college and are beginning their life-work, how to best accomplish that.

The natural ambition of every young man who enters architecture is to become an architect and to have his own practice, but all cannot attain this, and even after it has been attained all cannot continue—so always a great many men will have to be "just draughtsmen." A few years ago the majority of the architects labored under the assumption that all draughtsmen were potential architects, and paid them accordingly, but to-day it is being recognized that the professional draughtsman is a necessity, and without the draughtsman there cannot be many architects; consequently the condition of the draughtsman is bound to improve.

Inasmuch as architecture is a work of thought and mental effort, the levelling process of the labor unions can never be applied to them, and men will always be paid for what they know and what they can do; so the more they know, the more they can do, and the better they can do it all, the better they are bound to be paid. This being the condition, it behooves the young man to put himself in the position to obtain steady employment at a high salary. How can this be done? The exceptionally brilliant designers will always be paid very well, and will always be in great demand, largely because there are so few of them.

As designers are born and not made, many good, earnest, devoted draughtsmen must be content to follow on, and although their names will never be writ on the tablets of the architectural hall of fame, their work can be made of inestimable value in the execution of the design; for, after all, "the building is the thing." The young men who come from our architectural schools are practically all of them able to make very good presentation drawings, but they have no adequate idea of working drawings, and unfortunately underestimate the value of such work in the practice of architecture. For this reason young men, who have never had the advantage of school training, are frequently of much more value in routine office work than college men whose knowledge is far greater but who cannot put that knowledge to a practical, every-day use.

In the light of these facts, for facts they are, it is well for the young man just out of college, who sees a fairly long period of work as a draughtsman ahead of him, to learn to make good, clear, and concise working drawings, using standard indications of materials and standard symbols whenever possible, and carefully indicating all materials on the drawings. Too much stress cannot be put on the importance of plain, neat, legible lettering, and, above all, legible, well-formed figures, which can be easily read and which are so placed on the drawings as to show at a glance to what they refer, for more trouble ensues on the work from improperly figured drawings than from almost any other cause. Also, learn to make letters and figures large enough to be seen and to be read without difficulty, and increase their size on larger-scale drawings. Make a careful study of, and acquire a good general knowledge of, the principles of plumbing, heating, and electric wiring, so as to be able to properly locate all fixtures, piping, etc., on the plans and to allow proper room for boilers, etc.

Visit the jobs and the shops, and learn how work is put together and how to make workable, full-size details which will show the contractor exactly what is needed and no more and no less. Don't try to make pictures of your full-size details and waste lots and lots of valuable time putting artistic lettering on them, and carefully drawing out all of the details of hardware and patented specialties, and showing all the various connections for them, when they will be bought and applied by the contractor, whether they are shown on the drawings or not, and are thoroughly covered in the specifications.

Careful attention to these few, unimportant-looking, but really very important, items will do much toward improving the position of the young draughtsman, and make him more valuable to the architect. After having done these things and thereby becoming an excellent assistant, the next thing to do is to bend all your energies toward reaching that goal which should be every young draughtsman's aim, viz., becoming an architect, and there are still plenty of good seats in the front row for those who are strong enough and determined enough to reach them.

EVANDER CHILDS HIGH SCHOOL, BRONX, NEW YORK CITY.

C. B. J. Snyder, Architect.

Plates CLXI – CLXXVI follow page 326.

DESIGN FOR HIGH SCHOOL, SHEBOYGAN, WIS.

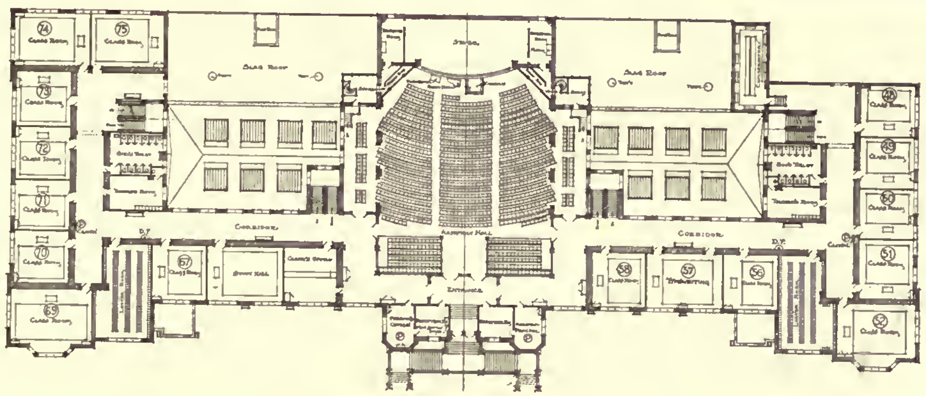
Childs & Smith, Architects.

HIGH SCHOOL, RIDGEWOOD, N. J.

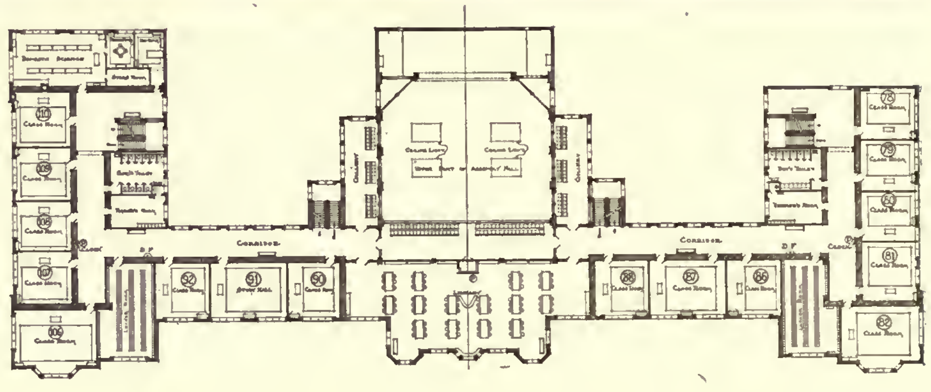
Tracy & Swartwout, Architects.

AUDITORIUM, HIGH SCHOOL, RIDGEWOOD, N. J.

Tracy & Swartwout, Architects.



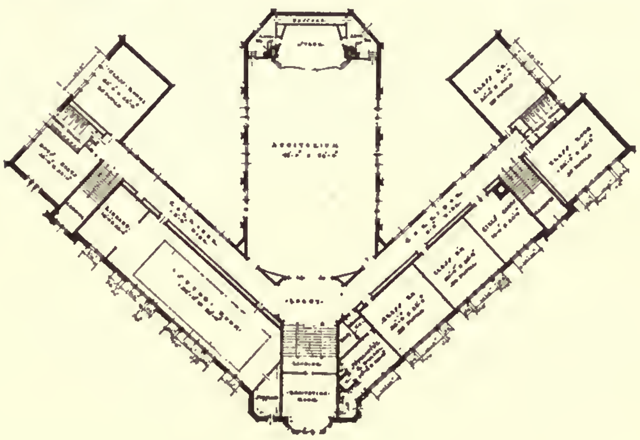
First-Floor-Plan



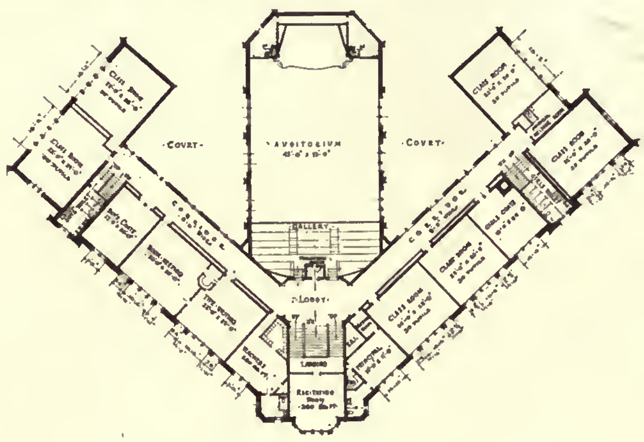
Second Floor Plan

DUNBAR HIGH SCHOOL, WASHINGTON, D. C.

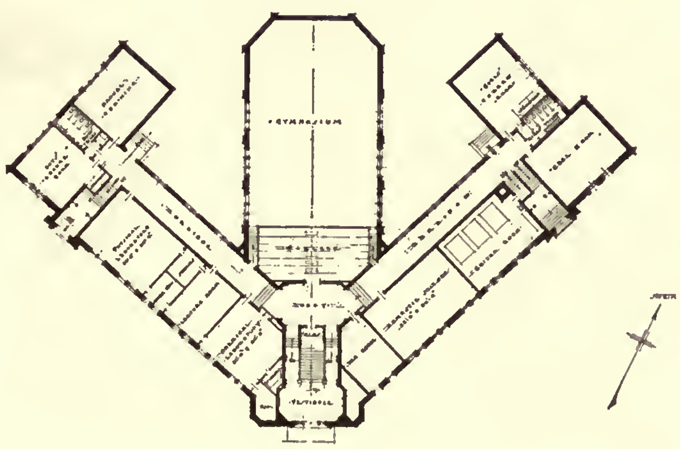
Snowden Ashford, Municipal Architect.



FIRST FLOOR PLAN



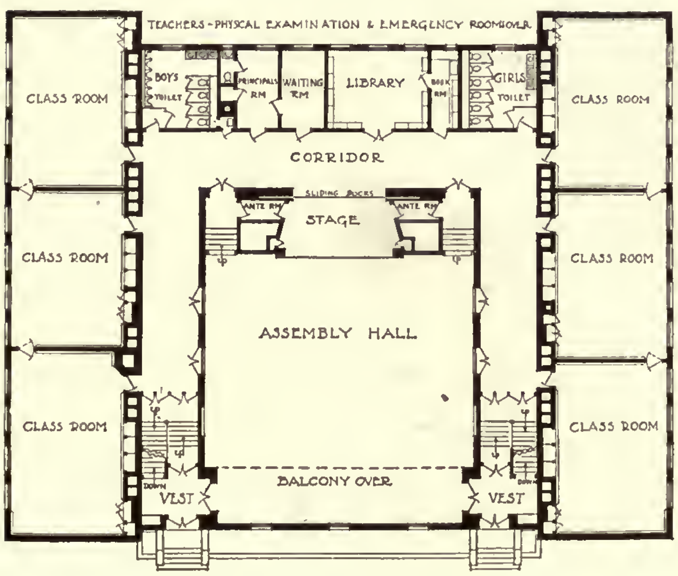
SECOND FLOOR PLAN



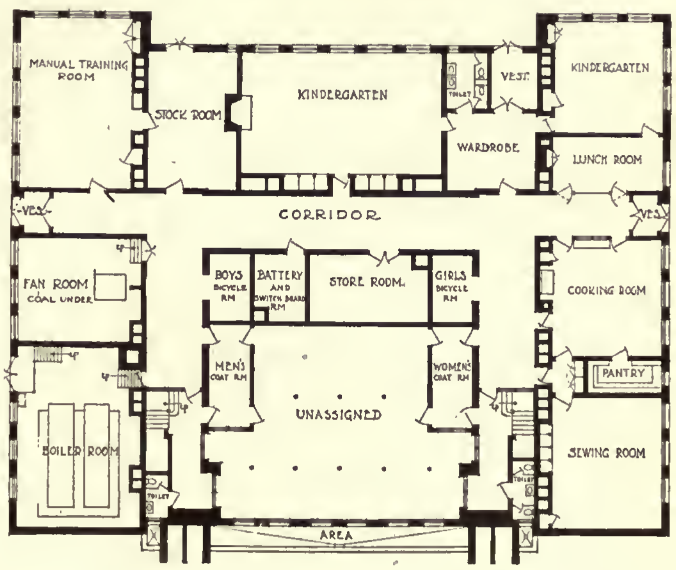
BASEMENT PLAN

HIGH SCHOOL, PELHAM, N. Y.

Tooker & Marsh, Architects. Arthur W. Coote, Associate.



FIRST FLOOR PLAN



BASEMENT PLAN

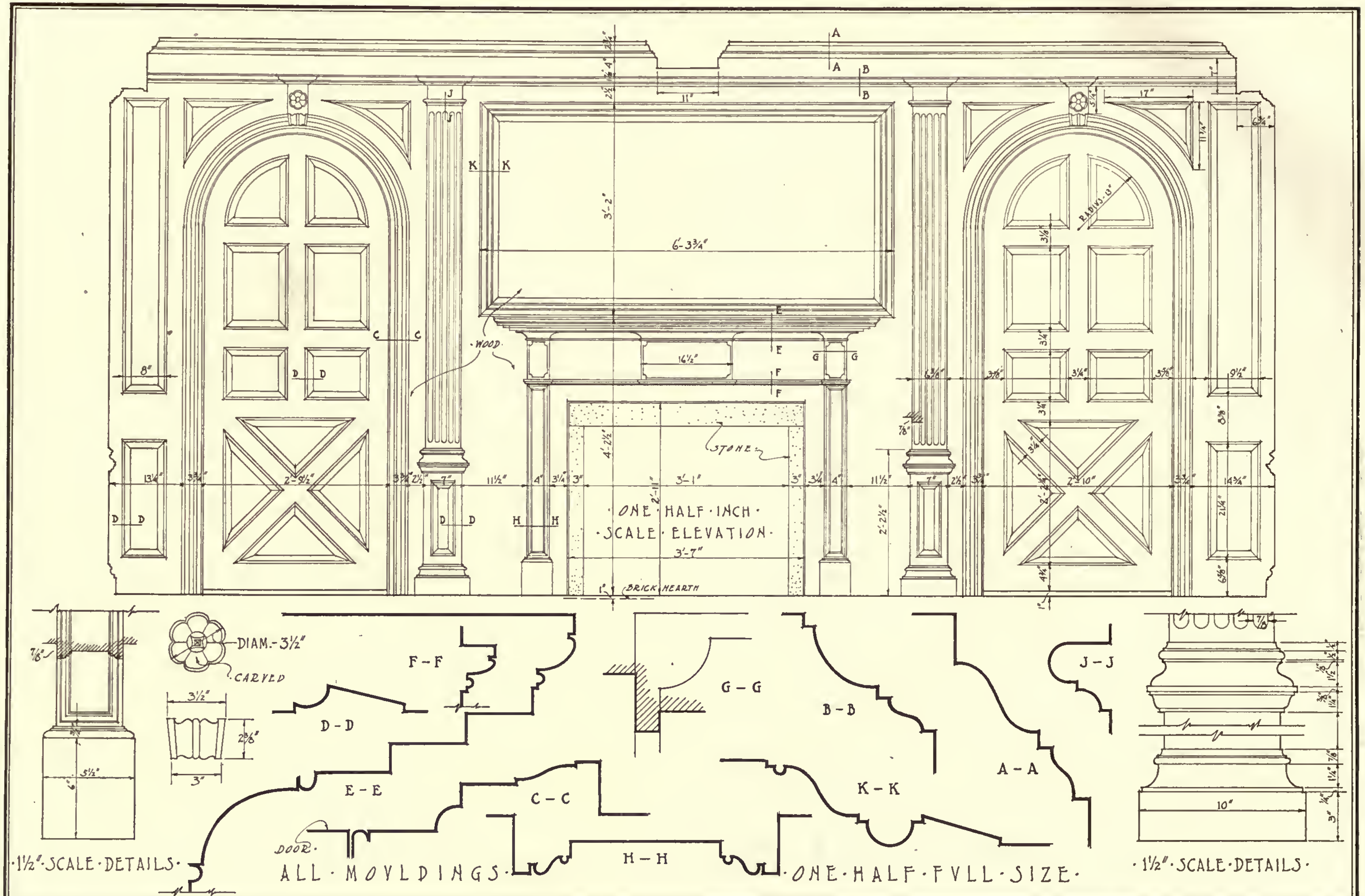
BANKS SCHOOL
WALTHAM·MASS.

BANKS SCHOOL, WALTHAM, MASS.

Kilham & Hopkins, Architects.

GRAMMAR SCHOOL BUILDING, ROSEMONT, RADNER TOWNSHIP, PA.

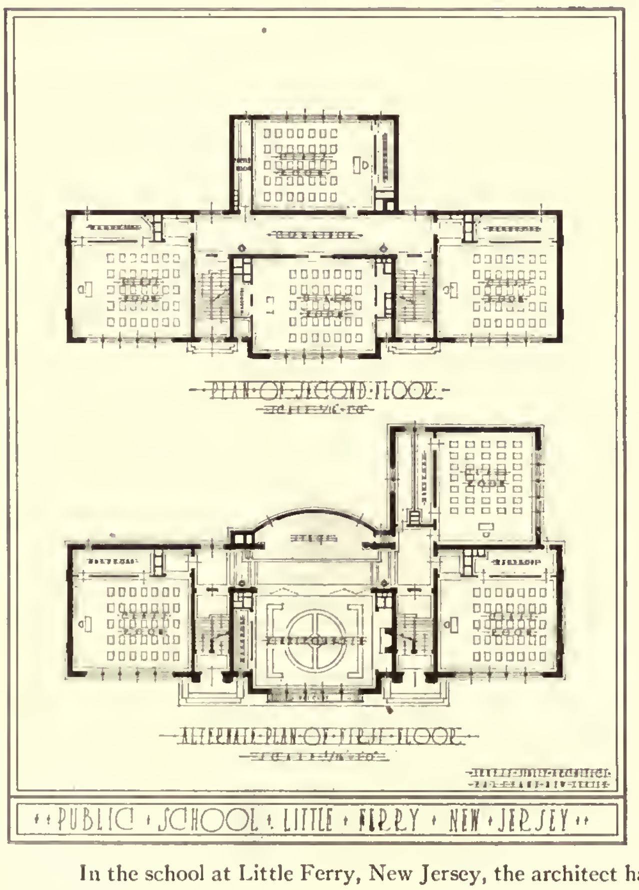
D. Knickerbacker Boyd, John L. Coneys, Victor D. Abel, Architects.

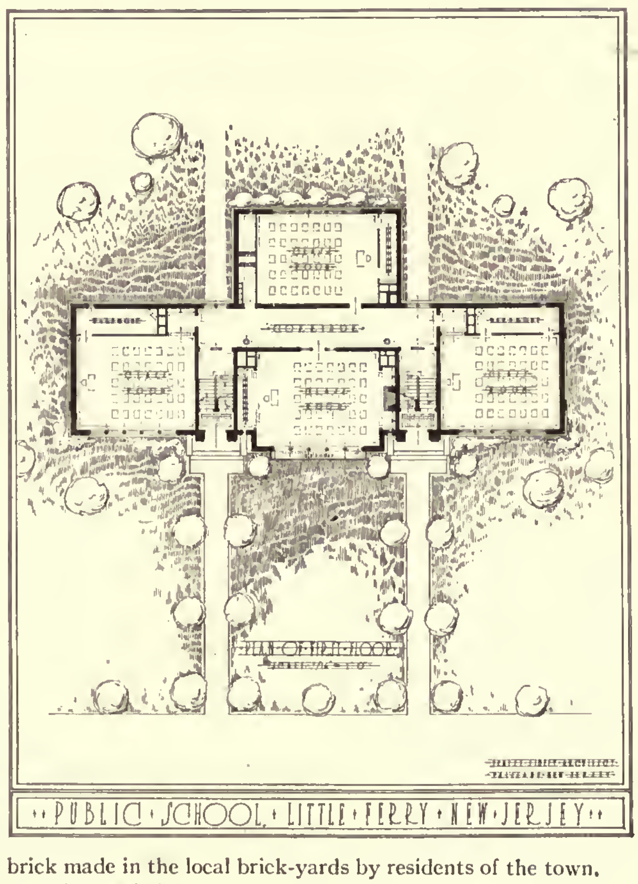


·EARLY·
·ARCHITECTURE·
·OF·
·CONNECTICUT·

·PANELLING·IN·THE·PARLOR·OF·
·THE·WEBB-WELLES·HOUSE·
·WETHERSFIELD·CONN·······DATE·1753·

·MEASURED BY·
·J·FREDERICK·KELLY·
·DRAWN·BY·
·LORENZO·HAMILTON·





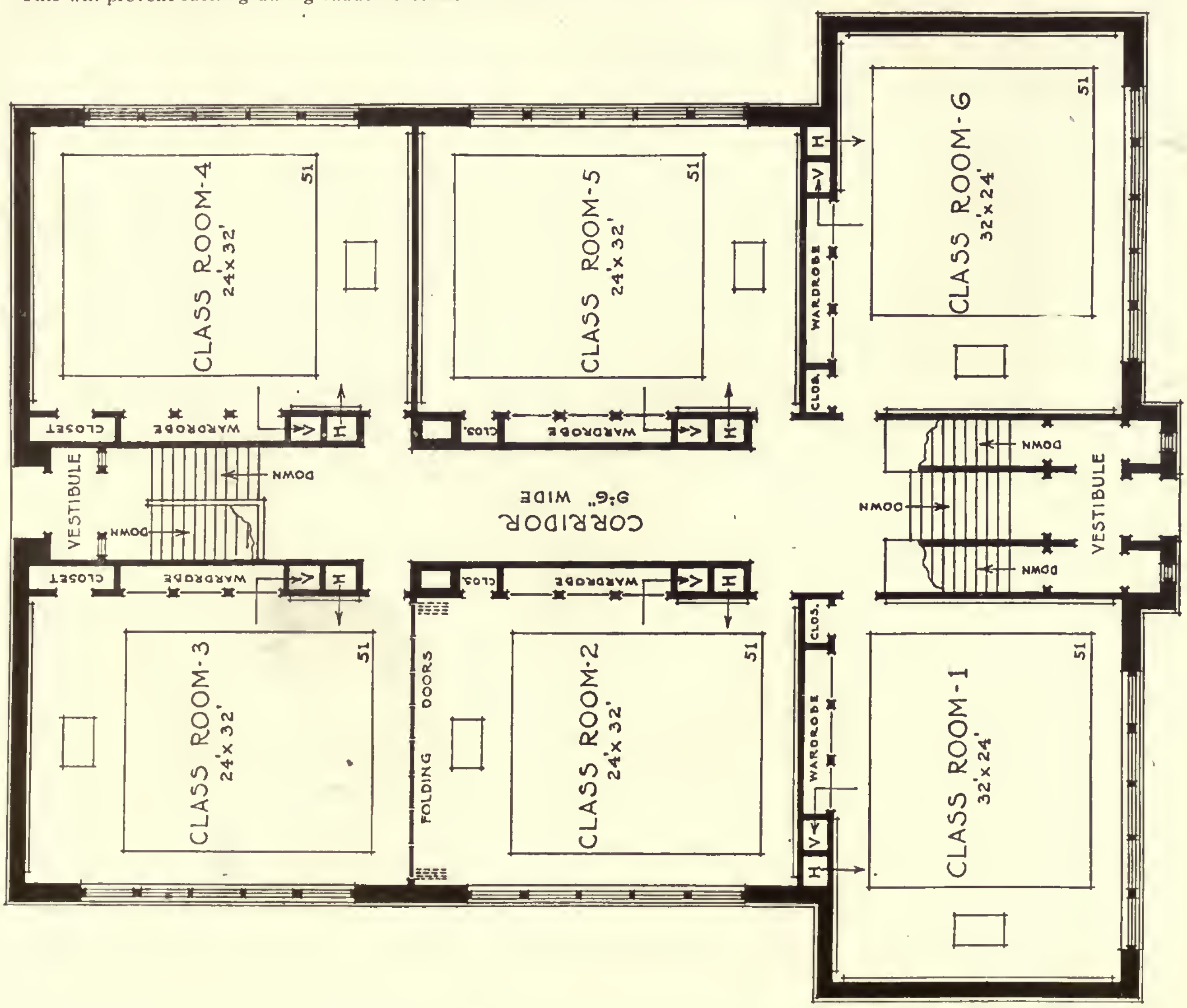
In the school at Little Ferry, New Jersey, the architect has used brick made in the local brick-yards by residents of the town. The brick were moulded and laid out to dry and while still green were struck by a hail-storm and deeply pitted. The result gives an unusually interesting and novel texture to the walls of the building. The trim is of concrete stone and the roof of variegated green slate.

COMBINATION GRADE AND HIGH SCHOOL, TOWN OF GREENSBURGH, WESTCHESTER, N. Y.

FERRIS AVENUE GRADE SCHOOL, WHITE PLAINS, N. Y. Tooker & Marsh, Architects. Arthur W. Coote, Associate.

TWO TYPES OF SCHOOL OF ALL BRICK DESIGN (RECENTLY COMPLETED).

Pivoted sash may be opened wide on warm days, thereby giving maximum ventilation. Shades should be attached to sash, and if this is properly done all direct sunlight will be excluded, even though all sash are open. SHADES.—Best colors for shades are light buff or gray. Two shades should be provided for each window, hung at centre; one to pull up, other down. If pivoted sash are used, shades should be hung on sash with twist pulleys for both top and bottom so that shades will always be in tension. This will prevent rattling during sudden breezes.

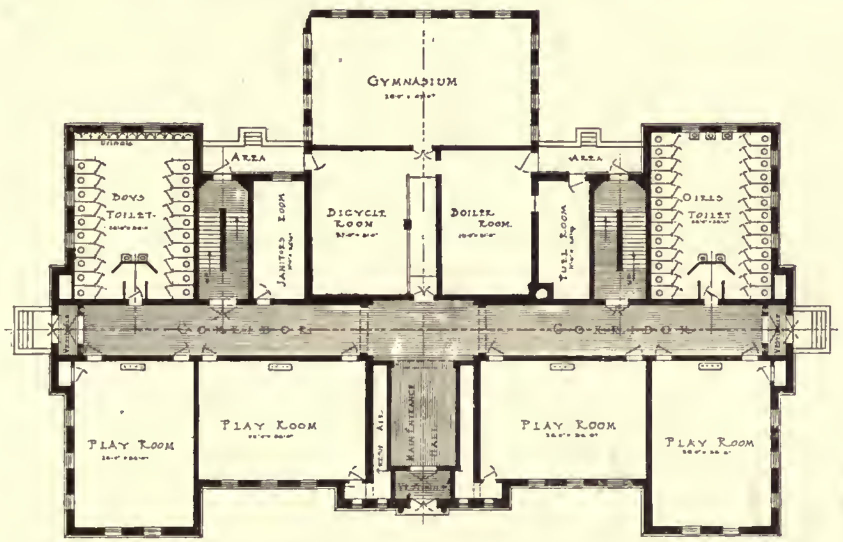


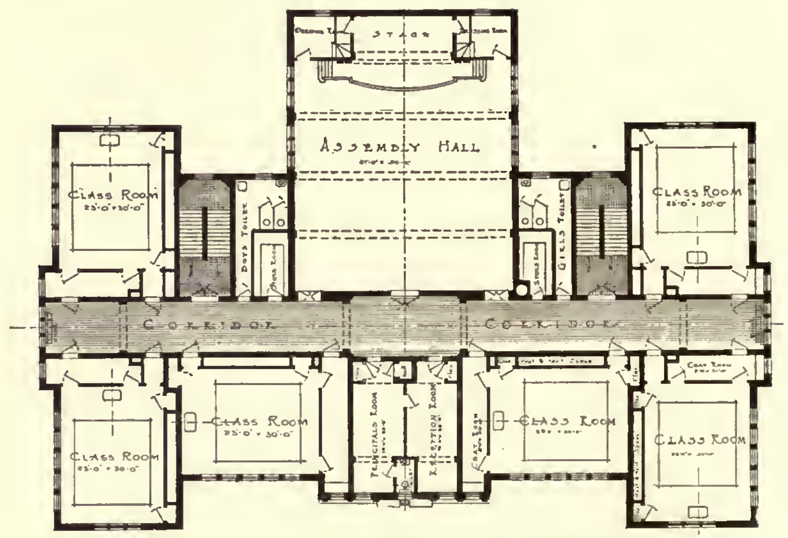
HENRY K. BOYER SCHOOL, LOWER PROVIDENCE TOWNSHIP MONTGOMERY CO., PA.

C. E. Schermerhorn and Watson K. Phillips, Associate Architects.

GRADE SCHOOL AND COMMUNITY CENTRE, HARTSDALE, N. Y.

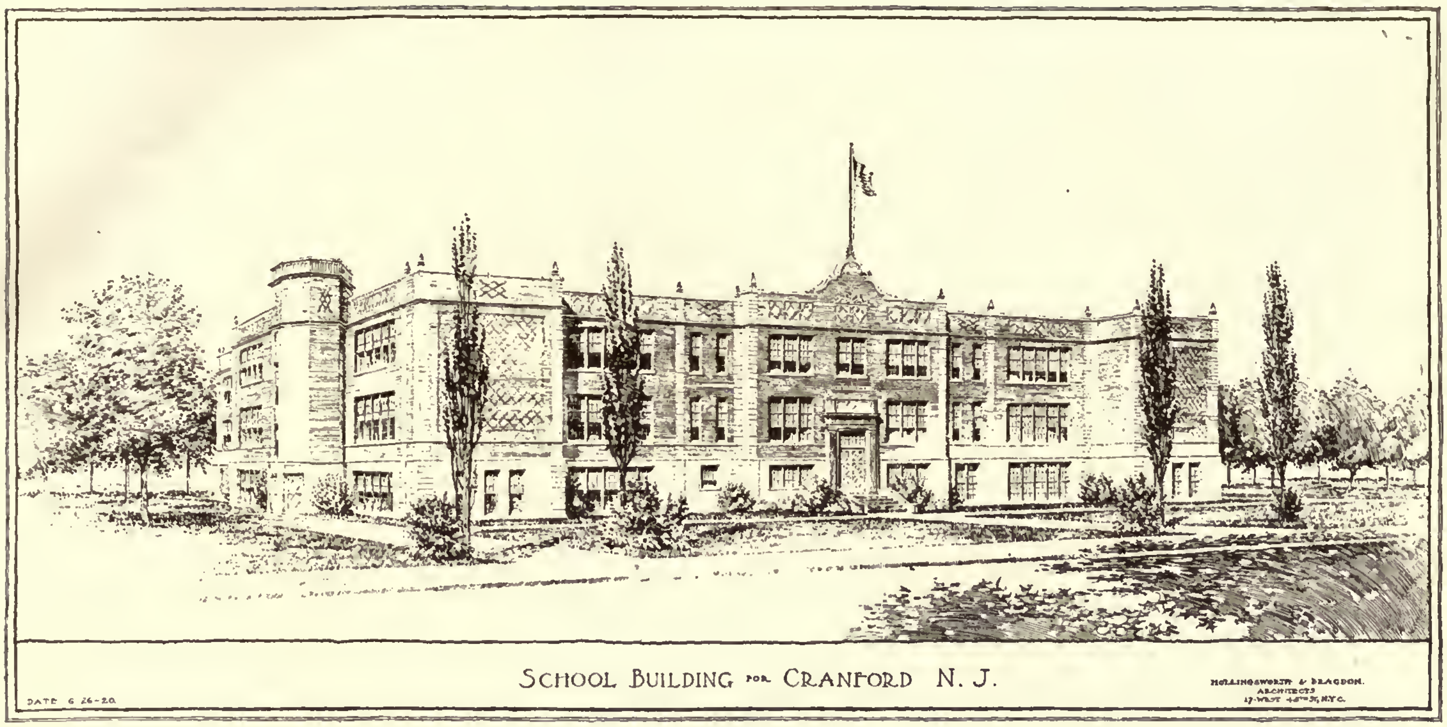
Tooker & Marsh, Architects. Arthur W. Coote, Associate.

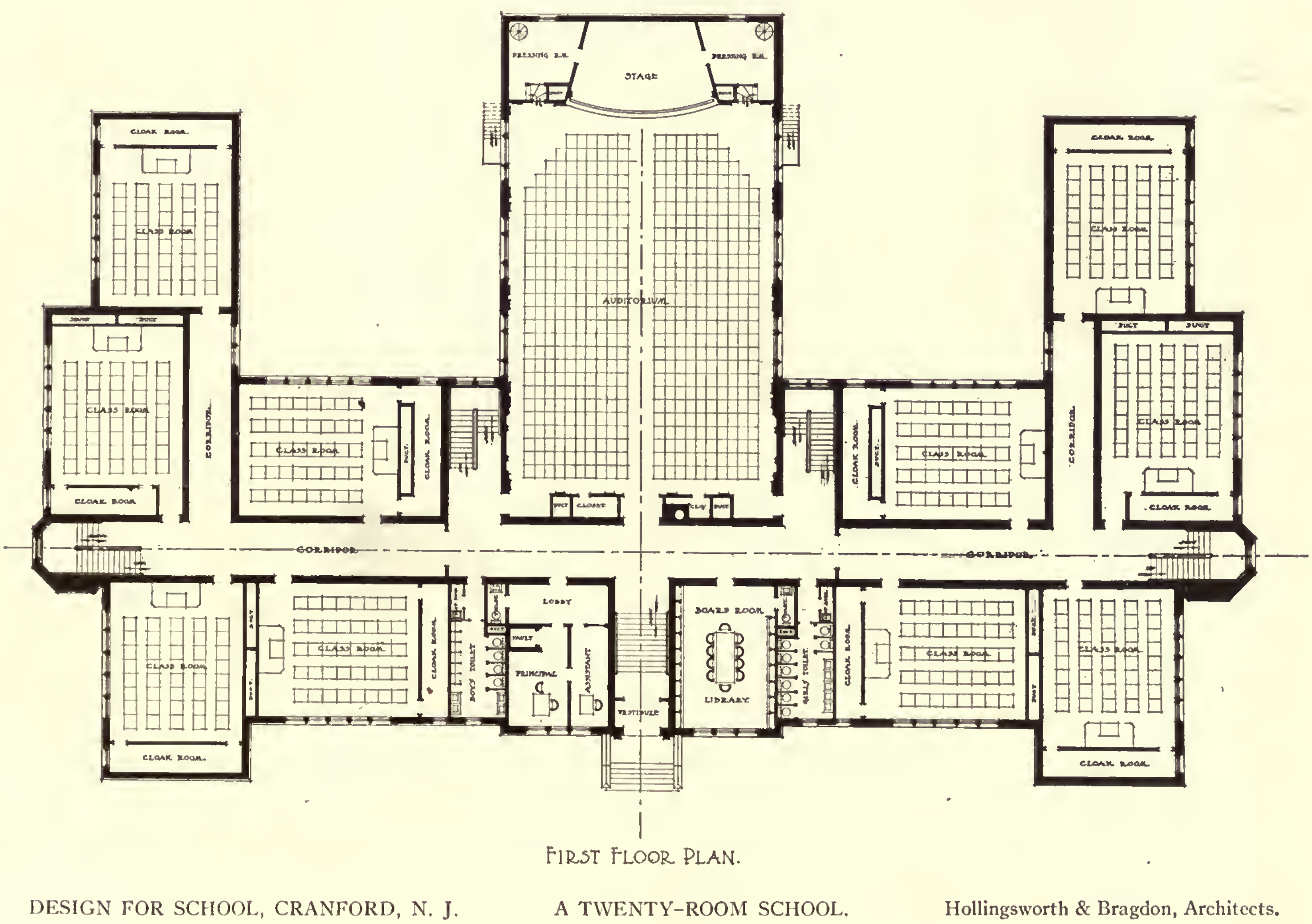




SCHOOL No. 64, BALTIMORE, MD.

