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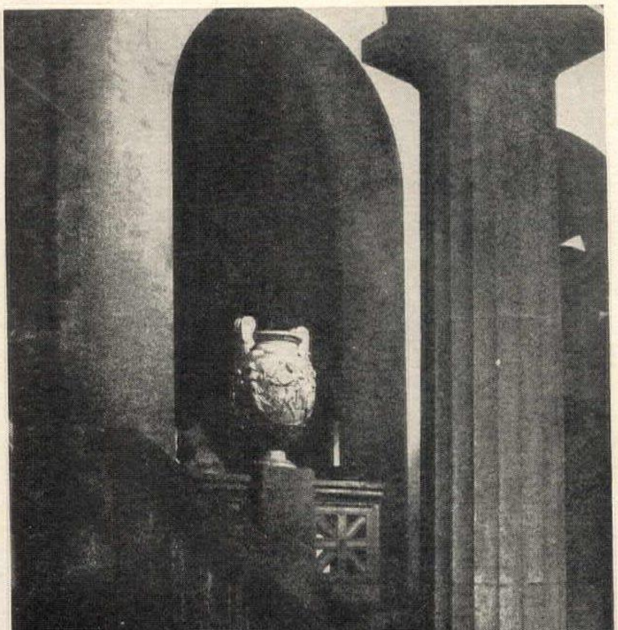
DAYLIGHT *in* BUILDINGS

BY PERCY E. NOBBS, M. A.

ARCHITECTURE may be regarded in many ways all equally truistic; for the present purpose it is to be considered as the art of assembling and arranging the diverse productions which are the concern of the lesser arts and crafts, in such ways as may result in distinctive occularly perceived impressions.

In the internal structure of a building more trades, arts, call them what you will, are as a rule involved than on the exterior, where wall materials,—stone or its substitutes — window materials,—glass in frames of wood or metal—and roof material,—sheets of metal, mineral or makeshifts for these—are all but exhaustive of the list and consequently of the techniques. But in the interior, choice of means to our ends is vastly freer and the combinations infinite.

In exercising our selective tastes as masters of every trade we architects may be influenced by a connoisseurship of ancient ways of doing things; by a conscious loyalty to a tradition, national, or cultural; by an exalted self-sufficiency of inventiveness; by a spirit of willing compromise with the idiosyncrasies of our clients, or by a clear perception of the fundamentals of problems as problems;—by all and any of these and by a hundred other sentiments. Yet whatever the light and shade of our motives in the resultant assemblage of material made eloquent through form and color (whether in being, or only potentially set forth in drawings, specifications contracts and purchase lists), the revelation of æsthetic content, if any, depends on *eyes to see with* and *light to see by*.



Staircase, 24 Friedrich-Karl-Ufer, Berlin

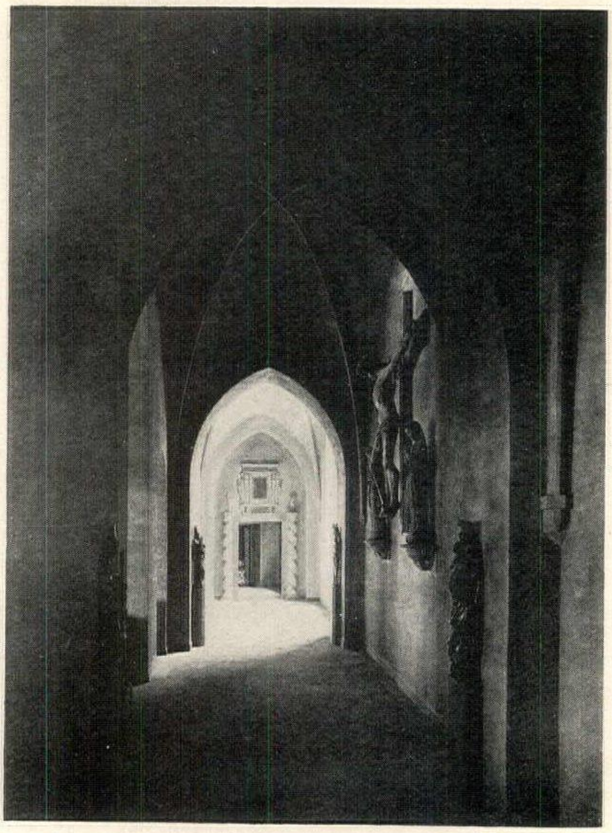
So we find that ultimately the value of the arrangement of parts and things is conditioned by the arrangement of the windows. These have a dominating importance not only in virtue of their own inherent uses, but as affecting every other internal element of a structure in its architectural, as distinct from its engineering, aspect.

Mere efficient planning is a matter of engineering talent—synthesis of use, prospect, aspect, construction. But planning may be art as well as engineering and without detriment to efficiency in virtue of inherent graces of solution. Our mathematical friends assure us that their problems have solutions in mere mathematics and, by virtue of grace, solutions in purest poetry. But the grace of solution of plan is of a rather superficial kind if it result only in pattern on a drawing, and in inanity of occular impression in the executed work. In these days of academic teaching and meretricious draftsmanship, pattern in plan without visualizatiton of the result of the pattern is all too common.

Of course, regularity of fenestration furnishes an easy basis for monumental quality and often provides incidentally for an even and practically effective distribution of light over floor areas, but in the case of the larger and more highly organic internal cells of structures this often results in utter dullness. The most harmonious proportions, the happiest decorations, the choicest materials and the most cunning craftsmanship will produce a mere assemblage of dissociated entities or a wonderland of delight, depending on how the light deals with them.

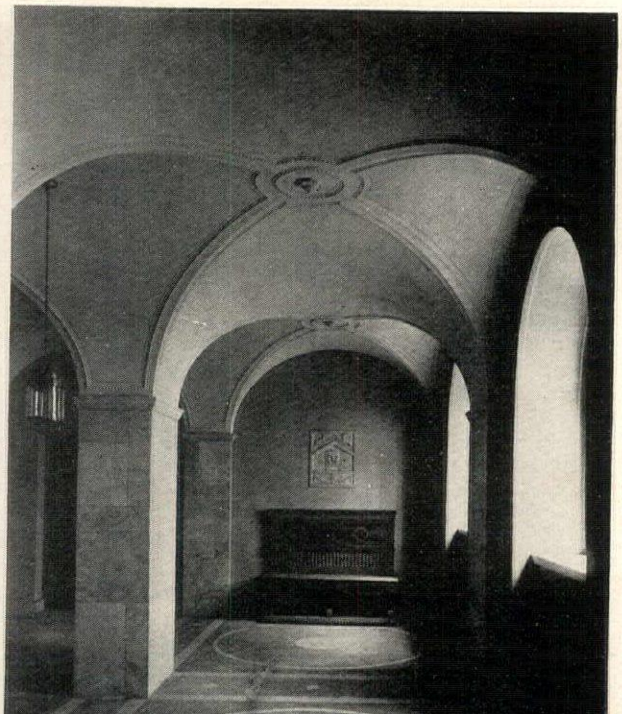
The eye does not require a great deal of light to see by in comfort; it does require a fine quality in the matter of shade and shadow. This continent is full of rows of large windows stopped off to 80 per cent with blinds, shades, awnings, sash-cloths and curtains and other encumbrances.

It is particularly in the churches that the greatest possibilities occur for composition in terms of light and shade yet how often, even in these, the very shapes of things so sedulously elaborated on the drawing board turn out "without form and void"



An aisle, Markisches Museum, Berlin

Sculpture Gallery, The Museum, Darmstadt



Anteroom, Municipal Building, Berlin

Portrait Room, Markisches Museum, Berlin

Picture Gallery, The Museum, Darmstadt

through the contrivance of fenestration with a view to external effects only;—that is, through unimaginative planning. Experimental as much of his work was, Wren nearly always succeeded in bringing about some miracle of loveliness through the disposition of his windows in relation to internal elements. It is in this sense that we may interpret Lady Dilke's most happy phrase, "the calculated effects of architecture."

The extending use of artificial light, even artificial daylight, tends to make us careless in these matters. The ideal of even distribution of light

deadly dullness and inefficiency of the lighting of the Louvre galleries is often cited as an argument for an equal dullness with efficiency. In Messel's work at the museum in Stuttgart there is efficiency without dullness and variety of lighting to suit variety of objects is contrived with a view to fine general effects. His methods are worthy of those sincerer forms of flattery which constitute so large a part of the technique of architecture throughout North America. He knew well that the "delight of the eye," to say nothing of its common comfort, when functioning needs

Main Committee Room, St. Elizabeth's Hospital, Harlem

is right enough in the departmental store, the school, the factory, but this is not the subject under consideration. It is not light to reveal objects seen in the hand, but light to reveal the place as a whole that is under investigation. Picture galleries and museums are places where the objects within the rooms exceed in interest the rooms themselves and some uncomfortable, rich men's houses are like that. In churches and in most houses, however, interiors exist more independently. But even in museums efficiency is not incompatible with a qualitative arrangement, as ..ll as a quantitative distribution, of light. The

backgrounds of qualified shade and on occasion gloom.

Now considering a window as a source of light;—like any other source the intensity of light derived from it falling on objects depends in an acute ratio upon the distance. But the light diffused from a large window veiled with muslin is exquisite in one way, while the definition derived from a small clear opening of equal total candle power may be exquisite likewise, but quite differently; each has its uses, its potentialities for magic.

The tricks of interior lighting habitual to the

Room in the Museum, Edam

Council Chamber, Town Hall, Ballenstedt

Hall III, Municipal Building, Berlin

contemporaries of Peter de Hooch and practiced before and since his time are in reality very simple. One may make two main classifications of interior views. Those in which the source of light (sky seen through glass) is visible and those in which it is not. The latter are subject to varied manipulation, the former to mere amelioration, for one cannot see much of color, or of form, with a strong light in one's eyes. Views, of course, are outside our consideration; when a window exists to be looked out of, it is vain to compete with the interest of nature.

Now the less visible the sources of light, the more visible will be the interior. Deep bays, embrasures, transepts, are devices to that end. But when the interior view involves a source of light, there is nothing for it but to make that source itself the interest as is often done with tracery, and stained glass, or to raise it high enough not to interfere unduly with visibility at the floor level, or to neutralize the asperity of the seen source by the admission of floods of cross lighting—all common practices in pre-reformation parish churches in England.

(*To be continued*)

Ladies' Committee Room, St. Elizabeth's Hospital, Harlem

The MUNICIPAL EXHIBITION *of the* NEW YORK *and* BROOKLYN CHAPTERS *of the* AMERICAN INSTITUTE *of* ARCHITECTS

BY *JOHN V. VAN PELT, A.D.G.F., F.A.I.A.*

A YEAR and a half ago the Public Information Committee of the New York Chapter of the American Institute of Architects enlisted the co-operation of the younger men of the chapter in a movement to beautify some of the city's more important squares and better traffic conditions. Different sections badly in need of improvement were considered and attention finally concentrated upon the City Hall Park, Union Square, Mount Morris Park and one or two other of the smaller parks and street intersections. In City Hall Park the imminent removal of the old Post Office, the much desired elimination of the two inadequate and ugly court buildings, together with increasingly difficult traffic problems and the unspeakable approach to the Brooklyn Bridge combined to create an especially insistent appeal for the services of the sub-committee that had been formed. Another type of problem was added to this expanding program through an effort to bring

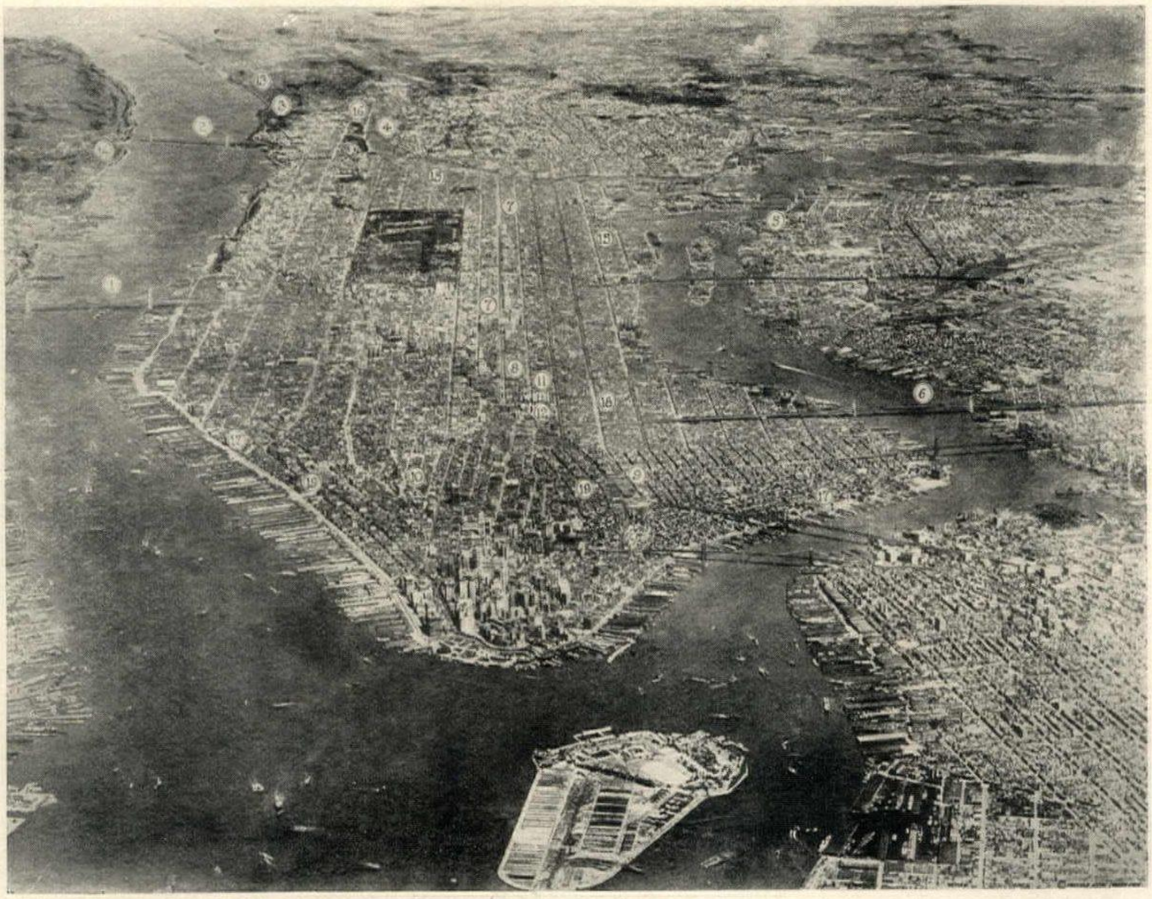


Fig. 1. Aeroplane View of New York on which are marked the various proposals for the development of the City

(Compiled by the Plan of New York and its Environs)

Key

(1) Hudson River Bridge at 57th St. (2) Hudson River Bridge at Fort Washington Park. (3) Hudson Memorial Bridge across the Harlem River. (4) High Bridge rebuilt, with improved waterway and adapted to vehicular traffic. (5) Tri-Borough Bridge across the Harlem River. (6) East River Bridge, from 8th St. Manhattan to Brooklyn. (7) Park Avenue Improvement. Viaducts around both sides of Grand Central Terminal. Widening of roadways from 34th to 40th and 46th to 96th Streets. Vehicular viaduct over the N. Y. Central tracks from 96th St. to the Bronx. (8) Fourth Avenue Elevated Driveway, from Union Square to 34th St. (9) Chrystie St. Widening and suggested park between it and the Bowery. (10) Sixth Avenue Extension, South to Canal St. near West Broadway. (11) Lexington Avenue Extension through Gramercy Park. (12) Irving Place Extension South to 12th St. and Fourth Ave. (13) Riverside Drive Extension to Yonkers and the North. (14) Henry Hudson Drive Extension South from Englewood Cliffs to Fort Lee. (15) East River and Harlem River Driveway from East 59th St. to Highbridge Park. (16) Harlem River Driveway Extension across Sherman Creek. (17) Waterfront Elevated Driveway from West 72nd St. to East 57th St. (18) Elevated Driveway on Chrystie St. (widened) and 2nd Ave. from Manhattan Bridge to East 23rd St. (19) Elevated Driveway on Canal St. from Manhattan Bridge to Waterfront Driveway on West St.

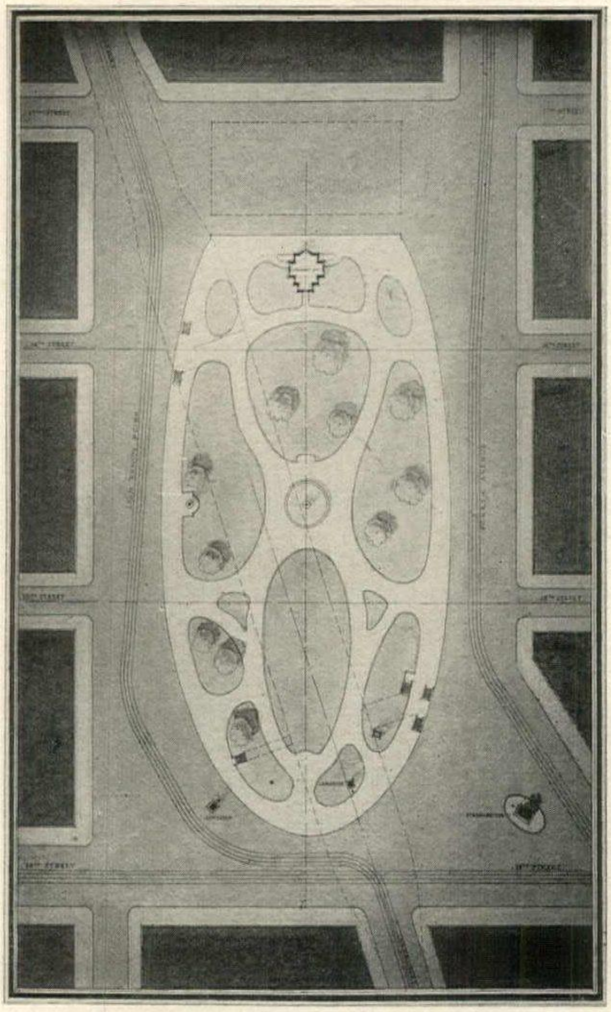


Fig. 2. Plan of Union Square as it is today

to New York some of the delight the *flaneur* finds in the public squares of Europe, when he hears the gushing flow or tinkling spatter of water from their beautiful fountains as it rushes out sparkling into the summer sunshine. This was enlarged by a proposal to add wading pools for the children and so develop a permanent form of the tripod supported spray that had been set up at intervals during two previous hot summers in front of the Fire Houses by the city administration and to whose popularity scores of romping and dripping children had testified. The Committee felt that such fountains might well be a visible memorial to the inauguration of New York's new water supply and a careful study disclosed that the amount of water that would thus be used would be an inappreciable percentage of the total quantity wasted daily in the city through leaky faucets.