Mottu & White, Architects.





FIRST FLOOR PLAN.

DESIGN FOR SCHOOL, CRANFORD, N. J. A TWENTY-ROOM SCHOOL. Hollingsworth & Bragdon, Architects.

CENTRAL HIGH SCHOOL, WASHINGTON, D. C.

Wm. B. Ittner, Architect.

Washington's School Shortage

THAT shortage of public school buildings in Washington has resulted in overcrowded classrooms and abbreviated courses of study for hundreds of children, is regarded by members of the education group of the City Club as one of the most serious situations in Washington, and demands the immediate attention of the community.

Entrance, Dunbar High School, Washington, D. C.
Snowden Ashford, Municipal Architect.

As a result of action taken at a recent meeting, the group will give thorough consideration to all plans for relieving the shortage of classroom facilities. A member of the board of education has been invited to be present at the next meeting and submit such plans as the school governing body may have formulated for remedying the situation. Definite action to aid in relieving conditions will then be taken by the group.

There was an informal discussion of some of the methods that emergency relief funds for financing a school-building programme could be obtained. Use of the District government surplus revenues, amounting to approximately $4,300,000, was suggested.

It was pointed out that the District's surplus funds have accumulated since 1916, when the revenues received under the half-and-half system of taxation were larger than required.

If Congress is asked by the City Club to allow school authorities to use these revenues for the erection of much-needed buildings, a request also will be made to have the federal government add about $4,300,000 to the District's fund. It was made clear that this will only be fair, due to the fact that the surplus revenues accumulated under the half-and-half system of taxation, and that the federal government should add its share to the municipal government's money. This would make approximately $8,600,000 available for the school building fund.

Enrolment records in the District public day schools have been broken. Figures compiled by officials show that 60,820 children are registered in the schools to-day, or 1,885 more than last year. The maximum enrolment last year reached about 60,000, making the enrolment to-day an increase of 820 over the peak of last year.

The total enrolment in both day and night schools, the figures show, has reached 66,868, an increase of 447 over the early October registration of last year. Pupils registered in both day and night schools last year at this time totalled 66,421.

Two hundred and twenty-seven students are enrolled in the normal schools.

The high school registration has reached 9,070, against 8,540 last year.

Enrolments in elementary school divisions total 51,186. This is an increase of 980 in the graded school enrolment this year.

In the night schools 6,048 are enrolled, an increase of 41 this year. Of this number 1,914 are colored and 4,134 white.

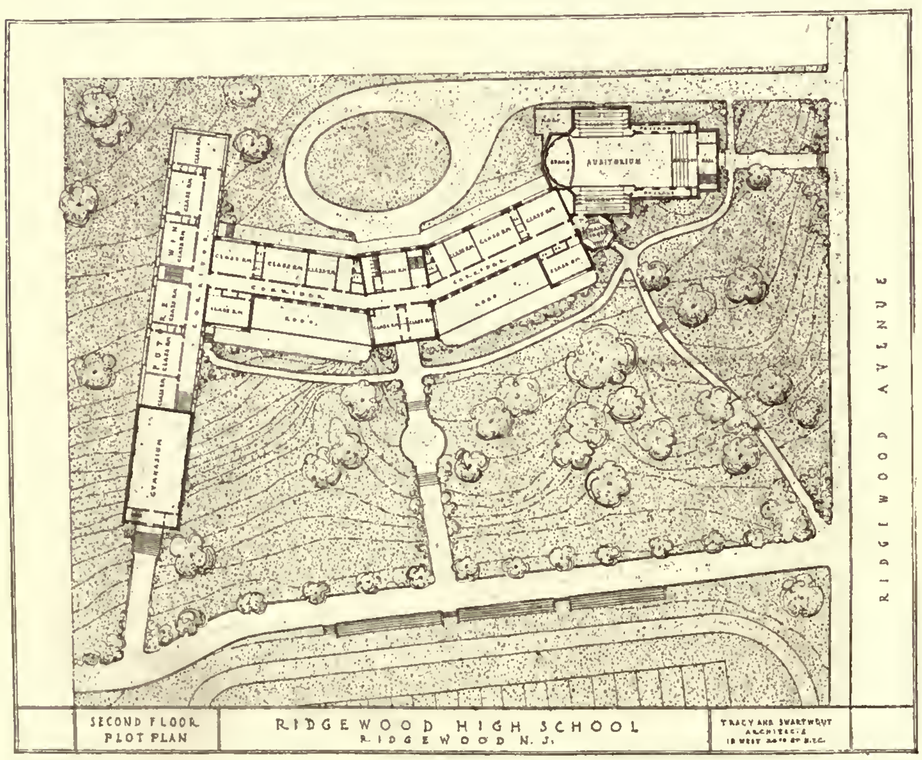
Central High School, Washington, D. C. Wm. B. Ittner, Architect.

The Ridgewood High School

By Egerton Swartwout

THE almost invariable mental picture of a high school is a square block of a building filled with large windows and with occasional blank spaces where there are no windows. It is ornamented, Heaven help it, with pilasters and a heavy cornice, or more often it is in a style of architecture which the local authorities call Tudor. It may be, and often is, practical enough, and has unilateral lighting and all the latest school equipment, but architecturally it is a crime, and being fireproof, it successfully resists the efforts of a beneficent Providence and remains, until happily it is outgrown and turned into a garage. Of course there are occasions where the exigencies of the site and the requirements of the locality demand a square block of a building, but more often than not it is merely due to lack of imagination on the part of those in charge of the work. It is always possible to get an interesting solution to any school problem. Mr. Clipston Sturgis has done a great deal for the schools around Boston, and there has been some charming work done in the Far West. There are some schools in California which are remarkably good and show an extremely ingenious treatment of the fenestration.

In the case of the Ridgewood high school a square-box plan would have been absolutely incongruous. The site is good; one of the best I have ever seen. It is in a fine residential section of the town, on a main thoroughfare, and is about eight acres in extent. The western half is flat meadow-land, bordered by a pleasant little stream, and forms an ideal athletic field. Toward the east the ground rises about thirty or forty feet and is very well wooded; the slope of the hill is gradual and curves toward the southeast. It is obvious that the gymnasium should be in close proximity to the field, while the auditorium, which was to be used for public gatherings not necessarily connected with school work, should be convenient of access to the main street. The usual arrangement of a combined gymnasium and auditorium, or a gymnasium under the auditorium, was therefore impossible. The gymnasium was accordingly placed at the foot of the slope adjoining the field, and directly connected, though at a lower level, with a future extension of the school proper. The auditorium, which with its future galleries will seat about one thousand, was placed at the other end of the building, facing the main road, and on the axis of an intersecting street. This arrangement is not so economical of cubage as the more compact plan perhaps, but its obvious advantages more than offset its slightly increased cost. Each unit is where it should be, and both can be used simultaneously without interfering with each other, and each can be used in the evenings without the necessity of opening or heating the school proper, which is the connecting-link between these two units and is irregular in plan, with a high central pavilion and two wings forming an obtuse angle with the central portion. By this irregularity of outline the building follows the contour of the hill and preserves the trees, most of which are large, fine specimens.



The building is extremely simple in character and almost devoid of detail. Simplicity is always desirable in a school, but in this case it was an essential, as the construction was started just before the war, in the face of a rising market.

The walls are a good quality of common brick and the trimmings cast stone. The roof is slate. An effort has been made to avoid the factory-like appearance of the recurrent groups of large windows, and to give the building a more academic or institutional air than is usual. This is accomplished by recessing the front above the first-story level, so that on the second and third floors the classrooms are on the rear, and the front windows on these two floors merely serve to light the corridors. The rear is not visible from the street, so that the large glass area faces nearly north and is entirely unobjectionable.

The auditorium is quite a radical departure from the ordinary bare, flat-ceilinged room. It is cruciform in shape and finished with brick quoins and rough plaster work, left in the brown or, rather, scratch coat, and is unpainted. The few mouldings on the ceiling are run in this same scratch-coat mortar. The plasterer insisted it could not be done, but it was finally, and the effect is remarkably good. The mouldings are naturally rough and imperfect but they harmonize with the ceiling, much more in reality than would appear from the photographs. In connection with this finish I stumbled on an acoustical effect which as far as I can find out has never been noticed before. In the original contract we had provided a certain amount of acoustical felt on the side-walls and on the vault over the stage. This was cut out to reduce the expense, and I was only fearful as to the result. Much to my surprise, I found on the opening night that the acoustics were excellent. After some experiments I came to the conclusion that it was on account of the thinness and porosity of the plaster on the ceiling. This is, as I have said, one coat of scratch on wire lath, and in some cases the coat was so thin that from the scaffold you could see the light from the skylight through the small interstices of the plaster. Undoubtedly the sound-waves went through the plaster, and the effect was almost as good as if the whole ceiling had been covered with felt. I don't pretend to say this would happen in every case, but it did at Ridgewood, and I have so much confidence in the idea that I am using this same scheme for a church. It's worth trying, anyway. The auditorium in the future will have two side and one rear galleries, which will increase its seating capacity and improve its appearance. Eventually I suppose the plaster will be painted, as it has gotten badly discolored in places, but the general color of it is excellent as it is.

A Notable One-Story Schoolhouse

The Rosemont School, Radnor Township, Pa.

By David Knickerbacker Boyd

THE new grammar-school completed in the summer of 1915 at Garrett Hill, Rosemont, Pa., marks an epoch in suburban-school development in Pennsylvania. Placed in a rapidly developing section of suburban character, this building has been designed on the unit principle so as to meet most readily the needs for increased educational facilities which will arise from time to time. To best accomplish this purpose, the one-story unit type was decided upon by the school board of the township of Radnor, after a thorough study had been made by the architects, Messrs. D. Knickerbacker Boyd, John L. Coneys, and Victor D. Abel. This type of building is arranged so that one classroom may be added at a time, if desired, or larger units may be constructed. The building is of the most flexible possible type, and is capable of indefinite expansion.

The portions of the new building now in use contain four classrooms, a well-lighted manual-training room, a domestic-science room, and play-rooms. There are also service-rooms in the shape of toilets, storerooms, and retiring-rooms for the teachers. A feature of the plan which deserves especial attention is the wide, well-lighted corridor, which has been designed not only as a means of circulation between classes and exits but which is intended for use in the summer-time for open-air classes and for other general school activities.

The physical activities of the school have been especially provided for in the basement. A shower-room, special toilets, and a tub-bath have been provided for the use of the pupils who will engage in athletics. A special entrance has been arranged so that the baths may be entered directly from the athletic field. It is proposed to use the field for community purposes, and a separate entrance will make possible the use of the basement for dressing-rooms without opening the balance of the building.

The features of the building just described have been provided for the double purpose of affording the broadest educational opportunities to the children, and also for making the school a recreation and social centre. The school board has been far-sighted in purchasing a large tract of ground, so that several acres are devoted to play purposes. These will be open for the general community at special times to be arranged by the school board.

While flexibility for future extension was the deciding factor in favor of the one-story type, many other considerations prompted its adoption.

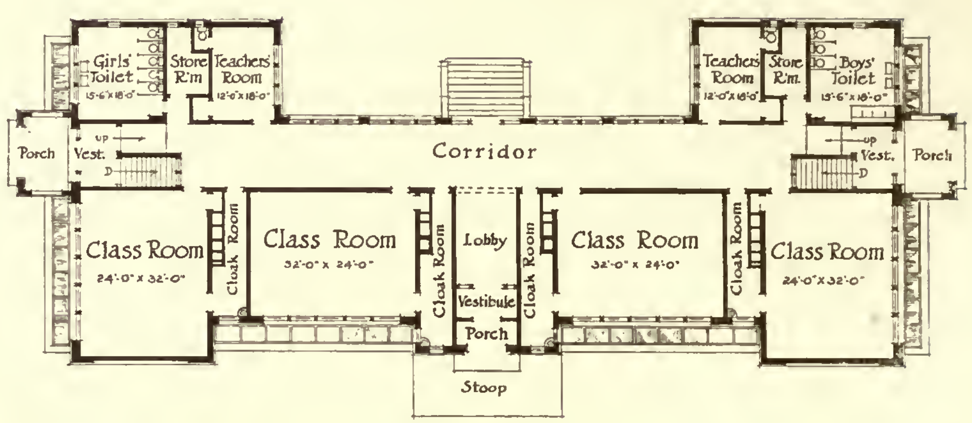
The first consideration was naturally the safety to life and limb, which is insured by having all classrooms and toilets on the ground floor, with a separate exit for each classroom. A glance at the illustrations will show how completely the menace of fire and panic has been removed.

With but one story, there are no stairs to climb several times a day, as is the case when some classrooms are on the second story. From an administrative standpoint, and in the dismissal of classes, etc., the one-story form of structure is admitted to be vastly superior to the two-story building. All interior walls and partitions are of brick and hollow-tile construction. Even the outside walls are lined with the latter material, doing away entirely with wood-lath or wood in the building, except in the roof itself, below which are suspended metal-constructed ceilings.

Individual bubbling fountains with wash-basins have been placed in the cloak-room connected with each classroom, and fire-hose equipment has been fully installed as a precautionary measure. The building is heated and ventilated by warmed fresh air, aided by direct steam.

The materials for construction are, aside from the fireproof floors and walls described, Holmesburg granite base, with brick above to the cornice, above which rises a green slate roof. The windows are disposed along the one side of each classroom, providing "unilateral" light.

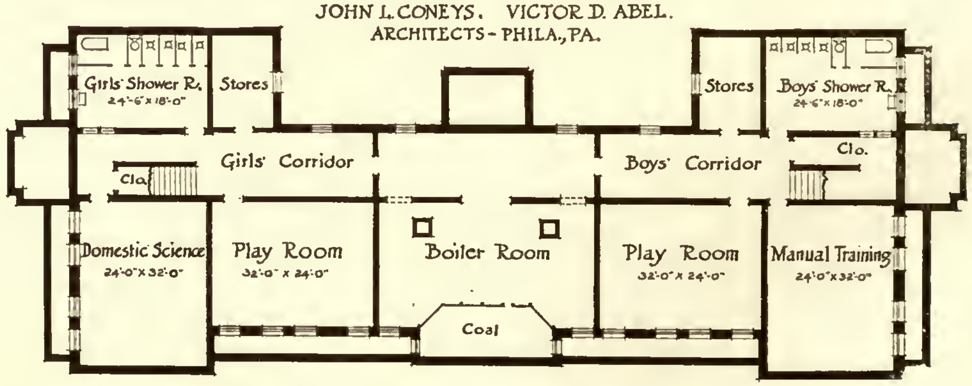
The corridors and toilets have red blocked cement floors with metal baseboards. The entire building is fitted with a vacuum-cleaning outfit; it is brilliantly illuminated and fitted with all devices to make it a model from the standpoint of health and hygiene, and to make it a community centre as well as an educational centre.



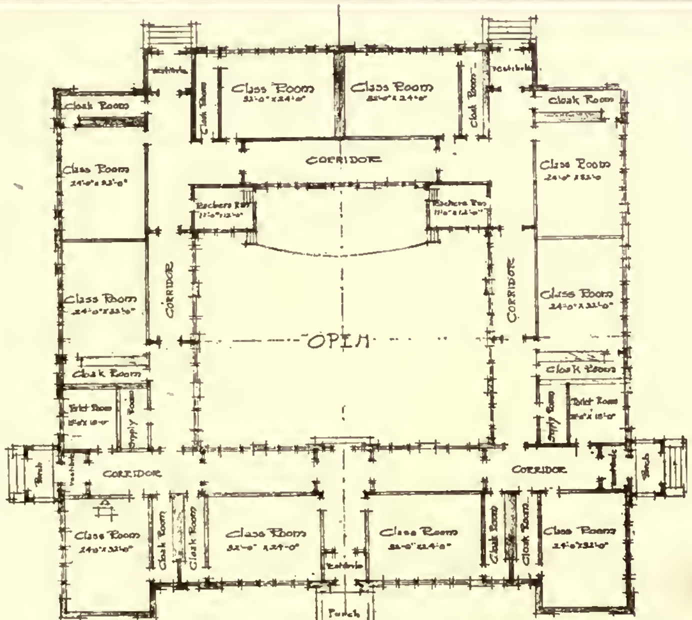
First Floor Plan

GRAMMAR SCHOOL BUILDING
for the
SCHOOL DISTRICT OF THE TOWNSHIP OF RADNOR
ROSEMONT-PENNA

D. KNICKERBACKER BOYD F.A.I.A.
JOHN L. CONEYS. VICTOR D. ABEL.
ARCHITECTS - PHILA., PA.



Basement Floor Plan



First floor plan for future enlargement.

The accompanying illustrations show two possible plans for the development of the building. In each the ultimate structure will be in the form of a hollow square, on the inner side of which will be continuous lighted corridors. These corridors will resemble a cloister in every detail except for the enclosing sash. The court may even be left open so as to form an open-air playground or open-air auditorium. It may also be roofed over for assembly and auditorium purposes.

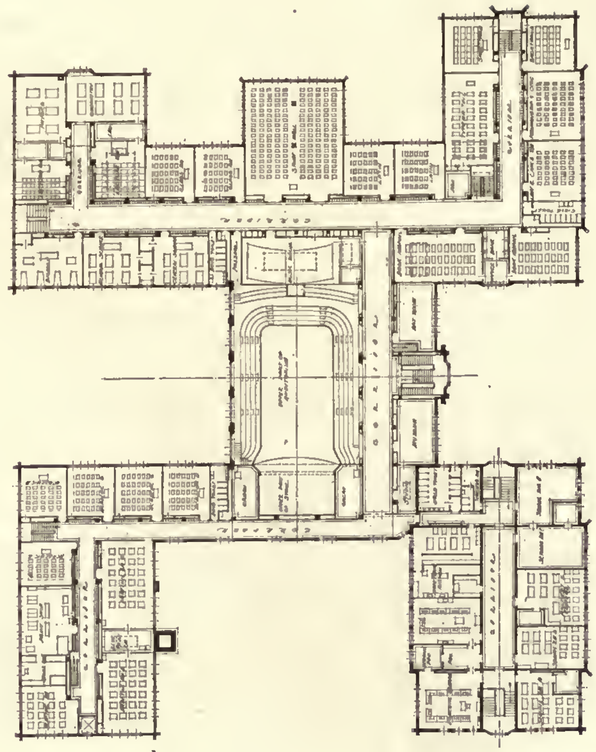
The Sheboygan High School

Childs & Smith, Architects

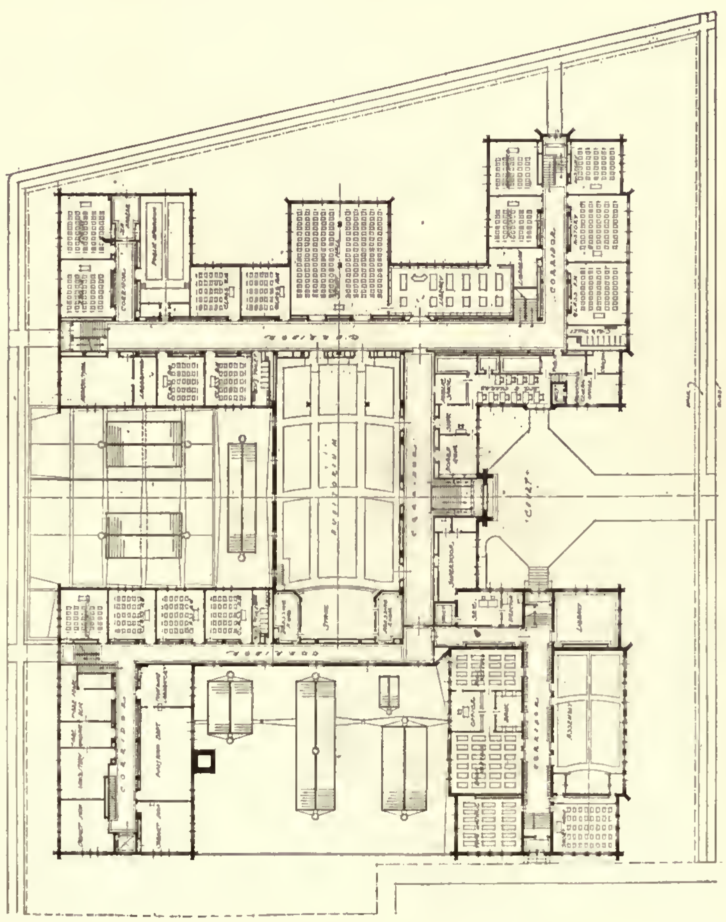
SOME of the finest recent school architecture in the country may be seen in the Middle and Far Western States. There has been keen rivalry among the local school boards there to get away from the old-time uninteresting and conventional schoolhouse, and to provide something that shall be both a source of local pride and an object-lesson to the community and the pupils.

In the Sheboygan high school, which involved a plan of large scope adapted to a building of unusual dimensions, a most happy result has been obtained. The building has dignity and architectural character with the appeal and charm of some of the notable examples of collegiate Gothic identified with the great universities. Ample provision for the requirements of study have been considered and the vital problems of abundant light and air. Here is a school that will remind many of the great public schools of England, of the great universities of England even, and of some of the famous buildings identified with our own colleges, both East and West. Such a building should be something more to the community than just a fine schoolhouse. It should be a lesson in the traditions that the architects have so admirably embodied in their design. The architects have succeeded admirably in adapting Gothic elements to a thoroughly up-to-date modern school, complete in all its manifold appointments.

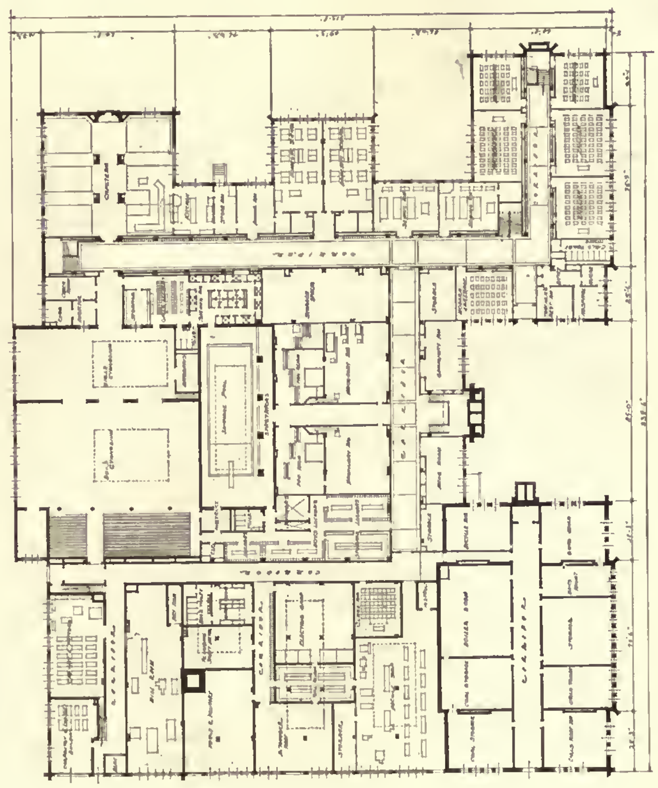
No public buildings have a greater educational value in the teaching of appreciation of architecture than our schools, for they make an appeal to minds in their formative and impressionable period. Sheboygan may well be proud of this handsome and distinguished building.



Third-floor plan.



Second-floor plan.



First-floor plan.

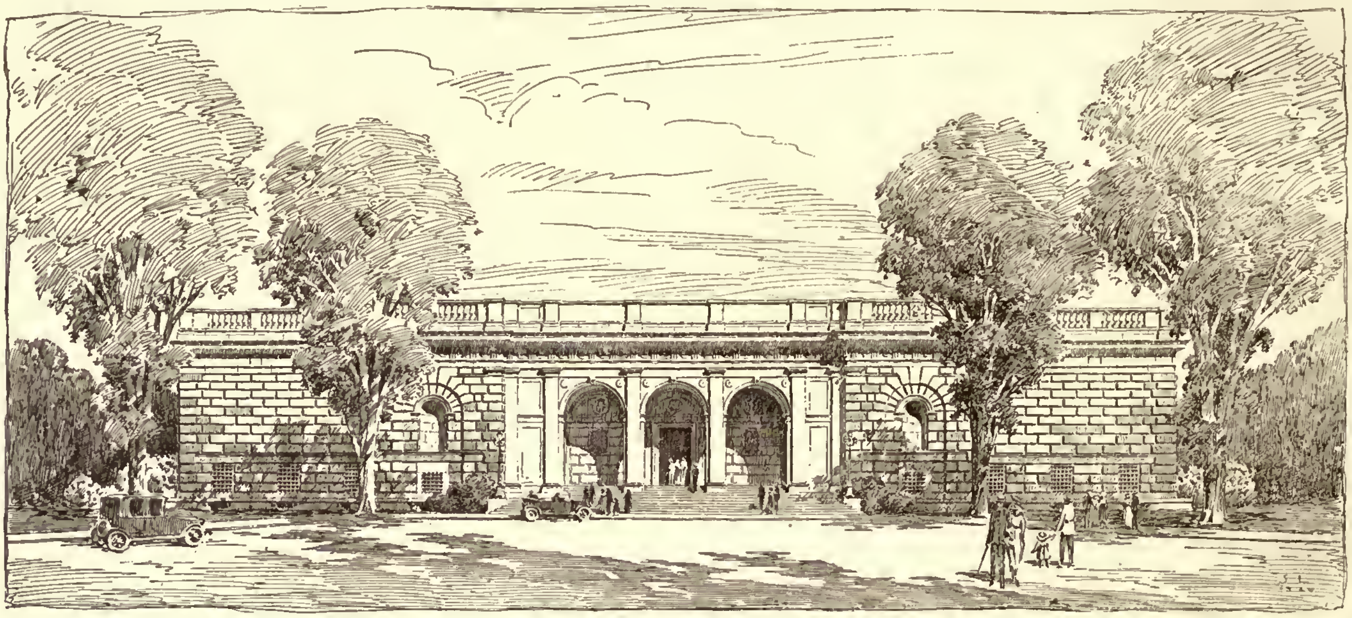
The Freer Gallery and What It Will Contain

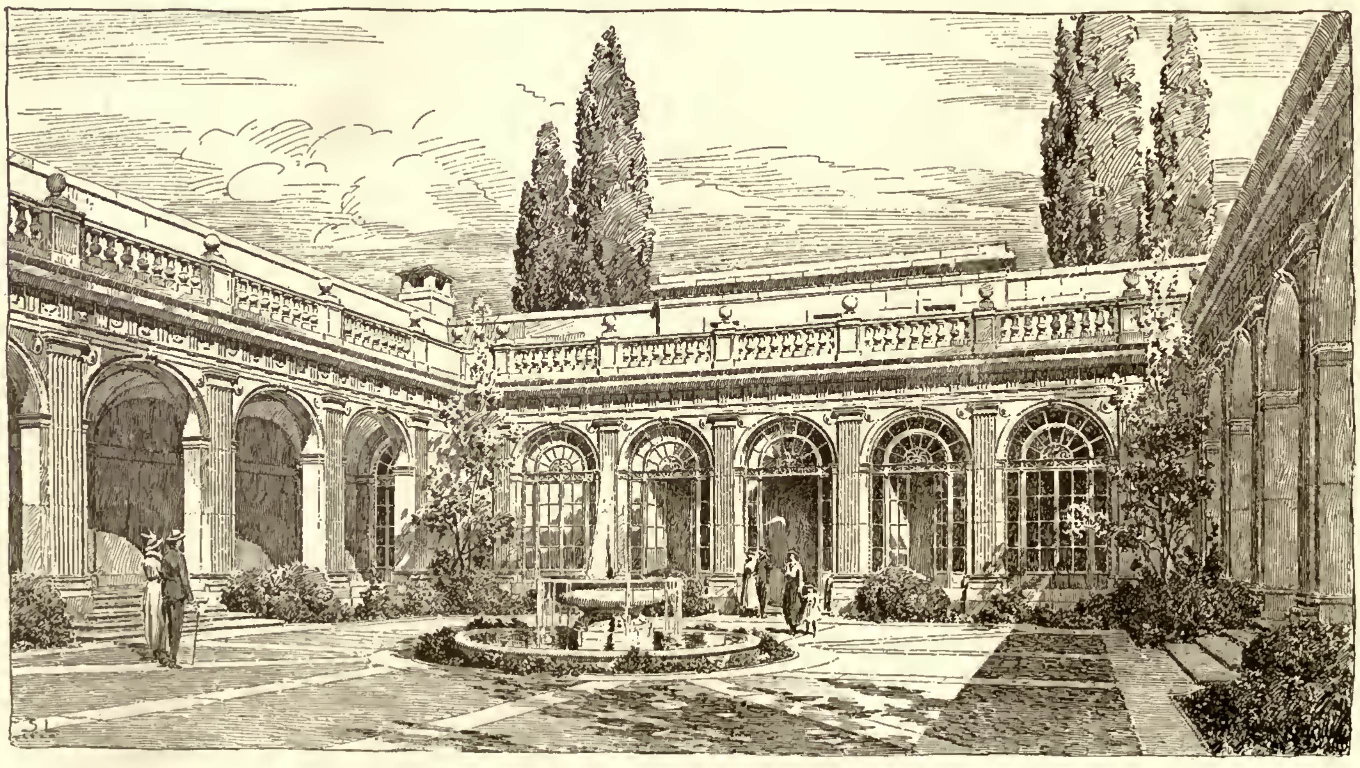
NOTE.—Although the building is completed, it will not be opened to the public until the collection is completely in place; probably some time next fall.

Charles A. Platt, Architect

THE building for the Freer Gallery, founded by the late Charles L. Freer and presented by him to the nation, has been in course of construction for several years. It is now practically completed, and when the process of installing the objects of art destined for it has been carried through it is probable that the structure will be dedicated before another year is finished. The Freer Gallery is situated on the south side of the Mall, not far from Washington Monument. It is one of the buildings entering into the grandiose scheme planned for the beautifying of the city and stretching from the Capitol down to the Lincoln Memorial on the banks of the Potomac.

The property on which the Freer Gallery stands belongs to the Smithsonian Institution, whose own old building at present occupies the neighboring site but is expected ultimately to be taken down. The gallery has been built out of the fund provided for the purpose by Mr. Freer. It will have cost, when the last detail has been attended to, approxi-



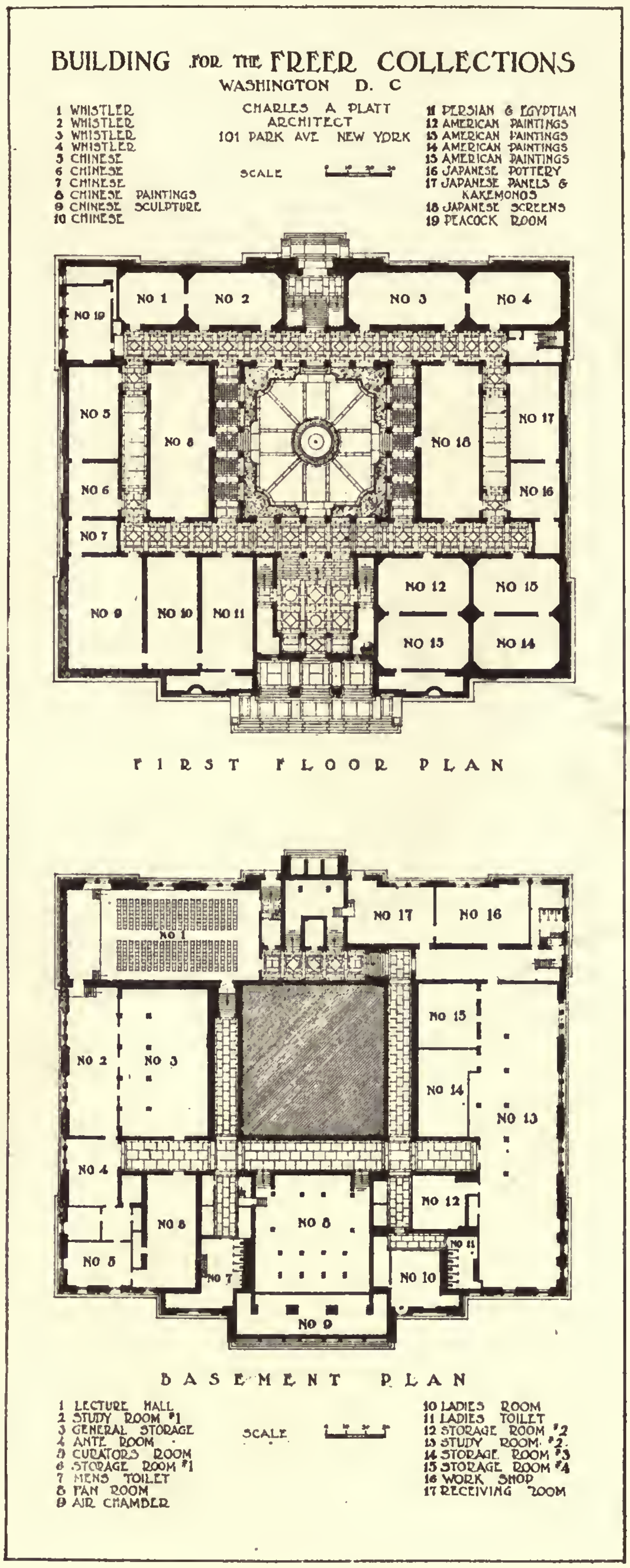


mately $1,500,000. It will be under the administration of the Smithsonian Institution. The regents of that institution will appoint the curator, whose name has not yet been announced.

The drawings, prepared by Mr. Platt, show a building in the style of the Italian Renaissance, a building which, as befits its purpose and the nature of its environment, is of modest height. It is 228 feet long and 185 feet deep, with and interior court open to the sky. This court is some 60 odd feet square, exclusive of the loggias which surround it. The exterior building is constructed of a warm, gray granite coming from Milford, Massachusetts. The court is of Tennessee marble. The floors of the galleries and corridors throughout the main floor, on which the works of art will be exhibited, are entirely of marble and tarazzo. Everything, of course, is absolutely fireproof. As the dimensions already given plainly show, the building is spacious. There are eighteen rooms surrounding the court on the exhibition floor. In the basement, in addition to the necessary administrative quarters, there is a commodious lecture-hall, and there are a number of storage-rooms. There are also rooms set apart for study. It is quite impossible and would be, in fact, opposed to Mr. Freer's ideas to exhibit all the gallery's possessions at one time. Quantities of these will be kept stored, but whenever a serious student with proper credentials wishes to examine them they will be brought out for his convenience and placed in the study-rooms aforesaid. The lecture-hall, by the way, has an entrance of its own at the rear of the building, which will obviate the necessity of bringing all the members of an audience through the exhibition-rooms.

The lighting of the main floor is entirely by skylights. Owing to the fact that the collections consist largely of small objects, the galleries are not lofty and the exhibition space on the walls is kept as low as possible. Each exhibition-room has its individual skylight. This may be tempered by louvers above the diffusing glass, so as to suit the requirements of the objects shown. None of the exhibition-rooms is at all wide. This is the result of a careful study of the matter of lighting. It recognizes the fact that for light to fall at the proper angle the distance from the skylight to the object displayed must not be too great. The question of temperature has also been taken into very serious consideration. The Freer collections contain many Oriental objects, which would be injured by too dry an atmosphere. Arrangements, therefore, have been made whereby moisture may be introduced whenever the air becomes too dry. There is a constant circulation of air provided above the diffusing glass in every gallery. This is expected to keep down the temperature in hot weather and has been calculated with particular care in view of the climate prevailing in Washington.

The principal entrance to the Freer Gallery will be through a loggia and vestibule opening upon a large square hall, in which there will be coat-rooms to the right and left. Turning to the right along the corridor, which divides this hall from the open-air court, the visitor will find four rooms devoted to paintings by American artists. One will be given entirely to the works of Thomas W. Dewing, another to those of Dwight W. Tryon, and a third to pictures by Abbott H. Thayer. The fourth room in the group will be given to a miscellaneous collection of American art, including paintings by the late John H. Twachtman, John S. Sargent, Willard L. Metcalf, J. Francis Murphy, Winslow Homer, and Charles A. Platt. The galleries on the farther side of the building will be occupied wholly by the works of Whistler. They terminate in a space in which the famous Peacock Room has been erected, precisely as it existed in the house of Mr. Leyland in London, for whom Jekyll, the architect, originally constructed it and where Whistler gave it the decoration which has made it renowned. All the other galleries on the exhibition floor are devoted to the works of Oriental art that form a distinctive feature of the Freer gift. These Oriental rooms will, of course, be kept comfortably filled, but there will always remain, as has been



said, a great number of objects in the storage-rooms. These will be drawn upon at regular intervals to make changes in the exhibition-rooms, so that the gallery from month to month will have always something new to attract the student.

In order to give some idea of the character of the collections taken together, Mr. Platt has supplied the following data:

AMERICAN ART

By James McNeill Whistler:
60 oil-paintings.
35 pastels.
45 water-colors.
100 drawings and sketches.
700 etchings and lithographs.

The Peacock Room.

By Dewing, Thayer, Tryon, etc.:
85 oil-paintings.
6 water-colors.
45 pastels.

By Augustus Saint-Gaudens:
2 studies cast in bronze, originally projected for the entrance to the Boston Public Library.

ORIENTAL ART: FROM THE FAR AND NEAR EAST

Something over 1,000 Chinese paintings.
About 135 Japanese screens.
" 400 Japanese paintings.
" 35 Chinese tapestries.
" 700 Chinese, Japanese, and Korean bronzes.
" 100 additional metal objects.
" 160 Chinese stone sculptures.
" 350 Chinese jades.
" 400 pieces Chinese pottery.
" 750 pieces Japanese pottery.
" 225 pieces Korean pottery.
" 375 pieces Near Eastern and Egyptian pottery.
A collection of several hundred pieces of Egyptian glass.

Town Planning for Convenience and Health

By Louis Lott

PART II

THE chart on page 336 shows the subdivisions of a comprehensive plan and the "maxims" that must guide the planner and the community in its preparation, and also the sources from which the funds for actual execution can be secured, by which, the grit, enthusiasm, esprit de corps, and liberality of a community can be measured.

The subdivisions of the plan are largely technical, but are more or less self-evident. To begin with, there must be statistics upon which a proper analysis of the case for planning can be made. Next are the plans of a general nature, empowering legislation, and—that which is very important—education of the public upon this vast subject through articles in the local papers, through illustrated lectures before clubs, and, as a permanent part of the curriculum of high schools, illustrated lectures upon the principles of town planning and of good citizenship, which are seeds planted that in time will bear the fruit of moral and active support for this great question.

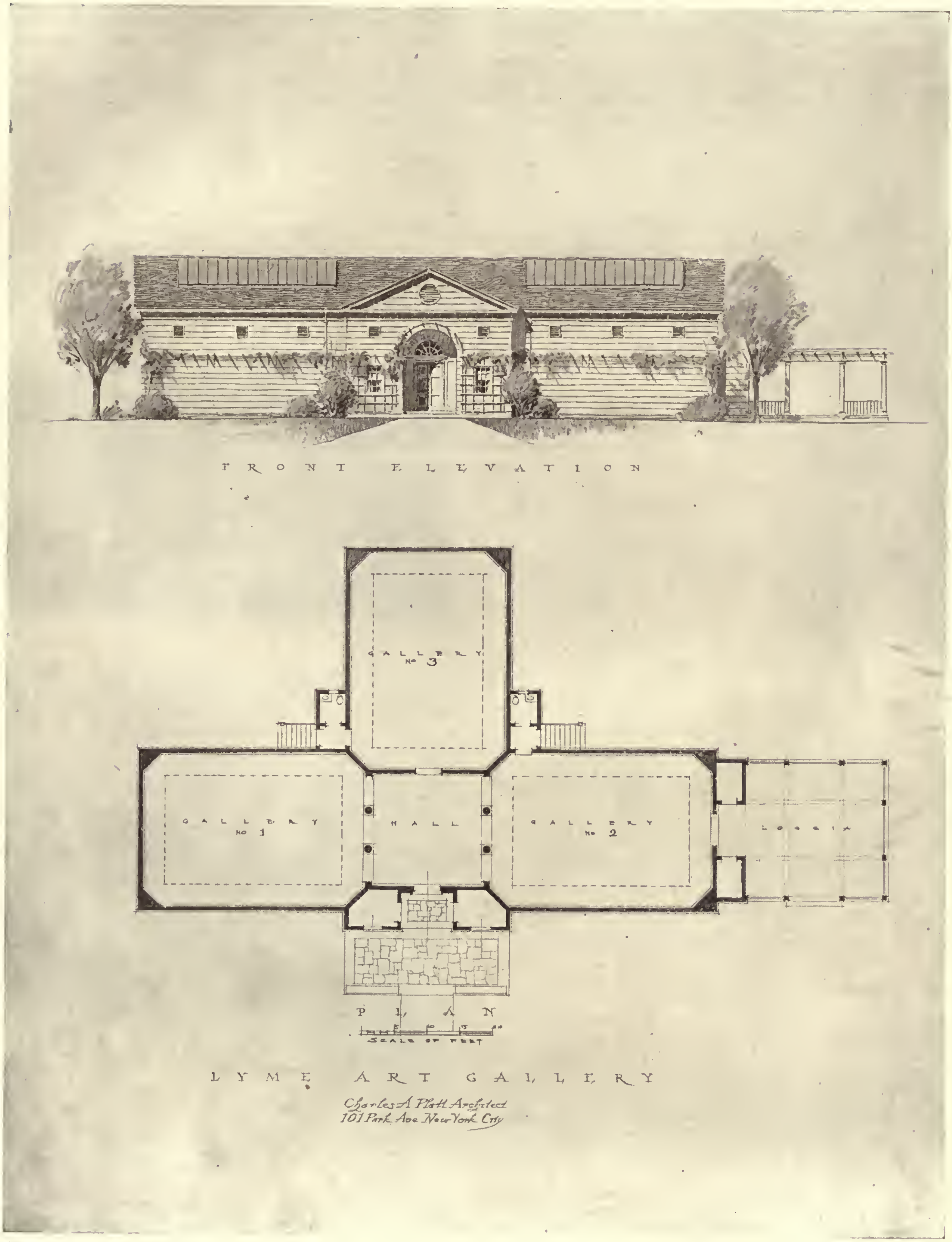
The detail plans exhaust the subjects under each heading and with due regard to each other. The guiding maxims for the preparation of the plan are as follows:

"Local and national patriotism" of its citizenship is the biggest asset that a community can have when attacking such a proposition. This will enable one community to outdistance another that has greater wealth and resources, but which has not the spirit of solidarity and sacrifice, nor that sense of greater civic responsibility that will prompt its citizens to give of their surplus wealth in the form of donations and bequests to this splendid cause and that will furthermore prompt them to subordinate personal opinion and interests for the good of the greatest number and stifle such "petty sentimentality" as is often displayed for the retention of this or that building or idea that would be in the way of genuine progress; all of which can be brought about through education upon the subject.

The first "maxim" that must guide the preparation of the plans is "reasonableness." The idea to be worked out must come within the bounds of reason and must ultimately be possible of execution. Mere castles in the air will scuttle the whole plan. However, that does not mean that the operations to be undertaken upon the physical body of the community should consist in mincing little scratches and cuts. On the contrary, the diagnosis and remedies must be sure to go to the root of the matter even if the actual operations must be deferred for a number of years. What, after all, does such a length of time mean in the life of a community, especially when it is considered that the infirmities of the city plan date in many instances from the beginning of the community? Make no little plans but such as are within the bounds of reason and common sense, and that can be executed wholly or in part from year to year.

An orderly development plan is also, among other things, purely a "business proposition," and must be founded upon the sound economic basis of cutting down overhead expenses, avoidance of waste, and securing permanent improvements to the community, for no undertaking or business is founded upon a sound financial basis that does not spend money in order to conduct its business in the most efficient manner and to achieve ultimate economy, and if this is conceded as true then few of our cities are now being developed upon this economically sound principle.

"Practicability" is the first requirement of a city-plan project, and this must be considered in advance of economy or beauty, since a thing cannot be considered economical in a larger sense if it is not practical, nor beautiful if its beauty is marred by the fact that it is impractical, does not fulfil its function, and consequently is an economic failure. Too much petty, short-sighted, makeshift economy is practised in city improvements that, in the end, prove wasteful.



ART GALLERY, LYME, CONN. Charles A. Platt, Architect.

Therefore "constructive economy," in the sense of "neither too much nor too little," that permits neither narrow niggardliness nor extravagance of any kind, must be a basic maxim in community development, since in all communities the programme of the comprehensive plan will be so large and the coast so great that no community can hope to carry it out excepting upon the basis of this maxim. Furthermore,

CHART III

in order to make every dollar count to the utmost, the maxim of "maximum intensive use" should be applied to everything in which public funds as well as private capital are invested, from the rarely used spare bedroom and the unnecessarily large porch of the private residence to the church property that lies idle at least 80 per cent of the time, to the average duplication of 30 per cent of street-car trackage, and the excessively wide roadway of the purely local suburban street, etc. Such a policy will go a long way toward conservation of community resources and will make many an essential or desirable improvement of the city plan possible.

The "welfare" features of a community must also receive basic consideration in the comprehensive plan by providing facilities for the proper kind of wholesome recreation, amusement, social intercourse, and broadening education. With such maxims to guide the preparation of the plan, it cannot help but be a complete success if "harmony of looks," which is just another expression for "beauty," is also admitted to the partnership of guiding maxims.

Heretofore it has been the right of an owner of a piece of property to carry on any kind of an activity or to erect any kind of a building upon it, excepting for such restrictions as might be contained in his deed, or any extreme nuisance that might be attacked in court. This custom has

Dayton, Ohio. A lost opportunity.

produced a hodgepodge of development in our American cities that has resulted in enormous losses, shiftings, and unstabilizing of realty values. This was particularly true of New York City, where conditions had become so acute and

Alley housing, Dayton, Ohio.

realty values so unstable that something had to be done that would curb this and that would regulate development in the future. Accordingly, the New York zoning law was framed and passed by the legislature in 1916. Since then many States, following the example of New York, have passed similar laws that have enabled many of their progressive communities to prepare zoning plans and regulations to govern their future development, and thereby safeguard and stabilize their realty investments.

Zoning means that a community is divided into a number of districts or zones, each of which is governed by special regulations that control the height, use, and arrangement of the buildings within that zone. These different zones are largely established in accordance with existing conditions, but their restrictions are not retroactive. The regulations that limit the height of the buildings are determined according to their use and the widths of the street upon which they face, thereby assuring an adequate amount of light and air, whereby such examples of short-

Dayton, Ohio. Contractor housing—not enough space.

sightedness as were shown in the erection of the Wall Street office-building cited later on are avoided.

Some communities that have a zoning plan have created many more zones than are shown upon this chart; others have deemed it wise and more expedient to have less, especially as regards residence zones, but in view of the fact that activities that do not belong in such districts are constantly encroaching upon residence property with the resultant losses in values, the zoning regulations applied to

General new contractor type (bad), Philadelphia, Pa.

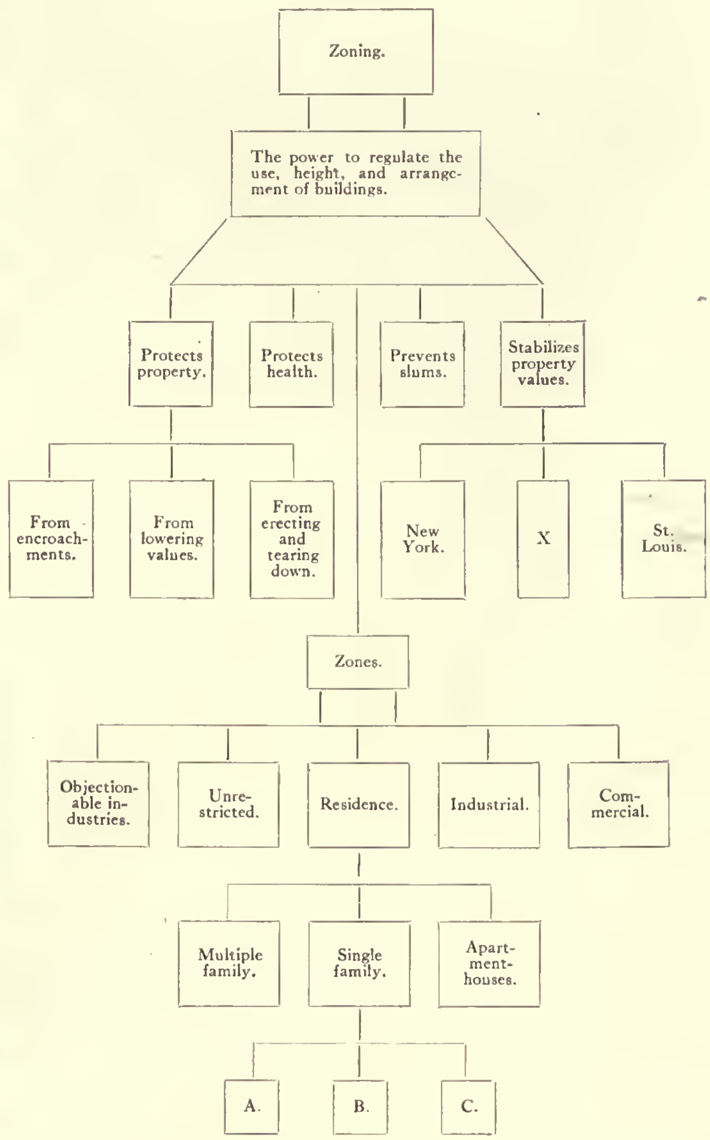
residence districts should be strict. A man's home, above all, should be protected.

The zones shown in Chart IV are as follows: Objectionable Industries, Unrestricted, Industrial, Commercial, and Residence districts.

By establishing these various zones nuisance industries are restricted to Objectionable Industries zones, and are kept out of Industrial zones. Factories, junk-yards, etc., are kept out of Commercial zones; activities that cause noise or much traffic are kept away from school and hospital zones; stores, etc., are only allowed to be established on the main traffic streets where they naturally belong. Residence districts are here divided into multiple-family, apartment-house, and detached-residence zones; the first allows double, duplex, and row houses; the second may contain any of the three groups but would eventually contain practically all apartment-houses. In some cities, where the apartment-house is quite frequent or the rule, it will be necessary to create A, B, etc., groups, which are then based upon the number of families allowed per acre. Single-family-house zones are reserved for such only, and are here divided into three groups—A, B, and C—based upon space limitations. The subdivision under residence will vary in different communities.

This subject is vast and only a general idea can be ob-

CHART IV



tained from such an article as this; however, a few examples are here cited for better understanding. Again New York furnishes some very extraordinary examples of the value of zoning, which, however, apply in principle to small communities as well. Somewhat prior to the period of 1916 land values upon the south side of 23d Street between Fifth and Sixth Avenues and upon Sixth Avenue between 14th and 23d Streets were at least double what they are to-day. This great slump was chiefly caused by the moving away of the great department-stores from this neighborhood, because of the encroaching industries that supplied these stores. However, after the stores had moved up to 34th Street and Fifth Avenue and on up the avenue to 42d Street, the cloak, suit, etc., manufacturers followed them from their locations in the side streets off of Fifth Avenue below 23d Street up into similar locations between 35th and 39th Streets. At the noon and evening hours these shops dumped their workers, mostly foreigners, out upon Fifth Avenue when it was crowded with shoppers, blocking the sidewalks and driving the shoppers away. An

War housing, Erie, Pa.

emphatic protest from the merchants of the avenue, accompanied with a threat of boycott of these manufacturers, together with the new zoning ordinance, which assigned other locations for these shops, eventually put an end to this, and is restoring the avenue to its normal life.

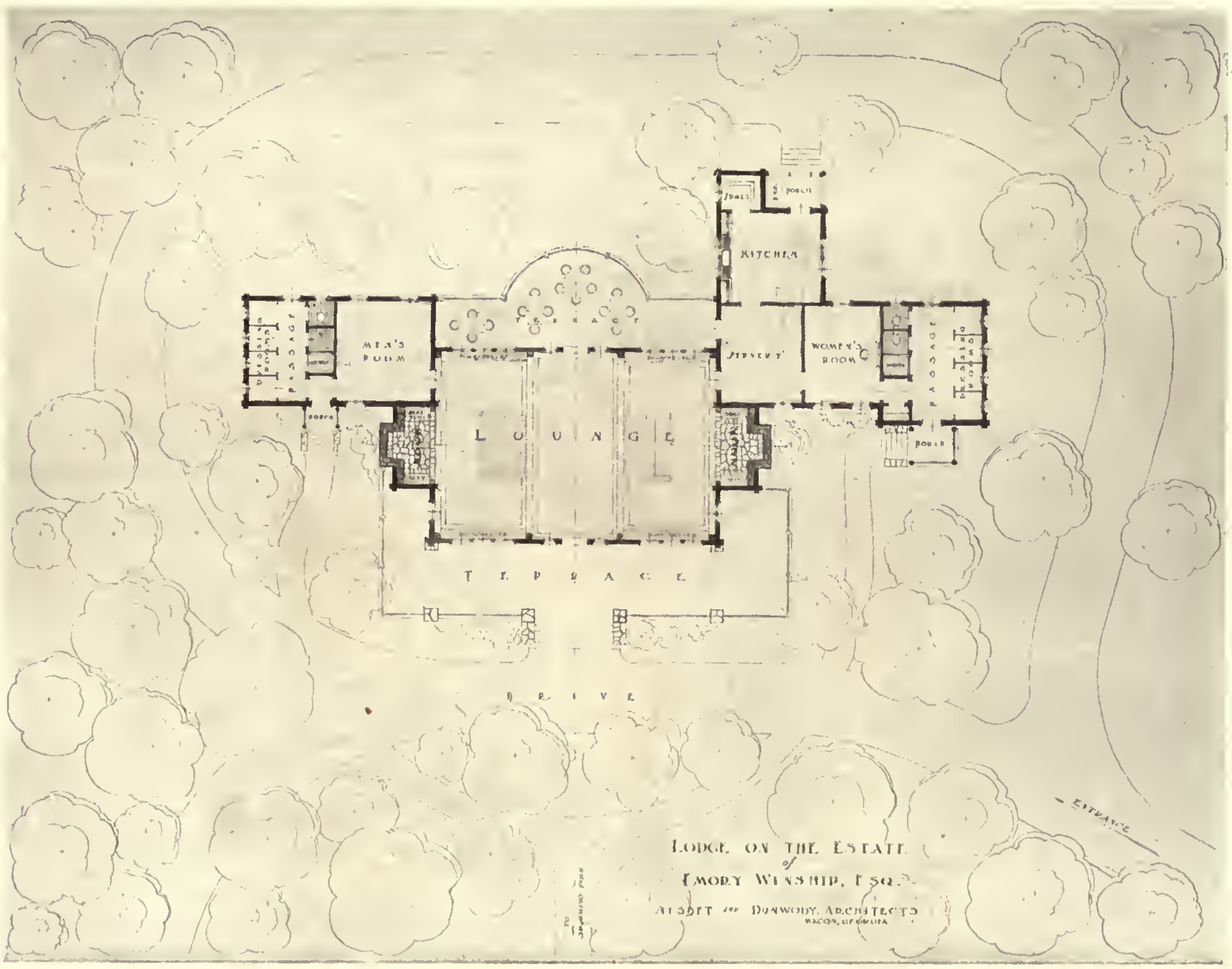
Another instance, and not an isolated one by any means: In Wall Street one of the early tall buildings, like many others, secured much of its light from windows in a party wall. In other words, it was stealing its neighbor's light until the owner of the latter also erected a tall building and shut off the source from his side. Naturally this caused vacancies. Just prior to 1916 this building, which represented an investment of about $2,000,000, was operating at an annual loss in excess of $30,000, and in 1916, when there was a great demand for office space, the owners of the building considered themselves lucky that the income showed a balance over expenses of about $5,000, or about 1/4 of 1 per cent upon the capital invested. The new zoning law has put an end to the possibility of such losses to the individual by protecting him from his own greed and short-sightedness, and thereby the community from loss of resources and collectable taxes.

Many pages could be written citing parallel cases in New York, and similar cases exist in every community in the country. The only difference is in the size of the figures. For instance, in the Middle West, in a small town of about ten thousand inhabitants, a lumber warehouse was erected in recent years in the heart of a natural residential district, not more than five blocks from the centre of town, and in order to emphasize its presence it was painted a bright orange. True, there were not many houses in the neighborhood at the time, but it has now become thickly settled. Naturally these properties will depreciate in value, especially since a modern subdivision is being opened up near by. Besides, there is the ever-present menace of an enormous conflagration should this warehouse ever catch fire. This shows that not only large cities are in need of zoning, but that smaller communities need this as much if not more, in order to regulate their growth and prevent losses which they can ill afford, since their wealth is mostly very limited.

Another case: in St. Louis there is a blighted district of about fifty city blocks between the down-town business district and the residence district to the west that has suffered a great decline in property values, because of the westward growth. The properties in this district, largely residences, were retained upon the tax duplicate at very nearly their original values, whereas their income has been continually receding. This condition could well have been avoided to a large extent had St. Louis had a vision of its development, a comprehensive plan, and a zoning ordinance thirty years ago. The transition would then have been gradual, the development along orderly lines, and millions in wealth could have been saved to property-owners and to the community. It should be mentioned, however, that St. Louis is one of the few cities that now has a definite plan, which has the support of the public, and upon the basis of which improvements are proceeding right along.

(*To be concluded.*)

Entrance, Evander Childs High School, New York.


KITCHEN
PORCH
MEN'S ROOM
PASSAGE
SERVERY
WOMEN'S ROOM
PASSAGE
PORCH
L O U N G E
PORCH
T E R R A C E
D R I V E
ENTRANCE
LODGE ON THE ESTATE
of
EMORY WINSHIP, ESQ.
NISBET and DUNWODY, ARCHITECTS
MACON, GEORGIA

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, School of Architecture of Columbia University

ARTICLE III

ESSENTIAL STANDARDS OF QUALITY IN BUILDING MATERIALS

Materials Used

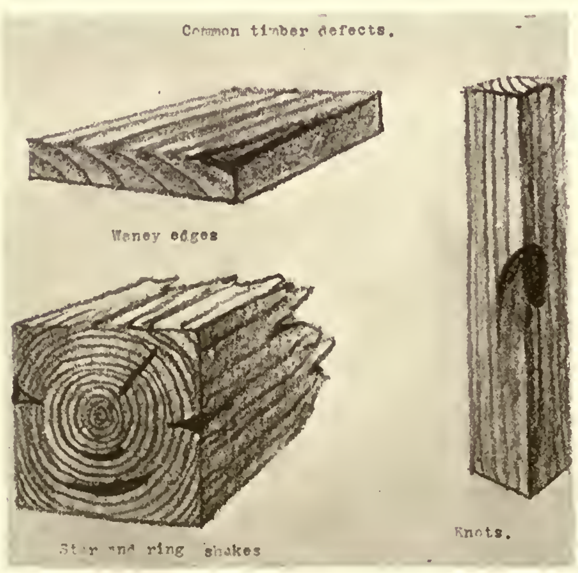
FROM the last article it will be remembered that the commonest types of small houses are the wooden-frame house and the masonry-and-wood house. Now it is essential that certain definite qualities be required of all materials of construction which enter into the building of these houses, and although there are many facts covering the standard qualities and methods of manufacture, yet the designer cannot expect to remember all of them. It is sufficient if he knows those qualities which mean satisfactory building and durability when applied to the structure.

Of the large number of materials which enter into the construction of a house, the following are the most important and should be maintained at a high standard: wood, clay products, cementing materials, metals, glass, and paint.

Woods

It is possible to enter into a long discussion of the classes, qualities, methods of conversion, defects of wood and similar subjects, but these are not pertinent to the main idea, namely, the essential qualities of woods which are used in the construction of the small house. There is a prevalent impression abroad that the supply of wood is becoming so depleted that it will in the future be used only for special ornamental features. This is wrong, for we still have enough virgin forests left to supply the country for several generations, and with the growth of forestry we will maintain a certain source of supply.

We have two classes of woods on the market which are used in different parts of the structure, according to their special qualities. These are commercially known as hard and soft woods, although this is not a very scientific distinction, since some of the soft woods are harder than some of the hard woods, and vice versa. Scientists have more accurate names than these, but as the above are so well established, there is no doubt as to what is meant.



In the market, lumber is not only classified according to the above, but according to the species of tree it comes from, and also according to certain standard grades of the same kind. These grades are determined by the presence of certain defects. The recognized defects are knots, shakes, checks, splits, streaks, pitch-pockets, stain, rot, wane, warp, cupping, mineral streaks, pith on the face of the board, and worm-holes.

Various large lumber associations issue rules governing standard sizes and classifications for woods to be used in construction. The best and the next best are the usual grades which are used for the interior and exterior trim of houses. These grades have many designations, as "clears" and "selects," or "A" and "B," or "No. 1" and "No. 2," or "firsts" and "seconds."

The grades used for the rough framing, such as studs, joists, rafters, subfloors, and sheathing, are not so good. They are designated as "No. 1 common" and "No. 2 common." A poorer grade still, known as "No. 3 common," is sometimes used for cheap temporary structures.

For the details of grading and standard sizes of lumber, every architect should possess the publications of the following concerns:

- Southern Pine Association, New Orleans, La.
- West Coast Lumbermen's Associations, Seattle, Wash.
- Hardwood Manufacturers' Association of the United States, Cincinnati, Ohio.
- California Redwood Association, San Francisco, Cal.
- Gum Lumber Manufacturers' Association, Memphis, Tenn.
- The National Lumber Manufacturers' Association, Chicago, Ill.

Next to the grading of timber, the most important factor of quality is the relative durability of the various woods, for upon this depends to a large extent the choice of them for special places. The following is a table taken from a government classification:

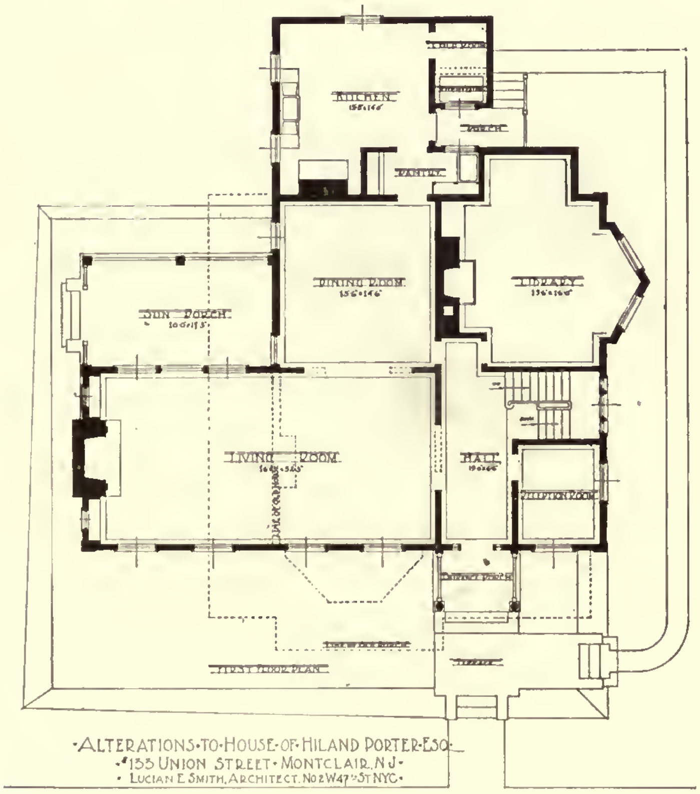
Relative Durability of the Common Woods

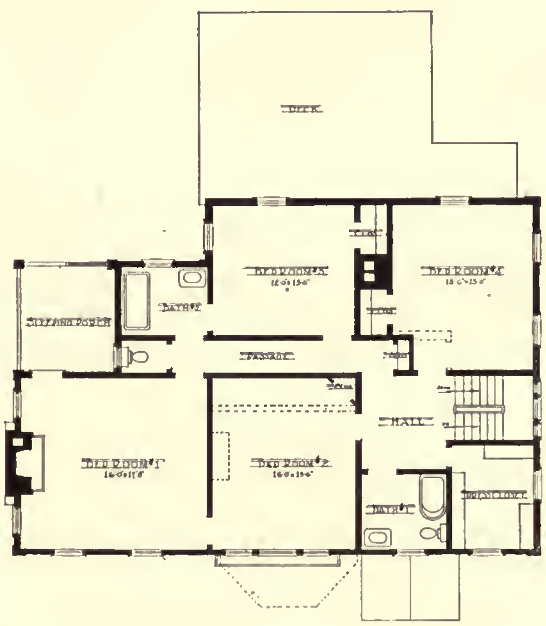
The Soft Woods

VERY DURABLE	DURABLE	INTERMEDIATE	NON-DURABLE
Northern white cedar. Western red cedar. Cypress. Redwood.	Douglas fir. Tamarack. Western larch. Long-leaf yellow pine. Eastern white pine.	Eastern hemlock. Western hemlock. Loblolly-pine. Norway pine. Short-leaf yellow pine. Sugar-pine. Western white pine. Western yellow pine.	True firs. Spruces.