As the problem of major importance, a scheme was developed for the region of the City Hall. In it, to simplify transportation, the elevated tracks of the Brooklyn Bridge are depressed into the tunnels already constructed by the city but never utilized (Figure 9). The trolleys run onto the upper level and are reached from an open space below them by separate staircases. This removes the dangerous crossing of the tracks at grade. The ugly extension of the bridge is replaced by a monumental entrance (Figure 10), conceived in harmony with the Municipal Building. The City Hall Park is shown freed from the uncouth buildings that mask one of the most beautiful examples of Colonial architecture that has been bequeathed to us by the past, and a plaza is maintained in front of the building to accommodate the crowds that are addressed from its steps. A diagonal approach to this plaza can be seen in the foreground of Figure 8, opening from lower Broadway where the Post Office now blocks the vista. The traffic between the upper west side and the New Jersey tunnels to the lower east side is deflected around the lower end of the park in a wide curve. The upper side of the City Hall is left unencumbered and the square thus formed framed by trees set in gravel permitting the public to circulate freely in imitation of the treatment

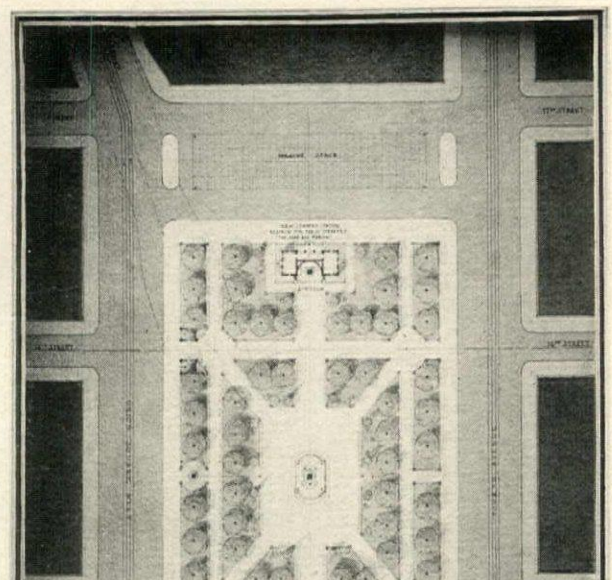


Fig. 3. Plan of Union Square as it might be Designed by Gerald A. Holmes in conjunction with conferences held by the Public Information Committee of the New York Chapter, A. I. A.

Fig. 4. The fountain in Union Square as it is today

in the Luxemburg Garden in Paris. This eliminates the difficulty, well nigh insuperable, of making grass grow in the shade.

The problem next in importance attacked by the Committee was Union Square with its antiquated meandering paths and the statue of Washington shunted to one side in a clutter of street cars and advertising signs. Straight paths in line with the direction of the circulation and a charming fountain have been introduced and the statue of Washington placed in the axis of Broadway and the Square itself. (See Figures 2, 3, 4, 5, 6 and 7.)

Several smaller squares also engaged the Committee's attention. Albert Flanagan planned a wall fountain for the northerly end of Mount Morris Park. It is banked against the hill in the

Fig. 5. The Statue of Washington in Union Square as it is today

axis of Fifth Avenue and in front of it is a shallow but spacious wading pool. Bernard Hertzbrun developed a series of steps and a cascade descending from Morningside Drive through Morningside Park in the axis of the Cathedral of St. John the Divine. He also made a study of a fountain and street intersection for St. Nicholas Avenue where it enters Broadway. Herbert Lippmann presented a plan to turn an ordinary cross town street between two avenues into a small park with fountains and pools for the children of the region.

The study of all these projects was the subject of several conferences at which representatives of the Society of Landscape Architects, the City Club

Fig. 6. Proposed fountain for Union Square Designed by Gerald A. Holmes

and the Architectural League of New York appeared and discussed numberless different arrangements presented for each problem. The older Chapter members, among whom were Messrs. William M. Kendall, Louis Ayres, Harvey W. Corbett, Charles Butler and Howard Greenley, assisted at the conferences while George B. Ford and E. T. Goodrich, experts in town planning, gave invaluable advice from the viewpoint of their special studies of important traffic problems.

The purpose of the Chapter's Public Information Committee was to hold an exhibition of the completed work and when the Russell Sage Foundation came forward with its study of a plan for Greater New York its assistance was sought and granted.

During the latter part of 1922 a special committee of the Chapter was formed to hold the

Fig. 7. Proposed setting for the Statue of Washington in Union Square. It is to be placed at the intersection of the Park and Broadway

(Drawn by Gerald A. Holmes)

projected exhibition and Commissioner Whalen of the Department of Plants and Structures was approached to bespeak the co-operation of the city departments, in the hopes that an exhibition showing all of the schemes projected during past years might be assembled and the attention of the public captured and concentrated on the idea of developing New York into the most practical, convenient and at the same time the most beautiful city of the world. The Commissioner responded immediately and moreover intimated that a municipal exhibition had just been suggested by the Mayor. He proposed that the Chapter hold its exhibition in conjunction with the Jubilee Exhibition.

It was evident that the public could be reached more effectively in this way than in any other and the Chapter gladly agreed. On its invitation the Brooklyn Chapter of the Institute joined with it in bringing this to pass. Thus the germ that took root nearly two years ago, with expectation of but small fruition, blossomed into the most important review of projects for the development of New York that has ever been produced.

What must have struck the most casual observer, is that these interesting ideas of this past were unrelated. Here one saw a proposition for a War Memorial, there one for an Art Center. Even the studies of the New York City Improvement Commission, of the Brooklyn Commission on City Plan and of the Bronx Parkway Commission did not develop comprehensive schemes for the greater city. It was reassuring to come upon the basic surveys of the Plan of New York and its Environs and to know that at last the Russell Sage Foundation will carry out the plans of the idealist who made the plan of Chicago a fact. Mr. Norton's

Fig. 8. Proposed rearrangement of City Hall Park after removal of the Post Office, Supreme and City Court Buildings, and the extension of the Brooklyn Bridge

Designed by LeRoy Barton, W. Stuart Thompson and John V. Van Pelt in conjunction with conferences held by the Public Information Committee of the New York Chapter, A. I. A.

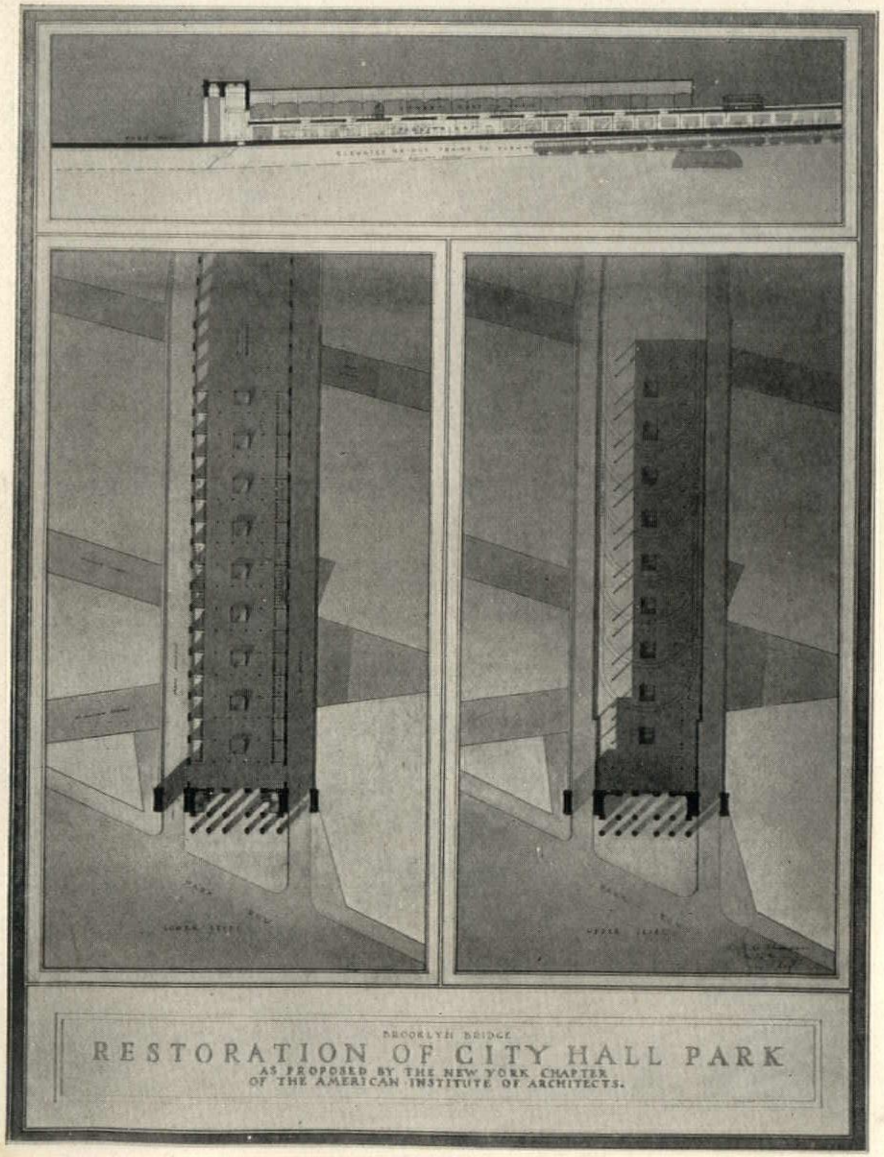


FIG. 9

FIG. 10

PROPOSED ENTRANCE TO BROOKLYN BRIDGE

DESIGNED AND RENDERED BY GEORGE KOYL OF THE PUBLIC INFORMATION COMMITTEE OF THE NEW YORK CHAPTER, A. I. A.

AT LEFT: PLAN AND SECTION OF PROPOSED ENTRANCE TO BROOKLYN BRIDGE

DRAWN BY GEORGE KOYL, VICTOR FARRAR AND JOHN THOMPSON death at this juncture was a blow; but he has left his work in sure hands. Already the Foundation has done much in obtaining data. An intensely interesting aeroplane view of New York was the central feature of their exhibit. On it had been cleverly drawn all the different schemes, bridges, etc., that of late have been proposed for connecting Manhattan and the other Boroughs (Figure 1). The Plan of New York and its Environs Committee offered it without comment as it is too early for them to arrive at conclusions in the study of this vast enterprise.

Among the projects of earlier days, the most important contribution was the findings of the New York City Improvement Commission appointed by the Board of Aldermen under Mayor McLellan in 1903. These drawings, beautiful in technique and lovely as tapestries in color, have been lost to the ken of man. The Exhibition Committee followed the trail; at first without success. Finally they came upon them at the bottom of a pile of valueless impedimenta in the basement of the Hall of Records. Needless to say much of what was proposed in them has not been carried out. In New York a succeeding administration is inimical to its predecessor and, for political reasons, rejects the valuable parts of projected work with the bad. The New York City Improvement Commission proposed the continuation of Sixth Avenue below Washington Square. This reappears in the list of suggestions of the Plan of New York and its Environs where Sixth Avenue is extended South to Canal Street near West Broadway. (See Figure 1, No. 10.) The Commission recommended the extension and widening of Seventh Avenue, which has been done, and has proved a valuable improvement; but the continuation of Bleeker Street Southeast to the Manhattan Bridge, the extension of Delancey Street as a thoroughfare from the Williamsburg Bridge to Broadway and the widening and extension of Christopher Street

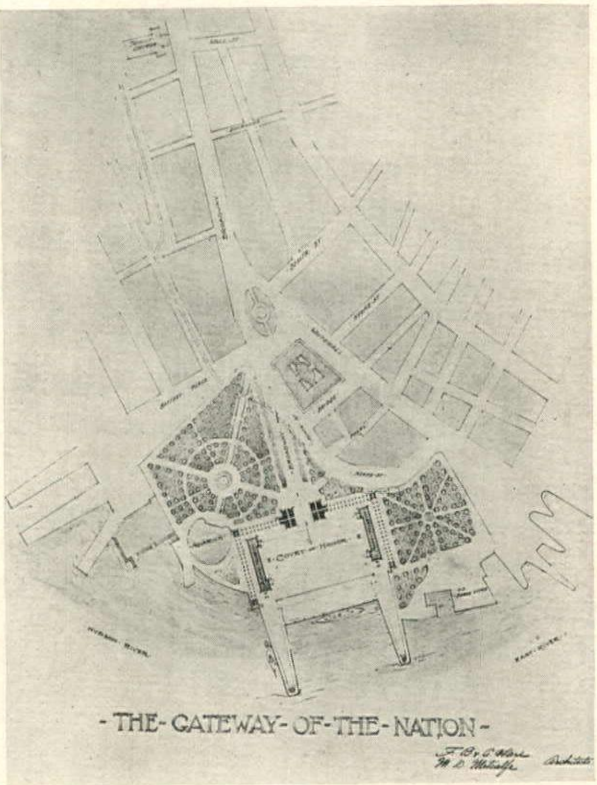


Fig. 11

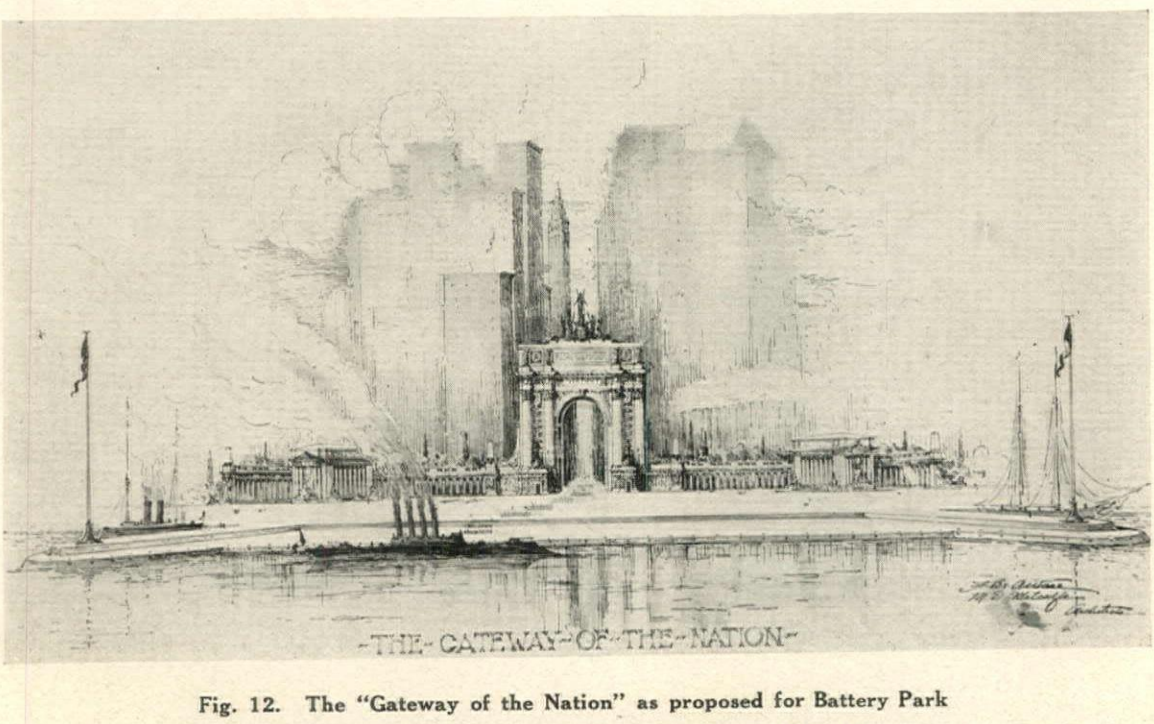


Fig. 12. The "Gateway of the Nation" as proposed for Battery Park

Designed by F. B. and A. Ware and M. D. Metcalf

to Fifth Avenue seem to have been forgotten, despite the intolerable congestion of cross town traffic throughout this section of the city.

The Plan of New York and its Environs reaffirms the need of arteries in lower New York. No. 12, Figure 1, proposes an extension of Irving Place to Fourth Avenue and Twelfth Street and among several other interesting schemes, important elevated driveways for vehicular traffic, one a waterfront elevated roadway, another an elevated driveway on Fourth Avenue extending South to Union Square, an elevated driveway on Chrystie Street (widened) and Second Avenue from the Manhattan Bridge to Twenty-third Street and one on Canal Street from the Manhattan Bridge to the proposed waterfront elevated driveway on West Street.