(*Continued on page* 342.)

ALTERATIONS, HOUSE, HILAND PORTER, MONTCLAIR, N. J. Lucian E. Smith, Architect.





(*Continued from page* 340.)

Hard Woods

VERY DURABLE	DURABLE	INTERMEDIATE	NON-DURABLE
Chestnut. Black walnut. Black locust.	Cherry. White oak.	White ash. Butternut. Red gum. Yellow poplar. Red oak.	Basswood. Beech. Birch. Buckeye. Cottonwood. White elm. Hard maple. Soft maple. Sycamore. Cotton gum.

From this table it will be noticed that the soft woods as a class are relatively more durable than the hard woods. This is true, because of the fact that the structure of soft

Difference in the cut of flooring boards. The flat grain in the softer woods is not durable.

woods is simple, while that of the hard woods is complex. When the former becomes wet and expands and then dries out and shrinks, the structure is not stressed internally as much as is that of the hard woods, and they are therefore much more capable of withstanding the action of the weather. Also certain of the soft woods have natural properties of resisting dry or wet rot.

Certain species of woods are, therefore, selected for particular parts of the house according to the needs of durability, strength, appearance, and local supply.

Rough wooden framing requires a wood that is fairly abundant and strong. The soft woods are generally used, and those which are classified as durable in the table are the most used.

For rough underflooring and sheathing the cheapest and most abundant local wood is used. Durability is not essential.

For shingles the most durable woods must be used, such as cypress, cedar, and redwood.

Lath are generally cut from waste slabs, and should be of some soft wood like spruce or of one of the softer hard woods. Siding should be made from one of the soft woods, especially those which are classed as durable in the table.

Porch columns and the like require very durable woods. They should be hollow except for very small ones. Built-up columns of interlocking type are usually specified, but the lumber used should be thoroughly kiln-dried so that the joints will not open.

Flooring should be capable of resisting wear and should not splinter. The hard woods as a class are more adaptable than the soft woods, although yellow pine and Douglas fir are used a great deal on account of their cheapness. These latter are divided into two grades: "flat grain," in which the annual rings are almost parallel to the surface, and "edge grain," in which the annual rings rûn almost perpendicular to the surface. The latter is more desirable, since it wears better. The flat grain splinters off, due to the layers of soft spring wood and hard summer wood. Oak flooring comes plain and quarter sawn, which is practically the same as the cut of yellow pine, but since oak is strong either way, the wearing qualities are not very different. Maple is also an excellent wood for flooring, since it is hard and smooth.

Door and window frames may be made from many kinds of wood, although the soft and more durable woods are generally accepted as the best. Specially hard and durable woods should be used for the sills.

Doors which are to be used on the exterior should be of a soft and durable wood. The choice of wood for interior doors is limited only by the taste of the designer. The doors which stand best the warping effect of steam-heat in the winter are constructed of white-pine cores with a veneer on the exterior made from some hard wood.

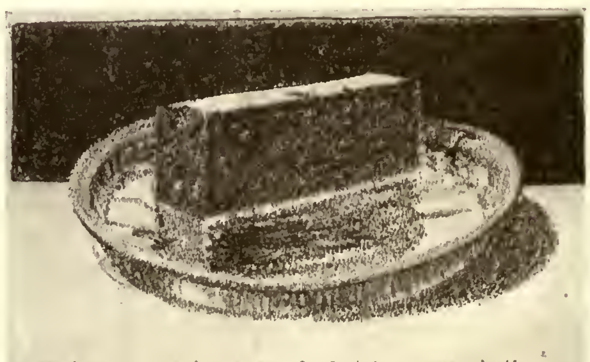
Sash and blinds require a soft and durable wood. Sash are subject to the drying of steam-heat on the interior and cold and dampness on the exterior. Sash built of yellow-pine sap-wood have rotted in a few years, and while soft maple, birch, and basswood have been used, they are not durable, although easily worked. White pine is considered to be the best for sash and blinds.

The selection of woods for interior trim depends only upon the designer's taste, since neither relative durability nor strength is a requirement. The harder woods in the past have been used more extensively for interior trim than the soft, because of their supposedly better and richer appearance, but this is not so true to-day, for new methods of treating such woods as cypress and yellow pine have shown them to be fitted for the best artistic places. Of course hard woods are not dented from knocks by furniture as easily as the soft woods, and in this way retain their appearance longer.

Clay Products

Bricks

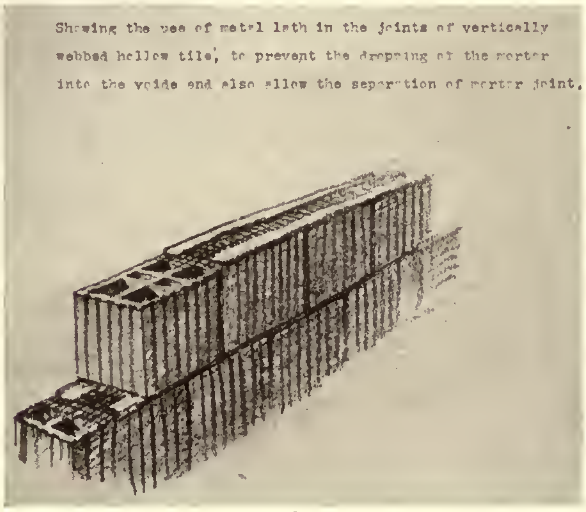
In considering the essential qualities of bricks for the small house it must be appreciated that those bricks which are used on the exterior must be able to resist the effects of weather and produce the best artistic results, while those which are in the interior of walls or chimney need not be



Method of testing a sample brick to see whether it will have a tendency to white wash.

held up to such rigid standards. The determination of the resistance of bricks to frost and weather action is quite simple. A brick which struck by a hammer gives a clear ring is one which has been well burned and has no soft spots, cracks, or weak places. Such a brick can be said to be satisfactory for exterior use, provided that it has the proper form and color desired and is not so overburned as to be twisted and warped. Another requirement sometimes specified is that the face brick made from soft clay should not show a percentage of absorption in excess of 15 per cent, and for the stiff-molded or dry-pressed bricks not more than 10 per cent. This, however, cannot be a hard-and-fast rule, due to the variation of clays.

Certain red bricks, unless they are burned very hard, show, when built into the wall, a very ugly white surface



Showing the use of metal lath in the joints of vertically webbed hollow tile, to prevent the dropping of the mortar into the voids and also allow the separation of mortar joint.

discoloration, called "whitewash" or efflorescence. This is not entirely due to the brick, since the mortar that is used may sometimes produce it. If it is due to the brick it can be discovered before the brick is used in the wall, by placing a sample brick on edge in a pan containing one inch of either rain or distilled water. As the water is absorbed by the brick, the white discoloration will develop on the top surface after several days of standing if it contains the salts which will cause the whitewash. Those bricks which have been very hard-burned will not discolor under any circumstances. If after passing this test the brick wall should develop whitewash, it can be laid to the mortar. In order to prevent any such occurrence it is necessary to waterproof the joints around window-sills and between the foundations and the wall, so that the minimum amount of water will be soaked up into the wall when it rains. An expensive addition of 2 per cent of barium carbonate to the mortar will tend to fix the soluble salts which cause this efflorescence.

Hollow Tiles

Hollow terra-cotta tiles used either alone and covered with stucco or brick veneer are being used more extensively than ever, due to the cheaper cost of laying them, since they are larger units, and also to the fact that they build a cellular wall. Wherever these tiles are used for bearing walls it is important that they be hard-burned, but the softer ones may be permitted in non-bearing partitions. Tiles for use in outer walls should be hard-burned, free from cracks, and straight, and should not show a greater absorption of water than 10 per cent. As these tiles are intended to support loads from floor-joists, it is essential that they should have the correct proportion of voids to solid shells and webs. The maximum width of any voids should not exceed 4 inches and the thickness of any shells or webs should not be less than 15 per cent of this measurement. In tests it has been shown that tiles laid with webs vertical are stronger than those with webs horizontal, but this difference in strength is not of very great importance in the small house, where the loads are very light. The chief thing to avoid in the setting of tile, when they are vertical webbed, is the dripping of mortar to the bottom and the insufficient spreading of it over the ends of the webs and shells. This can be overcome by laying wire lath over each course, and then buttering the mortar on the inside and outside edges. The mortar is prevented from falling out of place by the lath, and because it is not continuous through the wall, any penetration of moisture through it is stopped.

Mr. Leigh's Lithographs

THE frontispiece of this number is one of a series of notably distinguished lithographs by a young American artist, Howard Leigh, who has but lately returned from a year of study under Paul Maurow in Paris. Mr. Leigh's drawings include a number of views of old Paris and of famous buildings and scenes in the devastated regions, Rouen, Reims, Verdun, Soissons. The French Government bought a number of them. They will be shown this month at the Anderson Galleries, and we feel sure that architects and all interested in the graphic arts will find them well worth careful study.

Announcements

John M. Gardner and Richard O. Parry beg to announce that they have entered into partnership and opened an office for the practice of architecture under the firm name of Gardner & Parry, architects and engineers, 209–211 Guardian Trust Building, Denver, Colo., where they will be pleased to receive catalogues of various trades and manufacturing concerns.

We are in receipt of the new booklet showing the Gillis & Geoghegan hoists for handling material in industrial plants. It will be sent free upon request.

Harry Leslie Walker, architect, announces the removal of his offices from 19 West 44th Street to 144 East 54th Street, New York City.

Tilden & Register, architects, announce that on November 1, 1920, they will occupy new offices at 1525 Locust Street, Philadelphia, Pa.

The ILG Electric Ventilating Co., Chicago, announces the removal to their new and commodious building at 2850 North Crawford Avenue.

The company has had a most interesting growth. The new building will be of solid concrete, 300 by 200 feet, two stories, and will include 100,000 square feet of floor space. The cost of building alone was $400,000. The new plant provides for doubling the output of 1920. Modern improvements for employees' welfare include shower-baths, grounds for athletic events, baseball, tennis, etc. There is a cafeteria where meals will be served at cost, club-rooms, a moving-picture booth for educational and entertaining purposes.

The business of the company is the manufacturing of ventilating apparatus, ILG self-cooled motor propeller fans and universal blowers and exhausters, unit heaters, and air washing units. The company derives its name from Mr. Robert A. Ilg, the inventor.

Concrete Construction

By DeWitt Clinton Pond, M.A.

SECOND ARTICLE

IN the last article there was a discussion of the stresses in a typical slab and beam in the floor panels outlined by columns 9, 12, 15, and 17 of the building now being erected for the 395 Hudson Street Corporation by the Turner Construction Company. This building is located at the corner of Hudson and West Houston Streets, in New York City, and occupies an entire city block.

The architects for this building are McKenzie, Voorhees & Gmelin, of New York.

In following through the calculations in this article it will be necessary to refer to the figures—I, II, III, and IV—in the last article, which appeared in the September number of ARCHITECTURE. In carrying on the calculations for

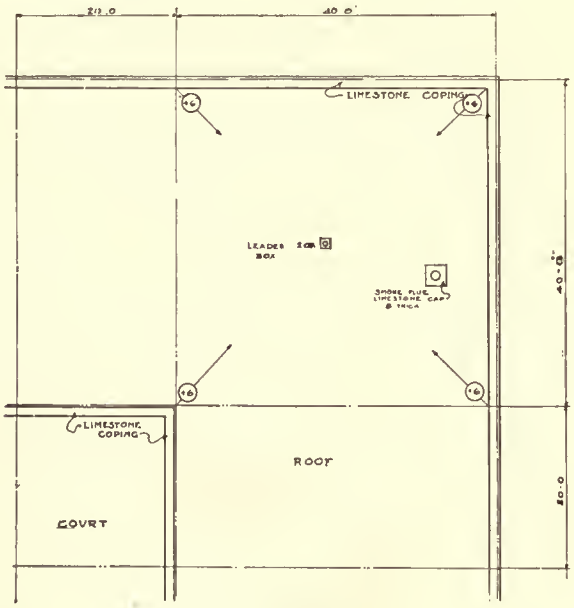


FIGURE V

the typical beam it will be necessary to design the stirrups. In the last article it was found that even if the width of the beam was increased to 1 foot and 2 inches the shear per square inch would be 150 pounds—the maximum allowed by the New York Building Code. Of this, in accordance wi h general practice but not the New York Building Code, 40 pounds will be taken up by the concrete and 110 pounds by the steel. The clear span of the beam is 17 feet 6 inches, and the proportionate length that will take the excess of shear over 40 pounds will be $110/150 \times 17.5 = 12.83$ feet, or 153.9 inches. The beam is 14 inches wide and the area over which the shear will be applied will be $153.9 \times 14 = 2,155$ square inches. The excess shear is 110 pounds, the average shear over this area is 55 pounds, and the total shear is $55 \times 2,155 = 118,525$ pounds. The value of a ⅜-inch stirrup (Fig. III, in the previous article) is 3,532 pounds, and the value of a ½-inch stirrup is 6,281 pounds.

Dividing 118,525 by 6,281 gives 19 stirrups. There will be two 1⅛ square, double-bent bars, with a total cross-sectional area of 2.53 square inches, and as seven-tenths of this area may be used to withstand the horizontal shear, 1.77 square inches may be deducted from the area of the stirrups. $1.77 \div .3926 = 4.5$, approximately, as the number of stirrups that the bent-up steel would replace. The steel is bent up at both ends of the beam so it will take the place of 9 stirrups in the entire length. The total number of stirrups will be $19 - 9 = 10$ necessary in the beam. It will be noted by looking in the list, in Fig. III, that *B1* is reinforced in exact accordance with the figures given above, and that the dimensions, except the length, correspond to those already determined. The true length of the beams cannot be determined until the girders are designed.

These articles are intended for general practice and the new New York Building Code has not been strictly followed. In the actual construction heavier reinforcing has been used as far as stirrups are concerned, as the code requires a shearing stress in concrete of 150 pounds when *all* diagonal tension is resisted by the steel. In accordance with this law there will have to be twenty-six stirrups. The method used herewith has been found to give very good results, however, and unless a building law states otherwise its use is recommended.

As far as the slab is concerned, it will be noticed that the spacing of the ½-inch round bars was given as 7 inches in the previous article, and that the list shows these bars spaced 7¾ inches on centres. This is accounted for by a reconsideration of the figures given in the last article. In this calculation the span of the slab was taken as 4 feet. Actually, it has been pretty definitely established that this span will be only 3 feet 10 inches, and the spacing of the bars on this basis works out between 7½ and 7¾ inches. The engineers evidently thought the last spacing gave enough reinforcing. They may not have taken the weight of wood block paving as high as has been the case in these calculations.

So far, in a tentative manner, a typical beam and slab have been designed, such as are marked *B1* and *S41*, in Fig. II. The slab can be considered as being definitely designed, but, owing to the variation in lengths of the beams, which vary on account of the difference of thickness of the girders, these beams cannot be considered as established.

It will be noticed that *S46*, having the same span and load as *S41*, is more heavily reinforced than the latter, and there might be questions asked as to why this is so. The answer is that *S46* is not a continuous slab but is "semi-continuous," and the formula in such a case is $M = \frac{1}{10} Wl$. In the present case, an experienced engineer would not bother to go through all the lengthy steps outlined in the last article but would combine them all in one calculation and use his slide rule. The formulas would be combined in the following manner:

$$\frac{1,085 \times 3.83 \times 51 \times 2}{10 \times 16,000 \times 7 \times .1963} = 1.93 \text{ bars in 12 inches.}$$

$$12 \div 1.93 = 6.2 \text{ inches on centres.}$$

The results given above will be found to check with the information given in the Slab Schedule, where the spacing is given as 6 inches on centres.

In developing the sizes of beams and slabs in the first-floor panel the author has attempted to show that while certain of the slabs in a floor panel can be designed before the columns are designed, it will be impossible to design the beams and girders until this is done. It has been shown that the lengths of beams are determined by the design of the girders, and the latter cannot have proportions and reinforcing determined until the sizes of the columns onto which they frame have been established.

It will therefore be necessary to start at this point the design of the columns and footings. Fig. V shows the roof plan and Fig. VI the ninth floor plan of the section under discussion. It will be noticed that columns 61 and 70 do not continue through the ninth-floor, but stop at the ceiling of the eighth. Column 77 does not carry even as far as these two, but stops at the ceiling of the seventh floor.

The first column that will be considered will be column 9. In determining the loads that will come on this support a tentative framing plan must be considered, if not actually drawn out. As 59 does not continue through the ninth story there will be a 40-foot span which will have to be taken care of in some manner. Either beams, spanning this distance, must be parallel to one framing into columns 58 and 60, or they must be framed at right angles to this direction. For the present it will be assumed that the long 40-foot beams will be framed in the first direction. In this case the only floor load that will come to the column will be that of a floor area 5 feet wide and 20 feet long, containing 100 square feet. The live load for the roof is taken as 40 pounds, as required by the building code of New York. The dead load must be assumed for the present from a general study of the slab construction which experience has shown to be proper. Assuming that a 5-inch slab is to be used; that the cinder fill will be kept to a minimum owing to variations in the level of the roof construction; that the tar-and-gravel roof finish will be 1 inch thick, the following will be a fair estimate of the roof loads:

60 pounds for the 5-inch slab.
25 " " " average fill of 5 inches.
10 " " " tar-and-gravel finish.
—
95 " " " total.

There will be beams and girders framing into other exterior columns, the loads of which will have to be distributed over the floor, and so an average load of 100 pounds per square foot, will be taken as the general roof load.

There are other loads that have to be determined as being carried by the column. One of these is the weight of the column itself. Exterior columns are often designed to fit the architectural requirements and are made larger than necessary in order to save brick in the curtain walls. In the present case the flat-slab construction in the lower floor design limits the thickness, or rather determines it. These exterior columns in this building are designed to have a dimension, parallel to the building line, of 3 feet 10 inches, and their thickness remains 1 foot 8 inches, unless the loads become so great that a greater area of column is required. On the ninth floor this width can be reduced to 1 foot 4 inches, as beam and girded construction is used to support the roof. These requirements determine the area of the column and the weights can be found. The cross-sectional area will be 3.83 × 1.33 = 5.1 square feet. The finished roof will be 18 feet 6 inches above the ninth floor and the cubic contents of the column section will be 5.1 × 18.5 = 94.3 cubic feet, and the weight will be determined by multiplying this by 144, which will give a result of 13,000 pounds.

Another load that must be found is the weight of the wall, and in this load will also be figured the weight of the spandrel beams. Fig. VII shows the cross-section through the parapet wall. The sketch shows a brick arch over the windows of the ninth story, which will be self-supporting. All the brick above this arch will be carried on the spandrel beams, and another beam is shown to support the roof construction. These two beams are shown in place of one in order to have a low parapet wall and yet have the beam supporting the roof in such a position that its height may vary with the slope of the roof.

In order to determine the load on the column the engineer must separate the construction into its various elements. It must be remembered that the sketch shown in Fig. VII is the architect's drawing, which was made before the structural members were designed. The engineer is at liberty to vary this slightly as far as the structural members are concerned, provided he does not change in any degree the architectural treatment.

It will be noticed that there are three kinds of materials shown: concrete, brick, and limestone. The two concrete beams will be taken as 8 inches thick and each 2 feet 9 inches high. Each lineal foot of these beams will contain 3.64 cubic feet of concrete, and will weigh 3.64 × 144 = 524 pounds.

The brick will be divided into three sections. There is the 4-inch facing on the face of the spandrel beam, a section of wall 1 foot thick, which carries up to the under side of the limestone cornice, and a section between the cornice

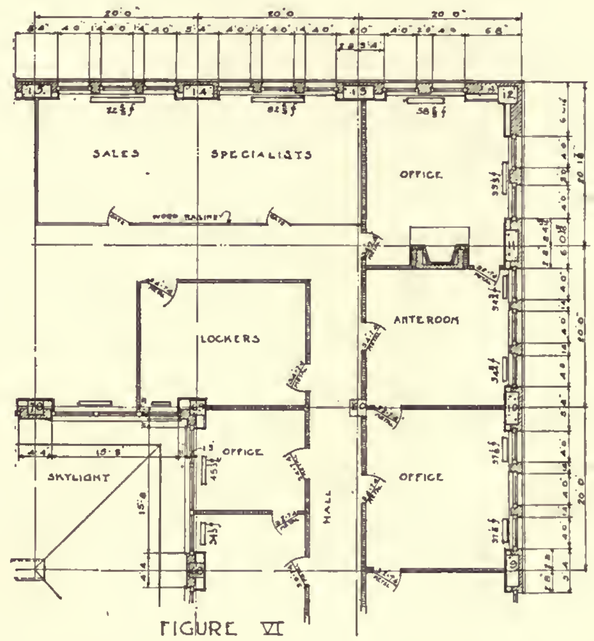


FIGURE VI

and coping, which is 1 foot 4 inches thick. The height of the brick facing is 2 feet 9 inches, the height from the spandrel beam to the cornice is 2 feet 4 inches, and the height of the brick in the parapet is 2 feet 6 inches. In order to determine the weight of this brickwork for each foot of wall the following calculations are necessary:

33 × 2.75 = .92 cubic feet of facing.
1.00 × 2.33 = 2.33 " " " wall.
1.33 × 2.5 = 3.33 " " " parapet wall.
—
6.58 total.
6.58 × 120 = 790 pounds.

The weight of the limestone is not difficult to determine. Bulking the cornice and coping together, the stone will be found to be 2 feet high and have an average thickness of 1 foot 6 inches, and each foot along the wall will contain 3 cubic feet. Limestone weighs 160 pounds per cubic foot, so each lineal foot will weigh 3 × 160 = 480 pounds. Adding the weights of all these three materials together the total weight of each foot of wall will be:

524	for	concrete.
790	"	brick.
480	"	limestone.
1,794	"	total.

The column will carry 20 feet of wall, so the total weight of wall will be 1,794 × 20 = 36,880 pounds.

The developing of a column schedule is one of the most exacting and perhaps one of the most tiresome tasks of an engineer. In order to do this, some system must be employed by which he can tabulate his loads and calculations. It will be noticed that there are many loads already determined

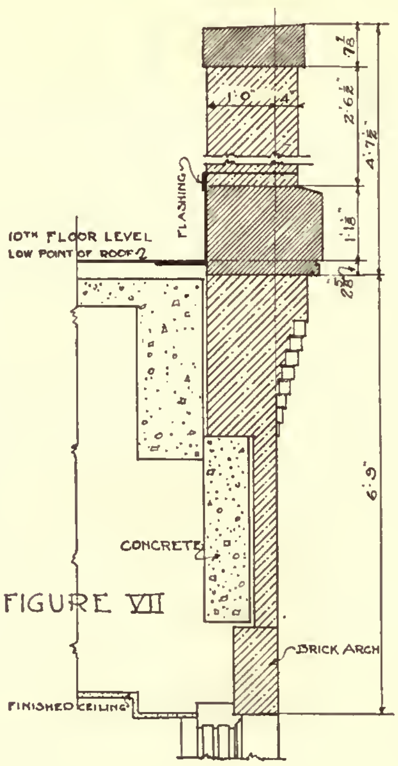


FIGURE VII

for only one section of column. As these loads must be found for each floor, it can be seen that some form of tabulation is necessary. Every engineer who has a great deal of concrete to design has a printed form made out in which the various results of his calculations can be listed.

If the reader does not have one of these forms the following method of tabulating can be used: A form should be devised with lines ruled horizontally and vertically. The horizontal lines will represent the various floors, and the vertically ruled spaces will have various headings. The first heading will show the area of floor carried by the column, and the second and third will give the dead and live loads per square foot used in the calculations. The next two columns will give the total dead and live loads on the area carried by the column. It is important that these two types of loads should be kept separate, as the live load can be reduced in accordance with the requirements of the code. Other columns should be used to list the additional loads, such as the weight of the structural column itself, the wall load, and any other information regarding weights that the designer may feel may not be listed under the other headings.

After all these loads are listed there should be other headings which give information regarding the column itself. This information should give the size of the column, the loads carried by the concrete and by the steel, the size of spiral wire used and its pitch, and the number and size of the vertical rods or bars. If such information is tabulated in some manner this can be given over to the draughtsman who is developing the column schedule and the results can be shown in such manner that the columns can be constructed on the job.

Owing to the need of explanation of each item in these articles, no attempt will be made to list the results of calculations as they are developed. It will be left to the reader to do this.

As far as the roof load on column 9 is concerned, the unit dead and live loads, the weight of the column, and the wall loads have been determined. It only remains to add these results together. The area carried by the column is 100 square feet. The unit dead load is 40 pounds and the total live load of the roof is 4,000 pounds. This, of course, cannot be reduced, as no reduction is possible according to the code until the load of the floor "next below the top floor" is figured.

The dead load will be 100 × 100 = 10,000 pounds, and the column load has been determined as 13,000 pounds, and the wall load will be considered as 37,000 pounds. To this must be added the weight of the hung ceiling, which will be considered as 10 pounds per foot, having a total weight of 1,000 pounds. Adding these results, the total will be:

4,000	pounds	live load.
10,000	"	dead load.
13,000	"	column load.
37,000	"	wall load.
1,000	"	hung-ceiling load.
65,000	"	total.

This must be carried on an exterior column, rectangular in shape and reinforced by vertical steel and bands or ties. The concrete for this type of column is a 1, 2, 4 mixture, and 500 pounds per square inch is allowed on the concrete and 7,500 pounds on the steel. It will be remembered that because of architectural requirements this column was designed to contain 5.1 square feet in cross-section. It will be seen that this area is much more than necessary. One-half of one per cent of this area must be of steel, or 3.7 square inches. If it is considered that 7,000 pounds is allowed on the *net* area of the steel and 500 pounds allowed on the gross area of the concrete, the column will support 394,900 pounds, which is much in excess of the load upon it. It is unfortunate that the code requires that the steel should have as large an area as that given above, when a rectangular column is necessary. Unless a special ruling is made, however, the amount stated above is required. This can be made up of eight ¾-inch round bars. The ties will be spaced 11½ inches on centres.

In the next article the design of other sections of the columns will be carried through, as well as the design of the other columns in the panel.

(*To be continued*)

Book Review

ENGLISH HOMES, PERIOD IV. Vol. I: LATE STUART, 1649–1714. By H. AVRAY TOPPING, M.A., F.S.A. Profusely Illustrated from Photographs of Famous English Homes, Showing General Elevations, Exterior and Interior Details, Gateways, Gardens, Furniture, Iron Work, Plaster, etc., etc. Charles Scribner's Sons, New York.

This volume, one of the comprehensive and invaluable series that will include all the important periods from Norman and Plantagenet to late Georgian, is the first to be issued since the war. The earlier volumes of the series were entirely exhausted, and the new volumes will include revision and extension of the whole scheme, with a great mass of new material heretofore unpublished. The plan involves presentation of practically all the houses of England of real architectural merit, and will form a complete and monumental history of English domestic architecture.

In the volume under consideration are shown houses that were built under the direction or inspiration of the two greatest English architects, Inigo Jones and Sir Christopher Wren. The impression that these English houses give at first glance is one of stately dignity and reserve, not to say plainness, in keeping with the contemporary English mode of life.

The dawn of the Renaissance in England under Jones, and its apogee under Wren, is one of the most interesting of all the periods of development of English architecture, and the influence of their work has been a vital one ever since. If the exteriors of these houses were marked by reserve and general quiet homeliness in keeping with their natural environment, there was no lack of sumptuousness and luxury in their interiors. Many of them, once you enter the doors, come under the designation of palatial. The period was one when the wood-carver was at his best, when Grinling Gibbons was the great master designer in this field, and elaborately carved and decorated mantels were to be found in almost every house of note. The use of wood was made an art, and used in the panelling of the walls with a richness and elaborateness never surpassed. It is to Webb that the author credits the pre-eminence of the woodwork of this period.

Erddig Park, Derbyshire.

Tijun's stairway, Chatsworth, Derbyshire.

The houses in this volume include some of the great ducal palaces as well as the more or less modest country squires' homes, and the text gives not only the particular reasons for the outstanding architectural character of each house but as well a history of its occupants. It is, therefore, a record of human affairs as well as a history of architectural structures. The individuality and personal tastes of the owners are brought out, and the part they played in the life of the nation.

In considering the influence of Inigo Jones it is to be noted that, although he was a keen follower of the Palladian tradition, with an exceptional first-hand knowledge by many visits to Italy of Italian architecture, both ancient and modern, he was never a mere copyist, but brought a fine artistic sense and originality to his work, a taste and a regard for fitness without which all architecture is but a mechanic art.

"The restraint, amounting often to severity, shown by Inigo Jones and his immediate followers in the matter of detail and ornament is a mark of the master's strong individualism. He formed and developed his style on his return from Italy in 1614. In 1628 Webb came to him and derived from this association the whole of his architectural taste and knowledge, subject only to English tradition, strong in him who had never left its shores. In 1647 Roger Pratt came home after long study in Rome. These are the only three names that survive in the history of our country-house architecture during the middle years of the seventeenth century when it first developed the Late Renaissance phase. They are its founders and earliest practitioners. Two of them learned it in Italy itself, the third at home by close connection with the elder and greater of the other two. From Italy, therefore, it came, and yet it is not what Jones and Pratt found fashionable in Italy when they visited it, for there the baroque style had ousted restraint and the word *pittoresco* was on men's lips. After a youth of extreme virility the architecture of the Italian Renaissance had reached manhood at the beginning of the sixteenth century under such men as Bramante and San Gallo. In the third generation came Palladio who, like several of his predecessors, wrote on the principles as well as practised the art of the reborn style. To them Vitruvius, whose treatise on Augustan architecture survived, was as a little god."

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Frontispiece to December

COMPOSITION FOR ETCHED PLATE, MUNICIPAL GROUP, SPRINGFIELD, MASS.

By Louis Orr.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLII DECEMBER, 1920 NO. 6

The Architecture of the Springfield Municipal Group as a Business Asset

Illustrations from Drawings Made by Louis Orr for his Etching of the Municipal Group

THE interesting commission given Mr. Louis Orr, of Paris, the American painter-etcher, by the Springfield, Mass., Chamber of Commerce, to make an etching of Springfield's well-known municipal group, has served to attract added attention to this notable example of American architecture. That such a daring design for a municipal building should have been accepted in staid old New England has inspired frequent comment, and it is interesting to know how such a plan came to be accepted. The new group of city buildings was made possible by the burning of the old city hall in 1906. The destruction of the building was total, and made necessary a complete new structure. Some dozen years before the burning of the old city hall, the late Tilly Haynes, a former Springfield citizen and later a well-known figure in Boston and New York, had bequeathed the city $10,000 for the extension of its historic Court Square to the river. Through the energetic leadership of Mr. George Dwight Pratt, who was later to be largely instrumental in securing for Springfield its now monumental group, this amount was increased by popular subscription to $100,000, with which was purchased the land needed to carry out Mr. Haynes's wish. The entire square was cleared to the river, with the exception of the historic First Church. The opening of this space in the heart of the city made Springfield one of the first cities in America to enjoy a civic centre, and it afforded an ideal location for the classic group that was built.

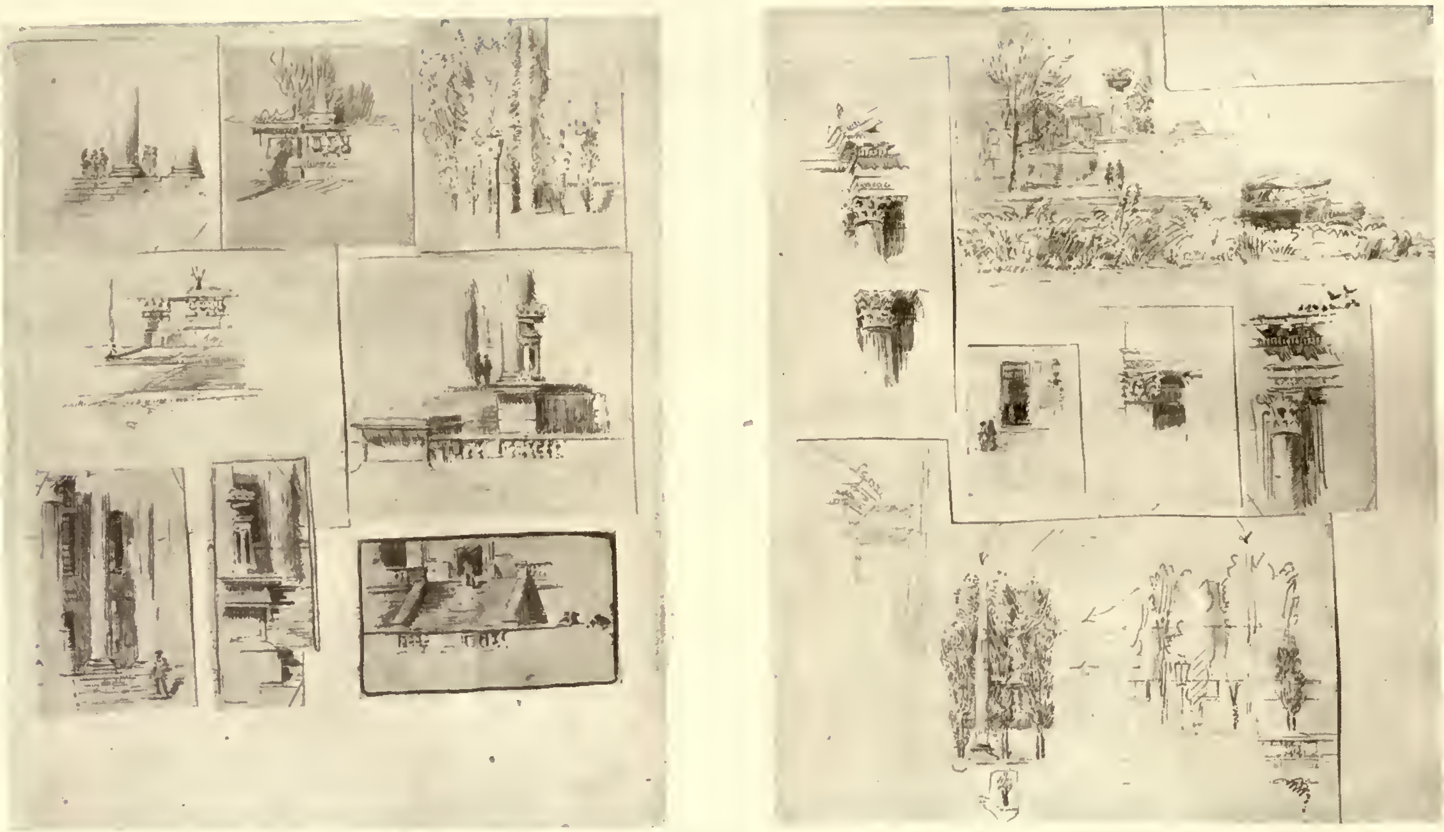
Detail of portion of pediment.