These suggestions of the Plan of New York and its Environs are only a small part of its activities. As its name implies, it looks forward eventually to the formulation of a comprehensive plan for the future New York, embracing all the surrounding territory in Westchester, Long Island, Staten Island and New Jersey. Witness of this is found in the listing of the Hudson River Bridges at Fifty-seventh Street (often called the Lindenthal Bridge; large drawings of this were hung in another part of the Exhibition), the Fort Washington Park Bridge, the Tri-Borough Bridge, the Hudson Memorial Bridge and the East River Bridge from Eighth Street Manhattan to Brooklyn, as well as a driveway to Yonkers and North and one at Fort Lee on the west side of the Hudson.

The different elements of this interesting exhibition are too numerous to review in detail though all were worthy of careful study. Battery Park is a natural point of approach from Europe to America. The Gateway of the Nation (Figures 11 and 12) by F. B. and A. Ware and M. D. Metcalf is a meritorious solution of this important problem. The Robert Fulton Watergate Association's first prize by H. Van Buren Magonigle was exhibited as a claim for a somewhat similar idea at One Hundred and Tenth Street and Riverside Drive. Farther on one found the much discussed and very interesting proposed Memorial in Central Park designed by Thomas Hastings for the Reservoir Site, a *première* this, as it had never been shown before. (See page 22.) The connecting avenue between the Grand Central and Pennsylvania Stations that would have proved such a boon, was loaned by Henry Rutgers Marshall. The Inspiration Point and Upper Riverside Drive developments by Frederick Law Olmsted and Arnold W. Brunner were also on view. The Port of Newark plans, Telewana Park, the Municipal Art Society Competitions, the Brooklyn Plaza Embellishment, the Recreation Pier for the foot of Ocean Parkway, Brooklyn, designed by Dodge and Morrison (Figure 13), Sundry War Memorials, one on the program of the Beaux-Arts Society, all could be found, studied and compared in their respective merits. Hugh Ferriss' instructive and suggestive drawings to illustrate the effects and possibilities of the zoning law restrictions occupied a deservedly important section of wall space. One of the most amusing drawings was a cartoon from the New York *Times* in which were grouped and located all the schemes for buildings and memorials that had been advanced for the occupancy of Central Park. It showed a beetling city, with no vestige of the park remaining.

It would be encouraging to think that New York is awakening to a consciousness of its defects even though that consciousness be dim and vague. But the New York and Brooklyn Chapters are parts of the great city as well as of the *Institute* and the exhibition was at least evidence that some of New York's citizens desire a better city. The

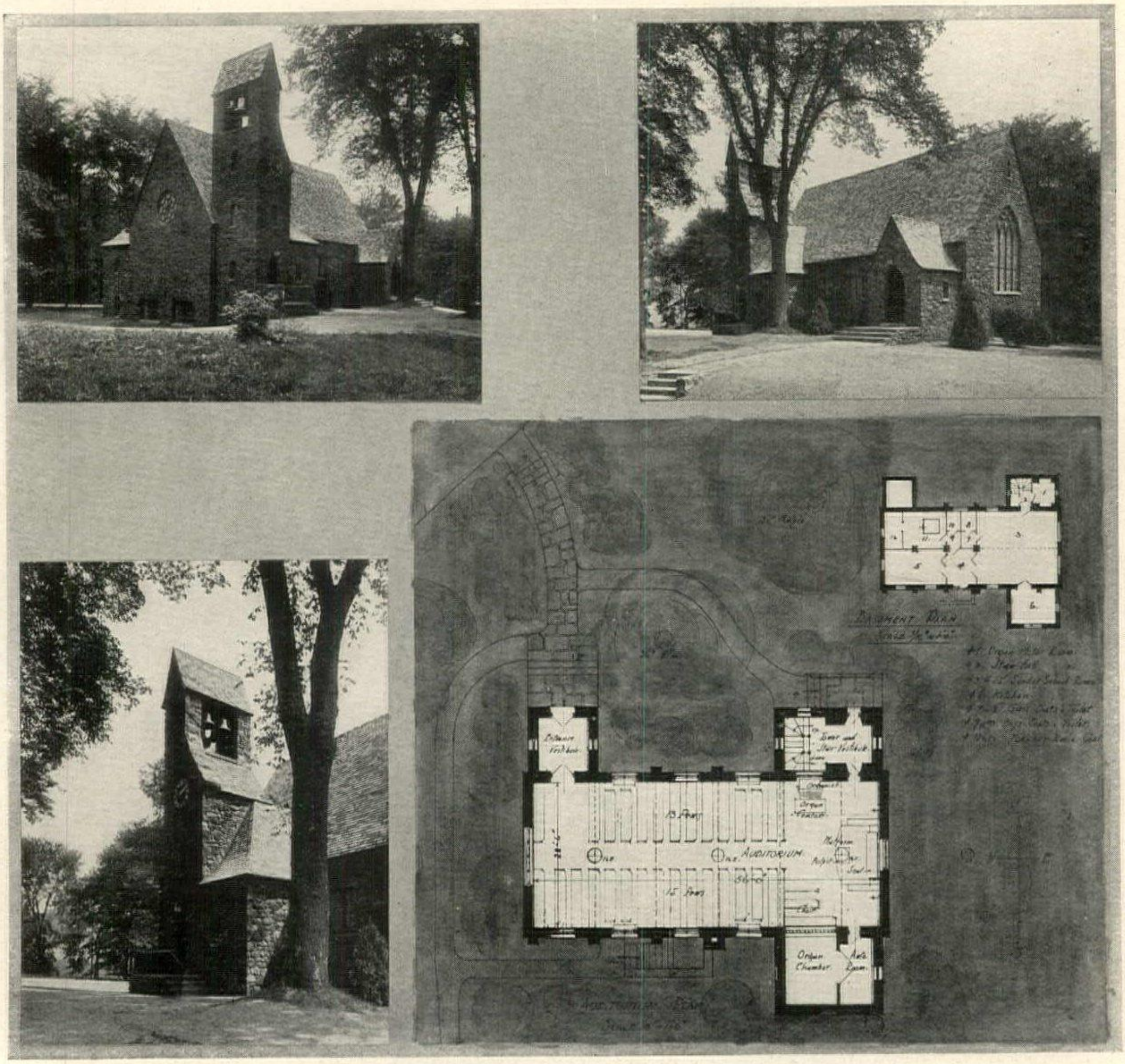
Fig. 13. Recreation pier for the foot of Ocean Parkway, Brooklyn

Designed by Dodge & Morrison, Architects

measles are catching; perhaps the exhibition may be. In any event it was well visited and by the average citizen more than by those that consider themselves competent in art and architecture. That was a compliment to the exhibition.

Furthermore, though there may have been imperfection in some of the schemes proposed, there was an undercurrent of sane and constructive planning. Many of the designs were well devised from the practical point of view. Traffic problems were solved in a way to relieve much of the congestion that now costs the city millions of dollars each year. The greater number of the architectural compositions were ably conceived. Some of them were masterly and if translated into steel and stone would become beautiful monuments worthy of any city.

As a first step toward the development of a comprehensive plan and as a valuable move in an educational program the exhibition was a notable success. It argues well for final achievement not only of a design on paper that shall possess proved excellence but for the embodiment of that plan in a new city that shall take its merited place among the great and beautiful capitals of the commerce of the world.

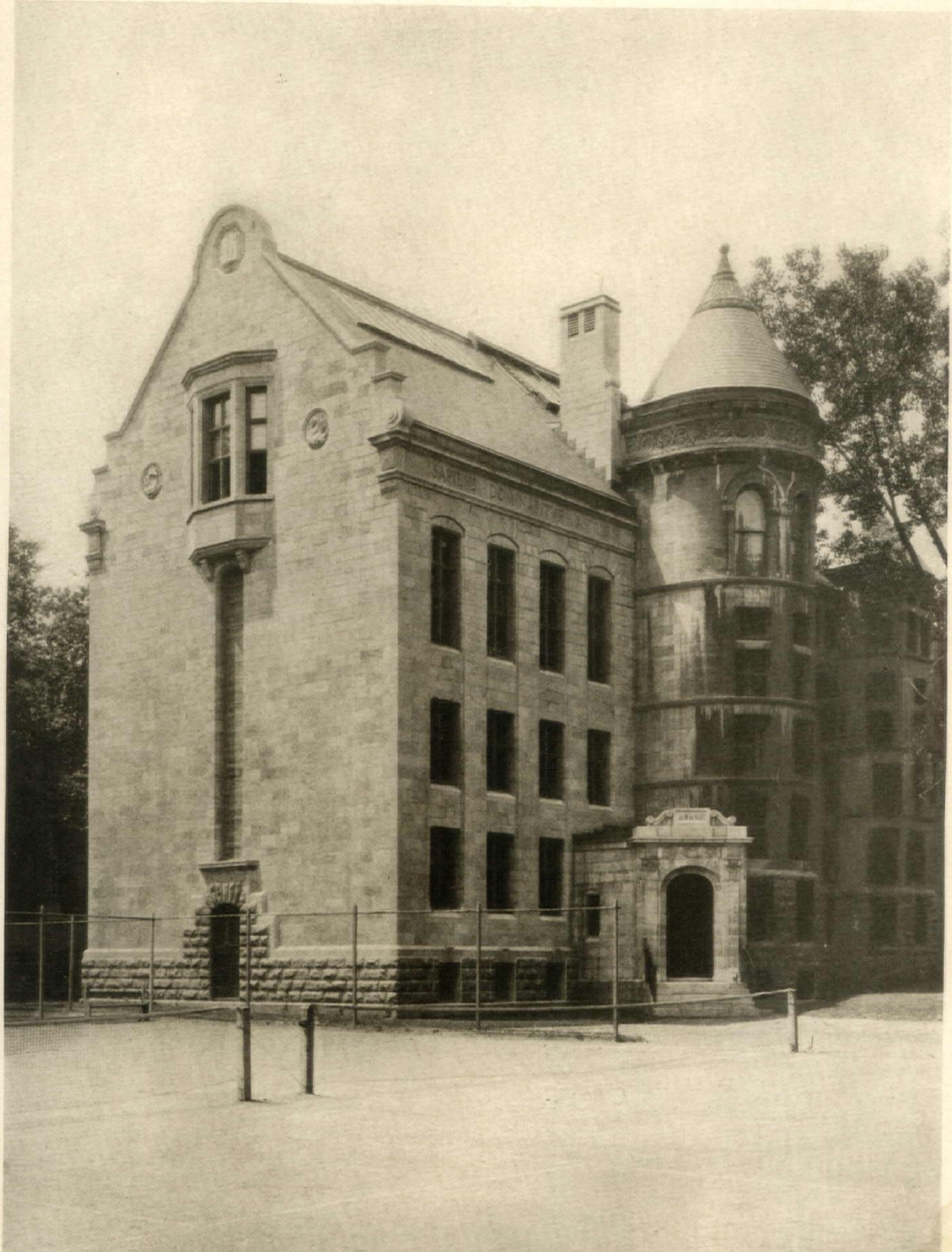


Village Church, Pocantico Hills, N. Y.