Soon after the burning of the city hall, Francke W. Dickinson, then mayor, appointed a commission of twenty men, with George Dwight Pratt as chairman, to present to the city plans for a building to replace the old city hall. The first step of the commission was to ask for a liberal appropriation from the city with which to secure competitive plans. By this method many of the leading architectural firms in the country were induced to make drawings. Some fifty plans were submitted, and by a process of elimination these were brought down to a limited number, and finally the design of Pell & Corbett, of New York, was chosen—a plan calling for two similar buildings with classic Corinthian columns, separated by a campanile 300 feet high. The beauty of the group idea with its tall, graceful Italian shaft, separating the pure Corinthian fronts of the sister buildings, was instantly appealing, but it did not escape sharp and even bitter criticism from the essentially practical taxpayers. But the critics of the plan have long since been silenced, and the loudest champions of the group to-day are to be found among the city's heaviest taxpayers. There is one beauty of the triple structure that does not appear on the surface. It was honestly built. With its administration building, having adequate and very handsomely finished aldermanic and council chambers, spacious offices for all the city officials, a stately marble entrance and stairway, and its beautiful auditorium, seating 400 more people than the Metropolitan Opera House and acoustically perfect, and its stately campanile towering 300 feet high—these buildings, land and all, were completed in 1913 at a cost of $1,800,000.

The auditorium, with its splendid seating capacity of nearly 4,000 people, and its spacious exhibition hall in the basement, proved ideal for convention purposes, and with this excellent equipment the Chamber of Commerce immediately made plans to attract to Springfield all conventions which it deemed desirable and which it could properly handle. For the past six years the Convention Bureau of the Chamber of Commerce has been spending $10,000 a year for this purpose, and with excellent results.

It was the desire of this convention committee for some adequate picture of the municipal group to show to conventions it was seeking, that ultimately led to the commissioning of Mr. Louis Orr to make an etching of the group. It was first planned to commission some artist to make an oil-painting, but the committee intrusted with the task was soon convinced that the result of such an attempt would be disappointing. The attention of the committee was then attracted to the work of Mr. Orr and the remarkable honors which had been bestowed upon him by the French Government. Further investigation satisfied the committee that

(*Continued on page* 351.)



PENCIL STUDIES FOR DETAILS OF LARGE DRAWINGS.

The Springfield-West Springfield Bridge, with its approaches, will lead from the heart of Springfield, a little north of the Municipal Group, cross the river, traverse a tract which is ready for development at the southerly end of West Springfield, and furnish ample connections to the centre of West Springfield at the north, and the through routes leading to the whole of western Massachusetts. It will provide for direct trolley service across the river, and for direct access to the fair grounds in West Springfield. It will cross by a concrete viaduct over the railroad yard on the Springfield bank, then by a series of seven arched spans across the river, and then by filled approaches to the existing streets in West Springfield. From end to end of approaches the extent will be about a mile, the river bridge itself occupying some 1,200 feet. The seven river spans will be of reinforced concrete, supported by reinforced-concrete arched ribs. The pier foundations will be of concrete resting on piles. The lower portions of the piers, exposed to the action of the river with its strong current, ice, and other drift, will consist of granite set in a concrete backing. The upper members of the piers will be of concrete. In the finish of the faces of piers and spans some artificial stone will be used. There will be an artificial stone balustrade resting on pilasters, extending the entire length of the bridge on each side.

Under authority of an act of the Massachusetts Legislature, the bridge was planned by a special commission, consisting of Honorable John L. Bates, Honorable Joseph H. O'Neil, and J. R. Worcester, Esquire, and is being built by Hampden County under the direction of the county commissioners. Fay, Spofford & Thorndike of Boston have been retained as engineers by both commissions. Haven & Hoyt, architects, also of Boston, were retained by the engineers as architectural advisers on matters relating to the appearance of the structure, notably to the towers, railings, and the treatment of the ends of the piers. The contract for construction of the bridge, exclusive of approaches, has been let to H. P. Converse & Company, of Boston.

Municipal Group from the river.

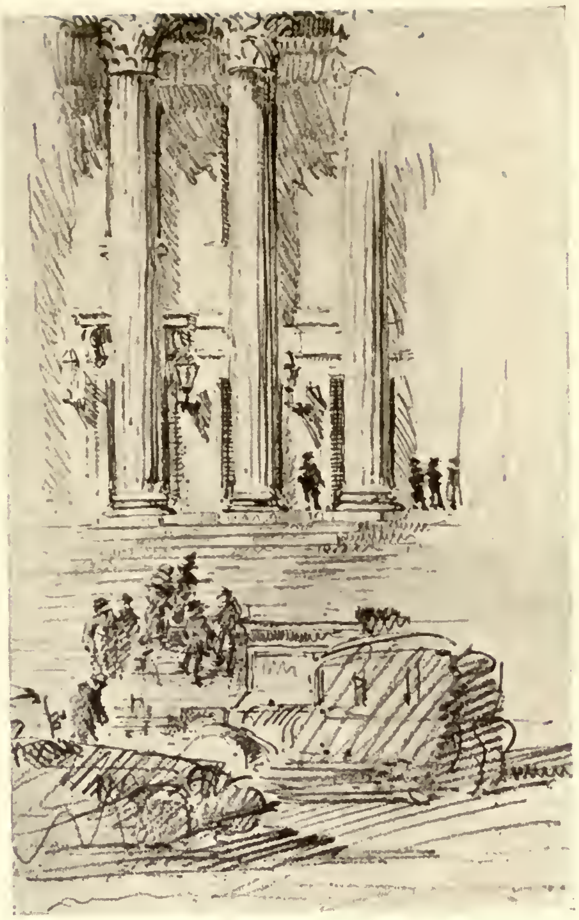
(*Continued from page* 349.)

here was the solution of the problem, for a way was at once apparent for acquiring a desired picture of the group for exhibition purposes and of financing the project. A contract was made with Mr. Orr whereby he agreed to make an etched plate of the group, from which 50 first-state artist's signed proofs are to be pulled, and the plate then destroyed. Five of the proofs are to be retained by the Chamber of Commerce, and 40 of the remaining 45 have already been sold by subscription at $200 each.

In commissioning Mr. Orr to come to America to make this plate, the business men of Springfield had illustrious precedent, for in much the same way was Canaletto, the Venetian painter, bidden to go to London, 200 years before, to execute a very similar commission. And many other eminent artists have been similarly commissioned to do important things in other countries. Thus it is not unlikely that the Springfield men who have given Mr. Orr this commission will prove the pioneers in a new art movement in America of interesting possibilities.

In giving Mr. Orr this commission, the committee were not unmindful of the publicity that would result from bringing this distinguished American artist from Paris to Springfield. They had reason to believe that it would possess a picture of the municipal group which would be comparable with Mr. Orr's work in the Louvre and the Luxembourg, which would serve to spread the name and fame of the city, and their expectations have already been realized. It has been an added satisfaction to the committee that Springfield was able to give this commission to a native of the Connecticut Valley—the talented son of its neighboring city, Hartford, Conn.

Mr. Orr is enthusiastic about the beauties of the group and says there is nothing finer in all Europe. Its fame should not be localized, in the opinion of the artist, but should rather belong to the whole country, for it is among the few distinctive American creations in architecture that compare favorably with some of the best things of the Old World. Mr. Orr is loud in his praise of the courage of the men who were responsible for the adoption of so daring a design in a Puritan New England city, and, perhaps from a somewhat prejudiced point of view, he likewise commends the faith of the Springfield business men who gave him this interesting commission. Mr. Orr believes that his coming to America to fulfil this contract will result in similar commissions being given to other European artists, and that the Springfield Chamber of Commerce will be given credit for having instituted in America a practice ages old in Europe, and which has invariably resulted in notably successful achievements in art.



Detail of columns.

Louis Orr, the painter-etcher, was born in Hartford, Conn., and received his first instruction in art in his native city. In 1906–1907 he studied in Paris with Jean Paul Laurens, the widely known painter-teacher. The first award received in Paris by him was a first prize for figure drawing in a competition held by the Académie Julien, which now hangs on the walls of that famous atelier.

He enjoys the unique distinction of having his work in the Louvre. In the permanent collection of the Luxembourg Galleries are 33 of his original drawings and etchings. A distinction of hardly less importance was his command by the French Government to make three etchings of the Rheims Cathedral during the war. These three etchings, one of the façade, one side-view, and one interior, sketched while the building was under fire and showing the sad destruction wrought by German shells, are now regarded as among the finest reproductions of this famous cathedral, and are treasured by France among the trophies of the war.

At the close of the war another command came to Mr. Orr from the government, this time from Marshal Pétain, to make an etching of the French entering Strasbourg. The resulting picture, which has been reproduced in this country, was shown in the Paris Salon in the spring of last year, and is now in the Louvre Gallery. It is a strikingly beautiful picture showing the entry of the French troops into the ancient capital of Alsace-Lorraine, lavishly adorned with the national colors. In recognition of his services, Mr. Orr has been awarded the Legion of Honor by the French Government.

Mr. Orr's other works include: In the Louvre Museum —Pont Neuf; Rheims Cathedral, façade, south side, and interior; tomb of Admiral Colbert; Hôtel de Sens; Hôtel du Compas d'or. In the Musée de Luxembourg—22 original pencil drawings and 23 original etchings, including his "Old Paris" series. In the Bibliothèque Nationale—Artist's proof of Colbert's tomb. In the Prince de Broglio Collection—St. Etienne du Mont. In the New York Public Library—Proof of Pont Neuf plate owned by the Louvre, and presented by the French Department of Fine Arts. In the Morgan Memorial Library, Hartford, Conn., Boston Public Library, and many other public and private collections.

VALUE RECEIVED

In carrying to completion the plans of the Municipal Building Commission, Springfield not only met its civic needs for a generation to come with a degree of satisfaction seldom experienced in municipal expenditure, but in doing so it gained for itself publicity which has probably done more to advertise Springfield in a desirable way than any single exploit in the city's history. Competent judges have pronounced these the finest municipal buildings in America. Including the land it occupies, the municipal group cost $1,800,000, and the city received full value for every dollar expended.

The campanile serves no practical purpose other than the housing of a large electrically illuminated clock which can be read two miles away, and a $10,000 set of chimes given by individuals and civic organizations. The group is of steel and reinforced concrete with Indiana limestone facing, with the halls, stairways, and corridors of the administration building of polished marble. The municipal group facing Court Square forms Springfield's civic centre, making not only a most imposing architectural monument, but a beautiful landmark which dominates the landscape for miles around.

The possession of such a fine auditorium has brought to Springfield the very best of music and entertainment, which has served not only to afford its residents entertain-

Detail.

ment of the best sort, but to make Springfield more and more a centre of culture.

Extravagant praise has been bestowed upon the acoustics of the auditorium by distinguished speakers and celebrated artists.

SOME OTHER NOTABLE BUILDINGS IN SPRINGFIELD—THE ART CENTRE

Springfield is fortunate in the possession near the centre of the city of an uncommon group of buildings devoted to the arts and sciences. The City Library, the joint gift of Andrew Carnegie and the citizens of Springfield, costing $350,000 and housing 200,000 books, with a capacity of double that number, is a beautiful white marble building on State Street, and as practical as it is artistic. Immediately west of the library is the Art Museum, which houses the priceless George Walter Vincent Smith Art Collection, representing the life-work of one of the most discriminating connoisseurs of America. To the assembling of this rare collection of porcelain, cloisonné, bronzes, jades, iron, lacquer and ivory, ancient armor, illuminated manuscripts, fine laces, embroideries, and Oriental rugs, Mr. Smith has devoted his long and busy life, and this collection he has now given to the city. The building, an Italian Renaissance structure of unusual character and beauty, was designed by the late Walter Tallant Owen, a brilliant young Springfield architect. This building was made possible by a bequest of $50,000 from the late Horace Smith and subscriptions of $90,000 made by public-spirited individuals and business concerns. Still farther west in the same group is the Science Museum, where are shown very complete and well-arranged zoological and ornithological exhibits, nearly all the donations of Springfield's citizens. Most notable of this entire educational group is the famous statue of "The Puritan" by Augustus St. Gaudens in Merrick Park, on the corner of State and Chestnut Streets. This impressive statue, commonly called "Deacon Chapin," was erected by the late Chester W. Chapin, then president of the Boston & Albany Railroad, in honor of Samuel Chapin, one of the founders of Springfield and a deacon in the old First Church. It is regarded as one of the best creations of the brilliant St. Gaudens, and a cast of it in the Luxembourg ranks it in France with the foremost sculptures of the day.

Detail.

The bells of the chimes were given by individuals and civic organizations.

Home Ownership on a Pay Envelope

National Housing Programme of the Young Women's Christian Association Seeks to Make the Road Easy for the Small Investor and Popularize the "Cottage Apartment" or "Kitchenette House." Believe Big Demand for the Very Small House with No Surplus Space to Buy, Build, Care for, or Heat! Proposed Suburban Project Outlined by Architect

By Wm. F. Thompson, Architect

National Board Young Women's Christian Association, New York City

IF a building "map" could be worked out, charting the way to the ownership of the very small house built to order at the smallest outlay possible, would it not be a stimulus toward releasing for the building and construction market small investors who are now holding off as much from intimidation as high prices?

As part of their national housing programme, particularly for professional and business women of every class (in which sixty-six communities are already actively considering possibilities, making surveys, raising money, or already engaged in construction), the Young Women's Christian Association has undertaken to promote the building of the "cottage apartments," cut to fit the young married couple or salaried young women who yearn for a home of their own. The proposed suburban project which has their indorsement is not only interesting as a business proposition but because it is the first attempt to put across the so-called "kitchenette" type of house, so dubbed because it is cut to fit the "beginning" married couple or the lone young woman's needs in space as well as purse.

The idea of this proposed development is to "scale down" home ownership to the requirements of thousands of home-lovers who, because of their stringent cash limitations and inexperience, are now unnecessarily staying out of the building field; to demonstrate to them on an actual working basis how to go ahead.

In order to do this, it is proposed to purchase a piece of property, in this case about 325 by 600 feet, the initial cost of which will be equally divided among the twenty-six owners, giving each a plot of 40 by 125 feet, and allowing sufficient property for the main drive and two service drives, for the building of a wall or fence, together with gate-posts and space for planting at the entrance, and also space for two tennis-courts, a recreation building, and the pergolas on either side.

The persons desiring to enter into this co-operative scheme will find it more economical and desirable for the following reasons: First, the property is purchased in one large block, and they obtain the benefit of this; second, the twenty-six houses are built at one time, thus effecting a saving, in giving out the contract to one contractor; third, their neighbors will be carefully selected, since only well-recommended persons may obtain the privilege of building their home in this community. Further, there is a recreation building with the tennis-courts, and there is also ample space at the rear of each plot of ground for the erection of a garage.

At the present cost of construction (attention should be called to the fact of falling prices) these houses and plots will cost about $5,000 apiece. If two persons erect a house together, the outlay per person (half cash and balance on mortgage) falls to $1,250, or less than several years' rental.

Other than in an advisory manner, the Young Women's Christian Association purposes to have absolutely no control in this project. It is co-operative only in the purchase of the property and construction for the saving involved. After that the ownership is to be individual and free. In this manner any group of owners can pocket the considerable savings that in developments of this kind generally go to the real-estate promoter.

It will, however, be necessary to have some form of agreement so as to maintain the roads, the tennis-courts, and the recreation building, as well as the entrance-gates and the general planting. And, further, I would recommend that if one of the owners desires to sell, that the purchase must be approved by the balance of the owners. This is so as to keep out undesirable owners, who will materially lower the standard of a section of this kind.

The scheme as outlined above is shown on the plot plan with this article. There are also two building plans—one for a cottage apartment and the other for a six-room house.

The cottage apartment illustrated is a unique plan, inasmuch as it is designed primarily for one or two persons, the idea being that the living-room is used as a sleeping-room, and therefore bath and dressing room has been shown on the first floor as well as the kitchen. There is, however, a possibility of having one room up-stairs finished off later, if this is found desirable.

The large bath and dressing room with the window placed as shown should prove very useful. The arrangement of the kitchen is worthy of mention, inasmuch as the range, sink, and refrigerator are on one side, thus simplifying the work in this room. The refrigerator is iced from the outside, and the kitchen is sufficiently large so that it could very well be used for meals, especially for one or two persons.

This is getting the house down to its lowest terms, and I believe that a ready market can be found for buildings of this type, which, as the perspective will show, can be designed attractively and given some character, and at the same time be economical to build.

The six-room house is extremely low in cubage for the number of rooms and their size.

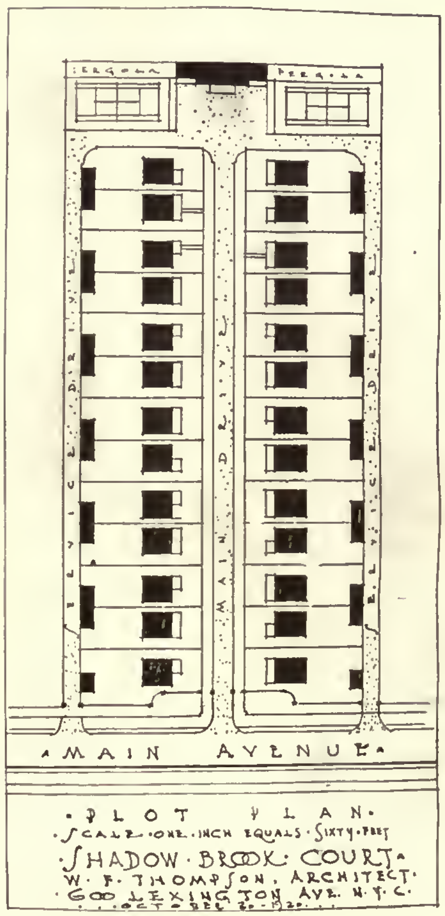
In this plan the usual hall has been eliminated, thus allowing for a larger living-room, and personally I believe that a very fine effect can be obtained by having the stair to the second floor start from the living-room. The well-located fireplace will afford a good elevation and also an interesting interior, and you will notice that there is ample wall space for furniture.

The veranda, being 8 by 25 feet, is ample, and the idea is to have it permanently glazed and screened, so that, like the sedan car, it is for all seasons.

The dining-room is placed, as shown on the drawing, so that this room can have a view of the street, and at the same time be directly off the veranda.

The kitchen is so designed that the range, sink with drain-board, refrigerator, and china-closet are all on one side. There are windows on two sides, which afford a cross-draft, and ample space on the opposite wall for kitchen-table and a large pot-closet, which can also be used for supplies.

The entry leads out into the yard and down into the



cellar, and contains a small closet for brooms, etc. There is also a coat-closet off the living-room.

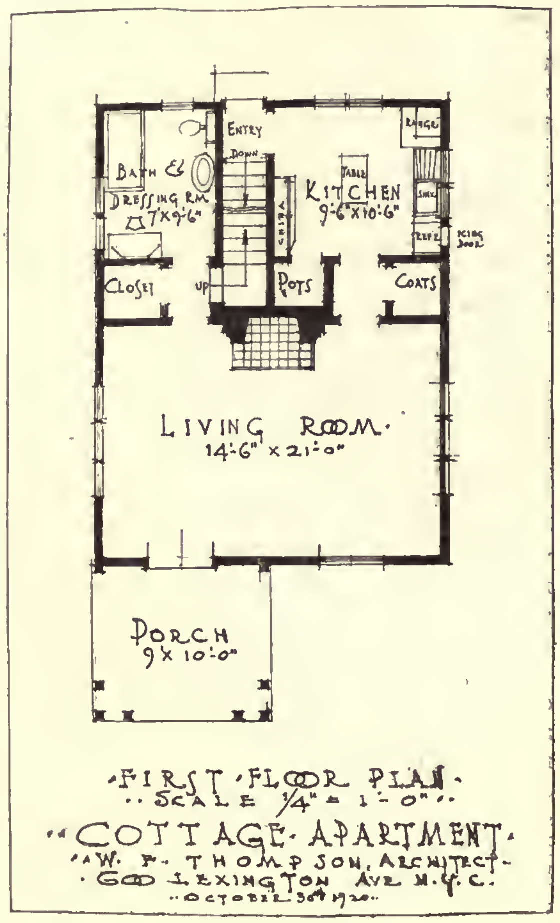
The second-floor plan shows three bedrooms with a very large closet for each, together with two closets in the hall and a storage-closet off the stair-landing. There is no attic to this house, but there are nine closets, and the cellar will afford additional storage space.

From the arrangement of the windows, as shown on the drawings, it is evident that good elevations can be obtained.

The bathroom is directly over the kitchen, which will simplify the plumbing and make it more economical. There is another point in that each room has a cross-draft, including the small rear bedroom, for the windows, as shown, can be opened onto the stair-hall, and it can in turn be ventilated by the exterior windows.

The cellar plan in each case contains a small heating-

(Continued on page 374.)]



St. Mark's Church, Mount Kisco

By Ernest Peixotto

TO the July number of ARCHITECTURE, I contributed an article on St. Thomas's Church on Fifth Avenue, New York City. In this article, I failed to attribute a proper share of the credit that is due to Mr. Ralph Adams Cram for his part in the designing of that very remarkable church. My attention has been drawn to this fact and I am now indeed glad to be able to correct the statement that I made in that article that the church, "as we see it to-day, is essentially Mr. Goodhue's." Just which part of the credit for its success should belong to the individual members of the firm of Cram, Goodhue, and Ferguson it would be difficult to determine, but it is clear that both Mr. Cram and Mr. Ferguson should have been given each his full share of credit in the completed work.

The lectern.

The plans for the church of St. Mark's at Mount Kisco, New York, were also drawn when the firm was still Cram, Goodhue, and Ferguson, but again, at a later date, Mr. Goodhue took charge of the building of the church, an edifice that, in my opinion, might well serve as a model for our smaller parish churches in America. Undoubtedly, the fact that it has a number of wealthy parishioners has made it possible for St. Mark's to possess a certain number of features that the ordinary country church could not aspire to. But, built as it is, of a simple granitic field stone, its fine proportions, its beauty of line and mass, could well be copied as a fitting type of church for congregations that adhere to and maintain the old Anglican tradition.

Its west front is almost entirely filled by a robust tower, square-topped, and pierced only by a few narrow-windows. Engaged in this tower on its north side, is an octagonal *tourelle* that ties also to the buttressed roof of the north aisle, so that, viewed from the northwest, especially when the leaves have fallen from the tree that stands in that angle of the church, the composition piles up in a very picturesque way, with the two porches, the small tower and its larger neighbor, forming a very handsome mass that is tied to the ground by the low long line of the rector's study and the choir rooms.

Though the church was built in 1909, the main tower, called "The Peace Tower," was not added until last year, and, of course, it has greatly enhanced the general effectiveness of the edifice, which, otherwise, is quite plain, the masses of its rough-laid stone being broken only by simple and rather small paired windows in the aisles and clear-story. The roof is made of heavy slabs of slate, whose grays and purples harmonize effectively with the general color of the stonework.

The oaken doors of the west porch admit one to a small, stone-vaulted chamber that precedes a vestibule panelled in oak.

The nave is simple but rich in effect. Three massive pillars at each side, support the pointed arches of the main walls. These six piers are slightly varied in form, four of them being round, one being octagonal and the other ribbed with perpendicular lines that give it, too, the effect of an octagon. The entire nave is paved with old flagstones, carefully chosen and laid, and its plain oaken pews seat about three hundred people. There is an aisle along the north side of the nave, but none on the south side, though I am told that a south aisle is shortly to be added. The beams and trusses of the roof are plainly exposed and make a fine effect.

The nave is separated from the choir by an exceptionally handsome rood-screen of carved oak. Its elaborate and exquisite detail of the richest late Gothic type, its slender arches and delicate cornice and parapet, contrast most hap-


View into chantry from aisle.


The organ from the sanctuary.

pily with the simplicity of the stone surfaces about it, and through its traceries one sees the handsome mullioned window that pierces the east end of the church above the altar.

At the right end of the rood-screen stands a beautiful pulpit, also in oak, the gift of A. W. Butler, the rood-screen itself having been given to the church by Robert S. Brewster. The choir-stalls were a gift from Doctor Allen M. Starr in memory of his son, while the bishop's chair, to the left of the altar, was given by Mrs. William Sloane in memory of Bishop Greer. The delicate screens that separate the chancel from the chapel that adjoins it, were the gift of the Altar Guild. Among other gifts are the lectern by Mr. Henry J. Whitehouse in memory of his father, entrance screen to the chapel by Mr. Hamilton L. Hoppin, the altar by Mrs. E. N. Potter in memory of her father, Mr. John T. Atterbury.

All this woodwork is unusually beautiful in design and finish, and shows the same careful craftsmanship that distinguishes the choir furniture at St. Thomas's, it having been made, in fact, by the same firm of wood-carvers.

Mr. Goodhue's genius for the designing and placing of ornament is everywhere apparent in this exquisite little church. The woodwork that I have mentioned; the doors that admit to the north porch and to the sacristy and robing-rooms for the choir; the linen fold panels in the priest's sacristy; the vestibule screen that supports the choir gallery at the west end of the nave are all, despite their elaboration and richness, evidences of his fine restraint and unerring sense of good taste in design. The ornament in stone is limited to a very few details, two corbels that support the main arch at the entrance to the choir and the figure of St. Mark above the main entrance of the tower by Mr. Lee O. Laurie being the only pieces of sculpture used. The lighting fixtures are very simple and appropriate, and the glass harmonizes well with the general character of the church.


The pulpit.

DETAIL CHOIR STALL END.

DETAIL OF STALL ENDS.

DETAIL OF CHOIR SCREEN.

DETAIL OF BISHOP'S CHAIR. (Representing Consecration of First American Bishops.)

DETAILS OF CARVING IN ST. MARK'S CHURCH, MT. KISCO, N. Y.

Editorial and Other Comment

Some Significant Cost Facts

THERE has been a mass of illuminating evidence brought out in New York's investigation of the building situation, and the end is not yet in sight. But even without the extraordinary conditions there revealed, there are some plain facts regarding labor costs that are of startling significance. From the associated employers of Indiana comes the following information with regard to the work and pay of bricklayers that affords one answer to present conditions. The figures showing the different wage rates and production records apply in a measure to every other trade concerned in building.

YEAR	RATE AN HOUR	BRICKS A DAY
1909	\$0.55	1,100
1916	.65	900
1918	.80	614
1919	1.00	587
1920	1.25	541

While the pay has gone up from 55 cents to \$1.25 an hour, the cost has risen from \$4.40 for the laying of 1,100 bricks to \$10.00 for 541 bricks.

From \$4.00 a thousand to \$18.50 a thousand! The same standards have influenced everything we buy. High wages and diminished production are responsible for the high cost of all things. It is labor itself that feels the pinch with the rest of us, and there are plenty of indications that unless labor wakes up and proceeds to do an honest and full day's work for a day's pay, that half-time and even shutdowns will be the only equalizing remedies.

We do not believe that the great majority of labor is without a sense of fairness and honor, and we are inclined to think that there are hopeful signs in the efforts of labor organizations to get rid of the alien and professional agitators, whose voices have been too loud in the land of their adoption.

A Lesson from Springfield

IF business and not beauty may have been the foundation motive for the building of the now-famous Springfield Municipal Group, its beauty and distinction have been the things that have made it return bounties in the way of wide publicity and consequent business. The city's business is conducted in convenient and beautiful offices, and the great auditorium, one of the finest in the country, noted for its incomparable acoustics, has been the meeting-place for many conventions and the scene of concerts by the best orchestras and some of the greatest singers in the country.

No one who passes through Springfield by train or auto can miss seeing the tall gray tower; it stands out an enticing landmark from all the country round about. And to stand in the square facing the tower with its two balanced buildings of classic design is to get an impression of beauty and dignity in architecture that few observers will forget.

We go to Europe and make a business of seeing as much of the famous architecture as we can, it is a part of the European formula, a part of the culture we are expected to bring back with us. We buy photographs and prints of Venetian palaces, of Greek temples, of great churches, famous galleries, and come home and hide them away after a while and forget them.

What a pity it is that the general public is not more observant of the good examples of architecture that lie near at home. It is a good thing for Springfield to show its appreciation of its own fine group by having it etched by Mr. Orr. It shows both a becoming pride and a high sense of the value of making it better known in a sister art. As only fifty proofs are to be made and the plate destroyed, in time it will become a rare old print of a famous classic building of the twentieth century.

We are privileged to reproduce Mr. Orr's drawing, frontispiece, for the complete etching of the group together with a number of his interesting sketches of details.

Mortgage Exemption

THE National Real Estate Legislative Committee is now a fixed Washington institution, and it will keep a sharp eye on all laws that concern real-estate ownership. At a recent meeting Mr. Walter Stabler, a member of the committee, made the following remarks with regard to the question of exemption of mortgages from the income tax:

"When a gross interest rate of 6 per cent is reduced by income taxes to a net of 2 to 3 per cent," said Mr. Stabler, "the non-taxable municipal or State or county or school or even road bonds paying 4½ to 5 per cent are naturally preferred, and as a result untold millions are being removed from the real-estate-mortgage market.

"In the past," Mr. Stabler said, "mortgage money has come very largely from individuals and estates, but this source is being dammed up by the income levy. The life-insurance companies, not being subject to taxation in the same way as individuals, are lending to the limit of their ability, but the best they can do, is 'but a drop in the bucket.' This is also true concerning savings-banks.

"In the final analysis," Mr. Stabler pointed out, "the chief sufferers from this situation are the tenants, who go to make up the vast proportion of the population in the cities and towns of the United States, for the consequent stagnation in building has forced up their rents.

"This condition is one of the greatest breeders of discontent," said Mr. Stabler. "It hits the masses and the persons of moderate incomes and especially those of fixed incomes. They are helpless with income stationary and out-go increasing. This situation must be changed; these people must have their burdens lightened or we will face greater discontent than now exists."

In conclusion Mr. Stabler said that "The only remedy lies in convincing Congress that the passage of a tax-exemption measure is needed to bring 'the vanishing funds back into real-estate loans.' "

The question is one for serious discussion, one that needs to consider carefully the effect upon the future as well as the present.

A reorganization of the present income taxes will have a bearing on the problem, and maybe it would be as well to wait until we see what the new administration is going to do about it. Something must be done if we are to have building adequate to needs.

For Better Housing

A Letter from the President of the Illinois Chapter of the American Institute of Architects Addressed to the Profession

Chicago, November 23.

Dear Sir:

The American Institute of Architects realizes that the architectural profession and the services it can render to society are not properly appreciated by the people, greatly to the detriment of the profession and the community.

The architectural profession has not received as much public recognition as other professions because it has not hitherto performed as much public service. The logical way to keep the value of architectural services in the minds of the people is to do some conspicuous public good.

The country is now confronted with a lack of private initiative in home-building and home ownership. The government is beginning to realize that homeless citizens and families, whether rich or poor, are not potentially the best citizens—that every additional home owner makes an additional credit possibility, an additional property security to the nation's wealth, and an additional urge for all other forms of permanent construction.

With a view to stimulating home building and home ownership, "Own Your Home" Expositions have been inaugurated to be held in various large centres to show the people the value of a good home and how to obtain it. Realizing that the majority of homes are not designed by the most competent architects, and that small-house plans are not usually profitable work for the established architect, the architects will make their contribution to this movement at present in the form of a Small House Competition.

You are invited to participate in this movement and send in the best solution of the small-house problem that can be devised for your particular locality.

You will notice that the cash prizes to be awarded are considerable, and that the other prize conditions are even more important to the architectural profession. The plans securing the prizes will be widely published, will be made available, complete with specifications ready for execution, at small cost to home owners, architects, and builders. These plans will bear the architect's name and address so that he may receive not only compensation for every reproduction of his plan, but may be placed in contact with the builder. Furthermore, arrangements are being made to reproduce the first-prize designs in the Exposition in facsimile and other prize designs in small models. One large house-furnishing store has offered to reproduce the prize designs in full size, furnished and decorated, in their store, and it is expected that other stores throughout the country will do similar service.