L. W. Eisinger, Architect

UNIVERSITY CLUB, MONTREAL

NOBBS & HYDE, ARCHITECTS



NEW WING, McGILL UNIVERSITY LIBRARY, MONTREAL

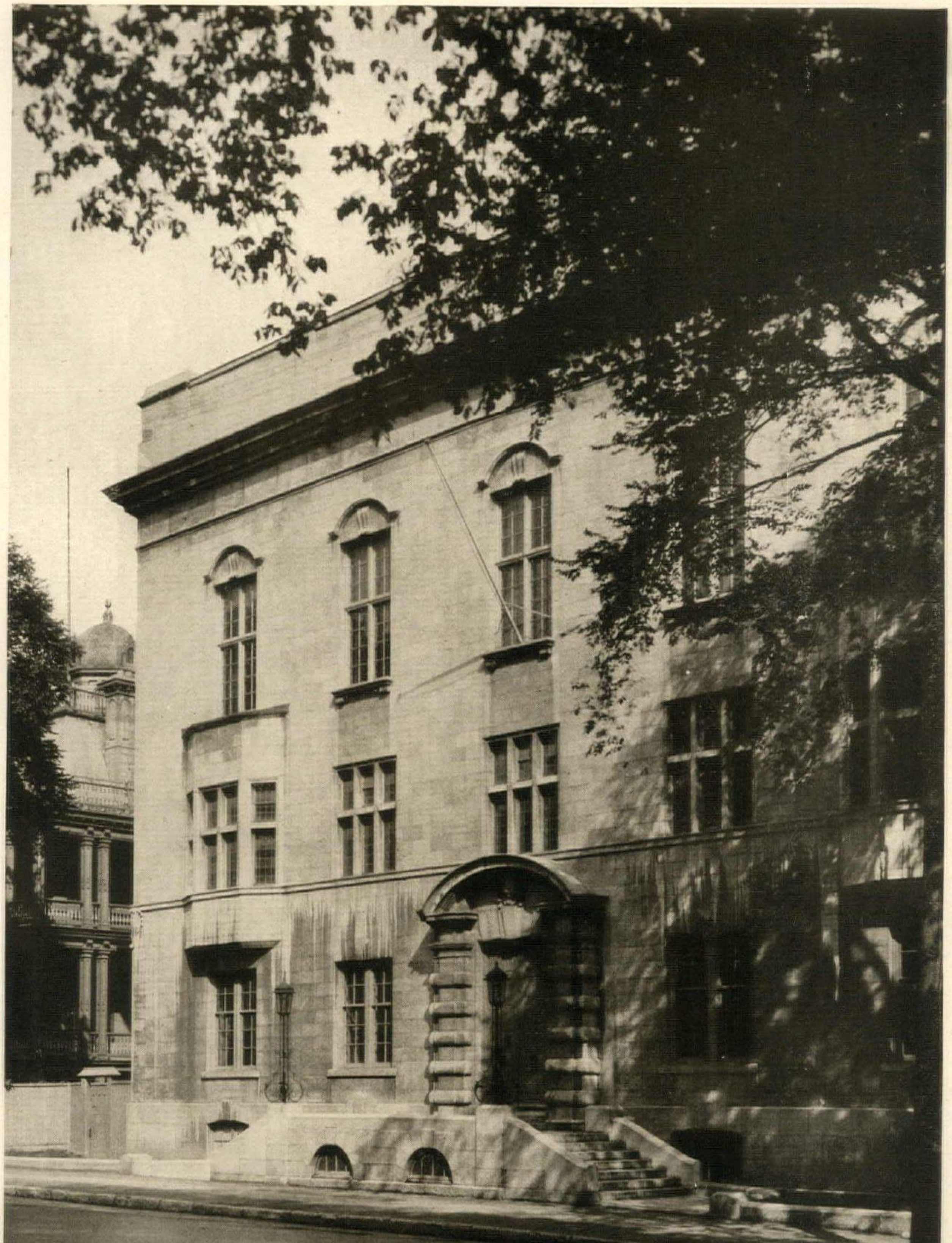
NOBBS & HYDE, ARCHITECTS

THE NEW BIRKS BUILDING, MONTREAL

NOBBS & HYDE, ARCHITECTS

LIVERPOOL AND LONDON AND GLOBE BUILDING, MONTREAL

NOBBS & HYDE AND J. RAWSON GARDINER, ASSOCIATE ARCHITECTS

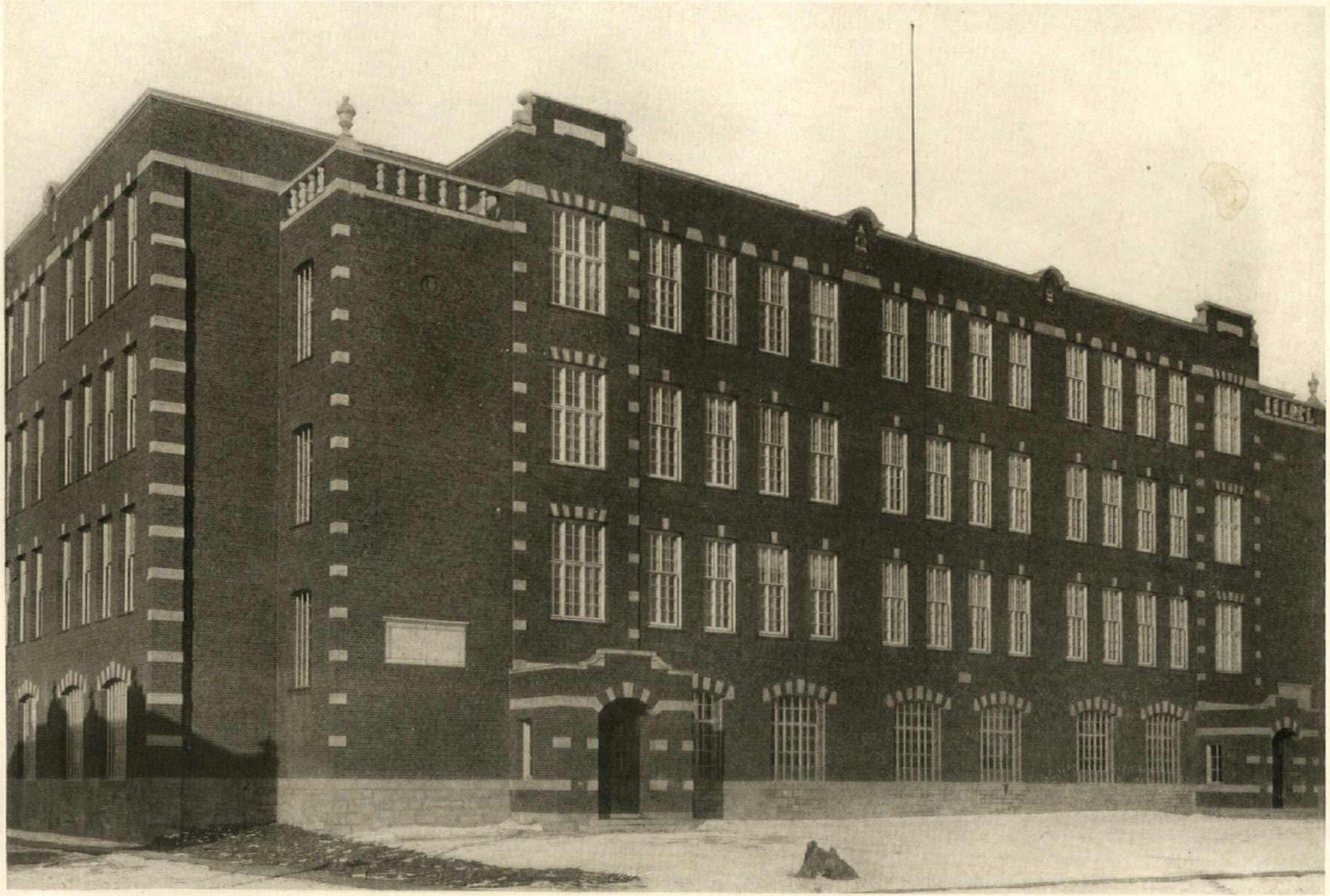


McGILL UNIVERSITY UNION, SHERBROOKE STREET, MONTREAL

DESIGNED BY P. E. NOBBS, EXECUTED BY HUTCHISON & WOOD

LOUNGING ROOM, McGILL UNIVERSITY UNION, MONTREAL

DESIGNED BY P. E. NOBBS, EXECUTED BY HUTCHISON & WOOD

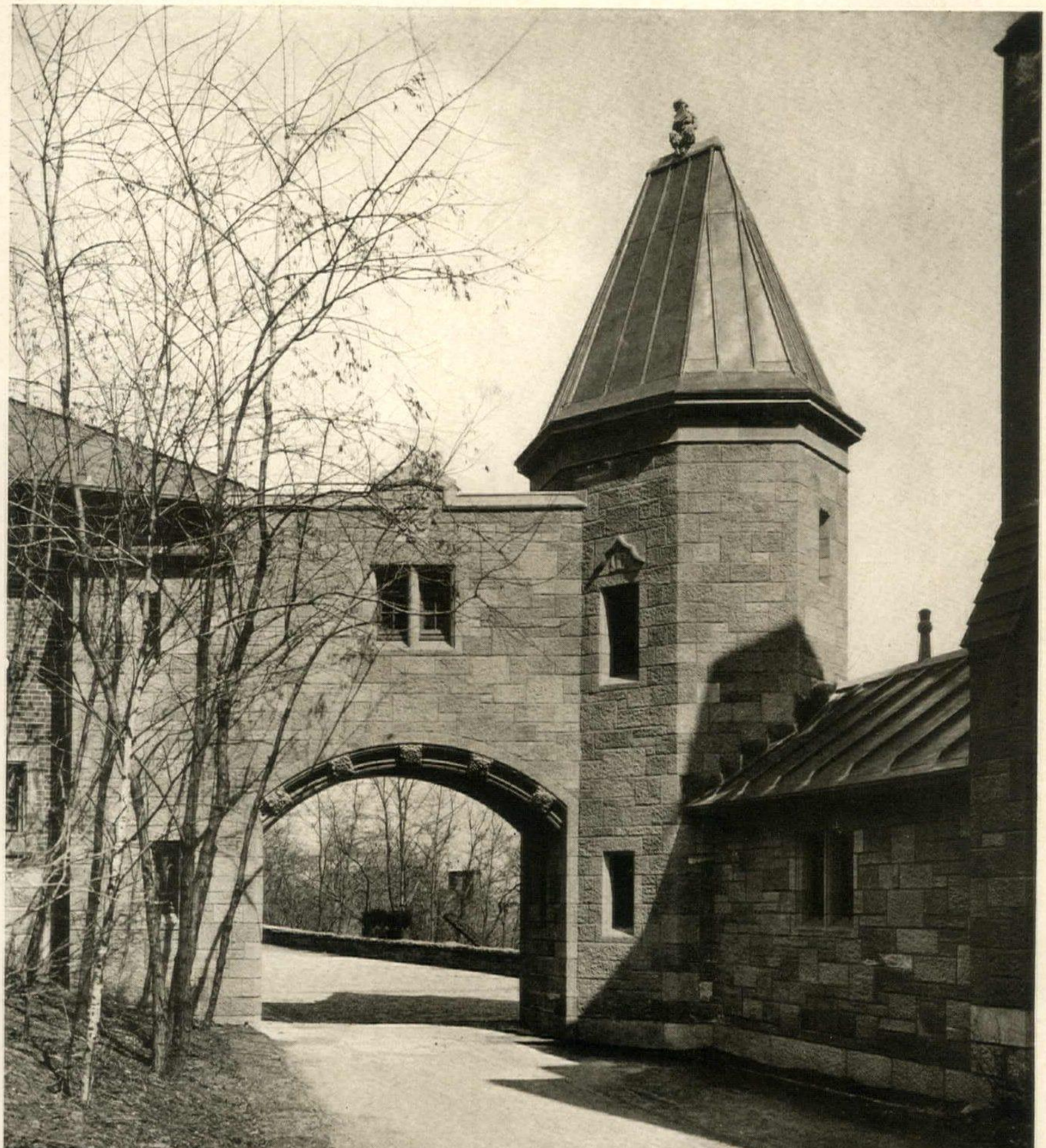


PEACE CENTENNIAL SCHOOL, MONTREAL

NOBBS & HYDE, ARCHITECTS

ST. JAMES' CHURCH, THREE RIVERS, QUEBEC

RESTORATION AND INTERIOR FITTINGS BY NOBBS & HYDE, ARCHITECTS



CONNECTION BETWEEN HOUSE AND GARAGE, WESTMOUNT, QUEBEC

NOBBS & HYDE, ARCHITECTS

BOILER WORKS, QUEENSFERRY, FLINT, ENGLAND

H. BULKELEY CRESWELL, F. R. I. B. A., ARCHITECT

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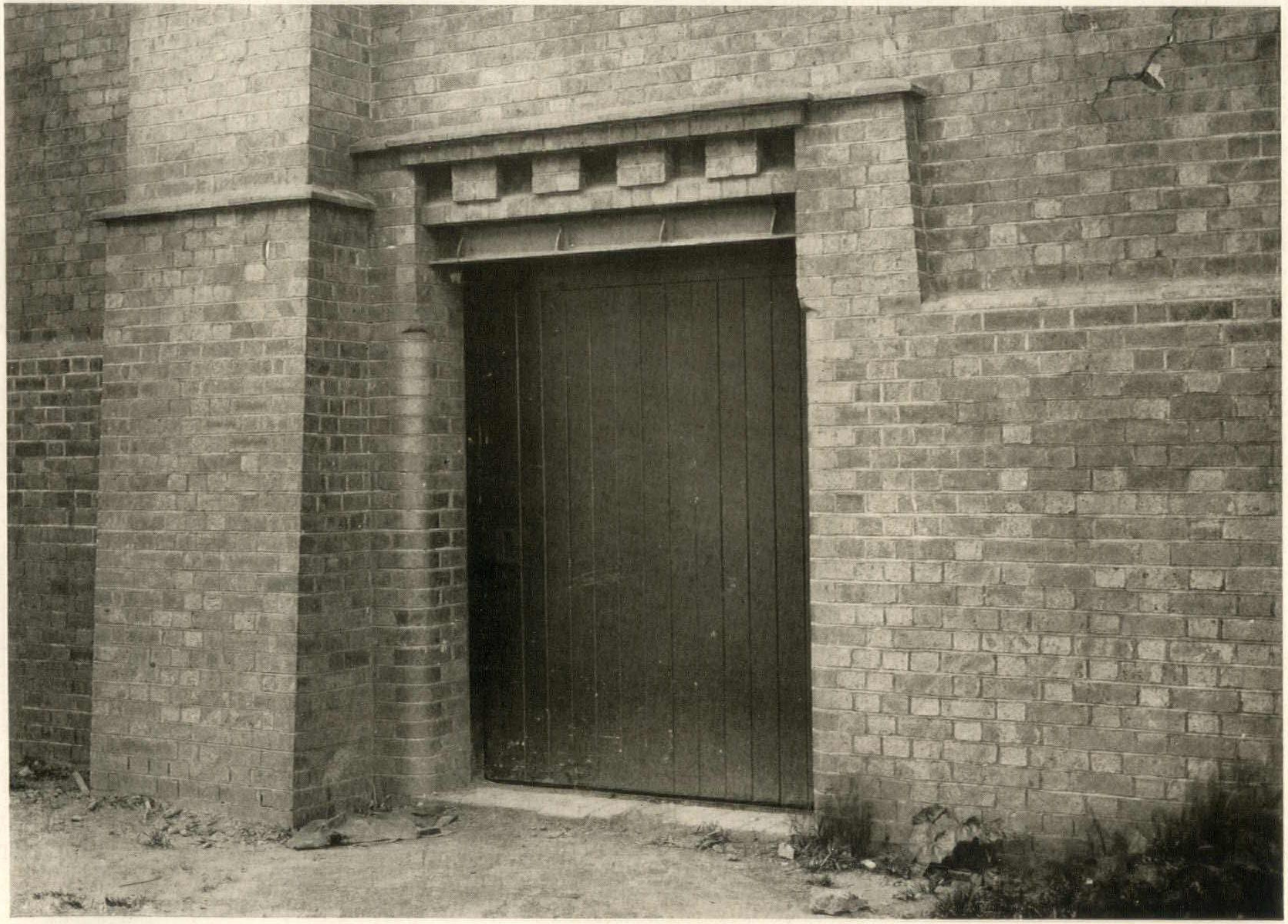
VOL. CXXIV, NO. 2423 JULY 4, 1923

BOILER WORKS, QUEENSFERRY, FLINT, ENGLAND

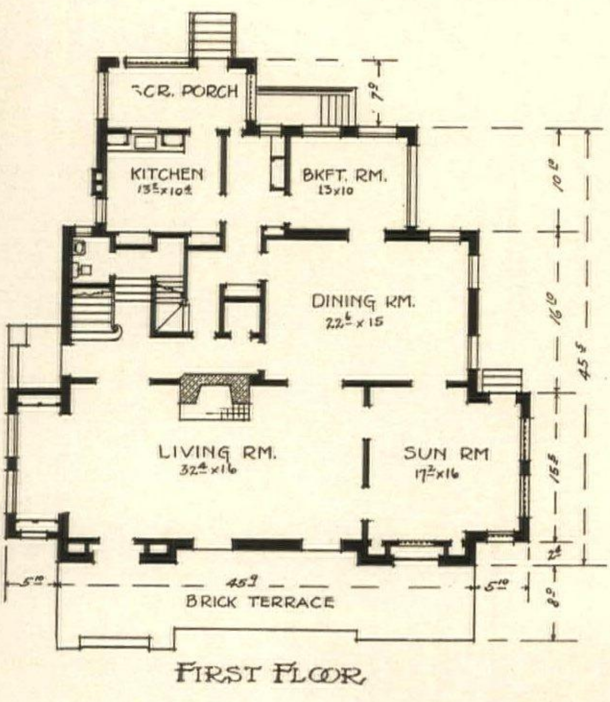
H. BULKELEY CRESWELL, F. R. I. B. A., ARCHITECT



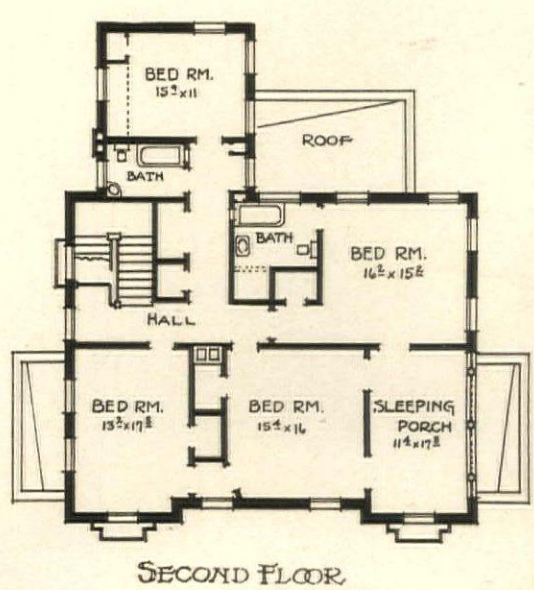
DETAIL OF DOORWAY

BOILER WORKS, QUEENSFERRY, FLINT, ENGLAND

H. BULKELEY CRESWELL, F. R. I. B. A., ARCHITECT



FIRST FLOOR



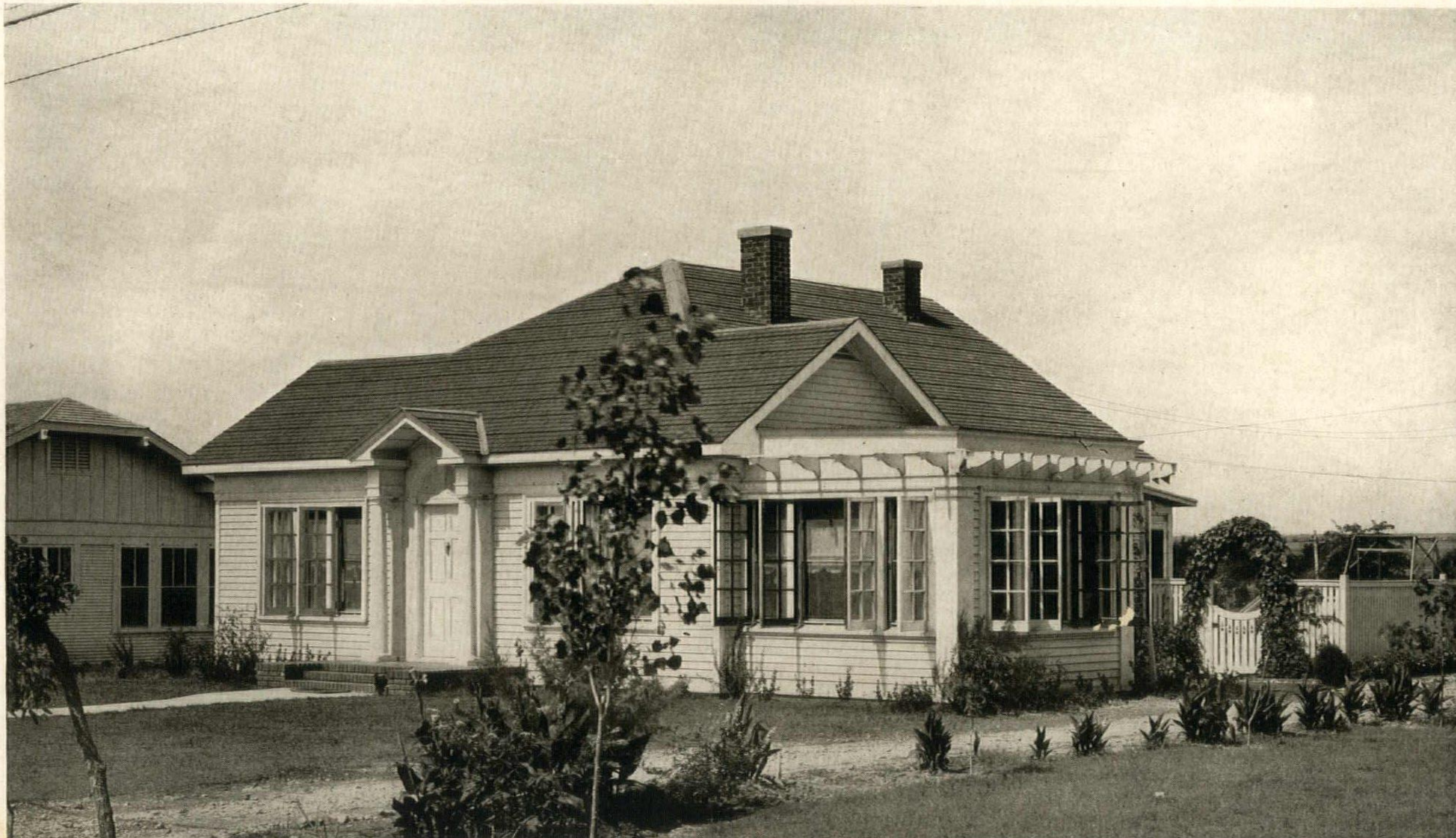
SECOND FLOOR

HOUSE OF DR. G. P. ROBERTSON, SAN ANTONIO, TEXAS

ATLEE B. AYRES AND ROBERT M. AYRES, ARCHITECTS

HOUSE OF DR. G. P. ROBERTSON, SAN ANTONIO, TEXAS

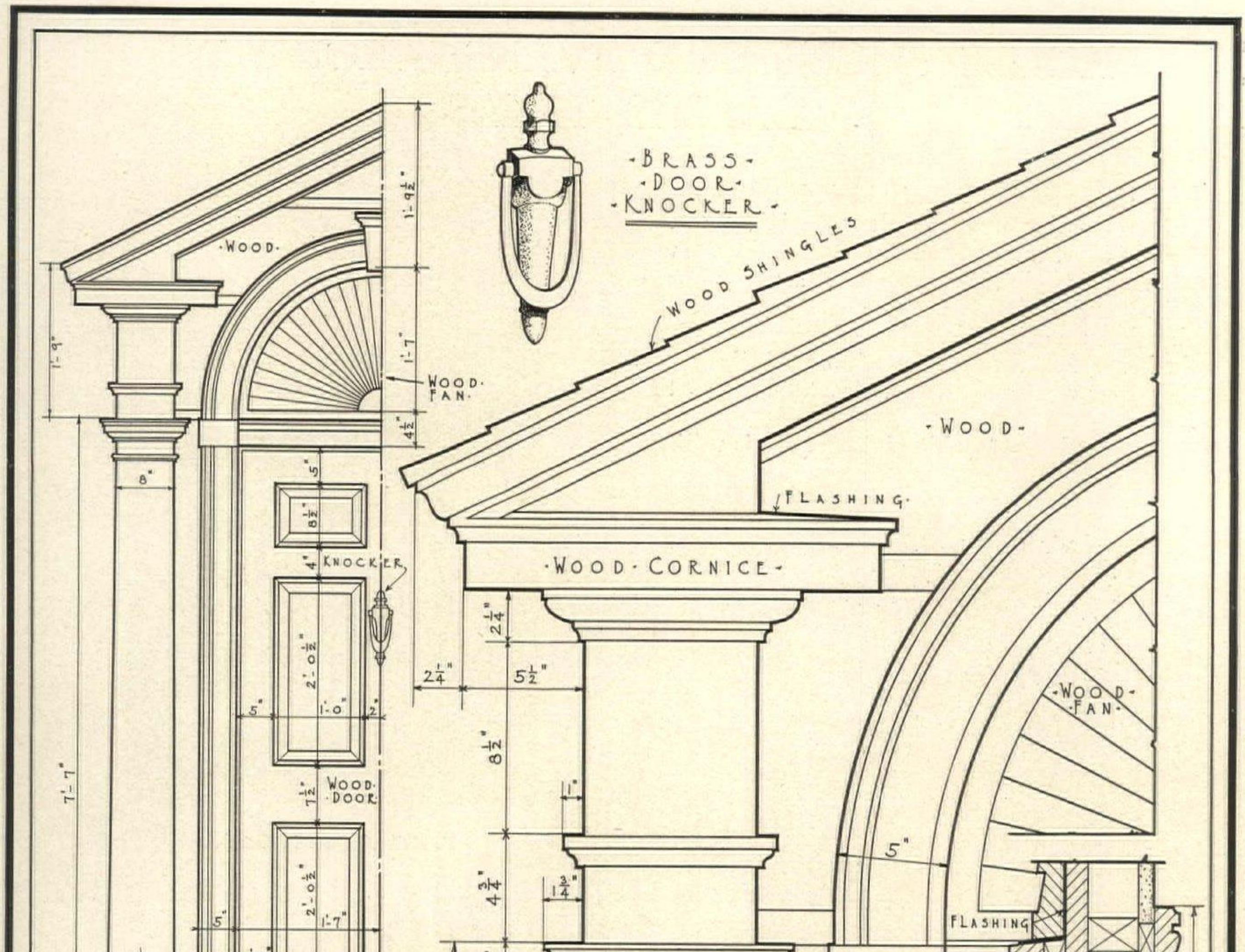
ATLEE B. AYRES AND ROBERT M. AYRES, ARCHITECTS



HOUSE OF CLIFFORD EVANS, ARCHITECT, DALLAS, TEXAS

MAIN ENTRANCE

HOUSE OF CLIFFORD EVANS, ARCHITECT, DALLAS, TEXAS



DETAILS OF MAIN ENTRANCE

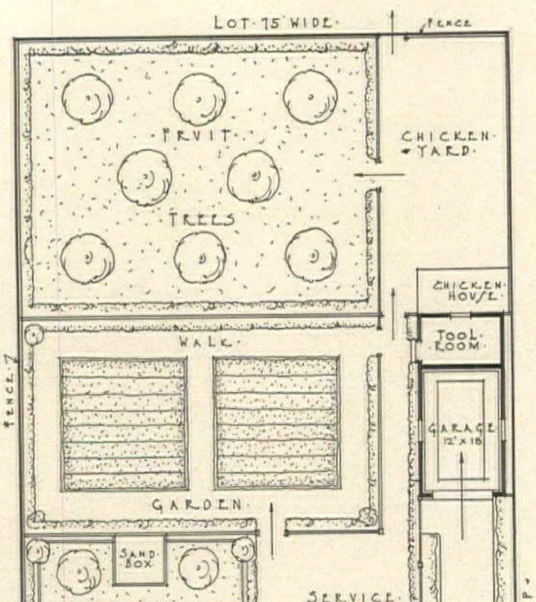
HOUSE OF CLIFFORD EVANS, ARCHITECT, DALLAS, TEXAS

HOUSE *of* CLIFFORD EVANS, ARCHITECT, DALLAS, TEXAS

THE pleasing and dignified character of the exterior of this small house is due to the effect the designer has obtained by the use of casement windows throughout, a well proportioned and detailed entrance doorway, and the glazed sun porch, which gives additional length to the house, also the doubling of roof shingles every fifth course, accentuating horizontal lines to the roof.

In this plan, every bit of floor space is utilized

Detail of Gate in Garden



Plot Plan

so as to save space and building cost. The convenient arrangement of rooms, the many closets, tiled bath and built-in tub, and other modern conveniences, have been thoroughly studied.

The exterior walls are covered with cypress siding, painted white and the wood roof shingles stained a deep moss green. The entrance doorway and all exterior trim and windows are of white pine.

The living room woodwork is of a soft silver gray finish and the mantel is of rough texture grayish brown brick with Rookwood tile inserts and hearth. The sun porch and dining room woodwork is finished to match living room. The balance of the woodwork throughout the house is finished a light cream ivory enamel, with birch mahogany doors.

The general description of the construction is as follows: Exterior foundation walls, reinforced concrete with frame walls above, covered with storm sheathing, building paper and cypress siding. Interior walls frame plaster finish. Double floors, finished floors edgegrain pine. Tiled bath and built-in tub. Weatherstrips to all windows and doors. Metal Twin Vertical Sliding screens to all windows.

This house cost $7,000 in 1921, exclusive of lot, fences, drive, sidewalk, garage and planting, and contains 1,400 square feet of floor area.

BEAUX-ARTS INSTITUTE *of* DESIGN

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Special Notice to Students

BY special arrangement with the Society of Beaux-Arts Architects, there appears in each issue of THE AMERICAN ARCHITECT *an average of five pages devoted to the presentation of drawings selected from the Beaux-Arts Institute of Design exhibitions, and also the listing of awards and the promulgation of all notices to students. These matters will be exclusively presented to students of the Beaux-Arts Institute of Design through the pages of* THE AMERICAN ARCHITECT. *By arrangement with the publishers of* THE AMERICAN ARCHITECT, *a special student subscription rate of* $5.00 *per annum has been secured. Further particulars with reference to this service to Beaux-Arts students may be obtained by addressing* THE AMERICAN ARCHITECT, 243 *West 39th Street, New York City.*

JUDGMENT OF APRIL 24, 1923

CLASS "B"—IV ANALYTIQUE

"AN ENTRANCE TO A MUSEUM"

In a great seaport a Marine Museum has its principal elevation on a water front boulevard. The main entrance, which leads through a vestibule into an impressive central hall is in the center of this elevation.

This entrance may be a single door or a group of three; it shall be preceded by a covered porch or portico. This is at a level of 5 feet above the boulevard and a broad flight of steps leads up to it. The total width of the motive shall not exceed 75′-0″.

JUDGMENT OF APRIL 10, 1923

CLASS "A" AND "B" ARCHÆOLOGY—IV PROJET

"AN ITALIAN PALACE FAÇADE"

Reminiscent of the days of street violence were the high and massive basements of Italian palaces, pierced with grilled windows or with heavily rusticated arches which at times gave access through a vestibule to the central court. Above, the great windows of the principal story admitted light and air to the apartments of state, suites of magnificent rooms used for receptions and formal entertainments. Over the principal story were additional floors, used for the less important rooms of the palace.

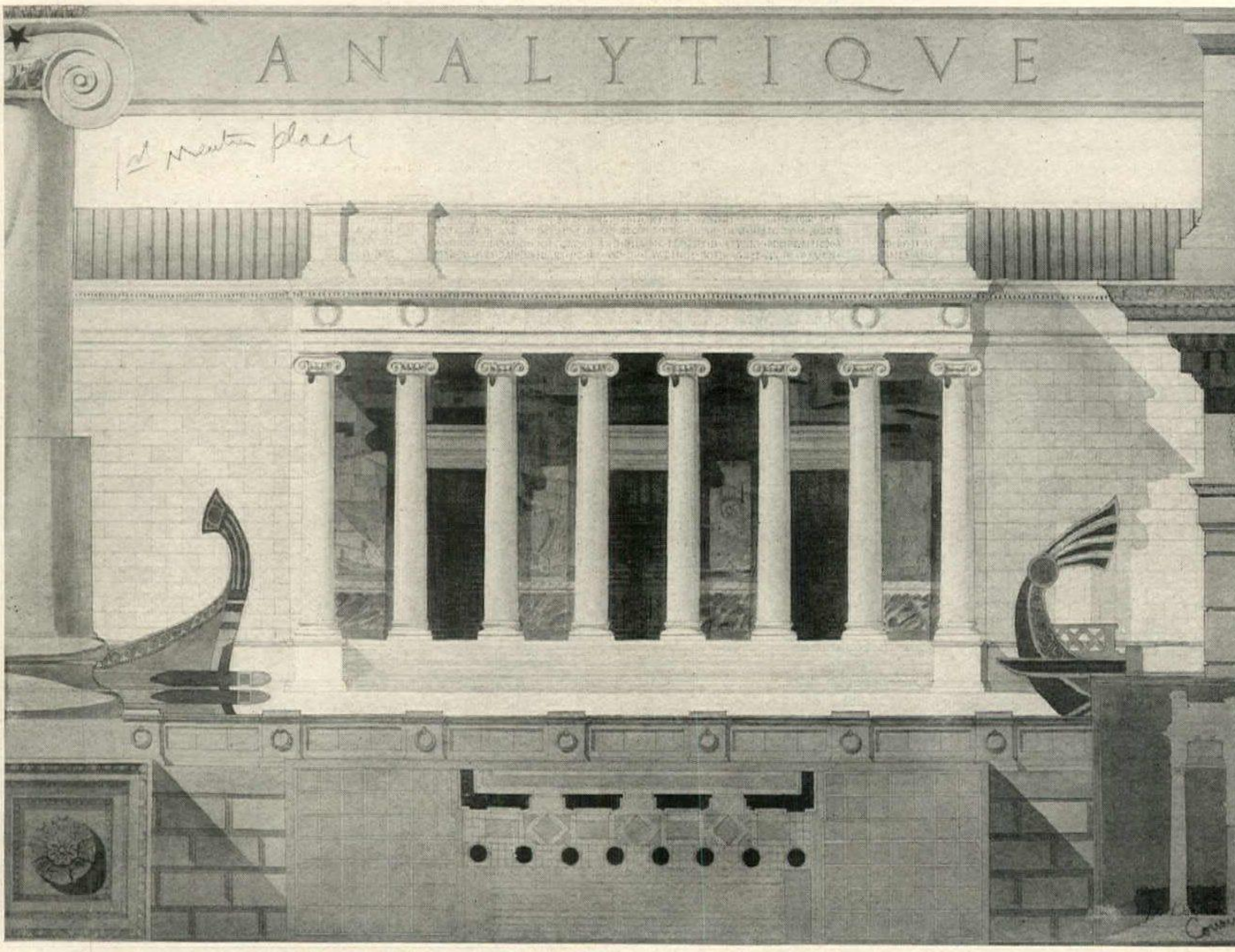
The architectural quality of these palaces was at once extremely dignified and restrained in the treatment of wall surfaces and yet it possessed a certain individual and sometimes fanciful character of detail which is always to be found in transitional periods such as the Italian Renaissance.

In the elevations of these buildings the great masters expressed the interior arrangement of the plan and embellished their compositions with architectural details which are known and recognized the world over.

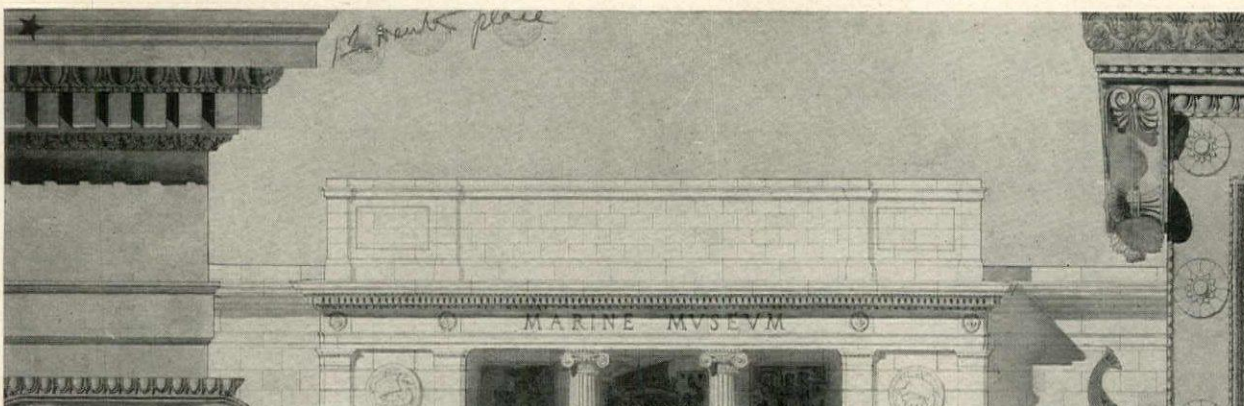
The elevation called for is that of a palace situated on an important square. There are three stories, including the basement or ground floor, but it may be assumed that a mezzanine floor or half story exists in a portion of the building between the basement and principal story. A door of monumental proportions in the center of the façade gives access to the court and the whole composition is crowned by a stately cornice. The length of the elevation on the square shall not exceed 150 feet.

Outhouse in a Garden at St. Anne's, Quebec

Nobbs & Hyde, Architects



B. BARBER — FIRST MENTION PLACED — COLUMBIA UNIVERSITY



P. OBNINSKY — FIRST MENTION PLACED — COLUMBIA UNIVERSITY

CLASS "B"-IV ANALYTIQUE—AN ENTRANCE TO A MUSEUM

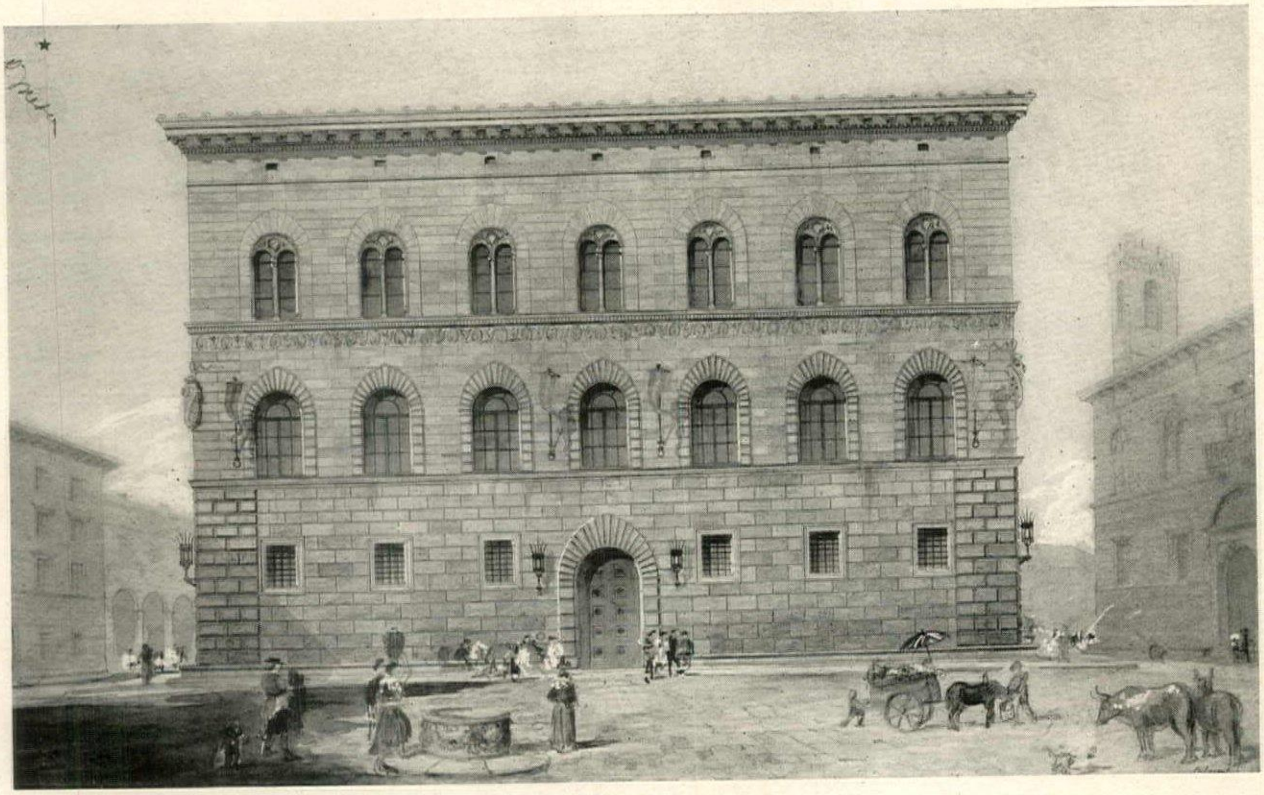
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