We trust that you will consider this matter of enough value to yourself, the profession, and the public to prepare and send a design which will be the best that your combined office force can produce. If you cannot participate, will you be kind enough to hand this programme to some draftsman who would be competent to participate.

Yours very truly,
Henry K. Holsman, *Architectural Adviser.*

The Architectural League Exhibition in the Metropolitan Museum of Art

Through the courtesy of the Park Commission of the city of New York, with the cordial consent of the trustees of the Museum, the Architectural League of New York has undertaken to hold its Annual Exhibition of Architecture and the Allied Arts in the unfinished south wing of the Metropolitan Museum of Art.

The exhibition will be opened about March 25 and will close April 26, 1921.

We ask your co-operation in making this the most notable exposition of recent progress in the arts of design that has ever been held in New York.

Detailed circulars of information regarding the exhibition will be sent later.

J. Monroe Hewlett, *President.* Lawrence Grant White, *Secretary.*

Book Reviews

OLD ENGLISH FURNITURE AND ITS SURROUNDINGS FROM THE RESTORATION TO THE REGENCY. By MacIver Percival. Charles Scribner's Sons, New York.

There have been many books published on Old Furniture, all of them with an interest for the collector and the amateur, for the architect and the decorator. We need not name them nor have we space, but we can commend as of special interest and value this book. It is a book of moderate size with a text that flows on gracefully and informingly through a field of illustrations from both photographs and drawings. The book is especially valuable for the amount of information it gives regarding the appropriate surroundings of good furniture, such things as Table Appointments, Upholstery, Wall and Floor Coverings, various Decorative Adjuncts. For instance, Delftware, Glass, Spoons, Candlesticks, Hangings, Pottery, Panelling, Stairways, Floors, Fireplaces, Mirrors, Brasses, Pictures, Chimneypieces, Furniture Coverings, etc.

It is a book for every one interested in the better co-ordination of period furniture and minor details of a tastefully furnished house.

THE BOOK OF NEW YORK. By Robert Shackleton. The Penn Publishing Company, Philadelphia.

Essentially a story of New York from the view-point of one interested in its changing human aspects, it is yet a source of much valuable information regarding the city's wonderful growth, and is concerned with many famous districts and buildings of interest to all who would follow the history of New York's ever-changing architectural aspects. It points out our great towers of business, the homes of the rich, and dwells upon the beauties of such classics as the City Hall, the Jumel and Van Cortlandt mansions. Of the Woolworth Building, the author says: "It is a noble building in its dignity and its fine simplicity, and points out, if the fact needs any pointing out, that a sky-scraper may be not only a thing of necessity, in a city developing as New York develops, but a thing of beauty."

TECHNIQUES OF PRACTICAL DRAWING. For Teachers, Students, and Professional Artists. By Edward S. Pilsworth. 16mo. Illustrated. The Macmillan Company, New York.

Here is a book of practical value to every student and worker in the arts, especially to those who are engaged in making drawings for reproduction, either in the form of illustrations or in the ever-widening field of purely commercial endeavor. Many young artists miss opportunities for a profitable use of this talent by a lack of knowledge regarding the technical requirements for reproduction. The commercial artist needs to know just the things that this book deals with in a direct and helpful way.

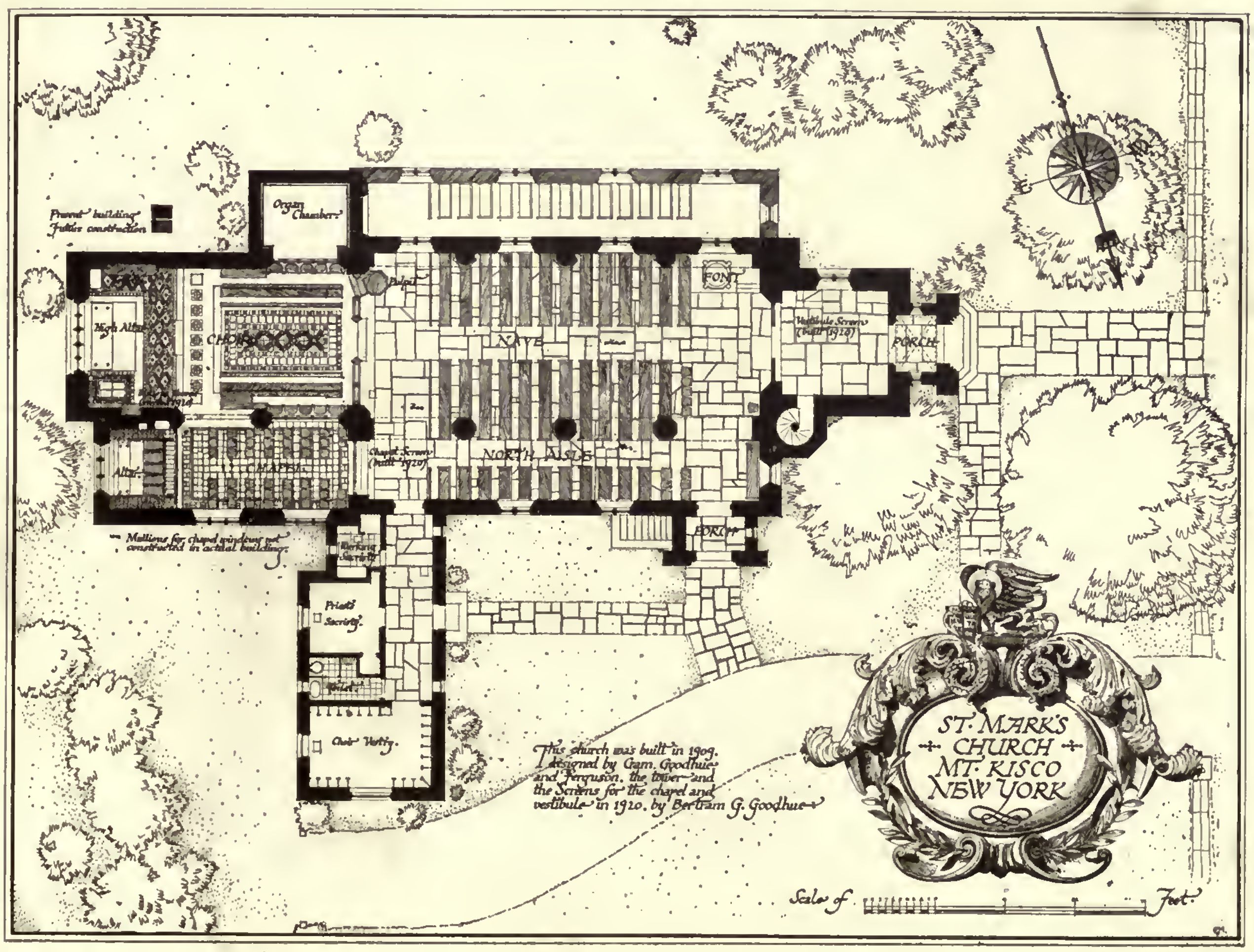
The subjects dealt with are: "Pencil Technique," "Pen Technique," "The Technique of the Brush."

DETAIL OF NORTH DOOR, ST. MARK'S CHURCH, MT. KISCO, N. Y.

Church designed by Cram, Goodhue & Ferguson, Architects.
The Tower, Screens for Chapel and Vestibule by Bertram G. Goodhue, Architect.

ST. MARK'S CHURCH, MT. KISCO, N. Y.

Church designed by Cram, Goodhue & Ferguson, Architects.
The Tower, Screens for Chapel and Vestibule by Bertram G. Goodhue, Architect.


Organ Chambers
Pulpit
FONT
High Altar
CHOIR
NAVE
Vestibule Screen (built 1920)
PORCH
Altar
CHAPEL
Chapel Screen (built 1920)
NORTH AISLE
PORCH
Mullions for chapel windows not constructed in actual building.
Priests' Sacristy
Choir Vestry
ST. MARK'S
CHURCH
MT. KISCO
NEW YORK
This church was built in 1909. designed by Cram, Goodhue and Ferguson. the tower and the Screens for the chapel and vestibule in 1920. by Bertram G. Goodhue
Scale of Feet

INTERIOR ST. MARK'S CHURCH, MT. KISCO, N. Y.

Church designed by Cram, Goodhue & Ferguson, Architects.
The Tower, Screens for Chapel and Vestibule by Bertram G. Goodhue, Architect.

PULPIT AND SCREEN FROM NORTH SIDE.

INTERIOR, TOWARD THE TOWER, SHOWING VESTIBULE PANELLING AND GALLERY FRONT.

ST. MARK'S CHURCH, MT. KISCO, N. Y.

Church designed by Cram, Goodhue & Ferguson, Architects. The Tower, Screens for Chapel and Vestibule by Bertram G. Goodhue, Architect.

RESIDENCE, I. COZZENS, LOCUST VALLEY, LONG ISLAND, N. Y. Rouse & Goldstone, Architects.

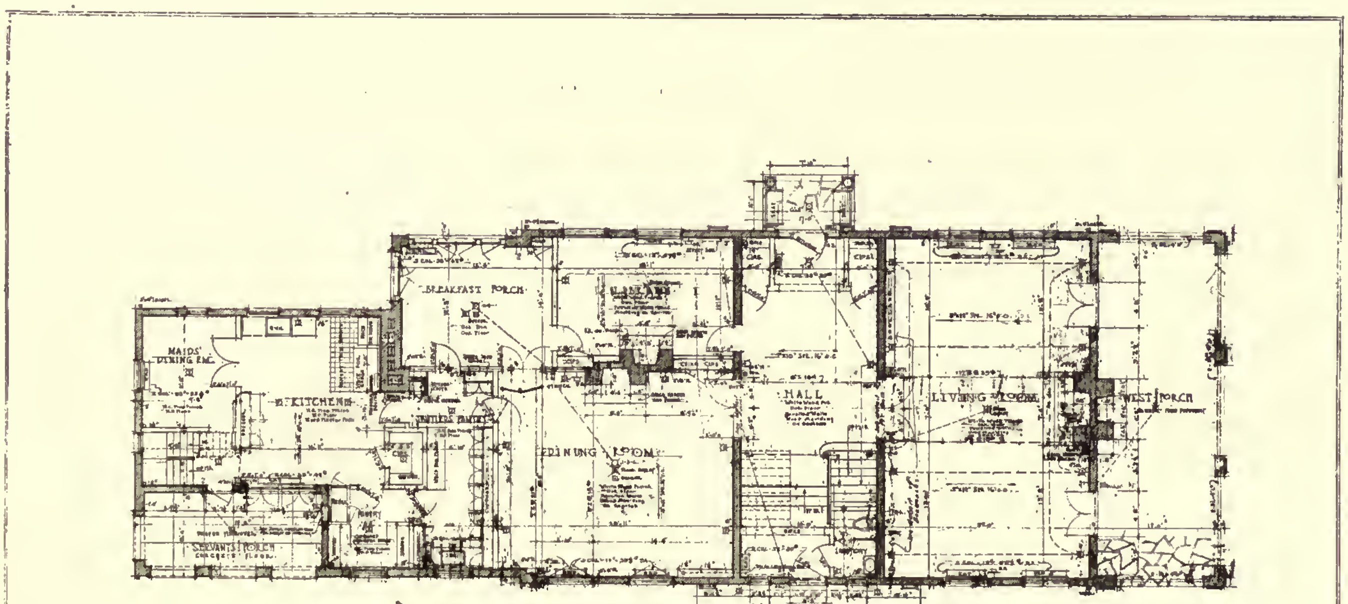
ENTRANCE.

PORTICO.

Rouse & Goldstone, Architects.

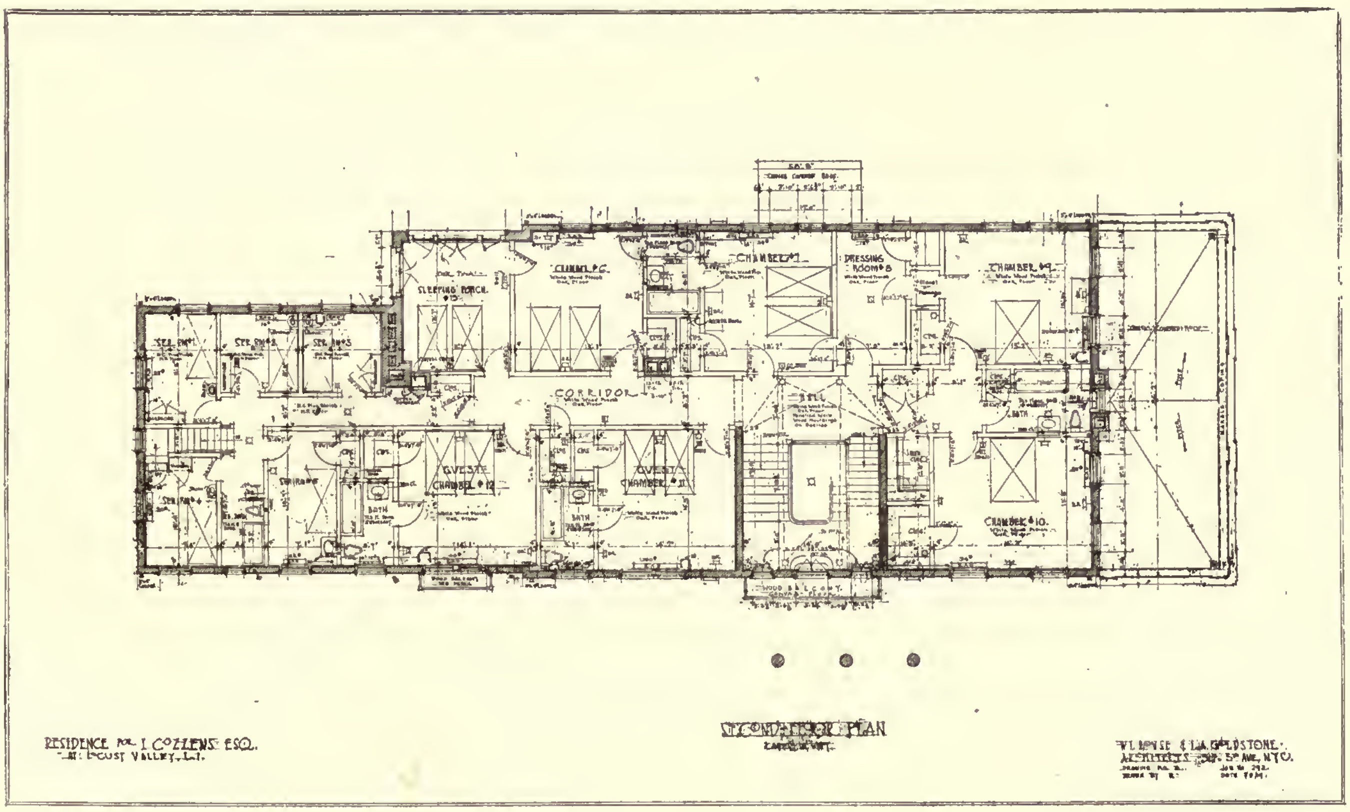
RESIDENCE, I. COZZENS, LOCUST VALLEY, LONG ISLAND, N. Y.

HALL.



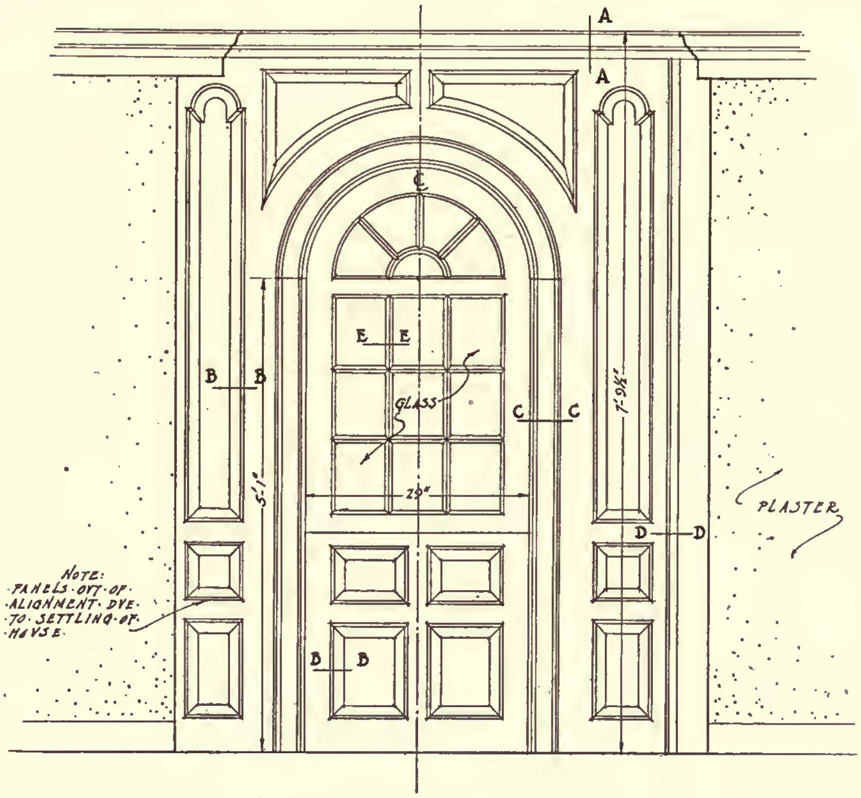
RESIDENCE, I. COZZENS, LOCUST VALLEY, LONG ISLAND, N. Y. Rouse & Goldstone, Architects.

LIVING-ROOM.



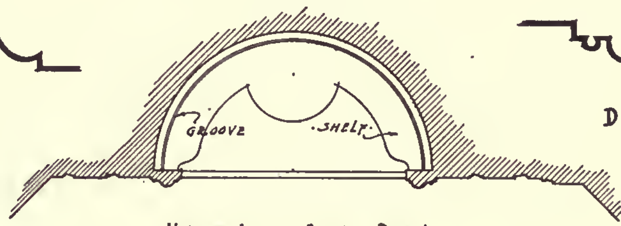
RESIDENCE, I. COZZENS, LOCUST VALLEY, LONG ISLAND, N. Y.

Rouse & Goldstone, Architects.



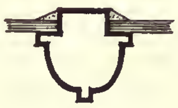
·HALF INCH SCALE ELEVATION·

B–B

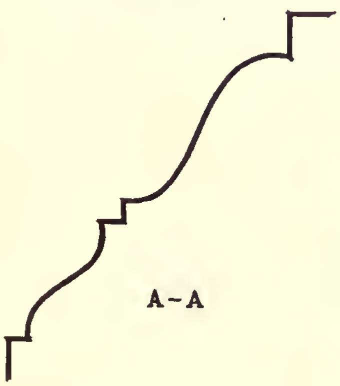


·HALF INCH SCALE·PLAN·

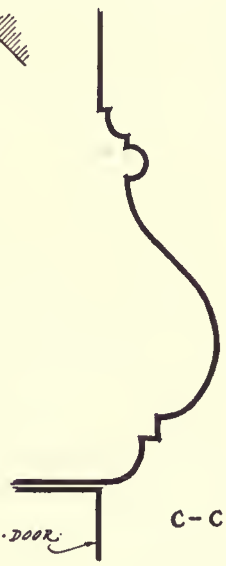
D–D



E–E



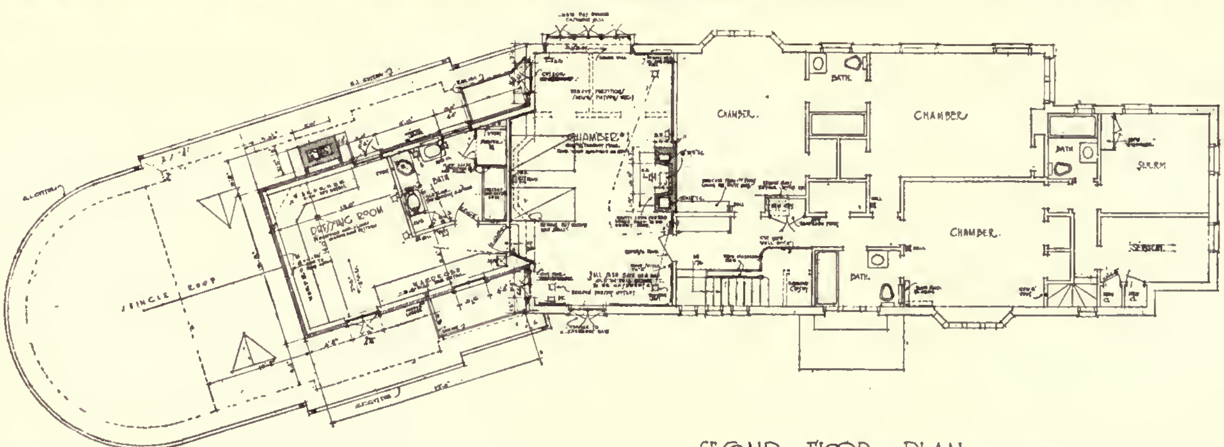
A–A



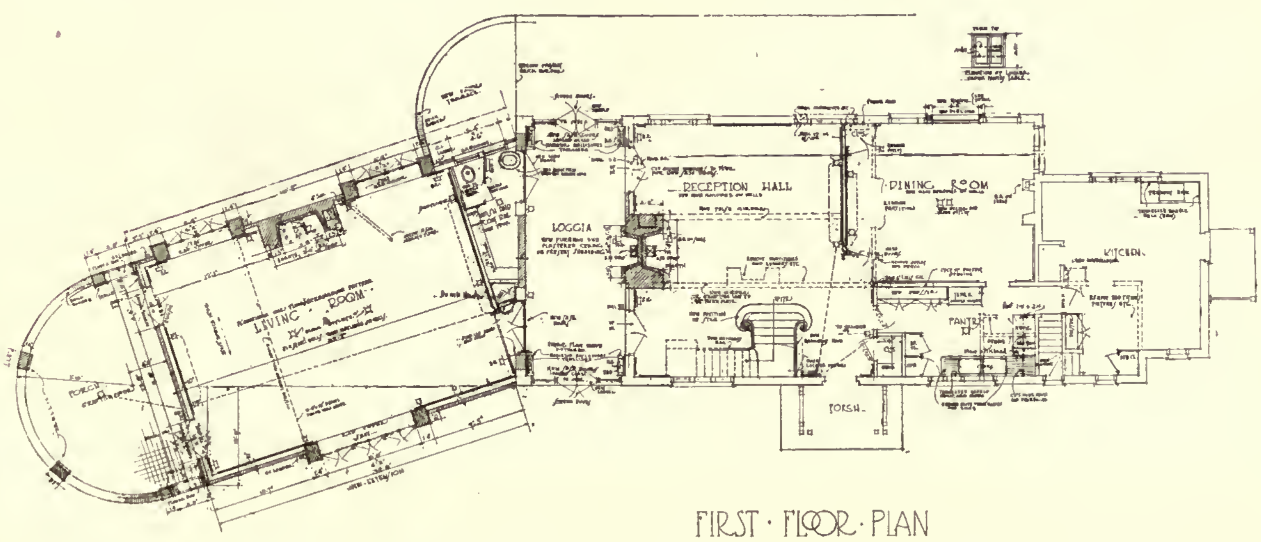
C–C

·ALL· MOULDINGS·ARE·SHOWN·ONE·HALF·FULL SIZE·

·EARLY· ·ARCHITECTURE· ·OF· ·CONNECTICUT·	·CORNER·CUPBOARD·IN· ·THE·OLDER·BEARDSLEY·HOUSE· ·HUNTINGTON·CONN·	·MEASURED·BY· J·FREDERICK·KELLY· ·DRAWN·BY· ·LORENZO·HAMILTON·



·SECOND · FLOOR PLAN·



FIRST · FLOOR · PLAN

RESIDENCE, AUGUSTA HAYS LYON, HUNTINGTON, LONG ISLAND, N. Y. Rouse & Goldstone, Architects.

LIVING-ROOM.

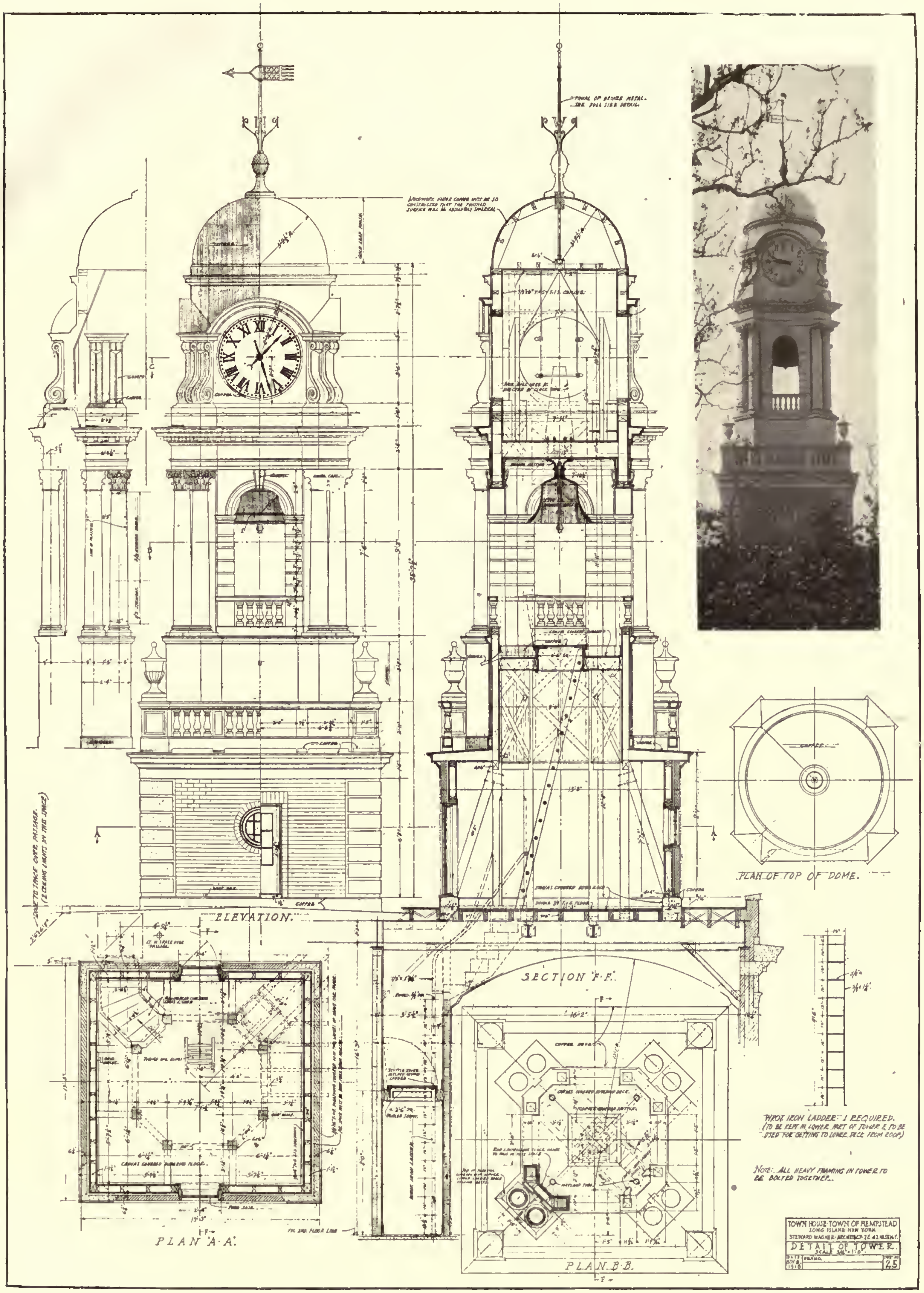
HALL.

Rouse & Goldstone, Architects.

RESIDENCE, AUGUSTA HAYS LYON, HUNTINGTON, LONG ISLAND, N. Y.

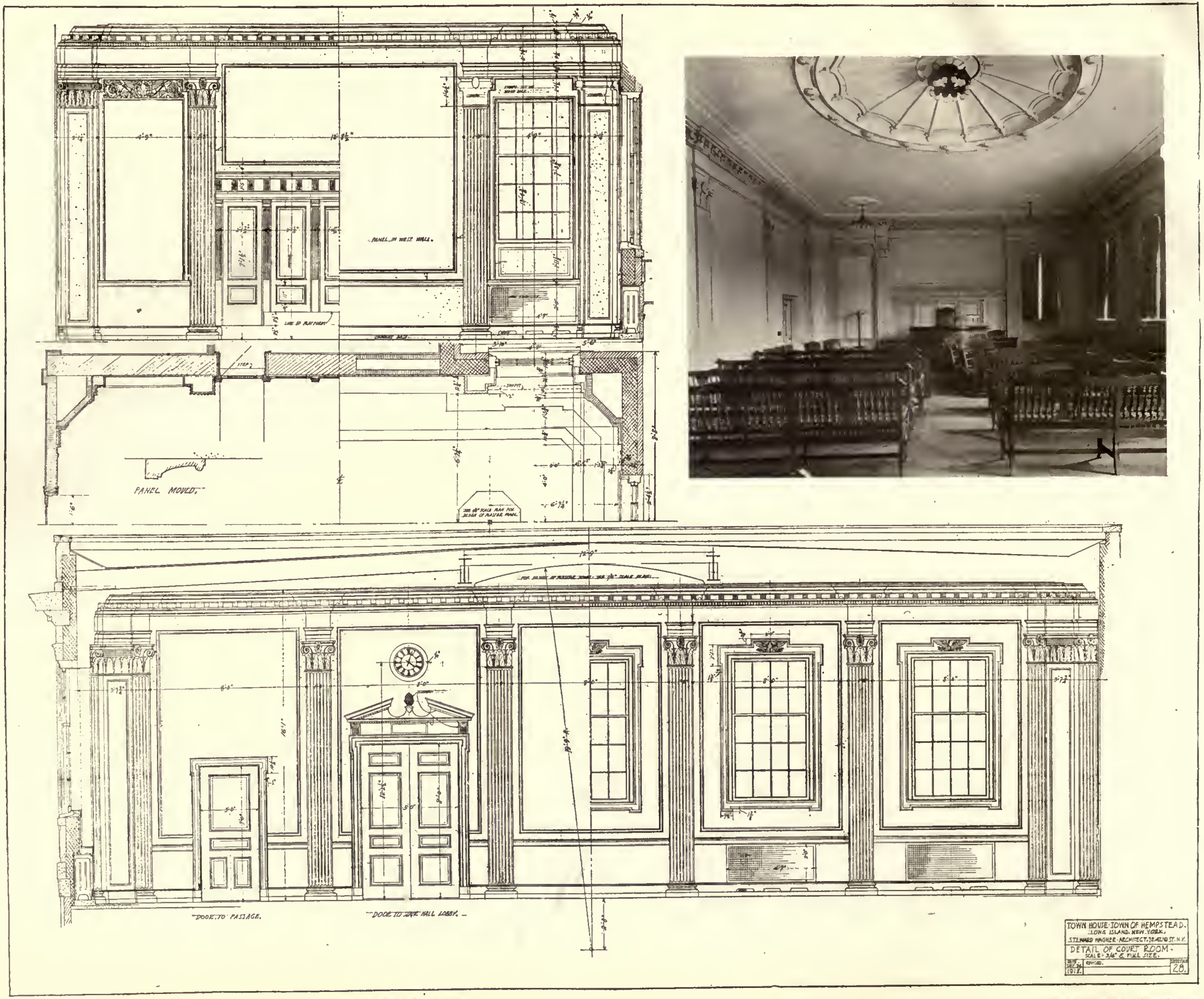
TOWN HOUSE, HEMPSTEAD, LONG ISLAND, N. Y.

Steward Wagner, Architect.



DETAIL OF TOWER, TOWN HOUSE, HEMPSTEAD, LONG ISLAND, N. Y. Steward Wagner, Architect.

DETAIL OF ENTRANCE LOBBY AND MAIN STAIRWAY, TOWN HOUSE, HEMPSTEAD, LONG ISLAND, N. Y. Steward Wagner, Architect.



HOUSE, HEMPSTEAD, LONG ISLAND, N. Y.

Steward Wagner, Architect

The New Hempstead Town House

Steward Wagner, Architect

Rear view, Town House, Hempstead, Long Island, N. Y.

THE new Hempstead Town House has an ancestry of historic interest closely intertwined with the history of our early colonial times.

The first town hall or "meeting-house" was originally established within the bounds of Hempstead by a white settlement in 1643, and was located inside the fort or stockade, where the settlers gathered for worship on Sundays and the annual town meetings were held for the transaction of public business. It was also used for the holding of the magistrate's court. The old town records show that the "town drummer" was paid twenty-five shillings a year for his service in beating the drum to call people to the meeting-house on Sabbath days for worship, and for the yearly town meeting. It is of interest to note in this connection that in this "meeting-house" took place the first provincial legislative assembly held in New York State. It was called together by Governor Richard Nicolls, and met February 28, 1665.

In 1680 the old fort and meeting-house were sold, and, a new meeting-house having been provided for by action of the town meeting, in 1678 a new building was built with town funds on the common land. This new structure was used for Christian worship and town business for the following fifty-six years.

During this period St. George's Church was organized, and after its new church building was completed, at a town meeting held November 1, 1774, it was voted to move the seats out of the old meeting-house into the new church building, the meeting-house thereafter being used exclusively for town purposes, and being used infrequently, it was neglected and was falling into decay. At a town meeting held December 27, 1742, a committee was appointed "to take care and charge of our old church or town house to secure it from any further damage," and as it was said that several persons had "pulled and carried away a part of ye said house without order or authority," the committee were imposed to make inquiry and to prosecute such transgressors on behalf of the town.