J. G. MEEM FIRST MENTION PLACED ATELIER DENVER

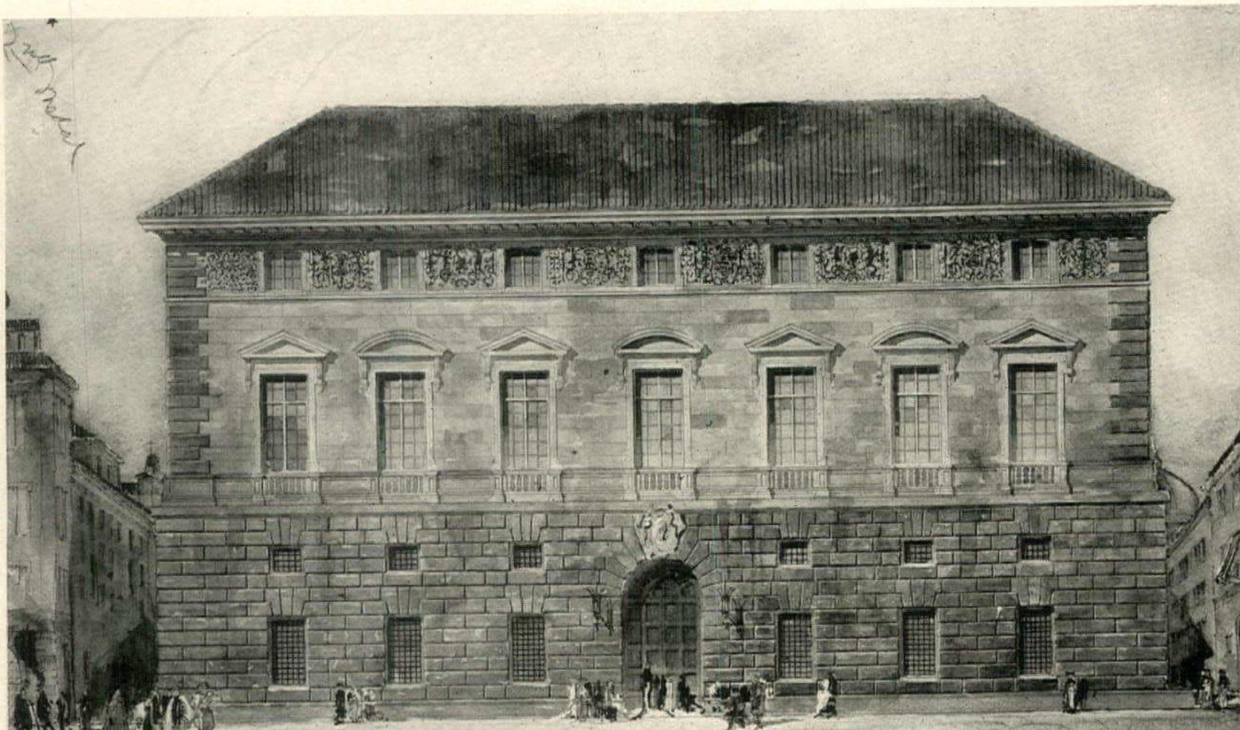
E. CACCHIONE FIRST MENTION PLACED "T" SQUARE CLUB

CLASS "B"-IV ANALYTIQUE—AN ENTRANCE TO A MUSEUM

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



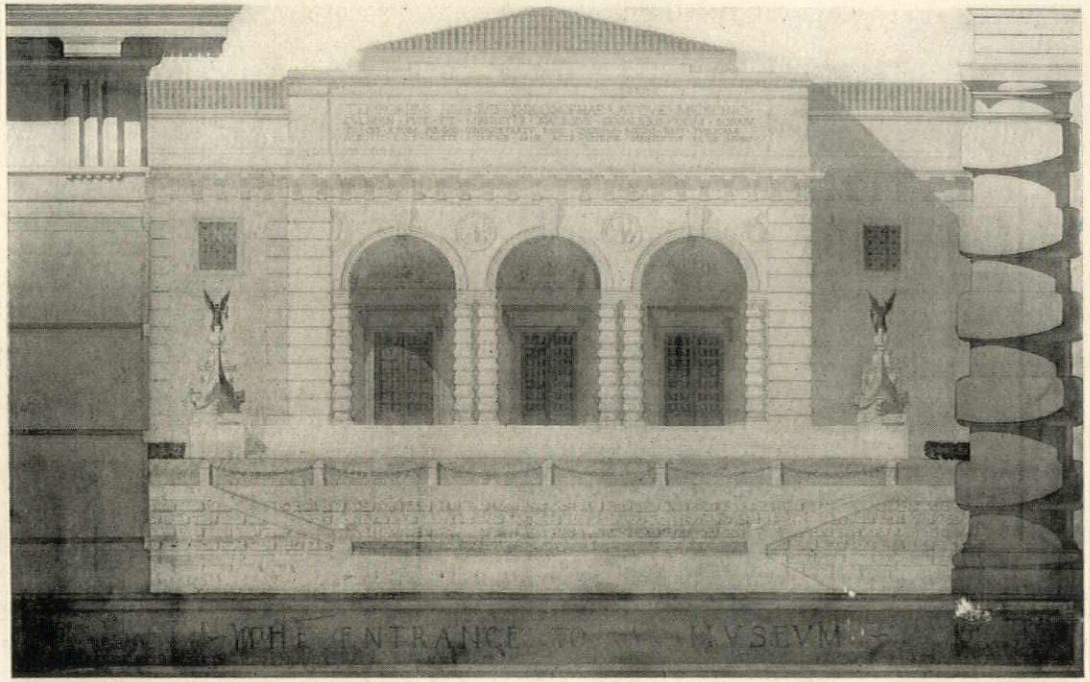
W. C. HILLS SECOND MEDAL COLUMBIA UNIVERSITY



S. R. MOORE SECOND MEDAL COLUMBIA UNIVERSITY

CLASS "A" AND "B" ARCHÆOLOGY-IV PROJET—AN ITALIAN PALACE FAÇADE

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



W. G. EICHLER   FIRST MENTION PLACED   ATELIER CORBETT-KOYL

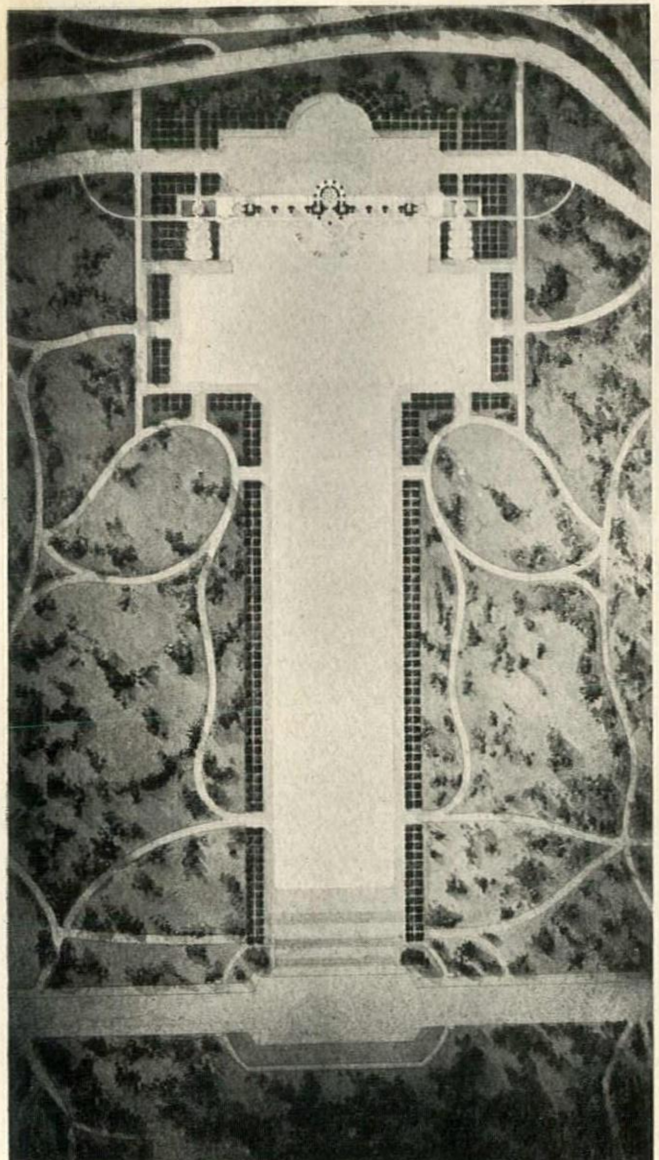
CLASS "B"-IV ANALYTIQUE—AN ENTRANCE TO A MUSEUM

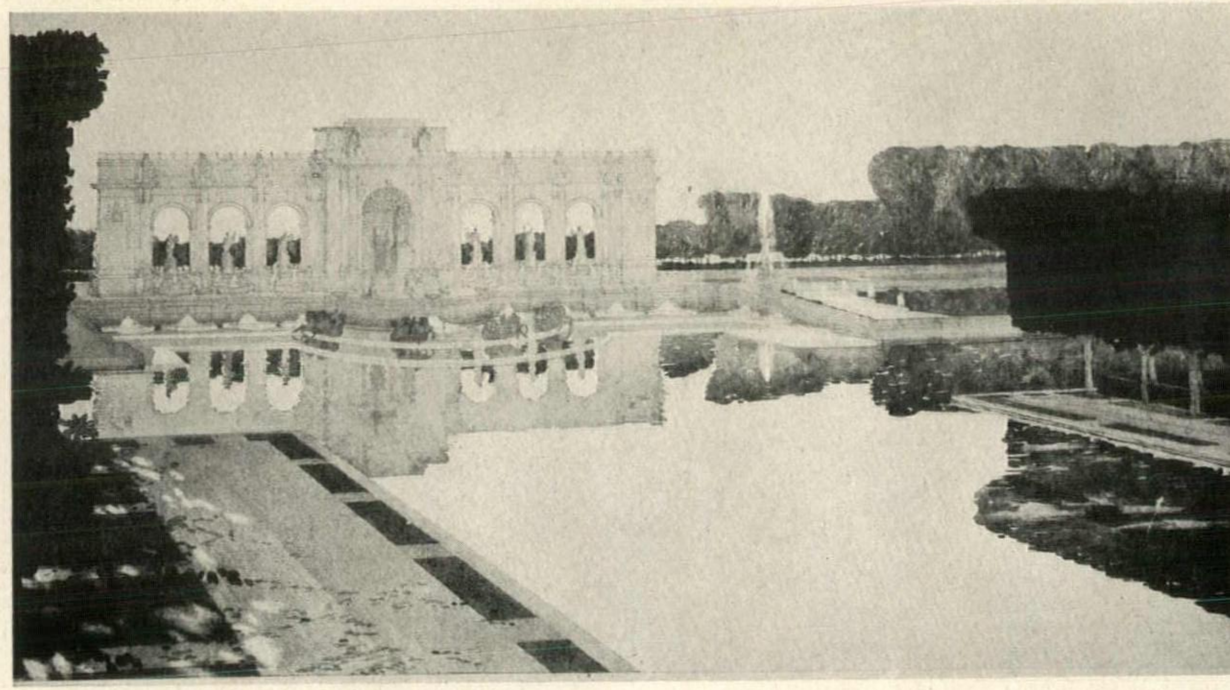
AT RIGHT

CLASS "A" AND "B" ARCHÆOLOGY-IV PROJET—AN ITALIAN PALACE FAÇADE

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

ALBERTA RAFFL   SECOND MEDAL   UNIV. OF ILLINOIS





PROPOSED MEMORIAL ON THE SITE OF THE RESERVOIR IN CENTRAL PARK

DESIGNED BY THOMAS HASTINGS, F. A. I. A.

(See article, page 7, on Municipal Exhibition in New York)

DEPARTMENT *of* ARCHITECTURAL ENGINEERING

TRANSMISSION *of* SOUND *by* MASONRY PARTITIONS

BY *PAUL E. SABINE, Riverbank Laboratories, Geneva, Ill.*

IN an earlier article†, the results of experiments on the transmission of sound by simple stiff structural units of wood, glass, and steel were given. The net result of that investigation was that the sound insulating merits of such units depend more upon the massiveness and stiffness of the structures as a whole than upon the physical properties of the materials employed. Thus a window of $\frac{3}{16}''$ glass of small leaded panes proved on the whole more effective in reducing sound than a single large pane of glass $\frac{1}{4}''$ thick. The experiments also showed that the reduction of intensity varied widely with variation in pitch, but that in general it was greater for high pitched than for low pitched sounds. In a later paper‡, the effect of materials of what was termed a "quilt-like" character, in reducing sound intensity was considered and the results of tests upon a number of such materials were given.

From those tests, it was possible to give a mathematical expression, involving two experimentally determined coefficients from which the reduction of sound by any thickness could be computed for materials in which the damping forces are great in comparison with the elastic forces. Further, it was shown that interposing layers of impervious material such as heavy building paper increased in a marked degree the effectiveness of porous felt-like materials in reducing the transmitted sound. Finally, it appeared that the reduction produced by different materials of this sort is in general in the order of their densities, the more dense materials producing the greater reduction.

The present paper deals with what may be called standard partitions and gives the result of an investigation extending over a period of some two years to determine the relative merits of the various types of masonry partitions commonly employed in modern fireproof buildings. These tests have been made upon an entirely *ex parte* basis. Manufacturers' associations interested in the various materials tested have very kindly supplied information as to standard practice in the use of their respective materials, and it is a pleasure to acknowledge this co-operation.

†*Transmission of Sound through Doors and Windows. The American Architect, July 28, 1920*
‡*Transmission of Sound through Flexible Materials. The American Architect, Sept. 28, and October 12, 1921*

The method of measurement was essentially that employed in the previous work and described in the earlier papers. The partition walls of uniform size 8′-2″ x 6′-2″ were built in a doorway between a large room 27′ x 19′ x 20′, the Sound Chamber in which the sound was produced, and a smaller room, the Test Chamber 10′-6″ x 6′2″ x 11′-6″. These two rooms are built upon separate foundations and have no structural connection. Due to the low absorbing power of the Sound Chamber, the sound from the organ pipe sources persists for a considerable time after the pipe has ceased, a matter of some 16 seconds for the lower tones and 6 seconds for the highest tone. By a careful determination of the difference of times which this residual sound can be heard on opposite sides of the test wall, and from the rate of decrease of intensity known from a careful preliminary study of the Sound Chamber, the ratio of the intensities in the two rooms with the test partition intervening can be easily computed. This ratio has been called the Reduction Factor, for the partition, and is a measure of its sound insulating properties. The experiments show that, for a given partition, this Reduction Factor varies widely with the pitch of the sound, so that a complete story can be told only as a result of tests with a large number of tones covering the whole musical scale. In presenting the results graphically, the logarithm of the Reduction Factor rather than that quantity itself will be employed. This mode of representation gives a truer notion of the phenomena as recorded in terms of loudness sensation, since the latter is roughly proportional to the logarithm of the physical intensity of the sound. On the logarithmic scale, zero represents a barely audible sound, 6, a sound of moderate intensity such as that from a violin or a violoncello in an empty room of moderate size, and 12, a sound so loud as to be painful. Thus for a complete audible extinction of a moderately loud sound, a logarithmic reduction of 6, which means a reduction in the physical intensity in the ratio of 1,000,000 to 1 is required.

Since the reader of the present paper will be more interested in the final results than in the experimental details, the latter may well be omitted. In the earlier investigations the tests were confined to six or seven tones at octave intervals ranging in pitch from 64 to 4096 vibrations per second. In most of the later work, the number of tones was increased to twenty-three. In most cases the partitions were built a stage at a time and the measurement of the sound reduction produced at each stage was made, each measurement requiring some 1800 separate observations. In this way, knowledge of the relative influence of the separate constituents of the finished partition could be obtained. Careful tests were made to determine the effect of acoustical conditions in the receiving Test Chamber upon the observed intensity. While this effect was not and indeed cannot be wholly eliminated, yet it is quantitatively known and the results given are for constant conditions as between the various types of partitions tested, so that it is believed that they represent the relative merits of these partitions in reducing the passage of sound between adjoining rooms.

Detailed Results for Plaster Walls

The partitions tested were of three types, namely gypsum block, both solid and hollow, hollow clay tile, and solid plaster on metal lath. The plaster applied to these bases in each case was unfibered gypsum plaster mixed in equal parts with clean sand. This was applied to an equal and uniform thickness on the various bases.

The results for the plaster on metal lath partition will be given somewhat in detail as

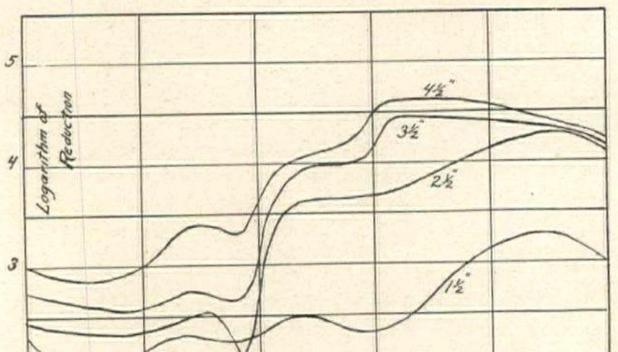


Fig. 1. Reduction of sound transmitted by plaster on metal lath partitions of different thicknesses

typical of the whole general procedure. They are instructive as showing the effect of thickness upon the reduction of transmitted sound by what may be considered as practically homogeneous masonry. The specifications for the metal lath base called for ¾″ channel irons set on 12″ centers and expanded metal lath weighing 3.1 pounds to the square yard attached by tie wire. The plaster was applied to equal thickness on the two sides, first to a total thickness of 1½″. Reduction measurements were made on this wall the results of which are shown in the lowest curve of Figure 1. An additional inch of plaster was added, and measurements were again made. The reductions produced by thicknesses up to 4½″ are shown in Figure 1. One notes that there is a gradual transition in the curves from the form for the thin wall to that for the thickest, indicating that the influence of the metal lath base plays a less and less important part in the transmission of

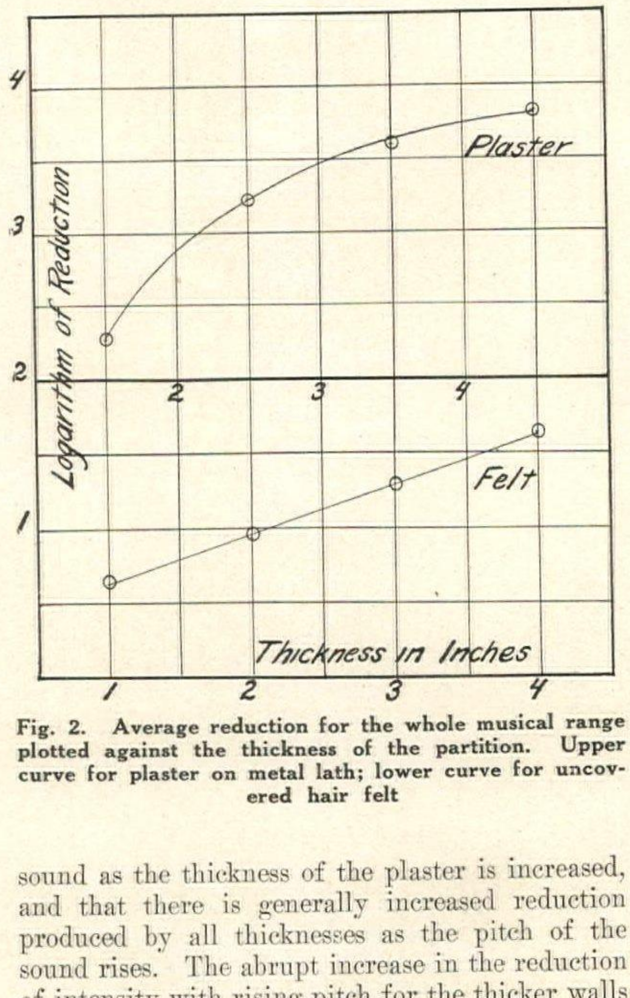


Fig. 2. Average reduction for the whole musical range plotted against the thickness of the partition. Upper curve for plaster on metal lath; lower curve for uncovered hair felt

sound as the thickness of the plaster is increased, and that there is generally increased reduction produced by all thicknesses as the pitch of the sound rises. The abrupt increase in the reduction of intensity with rising pitch for the thicker walls in the neighborhood of the tone C_4 is also interesting as indicating a possible difference in the mechanics of transmission of sound above and below this pitch. In practically all the walls tested this same phenomenon was noted. The anomalous case for the tone just below C_4 in which the reduction produced by the 2½″ wall is actually less than that due to the 1½″ wall emphasizes the fact already pointed out that comparative tests using a single tone may lead to erroneous conclusions as to the general sound insulating merits of different constructions. Control experiments were performed to determine whether the abnormally small reduction for this particular tone might be due to resonance of the Test Chamber.

A small portion of the latter was walled off by means of heavily felted panels, giving a small receiving chamber with high absorbing power. This change was without effect so far as this particular tone was concerned.

The question of the effect of the dimension of the test wall upon the reduction of intensity was also investigated by building a similar wall $2\frac{1}{2}''$ thick in an opening $3' \times 8'$. The results showed that on the whole the wall of smaller dimensions

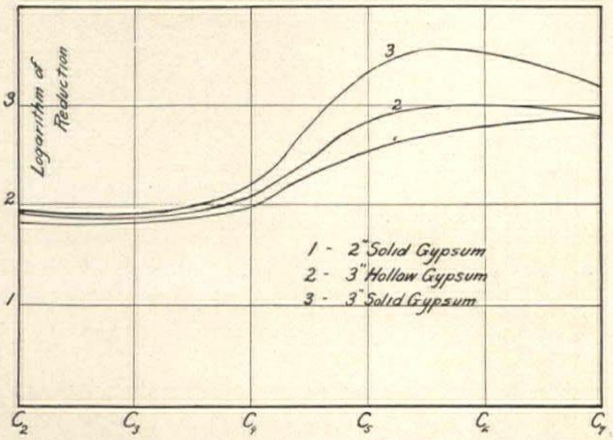


Fig. 3. Reduction of sound transmitted by unplastered gypsum tile partitions

reduced the tones below C_4 appreciably more than did the larger wall of equal thickness, but that the results above this tone were not appreciably affected by the area tested. This result is quite in agreement with the theory set forth in earlier papers, that for low tones at least the energy is transmitted mainly by flexural vibrations of the structure as a whole or in large segments.

Attention is further called to the fact that equal increments of thickness do not produce equal increments in the logarithm of the reduction, that is the first added inch of plaster makes decidedly more difference than does the last. This is especially true for the highest tones. This general fact is most clearly shown by the upper curve of Figure 2, in which the average logarithmic reduction for all the tones is plotted against the total thickness of the wall. The straight line in the figure is similarly drawn from the data obtained in earlier experiments with hair felt. The latter indicates that in a porous material like felt the reduction of intensity in transmission is a true absorption process in which each unit of thickness absorbs the same fraction of the energy that enters it as does every other unit, and that any desired degree of sound insulation may be secured by employing a sufficient thickness of the material. The case with the plaster is obviously quite different, and the shape of the curve indicates that there is a limiting value beyond which increasing the thickness produces only a negligible decrease in the transmitted sound. As a matter of practical importance, it may be said that the difference between the $3\frac{1}{2}''$ and the $4\frac{1}{2}''$ walls would not be noted by the ear under ordinary conditions, so that it is safe to say that, practically considered, nothing is to be gained in the way of reduced transmission by building partitions of this character more than $3\frac{1}{2}''$ thick.

Walls with Tile Base

Hereafter, the graphical presentation of the results will be smooth curves. It should once more be emphasized that the experimental points especially in the two lower octaves *do not* lie upon smooth curves, the reduction in certain cases varying rather widely from tone to tone due to resonance in the walls themselves. The smooth curves

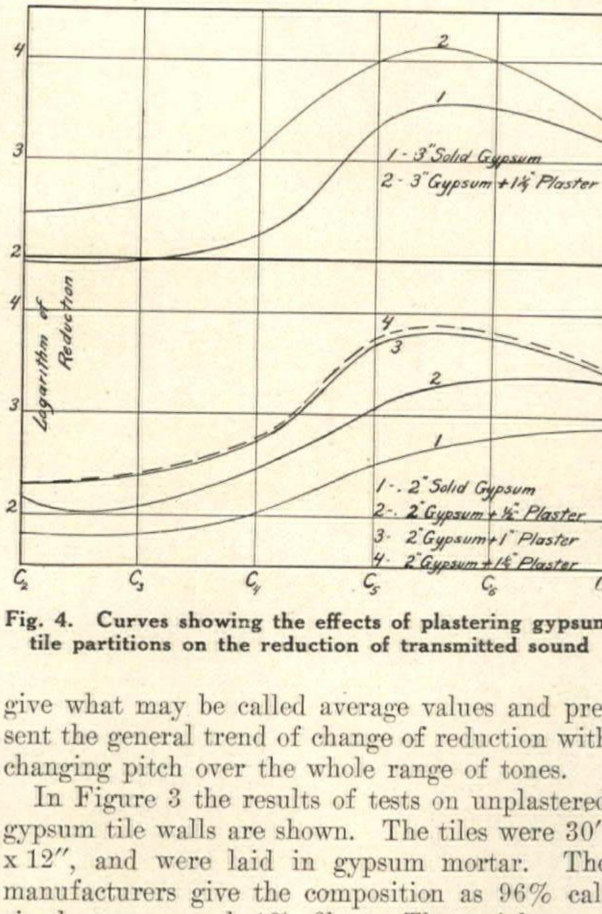


Fig. 4. Curves showing the effects of plastering gypsum tile partitions on the reduction of transmitted sound

give what may be called average values and present the general trend of change of reduction with changing pitch over the whole range of tones.

In Figure 3 the results of tests on unplastered gypsum tile walls are shown. The tiles were $30''$ x $12''$, and were laid in gypsum mortar. The manufacturers give the composition as 96% calcined gypsum and 4% fibre. The weights per square foot including the mortar are given below.

1. $2''$ Solid Tile 10.4 pounds
2. $3''$ Hollow Tile 11.1 pounds
3. $3''$ Solid Tile 14.2 pounds

The very slightly higher values of the Reduction Factor for the $3''$ hollow tile over the $2''$ solid tile of nearly equal weight indicate the negligible effect of the air spaces in the former. As will appear later in the general consideration of all the results, the factor of weight seems to predominate in determining the reduction of sound in transmission.

The lower curves in Figure 4 show the effect of the addition of plaster to the 2″ solid tile base. A coat ½″ thick was applied first on one side. Sound reduction measurements were made, a similar coat was applied to the other side and measurements were again made. Finally a smooth trowel finish coat of neat gypsum plaster ⅛″ thick was applied to both sides and measurements made on the finished wall. The very slight change produced by the addition of the finish coat

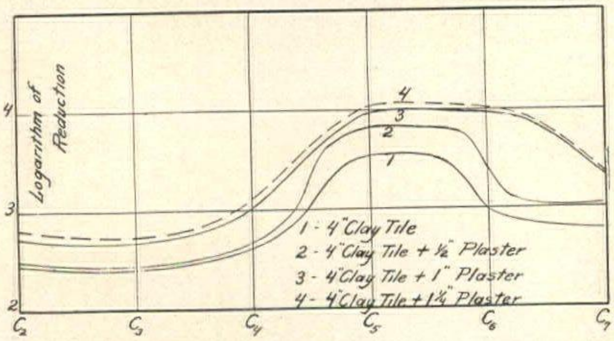


Fig. 5. Reduction of sound transmitted by hollow clay tile partitions

is significant as showing the negligible importance of surface conditions upon the transmission of sound by partition walls. The upper curves of Figure 4, are similarly drawn for the 3″ tile base and for the finished wall.

In Figure 5, the reduction produced by a 4″ hollow clay tile wall in the various stages of construction is presented. These tile, 11½″ x 11¾″, were set in Portland cement, the unplastered wall weighing 17 pounds per square foot. The general similarity in the shape of the curve to those preceding is to be noted with the exception that there is a more pronounced falling off in the reduction of tones of the highest octave than occurs with the other types. However, the fact that the shape of the curve for the finished wall conforms closely to those for the other plastered surfaces shows that in the finished structure any peculiarities of the base material are pretty well masked.

Analysis of the Data

The primary purpose of the present investigation was to secure quantitative data as to the relative importance of the various factors involved in determining the degree of sound reduction produced by masonry partitions. Scientifically we are interested in knowing why wall A reduces transmitted sound more than does wall B, rather than in the bare fact that it does. The passage of energy from room to room through partition walls is a mechanical problem, and one for which no complete theoretical solution has been obtained. The three physical properties involved are mass, stiffness, and damping, due to internal friction, of the wall considered as a whole. In the investigation, two of these quantities were measured. The mass per square foot of surface has been chosen as a measure of the first. By subjecting the walls to small pressures and on one side and measuring the displacement of the middle point produced thereby, relative values of the stiffness were obtained. Unfortunately no feasible means of measuring the damping has yet been devised.

In measuring the relative stiffness, advantage was taken of the fact that the Sound Chamber was sufficiently air-tight so that by admitting air from the organ wind chest into the room the atmospheric pressure could be raised an appreciable amount above the pressure in the Test Chamber on the opposite side of the test wall. This difference of pressure was measured by means of a

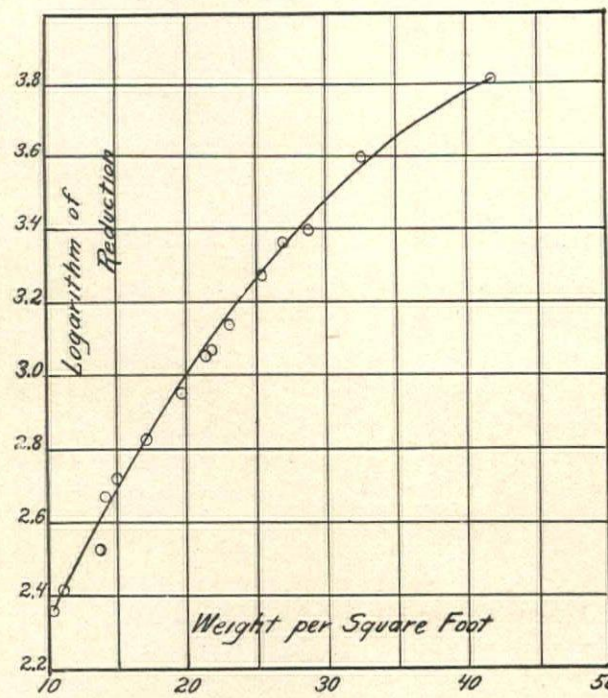


Fig. 6. Average reduction of sound over the whole musical range produced by masonry partitions plotted against the weight per square foot of surface

very sensitive differential pressure gauge. At the same time, the displacement of the middle point of the wall was measured by means of a delicate optical micrometer, that magnified the minute displacements about two thousand fold. The relative stiffness of the different walls may be expressed by numbers which are proportional to the pressures necessary to produce a given deflection.

In order to have a single numerical value as a measure of the reduction of sound intensity, the value of the logarithm of the reduction factor averaged for all the tones has been chosen. This procedure is justified by the fact, that with few exceptions, there is a general similarity in the shapes of the curves given above, and therefore the average affords a fair measure of the relative merits of the various walls as sound insulators.

In the following table, the results of all the tests are summarized. The figures in the column headed "Relative Stiffness" are computed from the displacements described above, and are the hydrostatic pressures in hundredths of a pound per square inch necessary to produce a yielding of .01″ at the middle point of the wall.

Inspection of this table shows immediately which of the two factors, mass or stiffness, is determinative in the reduction of intensity of transmitted sound by walls of this general character. Sound reduction and mass per square foot run in the same order. On the other hand, there is no obvious correspondence between stiffness and sound reduction. Thus, for example, Number 11, the stiffest wall, does not give the greatest reduction, Number 8 and Number 14, about equally stiff, differ widely in the average reduction factors.

In Figure 6, the figures for mass and reduction factor are plotted. The departure of the experimental points from the smooth curve are no greater than can be accounted for by the unavoidable uncertainty in estimating the weight of the walls. Obviously the conclusion to be drawn is that within the limits of variation of physical properties set by the scope of the present investigation, mass is the deciding factor in the matter of sound transmission, and that any advantage of one wall as compared with another is a matter simply of its greater weight, rather than of any intrinsic merit in the material employed in its construction. It appears then that the sound insulation between adjacent rooms separated by masonry partitions, is determined by the weight per square foot of such partitions. Moreover from the data of the table and the curve of Figure 6, it is possible to state the reduction of general sound intensity produced by any wall of this general character solely from consideration of its weight.

From a purely practical point of view, it appears that the advantage in sound insulation of any one of the types of construction tested, over the others does not make a very strong "talking point" in favor of its use. For walls of equal thickness the solid plaster gives the greater sound reduction, because of its greater weight. For the same reason solid tile of a given thickness is more effective than hollow tile of the same thickness. As between the finished walls on the tile bases and the 2½″ plaster wall, on the metal lath base the difference in sound reduction is not great enough to furnish a very strong argument in favor of the use of any one of them as compared with the others.

The investigation serves to indicate the limitations of ordinary partition walls in reducing the transmission of sound. Roughly speaking, a logarithmic reduction of 3 may be expected for walls as ordinarily built. This reduces sounds of moderate loudness from 1,000,000 times to 1,000 times minimum audibility. The latter are faint but distinctly audible. For the complete extinction of ordinary sounds a further reduction of 3 on the logarithmic scale (1000 to 1 in physical intensities) would be required. Obviously from the curve of Figure 6, this would require walls of prohibitively great weight and thickness. Even a total logarithmic reduction of 4 would require a wall weighing more than 50 lbs. per square foot, a figure for partitions which probably could not for structural reasons be tolerated save in exceptional cases. The investigation is now being extended to distinctly different types of construction with the hope of finding a more practicable method of reducing the passage of sound from room to room.