The records show no further mention of the old structure, and at the close of the Revolutionary War a system prevailed of holding the town meeting "at the houses" of certain prominent men, mostly in the village of Hempstead, the place of the next meeting being decided by vote. This practice continued in force for the next three-quarters of a century. The meetings were appointed to be held seemingly after some system of rotation at one or other of three inns or taverns of the village.

This method was followed until the year 1874, and we may imagine that entertaining their townsmen on such occasions was not an unprofitable honor to "mine host," especially as the law and public opinion had not yet forbidden the open bar in public houses on election days.

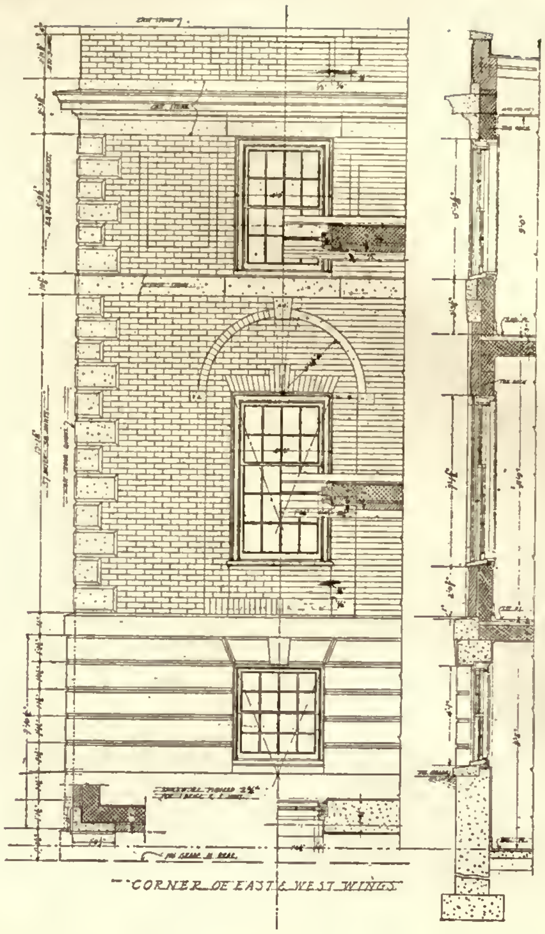
In the year 1874 the town purchased from a patriotic society of women their building known as Washington Hall, which was used from that time on until 1920 as the town hall.

In the year 1918 the growth of the community and accumulation of records made imperative the consideration of new quarters, and a site was selected known as Harper Park, opposite the historic St. George's churchyard, the building approach being flanked by two giant button-ball trees, over two hundred years old, these forming a magnificent setting for the new structure.

A competition was held, and the plans submitted by the author were chosen, the plan being of a T-shape form, the design based on the early colonial, with a clock-tower in accord with the historic traditions of the town.

(*Continued on page* 364.)

CORNER OF WING.



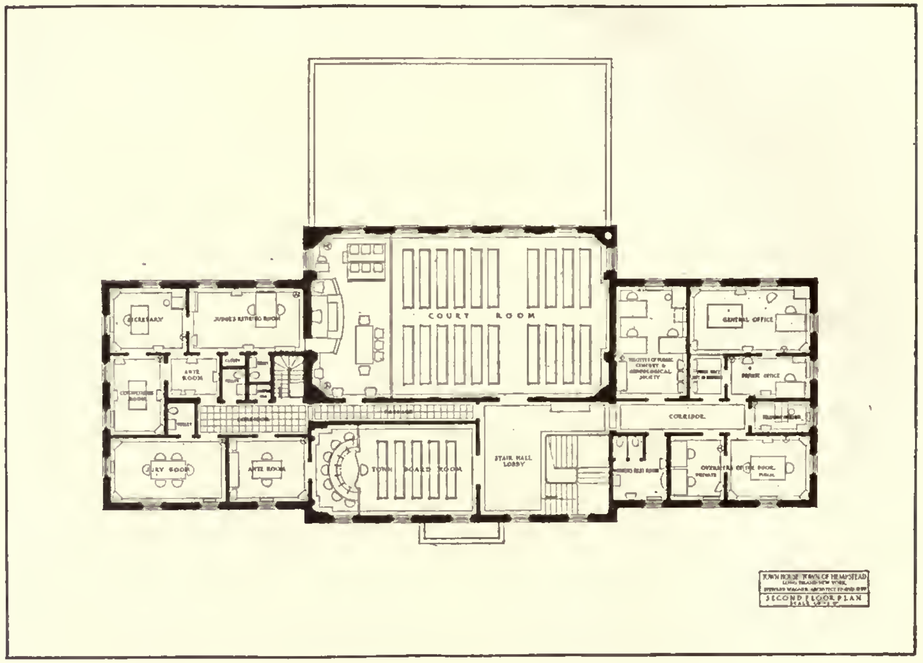
DETAIL OF WING.

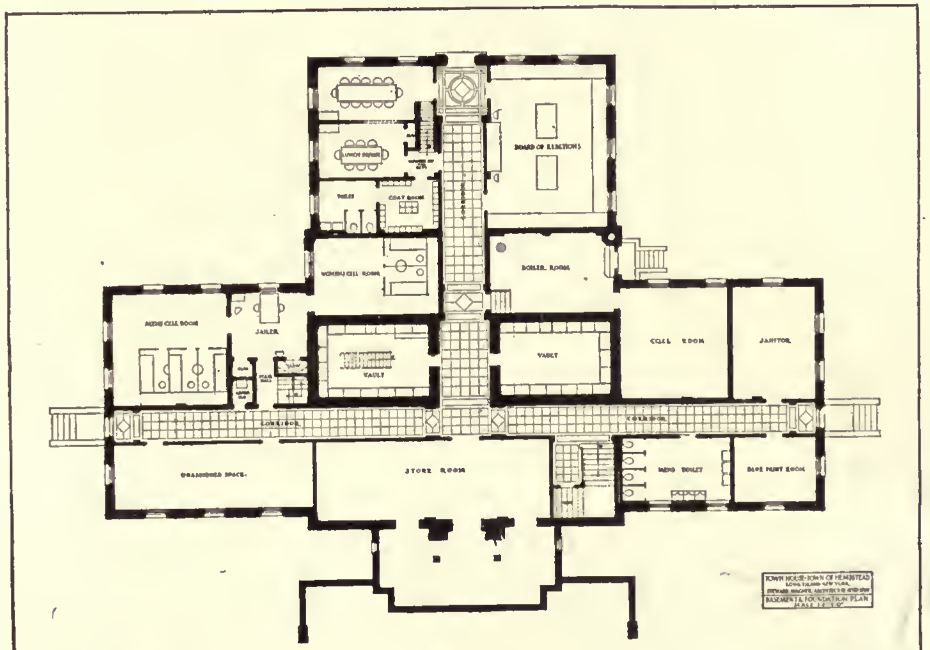
MAIN ENTRANCE.

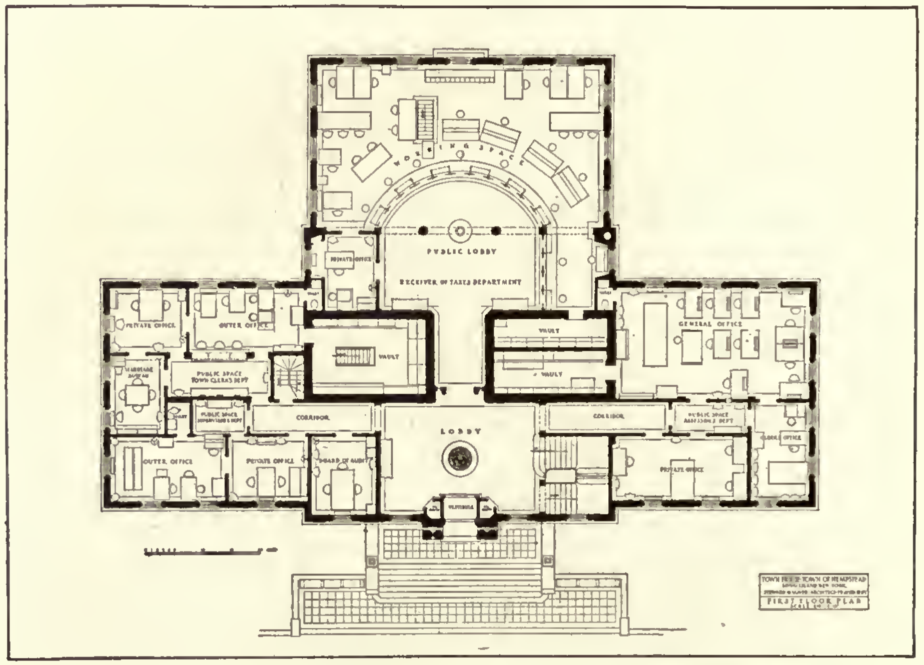
MAIN STAIR AND SECOND-STORY LOBBY.

TOWN HOUSE, HEMPSTEAD, LONG ISLAND, N. Y. Steward Wagner, Architect.

BOARD ROOM.







TOWN HOUSE, HEMPSTEAD, LONG ISLAND, N. Y.

Steward Wagner, Architect.

(*Continued from page* 361.)

It might be said here that in the past the planning and construction of a public building has generally been associated in the public mind with political intrigue, incompetency, and worse. In this instance, however, it is fair to state that the architect was not only unhampered in his efforts to produce a fitting structure, but received every encouragement and assistance from the various public officials directly in charge of the work, and their disinterested aid was a large factor in securing satisfactory results.

The contracts for the building construction were let in the early spring of 1918, at a time when prices were soaring to an unprecedented height, and as the expenditure was definitely limited to a very modest sum, unusual care had to be exercised in both the plan and choice of materials so as to keep within the fixed price limitations.

The building is two stories in height, exclusive of basement, with a tower rising to a height of seventy-five feet above the sidewalk level. This tower is equipped with a four-dial clock, which is illuminated at night, and furnished with chimes to toll the hour and half-hour, and for use on special occasions.

The plan is principally distinguished by its compactness and its ability to conveniently handle all public business and the correlation of the various departmental offices. The colonial motive has been carried throughout the interior design, including furnishings which have been specially designed by the architect to secure useful and harmonious equipment.

The main entrance on Front Street opens on a spacious public lobby, from which are directly accessible the departments of the Receiver of Taxes, Town Clerk, and Board of Assessors. The plan avoids all long or dark corridors, and is arranged to avoid at all times any possibility of crowding or congestion.

Adjacent to the public lobby a separate stair lobby is provided which gives access to the second floor, on which are located the court and town board room, which are equipped with the necessary conveniences in the way of judge's chambers, retiring rooms, private stairway for conveyance of prisoners between the cell-rooms and the courtroom, the prisoners' quarters being located in the basement, the grouping of all rooms permitting ready intercommunication with complete privacy. On this floor are also located the various minor town offices, such as the Superintendent of Highways and Overseer of the Poor. Special and complete vault accommodations have been provided for the convenient and safe storage of all town records.

A heating-plant is provided in the basement, which also contains rooms required for the convenience of the employees, janitor's office, and similar activities. The exterior of the building is constructed of red brick with stone trimming, with all floors and partitions of fireproof materials.

Special acknowledgment is made to Mr. John D. Fish, of Hempstead, New York, for the historical data contained in this article.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, School of Architecture of Columbia University

ARTICLE IV

ESSENTIAL STANDARDS OF QUALITY IN BUILDING MATERIALS

Cementing Materials

THE most important cementing materials which enter into the construction of the small house are lime, cement, gypsum, and their various mixtures, as mortar, plaster, and concrete.

The various technical requirements for good lime and cement are very strict and detailed, and for the small house it is customary to cover their qualities in the briefest manner by referring to the standard specifications of the American Society for Testing Materials.

Slaked lime should be made from well-burned quicklime, free from ashes, clinker, and other foreign materials.

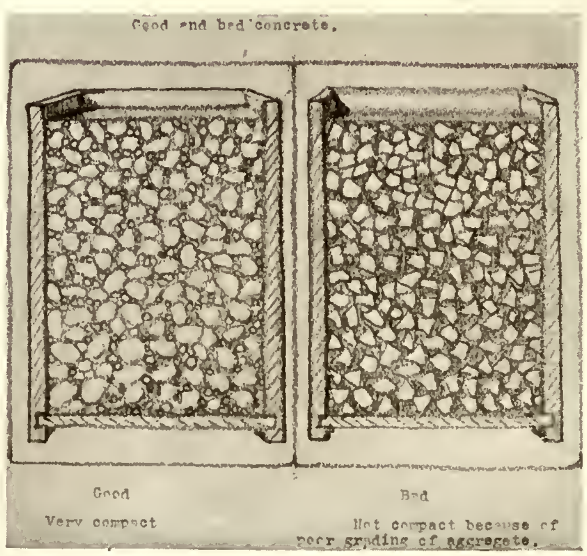
Dry hydrated lime should be the finely divided product resulting from mechanically slaking pure quicklime at the place of manufacture.

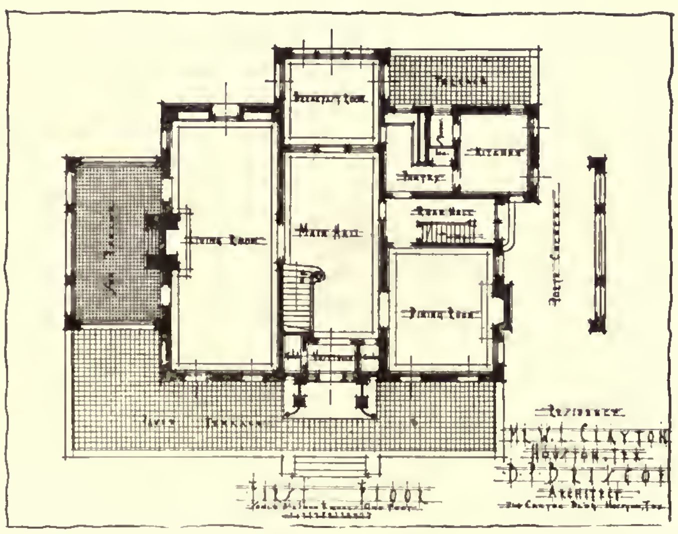
The specifications of the American Society for Testing Materials covering the quality of cement should be followed where large purchases are made. Where small quantities are to be used, the reliability of the dealer must be the basis of purchase.

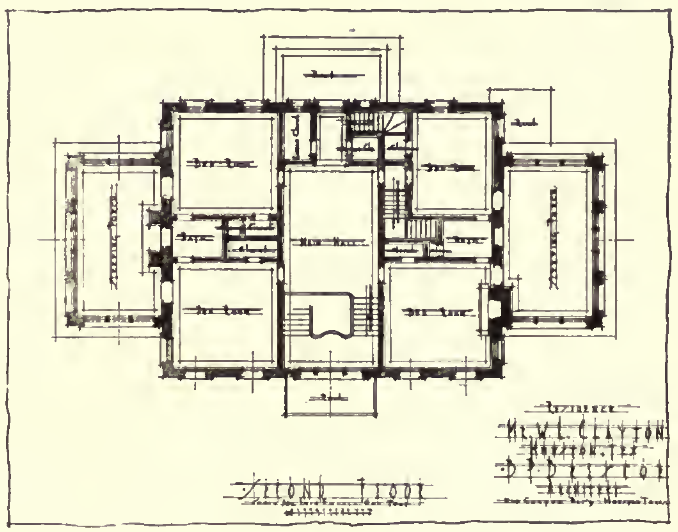
As mortars and concretes made from these materials are as important as the cements or limes, it is essential to have definite standards for them.

Lime mortar should be made of 1 part by volume of slaked-lime putty or dry hydrated lime and not more than 4 parts by volume of sand. The use of hydrated lime is recommended, since the poor qualities which are apt to develop from careless slaking of quicklime are thus avoided. It also comes in smaller packages, and if the entire quantity

(*Continued on page* 366.)







HOUSE AND PLANS, W. L. CLAYTON, HOUSTON, TEX.

B. P. Briscoe, Architect.

(*Continued from page* 364.)

is not used at once it may be stored without deterioration. It is only necessary to mix the hydrated lime with water until it becomes a paste, and then add the necessary sand. The purpose of adding sand is to increase the bulk and to reduce the shrinkage which pure lime paste will develop as it hardens. Pure lime paste, without sand, will shrink, crack, and develop very little strength. By introducing sand this contraction is reduced, but the addition of too much will decrease the strength slightly. However, this decrease of strength is very little. A mortar made of 1 part lime to 6 parts sand is nearly as strong as one made from 1 part lime and 3 parts sand. The maximum amount of sand to be used is generally governed by the ease of working, and not so much by the strength. A lime which is too sandy will not spread easily on the trowel.

Cement mortar is, of course, a stronger material and can be used in damp places where lime mortar would deteriorate. The theory of mixtures of both cement mortar and concrete is to proportion the materials so that they produce the most compact substance. For instance, in the cement mortar the cement should just fill the voids between the particles of sand, and in concrete this cement mortar should just fill the voids in between the larger aggregate, and this larger aggregate should be so graded in size that it makes the most compact body. It used to be thought that certain definite numerical proportions, as laid down by theory, of the various ingredients would hold true for all kinds of sands and aggregates. For instance, the proportion of 1 part of cement, 3 parts of sand, and 6 parts of aggregate was thought to be the best for ordinary use under all conditions. But extensive tests by the government have shown that the only real way to determine the correct proportions of mixtures is to experiment with the particular sand and gravel that will be used, and to test them to see what ratios give the most compact mass. It has also been shown that round aggregate, like pebbles, produce the strongest concrete, since the particles flow into place better than the sharper aggregates, which formerly were considered necessary because of the supposed idea that they made a better mechanical bond with one another. The proportion of water is also important, and it is found that a quaking mixture will produce the best results.

It is customary in small work, however, where no experiments can be made on various mixtures to determine their proper proportions, to follow the old rules of thumb for amounts.

Cement mortar should be made of cement and sand in the proportions of 1 part of cement and not more than 3 parts of sand by volume.

If cement-lime mortar is to be used it should not have more than 15 per cent by volume of the cement replaced by an equal volume of dry hydrated lime. The addition of hydrated lime to cement mortar improves its working qualities, making it slide more readily on the trowel and also increasing its waterproofness. Its strength is not decreased within the limits prescribed.

In concrete work it is as important to have good sand and aggregate as cement. Sand should be sharp, clean, coarse quartz. The sand used should not when it is rubbed in the hand leave the palm stained.

Gravel which is used as an aggregate should be free from clay or loam, except such as naturally adheres to the particles. If there is too much clay or loam, it should be washed with water. When bank gravel is used the best results will be obtained if it is screened from the sand and remixed in the proper proportions for fine and coarse aggregate. For ordinary mass concrete the size of aggregate should vary from ¼ inch to 2 inches, and in reinforced work should not exceed 1¼ inches.

The best proportion of parts to use must vary according to the requirements, but for the small house good results will be obtained by using 1 part of cement, 2 parts of sand, and 4 parts of gravel or broken stone.

Stucco is really a Portland-cement plaster used on the exterior, and its success depends a great deal upon the quality of materials employed and workmanship. All stucco to a greater or less degree cracks, but the problem is to make the cracks as small as possible. The government is carrying on an extensive investigation of the problem of stucco through experiments on fifty-six exterior panels which have been under observation since 1915. Each one of these panels has been spread upon a different base or made with different proportions. So far only two panels have been found to be entirely free from cracks, although many are practically uninjured by the small cracks which have developed. It is therefore quite evident that as a rule it must be assumed that the stucco will crack to a certain extent, and in order to cover such defects a rough surface is the best. As to proportions of mixtures, there is a great variation of opinion. The commonest is 1 part of cement, 2½ parts of sand, to which is added about $\frac{1}{10}$ part of hydrated lime by weight of cement. For a more detailed account on stucco, send for the Progress Report issued by the Bureau of Standards on the Durability of Stucco and Plaster Construction.

The qualities of internal plaster depend upon the construction of the wall, the methods of application of the plaster, and the quality of the plastering material.

The walls and ceiling to which plaster is to be applied must be so constructed as to be practically rigid under the loads that they will carry. Since plaster is not elastic, any slight change in shape of the surface will cause it to crack. The common backings which are satisfactory for plastering are wood lath, metal lath, and masonry, such as concrete, terra-cotta tile, brick, plaster board, etc. Wood lath makes the least rigid back of all, and for this reason is not considered the best, although it is the cheapest. Unless the wood laths are wet before the plaster is applied, they will absorb the moisture from the plaster and swell, thus cracking the wall. Metal lath for this reason is superior. Masonry walls should be made rough to give the necessary key for the plaster to cling to. In brick walls the joints are raked out, in concrete walls the surface is picked, and the outside of terra-cotta tile is marked with grooves for this purpose.

The best results in plaster are secured with three coats. The first coat is called the scratch coat, and is intended to form a bond between the wall itself and the plaster. It should be pressed into the apertures between the lath to secure a good bonding key, and its surface should be scratched with a tool to give the required bond between it and the next coat, or brown coat. The brown coat forms the main body of the plaster and averages about ¾ inch to ⅞ inch thick. The finished coat is then added on top of this and is intended to develop a plane surface with the desired color. Each coat should be allowed to dry out and then be wet before the next one is added. If wood lath is used, this drying and wetting will cause the lath to shrink and swell, so that cracks will be developed in the scratch and brown coats. These should be filled in before the finished coat is added.

The materials which should be used in the various coats depend upon the requirements which are necessary for each one. As the most important characteristic of the scratch coat is strength, and that of the brown plasticity, and the final coat appearance, the materials must be proportioned accordingly.

Scratch Coat Proportions

Hydrated lime	133 parts.
Sand	400 "
Hair	1 part

Brown Coat

Hydrated lime	100 parts.
Sand	400 "
Hair	½ part

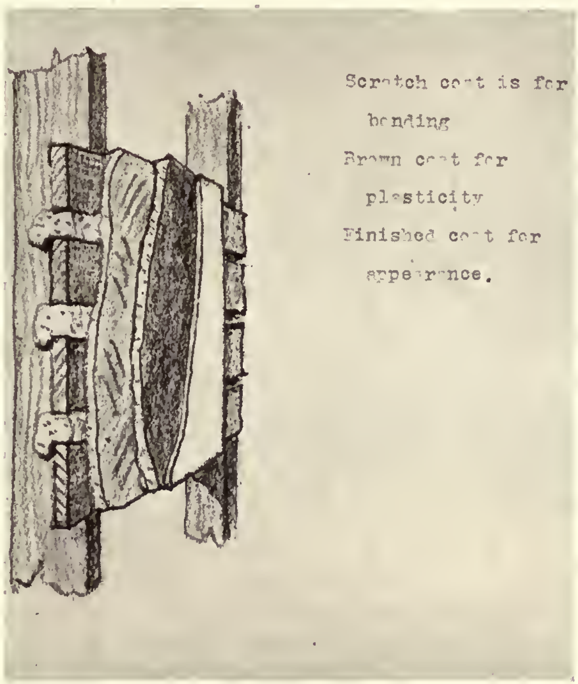
Finished Coat

Smooth Finish

1 part by volume of calcined gypsum.
3 parts " lime paste.

Metals

The most used metal in the small house is the so-called tin-plate or roofing tin. It is not a true tin-plate, for it contains 75 per cent lead and 25 per cent tin applied to a base of soft steel or wrought iron. It comes in two grades, IX and IC, the former being No. 27 gauge and the latter No. 29 gauge. The heavier is used for roofing and the lighter for valleys and gutters. The tin does not entirely protect the base metal, so it is necessary to paint both sides before it is applied.



Galvanized iron is another form of sheet metal which is extensively used for work on the small house. It consists of sheet iron or steel covered with zinc. The coating should be free from pinholes or bare spots and of a thickness to prevent cracking or peeling. If the coating is sufficient and well done, it is superior in lasting quality to the ordinary tin-plate.

As iron and steel enter very little into the construction of the small house, we will not discuss them in this limited space.

Paints

No material is so dependent for its qualities upon the honesty of the manufacturer as paint. No material needs to resist such a large number of factors which tend to destroy it. A good paint must have substantial thickness upon application, adhere well to the surface to which it is applied and protect it. It must resist the expansion and contraction of the underlying surface, the abrasion and wear from sand, dust, rain, and sleet, the absorbing action of the sun, and the contraction of the cold in winter. It must dry with sufficient rapidity when applied and must have good covering power.

The following is one of the accepted formulas for a good white-lead paint for outside use.

To the following base, add the materials given in the table:

Base

15.5 white-lead paste.
3 pints of raw linseed-oil.
5 ounces of turpentine and Japan drier.

Add to the above base the following for each one of the coats specified:

MATERIAL	FIRST COAT		SECOND COAT	THIRD COAT
	Basswood	Yellow pine, cypress		
Raw linseed-oil	¼ pint	¼ pint	....	1½ pints
Turpentine	1⅜ pints	1⅜ pints	1 pint	....
Japan drier	....	1 ounce	....	....
Benzol	....	⅔ pint	....	....

Glass

There are two kinds of window-glass used, double thick and single thick. The former is ⅛-inch thick and less, and the latter is $\frac{1}{12}$-inch thick. It is customary to use double thick in all window-panes over 24 inches in size. The grading is AA, A, and B, according to the presence of defects, such as blisters, sulphur stains, smoke stains, and stringy marks.

Plate glass is used only where the expense will permit. It is different from window-glass in that the former is made from blown glass, while this is made from grinding and polishing down sheets of rolled glass.

There are quite a number of other minor materials which enter into the construction of the small house, but as they are more or less identified with the mechanical equipment and the finishing, we will discuss them under these headings.

Twenty States were represented at a meeting of the National Council of Architectural Registration Boards held in St. Louis on November 18 and 19.

Two resolutions of interest to engineers were passed. One expressed the sentiment of the meeting that registration laws should permit the issuance of certificates to alien architects. Another was that joint registration laws for architects and engineers are undesirable.

The meeting evidently did not favor compelling the public to employ a registered architect, but rather took the position of protecting the name "architect" and then educating the public that the right to use the title was evidence of competency. The basis of registration was declared to be service to the public.

Superintendent of Registration Dodds, of Illinois, outlined the elements of a successful registration law based upon his experience administering laws in Illinois regulating many professions and trades.

New Houses for Old

By B. H. & C. N. Whinston, Architects

Remodelled shops and apartments corner Broadway and 80th Street, New York. B. H. & C. N. Whinston, Architects.

THE Calvin Apartments are an example of what may be accomplished with a comparatively small outlay and the use of novel ideas in planning and arrangement.

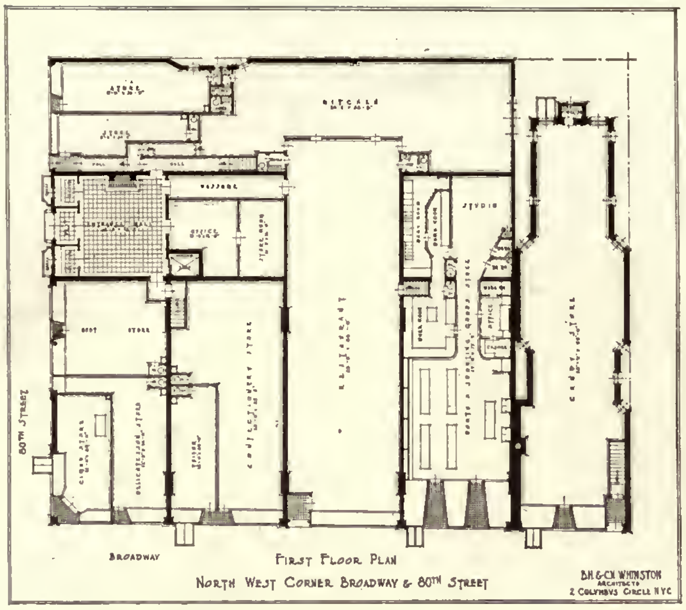
The northwest corner of Broadway and 80th Street, New York City, some fifteen months ago presented an appearance of dilapidation entirely inconsistent with the neighborhood and the possibilities of the corner. The seven old buildings which occupied the corner were erected some fifty or sixty years ago and had long outlived their usefulness. In fact, no one in the neighborhood, down to the oldest inhabitants, could tell with certainty just when they were erected.

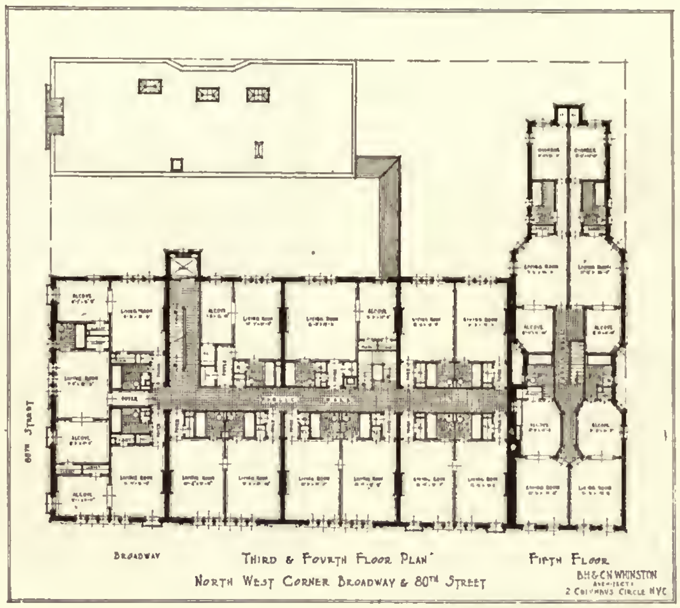
The four tenements on Broadway, with the inevitable saloon on the corner, housed the poorest class of tenants. The total rental revenues of the property amounted to about twenty thousand dollars per year. The apartments, of the old dead-centre type, brought about fifteen dollars per month, there being two per floor and sixteen in all. With the need for increased revenue, the owner was confronted with the problem of improving the property at a minimum of expense, and the architects were intrusted with the entire proposition. The ultimate result shows that they were given full swing of the project, and their treatment of the problem has resulted in a pleasing, practical, and profitable arrangement.

Old buildings before alteration.

The houses were thrown together to form an harmonious whole, the stairways removed, and new ones introduced in logical locations. The floors were divided into suites of one, two, and three rooms with foyers, baths, and closets. The best quality of plumbing equipment was provided, and the finish of the building throughout was made new, with parquet floors, stippled walls, new doors and trim, and so on, down to the last detail. The four corner houses, which contained sixteen apartments originally, were increased in height by the addition of one entire

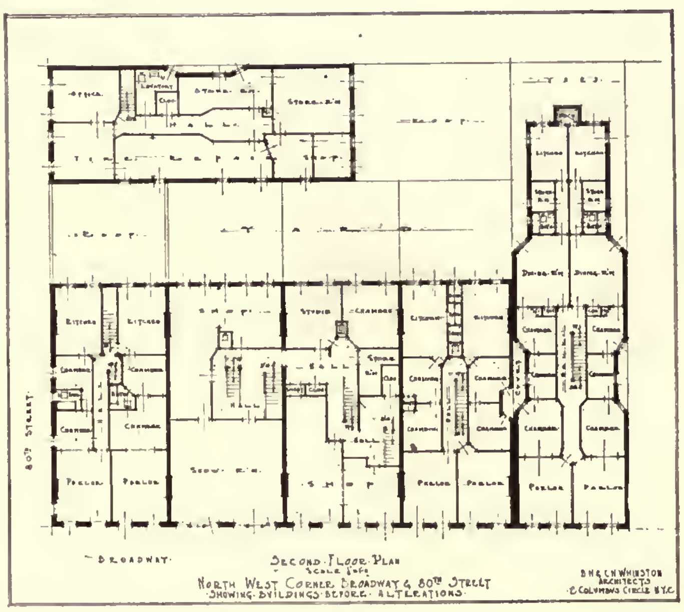
(*Continued on page* 370.)



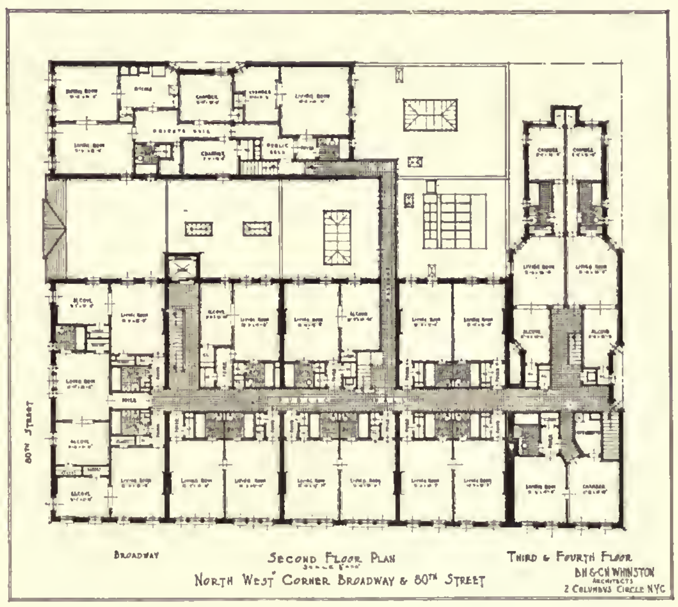


ENTRANCE-HALL ON WEST 80TH STREET.

A TWO-ROOM APARTMENT.



BEFORE ALTERATION.



AFTER ALTERATION.

CALVIN APARTMENTS (REMODELLED).

(*Continued from page* 368.)

new floor and divided into thirty-nine apartments, with fifteen additional apartments in the northerly extension.

An elevator was installed, which connects the entrance-hall with the upper portion of the building.

The old one-story building on the street suggested the proper motive for an entrance, and the entrance-hall was developed in full conformity with the interior English effect.

The ceiling was beamed in old oak, with stippled plaster between. The walls are of caen stone, tooled with six cuts to the inch and deeply cut joints left open. The floor is of dull faience and quarry tile, with Tennessee marble base. The ornamental trim at all doors and openings is of cast caen stone. The radiators are concealed behind bronze grilles between the vestibule and the adjoining alcoves. These alcoves have built-in oak settees and are lighted by wall-brackets, the whole forming a most inviting entrance.

Main entrance to Calvin apartments on West 80th Street.

The two-story garage at the westerly end of the property provided an excellent five-room and two-room apartment above, with two baths and one bath respectively, as well as two stores and service entrance to restaurant below.

The total cost of the work was $150,000, and the ultimate rental value of the property is now over $120,000 per year, an increase of over $100,000 per year! This latter sum is, of course, not realized by the owner, but by the operating company who took over the property.

That the development enhanced the neighborhood can be seen by comparing the character of the shops on the old premises with those on the new.

Announcements

Jobson and Hubbard, architects, wish to announce they have moved their offices from the Pullman Building to 225 North Michigan Avenue, Chicago.

Weller H. Noyes announces the removal of his office from 800 First Avenue to Suite 602, Transit Building, No. 7 East 42d Street, New York City.

Messrs. Hewitt and Ash, architects, have moved their offices from No. 520 Walnut Street to No. 1827 Arch Street, Philadelphia.

John F. Suppes desires to announce the opening of an office for the general practice of architecture at the Firestone Park Bank Building, 1115 South Main Street, Akron, Ohio.

We regret to announce the recent death of Mr. E. W. Hart, architect, of the firm of Hart & Barrett, East Las Vegas, N. M. Mr. Hart was well known and had practised his profession for eighteen years in Columbus, Ohio, before going to Las Vegas for his health. Mr. Barrett will continue the office at its present location, Suite 11, Crockett Building, East Las Vegas, N. M.

The firm of J. C. Berry & Co., architects, composed of J. C. Berry and E. F. Rittenberry, have taken into partnership Mr. M. C. Parker of Fort Worth, Texas. Mr. Parker will move his office to Amarillo and be connected with this firm after November 1. The new firm will be styled Berry, Parker & Rittenberry, Architects, with offices in the present location, Suite 29, 30, 31, Fuqua Building, Amarillo, Texas. J. C. Berry and E. F. Rittenberry will complete all their old contracts and assume all obligations of the old firm.

MacRae's Blue Book.—Thoroughly indexed, substantially bound, of convenient size and weight. All names *live.* More than 50,000 of America's keenest buyers rely upon MacRae's Blue Book for their buying information. It contains: Arranged in alphabetical order, the names and addresses of 35,000 of America's leading manufacturers, showing in thousands of cases, location of branch offices. Indexed under 14,000 classifications of material, and supplies the names and addresses of these 35,000 manufacturers with brief selling talks on the merits of the advertisers' products. An alphabetical index of trade names of materials and the names and addresses of the manufacturers thereof. Miscellaneous data, such as weights, measures, and tables, gleaned from a thousand sources, and so unique and valuable that in the physical valuation of railroads, where almost every form of material and equipment must be considered, it has been used very extensively. Manufacturers are scattered from coast to coast, from boundary to boundary. MacRae's Blue Book gives you a bird's-eye view of the entire industrial field. It enables you to get in touch with manufacturers and dealers of whom you have never heard before. Letters can be sent north, east, south, and west, stating your needs.

Prizes for the best work in beautifying Fifth Avenue during the year have been awarded as follows:

Gold medal for best new building, 24 West Fifty-seventh Street Company, for their new building erected at 24 West Fifty-seventh Street, Buchman & Kahn, architects.

Silver medal for second best new building, Douglas L. Elliman & Co., Inc., for their new building erected at 15 East Forty-ninth Street, Cross & Cross, architects.

Gold medal for best altered building, Guaranty Trust Company, of New York, at 522 Fifth Avenue, Cross & Cross, architects.

Silver medal for second best altered building, Edward I. Farmer, at 15 East Fifty-sixth Street, Trowbridge & Ackerman, architects, Lawrence Barnard, associate architect.

Mr. James C. Mackenzie, Jr., architect, formerly located at 15 East 40th Street, announces the removal of his office to 4 East 39th Street, New York City.

Croft and Boerner, architects and engineers, announce their removal to 1006 Marquette Avenue, Minneapolis, Minn.

The Building Situation in Argentina

Photographs by "La Nacion," Buenos Aires

THERE is a large field for the sale of American construction materials in Argentina. Buenos Aires is in great need of first-class office-buildings. Modern hotels and apartment-houses of the American type are needed and many model homes for working men will soon be erected in the suburbs. Notices appear in the newspapers of the capital from time to time inviting bids on various public construction enterprises.

Faculty of philosophy and literature.

The National Council of Education has adopted a large building programme for public schools, and the plans to be completed in the next few years call for an expenditure of about $8,500,000. The needs of various cities in the Province of Buenos Aires will call for the installation of sewerage and water systems, in the near future, at a total cost of $2,300,000.

The various provinces of Argentina have building programmes independent of those of the central government, but also receive federal aid in the execution of many public works.

Argentina has always been an excellent market for iron and steel products for construction purposes. Formerly the imports of cement were considerable, but a large cement plant is now in operation about two hundred miles from Buenos Aires, owned by American interests. Lime of unsurpassed quality is found in many parts of Argentina, and the plaster of Paris used is produced chiefly in the country. Clay roofing tiles and roofing slate, and glazed wall and vitrified floor tiles, are imported in considerable quantities.

In the past ten years many skeleton-steel structures have been erected.

The lack of ocean transport tonnage for bringing in construction materials, machinery, etc., the high costs of such materials, of fuel, lubricants, etc., increased ocean freight rates, a lack of investing capital, and the higher wages of labor with a shorter working day—all of these greatly diminished construction operations of either a public or a private nature in 1918. An immediate result of the decrease in the erection of office and apartment buildings has been an abnormal increase in rentals of all sorts, and without regard to localities.

None of the older cities of South America has so completely lost its national characteristics as Buenos Aires, and, while the greater number of houses are constructed after the old Spanish style of one or two stories built around a "patio" or inner court, there are, nevertheless, many palatial mansions in the newer quarter of the city and in the business district designed after Parisian, Italian, Moorish, and Norwegian patterns.

On account of the scarcity of lumber, wooden houses are seldom seen. The smaller one, two, and three story houses are made of a hand-made native brick, and are faced with cement. The larger and more expensive buildings, such as apartment-houses and office-buildings, are constructed with steel frames and reinforced cement, with brick walls and hollow brick for partitions. Very little stone or granite is used, although in certain parts of the country there are large deposits yet to be quarried. The great difficulty is transportation, since freight rates are very high for either brick or stone.

Only a few years ago the greater part of the houses in Buenos Aires had only a ground floor, hence the impression which struck the European traveller on arriving at the Argentine capital was of a decapitated town, extending over vast space, and extremely flat. But in these last years an infinite number of buildings have been constructed, scattered over all the town, with very grand proportions and, for the most part, of the Italian Renaissance style.

The municipal programme for 1920 considered the increase of the area of public parks in the city of Buenos Aires by fifty-one acres, and the carrying out of previous ideas of diagonal boulevards crossing the city. Comparisons were made with European cities and presented before the municipal authorities to show that Buenos Aires was not devoting enough space to the use of parks and avenues. Although this city covers an area two and a half times as great as Paris, it contains less than half as much park and open space. Comparisons with London, Vienna, and Berlin were also unfavorable.

Buenos Aires is one of the fastest-growing cities of the world. The census of 1914 showed 1,575,800 inhabitants, and it is now estimated to be over 2,000,000, since immigrants are arriving at the rate of more than 10,000 per week. Until recently the city has retained most of the characteristics of the small Latin American city. The one-story massive stucco house with interior patio has been the

(*Continued on page* 374.)

Paseo Colon (Columbus Square).

HOUSE OF CONGRESS. (The representatives of the nation have met here since May, 1906. The building is Greco-Roman style and resembles the capitol at Washington. The plans for the building were drawn by Mr. Victor Meano. The cupola weighs 30,000 tons).

LA MORGUE. (The Morgue of the medical profession, where students have the opportunity to dissect and study the human body. The building belongs to the Institute of Legal Medicine.)

CASA DE EXPOSITOS (Government Building for the care of natural children).

ESCUELA PRESIDENTE ROCA (Primary School of President Roca).


COLEGIO NACIONAL (Mariono Moreno High School).


BOLSA DE COMERCIO (the Exchange).


NUEVO BANCO ITALIANO (New Italian Bank).


PLAZA HOTEL. (Fourteen-story building as a specimen of the national progress rather than as a money-making undertaking).

COLON THEATRE. (The exterior of the building shows three different styles of decoration: the first floor in the Ionic style; the second Corinthian; and the third Attic, inclining toward the Corinthian. The height of the façades, from the ground up to the cornice, is 24.70 metres. The playhouse is one of the largest in the world. Its total length from one of the balconies is 75 metres, three metres longer than that of San Carlo in Naples. The dimensions of the ground floor are 27.8 metres by 22.50 metres. It contains 900 fauteuils placed on seven grades. The hall can hold 3,750 spectators. The front of the stage is 18 metres broad by 19.25 metres high. The interior vertical dimension of the stage is 48 metres from the foundations up to the arch. The theatre is constructed with incombustible materials.)

GOVERNMENT PALACE. (The building is constructed with bricks on a piece of ground that forms a parallelogram. The façades cut at right angles and measure 125 metres by 81 metres. The building has on its highest part a group of gigantic statues, made by the sculptor Bianchi).

prevailing type, and the streets, with the exception of a few avenues, are narrow. A city ordinance now requires that new buildings must be constructed to a given line in order to widen the thoroughfares, while the big increase in land values is automatically taking care of the increase in the height of buildings, which are invariably being built of two or three stories.

A resolution was adopted also for city supervision of all buildings to be erected on the diagonal avenues in order to insure proper embellishment of the city. It was originally intended that these avenues should radiate from the Plaza de Mayo, but the scheme was abandoned because of the great cost of acquiring the property and constructing the boulevards. However, the administration favored taking up the plan again. The razing of so many houses along the line of the boulevards would necessarily aggravate the present situation of rent scarcity, but it is felt that this temporary disadvantage would be more than compensated for by the building of two, three, and four story houses along the way. If the ideas of the administration and city engineers are carried out, a building boom will soon be inaugurated in Buenos Aires with an accompanying need for large imports of building materials.

Home Ownership on a Pay Envelope

(*Continued from page* 355.)

plant, coal storage, and a small laundry. In connection with the laundry, there is a suggestion that might be made, that in place of the sink a combination sink be installed or laundry tray be placed along the side of the sink, over which the drain-board would fit, and the regulation kitchen-sink installed. Many people believe that one laundry tray would be sufficient in a house of this size, especially if there is a good hot-water supply. In this way, it goes without saying, the expense would be less.

I believe if the architects generally would take up this matter of trying to interest groups of approximately twenty-six people, and sufficiently investigate prices of property, that the result would be better architecture for the small, inexpensive houses. They must bear in mind that they have got to eliminate a great many of the refinements that one's natural tendency leads him into with the resultant higher cost, and it is just this small additional extra amount per house that usually turns the prospective client from the architect to the speculative builder.

To say that a project of this kind is unprofessional is, to my mind, beside the point, since results are what count, and if the architects could see their way clear to this development idea, there is no question but that the small-house architecture of the entire country would be greatly improved in a very short time, for, as we know, in plan and elevation, the houses would be so far superior to the speculative builder's type that the public would very quickly recognize it. Therefore, as mentioned above, it is only necessary for the architect to hold down on special mouldings, which boost the price, and be content with a simple, well-proportioned building for the first few developments.

By this first sacrifice, the public will soon appreciate the superiority of these buildings, and then in later developments the architect can undoubtedly prove to his group of clients that a few dollars more will give them infinitely better houses from the standpoint of design and, consequently, more livable, *i. e.*, the owners will soon realize that each year they become more and more fond of their houses instead of each year desiring a change to be made because of lack of real design.

Any group of professional or business women—or in fact, young married couples—who are interested in the outlined project as given, may obtain full information concerning it from Miss Blanche Geary, of the Building and Construction Bureau of the National Board of the Young Women's Christian Association, 500 Lexington Avenue, New York City. Miss Geary, under whose direct guidance floor plans for many million dollars' worth of association buildings have been developed, spends almost her entire time in visiting individuals and communities in the interest of this housing programme of the association.

Town Planning for Convenience and Health

By Louis Lott

PART III

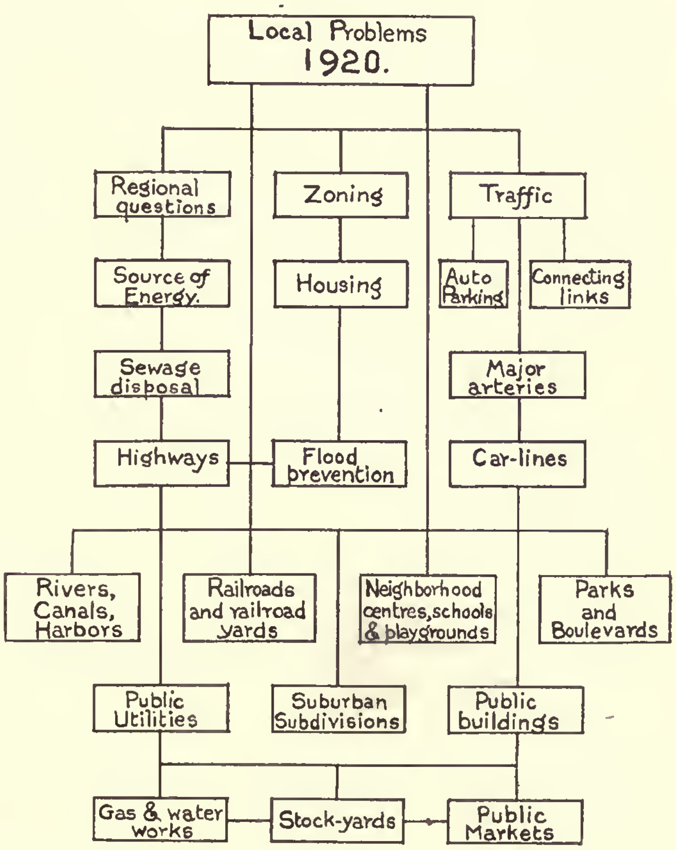
LOCAL PROBLEMS

CHART V will show, in a general way, such local problems that are common to most communities, and that must be met and studied in relation to each other in the comprehensive plan. They are approximately as follows:

A regional plan, which must solve questions common to a given region. In some cases, such questions will involve territory extending far beyond a community's limits and are such as highways, railroads, sewage disposal, water-supply, flood prevention, source of energy from water-power or such as is more recently generated directly at some coal-mines, and which does away with coal transportation.

Railroad plan. This is one of the first items in a comprehensive plan that must be carefully analyzed and solved, since the common carriers are the most important factors in a community's existence. Therefore, ample provision should be made for future expansion of their rights of way, passenger-stations, freight depots and yards, but at the same time the community's interests must be guarded, which may require rerouting of lines in order to prevent blighted districts, or it may be a question of grade crossings, etc.

CHART V.



River or canal problems that need solution, in the way of correcting their course, or turning the river frontage over for public use and enjoyment, by providing river parks and boulevards, bathing-beaches, landscaping, or by providing docks and railroad yards, or there may be flood-prevention measures that must be undertaken, etc.

Comprehensive sewer and underground service line plans are needed by almost every community, such as for heat, light, water, power current, etc.

A plan of public utilities, some of which are owned by nearly every community, such as surface and underground transportation lines, gas and water works, abattoir and public markets, etc. The latter should, especially in larger communities, be distributed over the community in the same manner as are neighborhood centres.

Neighborhood centres, playgrounds, and school problems are common to every community, and should be distributed in a scientific manner upon the basis of future density of population before desirable areas and locations are used for residence or other costly improvements. Moreover, the proper solution of this problem is that, if possible, all three be combined in one group, the schools so planned as to serve as neighborhood centres and the public playgrounds used in connection with the schools. In this way, maximum intensive use and economy referred to in Chart III can be had.

Furthermore, there are play fields, parks, and boulevards that every community should have, and the areas for which must also be reserved before they are developed for private use, etc.

But perhaps the most important question that confronts every community to-day, and the one which will have the greatest bearing upon the community of to-morrow, is the subdivision of the countryside immediately surrounding a city into "suburban subdivisions," or plats; for be it remembered that not so very many years ago 34th Street lay within a suburb of New York City, and Central Park out in the country, and that, furthermore, until very recently the present apartment-house districts of many of our newer and fast-growing cities lay out in the country, where Brer Fox and Brer Rabbit bid each other good night, and it is upon such land that the greatest opportunity for present-day constructive town planning lies.

In the past landowners and real-estate speculators have subdivided and put upon the market such patches of land that they controlled, a patch here and another there, and according to their various views and policies. One developed his holdings with the idea of making it a high-class development; another near by, maybe, playing upon the human weakness of wanting to be next to the sun, made his development of smaller and more popular priced lots; possibly another did the same thing; eventually the original development deteriorated into a spot of "has-been" glory to such an extent that the properties are put up for sale at only a fraction of their original cost, and those who can, move out to a new subdivision, where the whole process is perhaps started all over again. At all events, there was no co-ordination, and little protection was given to the home-builder in such a method of platting, and fabulous sums have been lost to the nation in this manner.

Furthermore, practically all communities have allowed large parts of their suburban districts to be ruined by accepting plat after plat that was rarely planned with any provision for open spaces, or for major arteries, or boulevards and parks, or beauty of any sort, and, with few exceptions, all laid out in a senseless, dreary, dry, hopeless mannner of straight streets and minimum-sized lots; just plats with straight lines drawn upon them regardless of the topography of the land, and mostly with the sole idea of extracting as much profit as possible from the ground and with the philosophy of: "After us the deluge." In many instances such districts have been platted for miles around a community, with no probability of houses being erected upon them for perhaps thirty or more years to come. There they lie, decorating the countryside with their ribbons of sidewalks that will have gone into decay before being used, and growing weeds upon perfectly good farm land that should be used as such to produce food next to the source of consumption. Such procedure is nothing but economic madness and criminal waste, in that, when the land is finally built upon, the accumulated interest charges upon the original inflated purchase price of the lot plus the taxes, has produced a value that is all out of reason and is one of the factors for the high cost of living. Besides this, there are the losses to the community of the interest charges upon premature development and of food production in the intervening years of idleness. Such practice has been condemned time and again and cannot too often be repeated. The really disheartening factor about this is that after all the accumulated expenses have been piled up against such land, there is, in the end, nothing to show for it but the most ordinary, commonplace development that will be all out of harmony with the advanced demands of the time when it finally will be put in use, if at all, since in some cases such lots have actually been resold for farm land.

The remedy for all this is "comprehensive planning" of such territory, which, with the exercise of forethought and reasonable regulations, will make such depreciations impossible besides adding greater uniformity and beauty to such districts and at less cost of construction, and all without expense to the community other than the preparation of the comprehensive plan, which, besides stabilizing property values, will also reserve from private ownership for public use such land as is needed for school and playground sites, for play fields, parks, and boulevard, and for a comprehensive system of streets and major arteries of such forms and widths and in such locations that these will link up with the major arteries of the city and with the rural highways, and with each other in such a manner as to allow a swift, smooth, and direct flow of traffic which, under present conditions, where no such provisions have been made, is becoming more and more difficult because of the increasingly greater use of motor-cars and trucks, especially on Saturdays and holidays. This particularly applies to our larger and fast-growing communities such as Detroit. At present these communities allow property lines along their main traffic-bearing arteries, formerly rural highways, to be established upon a basis of width laid down in the early settlement days that to-day prove to be entirely inadequate to carry peak-load holiday traffic.

City plan commissions should, therefore, have the greatest power to regulate and guide subdivision platting upon a comprehensive basis and to demand that major arteries be provided for, and that these be of ample width to take care of such peak-load traffic that they will ultimately be called upon to carry, and at a maximum speed compatible with safety and regardless of existing local ordinances pertaining to street widths. However, in most cases the full street width need not be taken over by the community until such time as it is actually needed. On the other hand, the roadways of second-class arteries, and especially of purely local residence streets, are, by city ordinance in most cases, of far greater width than will ever be needed, in that not a single vehicle traverses such streets for hours at a time and there never is a peak load. The same principle applies to sidewalks. Therefore, a revision of these antedated street-width ordinances and a more scientific planning that will determine them upon the basis of actual requirements will, in the aggregate, prove a considerable saving in construction and maintenance of roadways. This does not mean that local street widths between property lines should be reduced; on the contrary, the space saved in roadways should be added to the parking space between property line and curb, which, in all cases, will improve the looks of a street besides allowing more ground for shade-trees, thereby removing these farther from the house fronts and allowing more air and sunlight, the greatest enemies of germs, to penetrate the houses.

However, a satisfactory solution of an efficient suburban street system cannot be accomplished by strictly following, in all cases, the property lines established by the original land grants and their subdivisions. Examine the map of any community and it will be found that the suburban street system is very much like a picture puzzle, because the streets have followed the crooks and breaks of the boundary-lines of the land, and the puzzle is left to the town planner to provide, if possible, at least a few through-going transverse arteries at the least expense. Again Detroit furnishes some glaring examples; for instance, the inadequate connection between Woodward and Jefferson Avenues inside of the Seven Mile Road.

Where a suburban section is located upon rolling territory with a number of owners, then the only rational, practical, economic, and beautiful solution of such a problem can be had upon a comprehensive, co-operative basis; by which the area is platted, regardless of existing property lines, and each owner is reallotted the same percentage of his original ground holdings in the same locality, minus the percentage of contribution to the common street system. A procedure of this sort is bound to be slow and require patience to get all parties to agree. However, it will be worth the effort, since not only a more beautiful subdivision will result, but also a great saving can be made in street construction and grading, besides allowing better street grades. I recently had just such a problem involving twenty-five different owners of about three hundred acres.

Also in localities where the residential sections do not offer any irregularities of topography or other natural features, or where these sections are not bisected by frequent radial rural highways that will relieve the monotony of the street plan, it would be desirable to follow this plan of co-operative comprehensive planning in order to get away from the bone-dry monotony of the rectangular street plan that affords no features of interest, no interesting perspectives peculiar to the curved or broken street, but presents uniform, endless vistas of straight streets with houses ultimately more or less alike, and as inspiring as a string of freight-cars. This senseless scheme of things is happily being supplanted by the more interesting and beautiful modern plan of curved streets and broken vistas. However, this has its limitations when applied to small plots of ground within rectangular boundary-lines, and at best is only patchwork instead of evolving out of a general scheme. This is not to be understood to mean, though, that the straight street has no place in the modern subdivision or city plan. On the contrary, it has as much of a place as the curved street, and in many instances is far more practical, desirable, and in some instances more beautiful. The point is that there should be variety to break the monotony of a rectangular street system, and to adapt the street plan to the contours of the land.

There is still time and opportunity for city plan commissions to correct at least the most glaring defects in already platted suburban districts that have as yet not been built upon, by replatting such territory upon more scientific and artistic principles, and comprehensive lines, and upon a co-operative basis by which the replatted ground will be reallotted according to the original holdings and in approximately the same location. Of course this would in some cases be a considerable undertaking; however, considering the future welfare of the community, it would be well worth the trouble, and the property-holders would then at least possess something worth while to show for the inflated purchase price of their lots. So wake up, American communities, and salvage while you may.

The question of public buildings is also a very important consideration in every community, and, where possible, federal, county, and municipal buildings, such as post-office, court-house, city hall, auditorium, library, art and industrial museums, etc., should be brought into a group plan. Some engineers oppose this idea as being expensive, and because adequate space for future necessary expansion is often difficult to provide. However, I do not agree with this view, for if the original space does not allow of future expansion, then near-by property can be acquired, as was done with the office-building of the city of New York adjacent to the City Hall. Furthermore, as a city gradually covers a vast territory, there should be municipal borough centres to relieve the central office and for the convenience of the public.

Moreover, public buildings should not, as a rule, be located in the heart of a business district, because they more or less interfere with the expansion of business, either bringing it to a halt at such buildings or seriously interrupting it, thereby reducing adjacent property values, as well as those that lie beyond; besides, there is rarely sufficient available space in a business district for such buildings, and the ground is too expensive. Furthermore, there is no valid reason apparent why public business should not be concentrated as well as private business; and, lastly, public buildings should be a matter of pride to a community, and therefore be of dignified appearance; however, no matter how good the design, if the building has not a fine setting, much of its impressiveness is lost.

Therefore, since a fine setting cannot be obtained in an ordinary business district, why not combine public buildings, where possible, into a group plan, just offside the business district, where quite often a district can be found that has been scrapped in the forward march of events and has become cheap and dilapidated, in some cases having turned into a slum district. By doing this, more land can be acquired for less money, the buildings can receive an effective setting, and, because it is a real eyeful instead of scattered bits here and there, an impressive feature of beauty and local character is created in which community pride can be centred. Cleveland is here cited as an example where a city took over just such a dilapidated district for its group plan, of which feature Clevelanders are very proud. However, this is not to be understood as championing any extravagance in public buildings. On the contrary, public buildings, like any other, should first of all fulfil their practical functions and be compactly and economically planned, but that is no reason why they should not at the same time be good to look upon and have a dignified setting, especially if this can be had by using good judgment in the selection of the site and great care in the design. The point is that there should be a sane nicety of balance of all questions that enter into all community undertakings.

At this point it seems in place to discuss the status of "beauty" in town planning.

If a community is to be developed into a homogeneous, well-rounded whole, that will conform to the diversified interests, needs, and preferences of its inhabitants, and allow them the enjoyment of all the worth-while things of life, besides the purely essential, then the maxim of "harmony of looks," or the "city beautiful," must be admitted to the partnership of essential maxims that should govern rational town planning, and a clear and unprejudiced opinion upon this should be had.

The old "city beautiful" idea as such, without primary consideration of the practical questions involved in a comprehensive city plan, is to-day but shifting sand to build upon, because of the largeness of the programme of essentials and the limitation of available funds. On the other hand, the predominance of the engineer during and after the war, and the wonderful feats of his profession, together with the high cost of improvements and the intense commercial spirit of these days, have brought about a tendency toward disregarding the æsthetic and beautiful, and to go to the other extreme of the purely "city beautiful" idea. Both of these extremes are wrong, as all extremes are, and it is only by keeping to the middle of the road between them that a thoroughly harmonious, all-round development of a community can be expected, and this can be only accomplished by co-ordinating the work of engineers, architects, and landscape architects, and by giving all phases of the plan their proper sphere of influence. Beauty is recognized to be a necessary part of the whole and in its place as much in order as any other part, especially if it can be had merely for the price of a more careful study of a project and by the application of higher standards of criticism and professional ability. These will in many cases increase values all out of proportion to the money expended. In all events, it is certain that the rational æsthetic can apply his art to any town-planning project or building, be it ever so commonplace, and by patient study give to it a simple beauty that will entail little or no additional expense and make all the difference in the world in its appearance. Where, however, there is no regard for beauty in a town plan, something very much worth while will be lacking in community life, and a lopsided development is bound to result. On the other hand, a harmonious, orderly plan will be secured from a proper consideration of this factor, since beauty, in a sense, is the product of "harmony and order."

In the past many town planners have been very reluctant to even mention the word beauty in connection with town planning because of the sins that have been committed in its name, and for the reason that this word has as yet no status before our courts, and, furthermore, because of a general lack of conscious understanding by the general public of the meaning of art and its importance in life; for in our intensely practical and commercial age art is looked upon by many as a thing apart from, instead of a necessary part of, our daily life. But those who hold this view should remember that every age and civilization, and all races from the North to the South Poles, have striven to express their need and sense for the beautiful in some form or other, and that among the most valued and cherished heritages that have come down to us from these bygone ages are these works of beauty by man called art, as is attested by the fury and grief of the French and Belgians at the damage done during the war to their architectural monuments, to their domestic architecture, and to their fine old avenues of trees, etc. So why should not we strive to hand down to posterity as a mark and degree of our civilization lasting monuments of beauty besides our wonderful contributions to invention and science, which, moreover, are subject to change from year to year, whereas beauty remains constant through ages? In former ages it was the privilege of the church, and of potentates, to hand down this heritage, but in our democracy this is the privilege of all the people, since they are also the government; so it is up to them to make this contribution individually and collectively toward our present-day civilization, and to interest themselves in and further the finer and less obvious things of life.

We strive to surround ourselves in our daily life with good taste and express it in our homes, our household furnishings, our motor-cars, etc., so why be indifferent to the appearance of things that are common property and that we look upon day after day, such as our street pictures—our public and private buildings of all kinds, the railroad and highway approaches to our cities, our parks, etc.? Surely it is a greater satisfaction to look upon a beautiful street picture such as High Street, Oxford, England, or upon a harmonious building or bridges, or upon a beautifully laid-out park, than upon a commonplace or ugly one. Therefore, if, for example, an individual wishes to erect a building, why not make it a contribution toward the city beautiful and have a design of simple beauty that will fit the purpose and into its surroundings, and be a monument to the owner besides producing dividends?

Use a few examples in New York City, for the sake of illustration, the lessons of which, in spite of their typical New York magnificence, will hold good anywhere. The Woolworth Building, for instance, must be looked upon not only as an elaborate monument to an individual and an expensive advertisement of this name, but as a dominating landmark of great beauty and character that lends distinctiveness not only to the immediate street pictures but to the entire panorama of Manhattan Island, and consequently must be considered a distinct asset to New York.

Madison Square, on the other hand, which must be judged as a whole, promised at one time to become one of the most beautiful and picturesque open spaces in the world. Before the old Fifth Avenue Hotel was torn down there stood the Flatiron Building, a splendid solution of the problem, the Metropolitan Life Tower, the Parkhurst Church, the small Court Building, and the Madison Square Garden, besides a few other less conspicuous buildings. Then came the new buildings along the north and west sides of the square, which, for the most part, are lacking in refinement and good taste, not because of lack of money expended upon them, but because of lack of ability and gray matter put into the design. As it is, the square, still boasting a few distinctive features, has sadly fallen behind in the charm that it promised in its earlier structures.

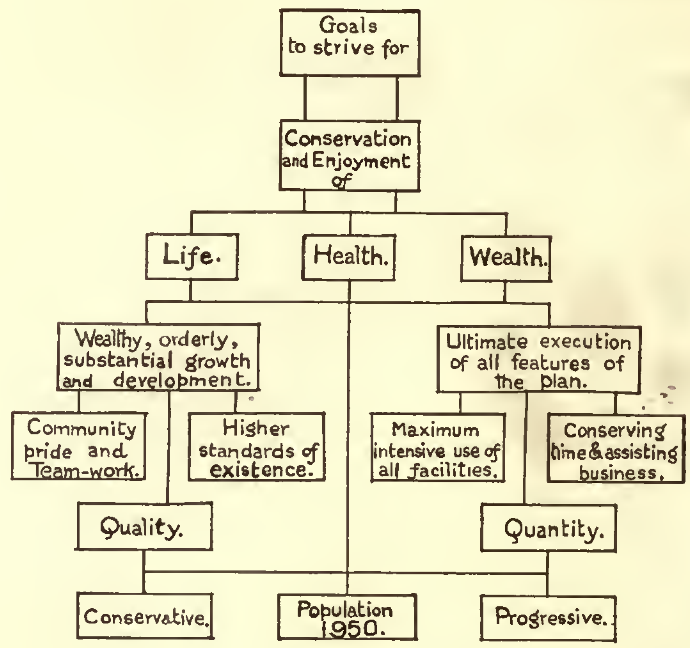
Buildings in such important locations should, therefore, have come under the jurisdiction of the New York Art Commission, and the lesson to be derived from this is that every community should have an art commission to co-operate with its city plan commission, whereby many an individual eyesore can be avoided, for be it remembered that no matter how well a town plan has been conceived, if the individual structures that line a street or square are without merit, or are not designed in harmony with each other, the ensemble will suffer. Wonders can be accomplished where there is a will and co-operation.

With such lessons to look back upon, it should not be difficult to convince the public of the necessity for a comprehensive plan.

Goals

The goals of a community as set forth in this chart should be to provide healthy, substantial growth, and at the same time the means for maximum conservation and enjoyment of life, health, and wealth of its inhabitants, and to hand down to posterity this heritage in a well-worked-out

CHART VI.



plan and principles for community development, that these goals may be perpetuated and afford the greatest opportunities for constructive citizenship. This will put an end to makeshift, haphazard, uncorrelated development of the community by substituting orderly, economic, permanent development and growth, that will allow a maximum intensive use of all of the facilities of the community, and reserve from private ownership for public use such areas that will contribute toward the main goal and allow for the greatest possible expression of community spirit and pride. Mere increase in area and size of population, in other words, quantity without a corresponding quality of development, is a mighty poor, short-sighted goal for a community to strive for, and has a parallel in the man who amasses a great fortune but misses many of the finer, worth-while things in life.