No.	Wall	Average Logarithm of Reduction	Wt. per sq. ft.	Relative Stiffness	Average Reduction
1.	2″ Gypsum Tile, unplastered	2.36	10.4		230
2.	3″ Hollow Tile, unplastered	2.42	11.1		260
3.	1½″ Plaster on Metal lath	2.53	13.9	4	340
4.	3″ Solid Gypsum Tile, unplastered	2.67	14.2		468
5.	2″ Solid Gypsum and 1½″ Plaster	2.72	15.		525
6.	4″ Hollow Clay Tile, unplastered	2.83	17.		677
7.	2″ Gypsum and 1″ Plaster	2.95	19.6		892
8.	2″ Gypsum and 1¼″ Plaster	3.05	21.4	84	1120
9.	4″ Clay Tile and ½″ Plaster	3.07	22.		1180
10.	2½″ Plaster on Metal lath	3.24	23.2	17	1740
11.	3″ Solid Gypsum and 1¼″ Plaster	3.28	25.4	130	1910
12.	4″ Hollow Clay Tile and 1″ Plaster	3.36	27.		2300
13.	4″ Hollow Clay Tile and 1¼″ Plaster	3.40	28.8	120	2500
14.	3½″ Plaster on Metal lath	3.60	32.5	77	4000
15.	4½″ Plaster on Metal lath	3.82	41.8		6600

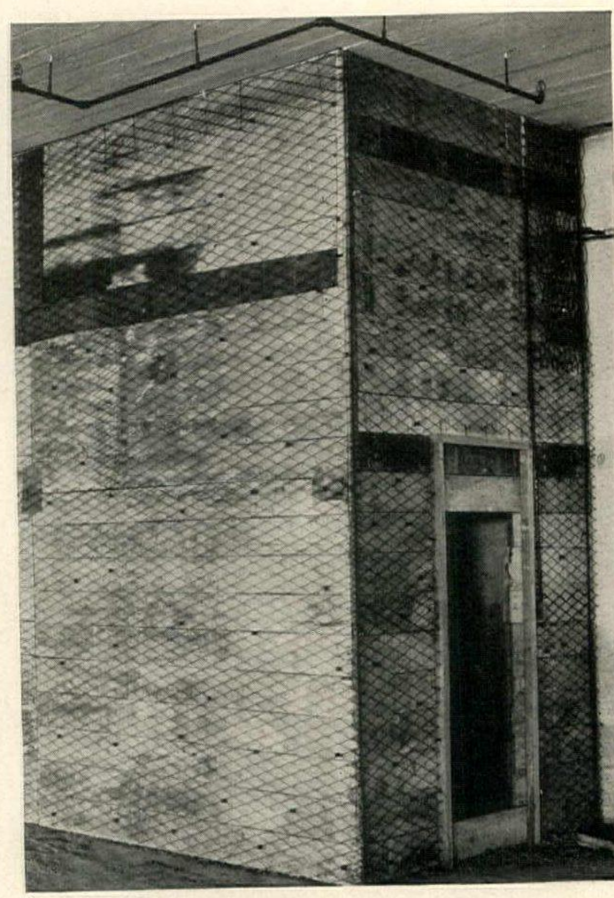
UNUSUAL FEATURES *of a* MODERN LOFT BUILDING

THE Traylor Building in Philadelphia is a good example of a modern loft building. It is designed for a live floor load of 150 lbs. per square foot which makes it capable of housing a wide range of occupants. The building fronts 150′-0″ on North Broad Street and 205′-0″ on Lehigh Avenue. It is eight stories and basement high. The shipping space is located at the East end of the Lehigh Avenue frontage, occupying the entire bay. In this space is a shipping platform which has access to a large freight elevator. There is also another elevator large enough to take a motor truck to all of the floors where it can be loaded and unloaded within the tenants' quarters. A passenger and a combined passenger and freight elevator are located in the Northwest corner of the building. Standard fire towers are located in the Northwest corner and in the center of the South side, both opening directly to the sidewalk. A third stairway in the Northeast corner of the building opens into the shipping space. The arrangement of the stairs, elevators and toilets is such that any desired subdivision of the floor space can be made. The street fronts are faced with a red pressed brick with light colored terra cotta trimming.

Traylor Building, Philadelphia, Pa.
Wm. Steele & Sons Co., Architects and Engineers

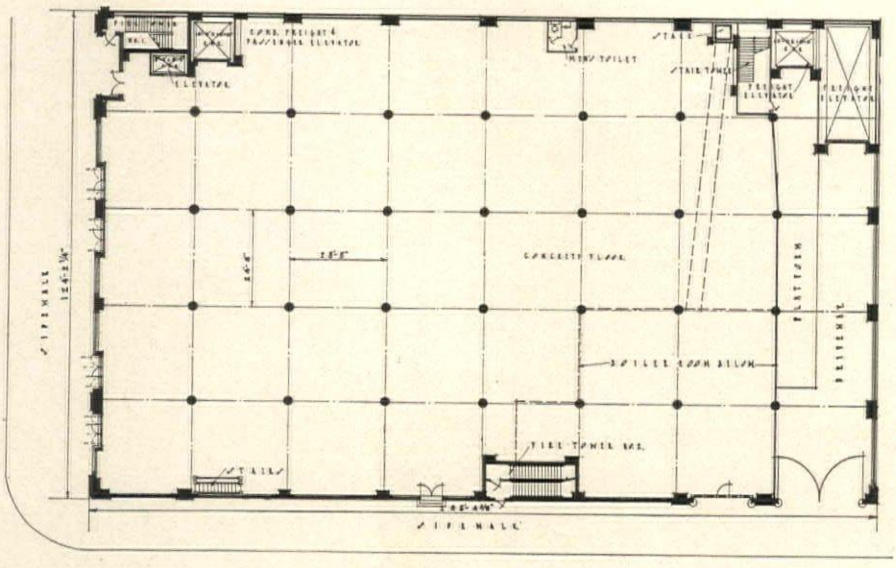
A method of construction that can be used with a reduction in cost is interesting, especially at this time. Such usage is only justifiable, however, if it is equal to or better than established methods. The essential qualities are durability, strength and resistance to fire, and appearance is an important but not the controlling factor.

In this building all of the interior partitions, except as noted, and the North and East exterior walls are constructed of Gunite. The interior walls are of 2″ Gunite except those about the fire towers which are of brick as required by the Pennsylvania building laws. These walls are constructed on a vertical form over which is placed an expanded metal reinforcement. The floor forms, assembled in panels for the flat slab construction, were used for the partitions. On this construction was shot the Gunite to the required thickness. The chimney has a 4″ fire brick lining for about 25′-0″ above the breeching and common brick lining above this extending to the roof level. An air space separates this lining from a 2″ enclosing Gunite wall.



Forms previously used for flat slab floor construction, in place for partitions about the toilet rooms

The exterior walls presented a different problem. In lieu of the city code requirements for exterior walls, the Department of Buildings



First Floor Plan

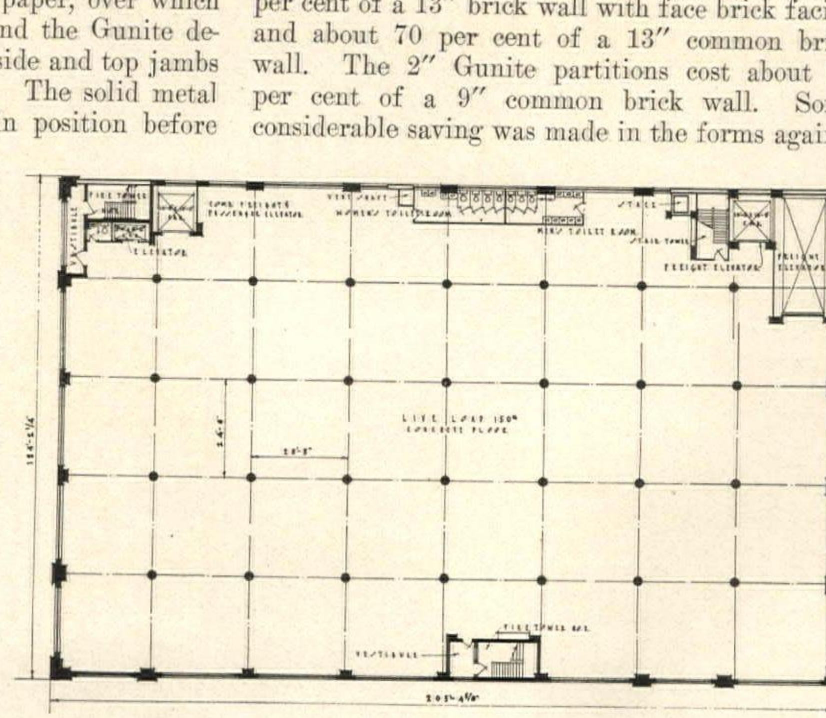
accepted a hollow 12″ Gunite wall with an inner and outer wall, each slightly more than 2″ thick and four Gunite studs in each panel, all making the required volume of concrete. In granting an approval for this construction, the Department recognized the tests, conclusions and recommendations made by the Underwriters' Laboratories on Gunite walls (Laboratory Index Retardant No. 1327).

The outer 2″ wall was constructed by erecting a steel-faced, sectional form over which was placed the expanded metal reinforcement on which was shot the Gunite. The inner wall was constructed by erecting 1″ x 6″ boards at the concrete studs with 1″ x 3″ intermediates. These vertical boards were covered with a heavy tar paper, over which the reinforcement was placed and the Gunite deposited. The window sills and side and top jambs were shot with this inner wall. The solid metal sash and frames were placed in position before the Gunite was deposited and weatherproof contact between the two secured. The sills have the necessary projection and drip with the tops and faces troweled to a finished surface. The Gunite studs were reinforced with ¾″ round rods, laced.

When the Gunite is deposited to the required thickness, it naturally has a slightly irregular surface which is screeded true when still soft. Over the first coat, screeded as described, a thin finish coat was shot, which was then brushed with a whitewash brush, wetted with clear water, with the result that a finish practically equivalent to a sand finish on plaster was produced.

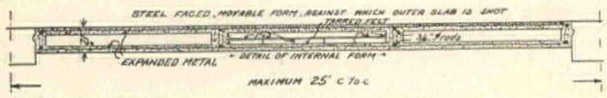
Gunite is a 1:3 mix of cement and sand. The aggregate is composed of two grades of sand properly proportioned. The dry sand and cement are placed in the cement gun, thoroughly intermixed and discharged through a specially made hose by an air pressure of about 35 pounds per square inch. At the nozzle water is introduced through its walls and is, by the air pressure, immediately atomized and forms a complete, intimate contact with the sand and cement. By virtue of the air pressure the material is deposited with a distinct impact which results in an extremely dense mortar. This extreme density is the cause of the waterproof qualities which characterize this material. It insures the metal reinforcement from corrosion and gives the material the great strength which it possesses. These properties are all definitely established by the tests mentioned and by other tests made at Columbia and Lehigh Universities.

The cost of these Gunite walls will be given in terms of percentages which should be applicable to other cities under normal material supply conditions. The 12″ Gunite wall cost about 60 per cent of a 13″ brick wall with face brick facing and about 70 per cent of a 13″ common brick wall. The 2″ Gunite partitions cost about 60 per cent of a 9″ common brick wall. Some considerable saving was made in the forms against



Typical Floor Plan

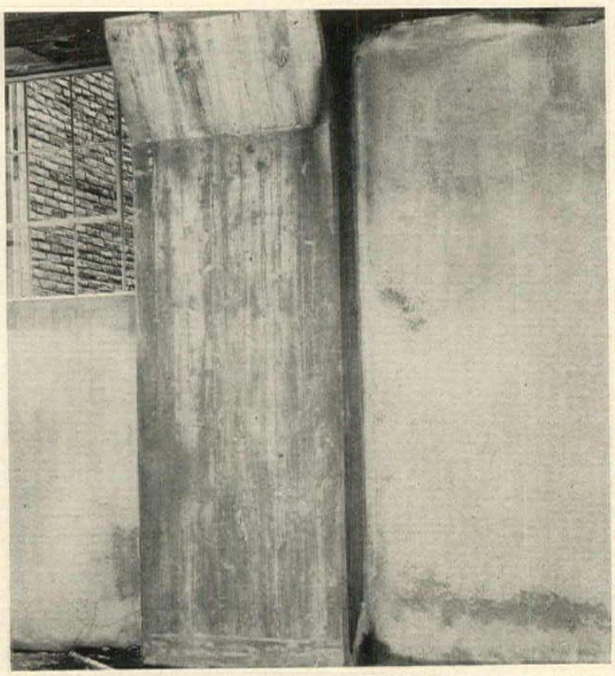
which the Gunite walls and partitions were shot. The forms for the flat slab reinforced concrete floors were made in panels. These sections of



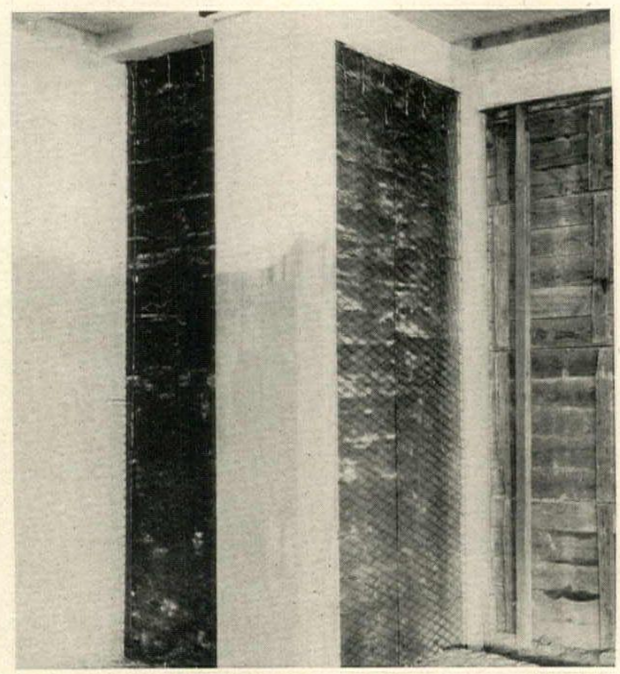
Detail of hollow 12″ Gunite wall used in lieu of 13″ brick or 6″ reinforced concrete walls

forms were set up for wall forms after having been used in the floors. They then became merely an item of labor cost for erecting and removal with a small added cost, this being a proportion of the cost of material and labor used in making the panels for floor form use. Advantage can often be taken of this dual use of forms if it is given proper consideration when the contractor lays out his scheme of procedure.

This construction possesses those qualities which are desirable and with its comparative low cost, is entitled to consideration. The building herewith described and illustrated was designed by Wm. Steele & Sons Co., architects and engineers.



Hollow Gunite wall with finish coat and unfinished concrete column



Forms covered with tar paper and reinforcement, in place in wall enclosing chimney

Fatigue of Metals

BULLETIN No. 136, entitled "An Investigation of the Fatigue of Metals, Series of 1922," is the second report to be issued of the investigation of the fatigue of metals carried on at the University of Illinois in co-operation with the National Research Council, Engineering Foundation, and the General Electric Company. Since the publication of the previous report in Bulletin No. 124 a considerable amount of additional test data has been obtained for specimens subjected to reversed stress. The tests of specimens in reversed flexure were made on the same machine as was used for the tests recorded in the earlier bulletin; no new kinds of steel have been tested since its publication, although a number of different heat treatments has been used. Test data from the local laboratories as well as from other laboratories are given for the endurance limit for wrought ferrous metals under reversed stress, and the evidence for the existence of such a limit is summarized. Various miscellaneous tests and test results, such as tests under reversed shearing stress and the effect of speed of stress reversal, are reported. An extensive study, which includes a discussion of the Goodman diagram for the effect of range of stress on the fatigue of metals, has been made of the resistance of metals to repeated stress other than reversed stress. Several of the unsolved major problems in the fatigue of metals are enumerated and briefly discussed.

Copies of Bulletin No. 136 may be obtained without charge by addressing the Engineering Experiment Station, Urbana, Ill.

DEPARTMENT *of* ARCHITECTURAL DECORATION *and* FURNITURE

Modern American Interiors and their correct furnishing

By . . . . . . Morris L. King

THERE is a page out of Ruskin to the effect that modern architecture differs from that of the Renaissance in Italy, in so far as the brilliance of design in the palaces of Michelozzo, Peruzzi, San Gallo and their contemporaries was mainly confined to the exteriors,—often, as in Venice, to the main façade, veneered with porphyry, onyx and alabaster,—the interiors being plain and unstudied, whereas in modern mansions (Ruskin writes of Victorian England) the interiors are designed in a stately and magnificent manner, while the exteriors are ungracious and ill-composed.

This criticism, however justifiable in his day, is archaic now for a brief study of contemporary work reveals that the interior of a residence is not likely to be as well proportioned or as pleasing as the exterior, the reason for which is not immediately apparent. Undoubtedly exterior elevations receive more study than interior; also, in most residential work one encounters pecuniary difficulties when the studies are made for interior finish. But neither one of these is a factor which explains or enlightens the situation, for some architects maintain the same quality of design throughout a house, while confronted with identical difficulties.

Fig. 1. **View through the Library, House of Hon. Henry White, Washington, D. C. John Russell Pope, Architect**

When time has given men the proper perspective for studying this age, one criticism of modern civilization which will endure, is that we have lost the "grand manner." Our civilization is too raucous, restless and meticulous to admit of the austerity, dignity and stateliness of classic times or the Renaissance. It is true that great canals that unite oceans and sever continents are dug, or that monstrous skyscrapers are thrown up over night, yet there is a certain fussiness, a cerebral as distinguished from an æsthetic quality about the proceeding that divorces it from the auspicious deeds of bygone days. When one compares the Liverpool Cathedral, the Capitol in Washington, and the Paris Opera House, to name three splendid structures of modern times, with St. Peter's, Rheims and Karnak, the disparagement becomes all the more apparent. We are too intent on mass and economic production to equal or surpass these latter monuments.

The modern residential interior also suffers, though to a less marked degree. In the less costly homes, it is usually difficult to make any attempt at architectural treatment, as the money has been expended on the building proper, and rooms are merely "decorated" and furnished. In the more pretentious residences, where the "finish omitted" rooms are studied as a later problem, designs are not conceived with such facility and ease as was the case with exterior elevations. Work is often furtive and undecided, proportions are ungracious, and walls are apt to be overcharged with ornament. The restraint, perfect proportioning and undefinable quality which characterize the lordly mansion in all ages, are likely to be missing.

In this article, however, an attempt is made to present the antithesis of this argument, in illustrating some of the very finest of contemporary work, and to suggest the beauty and quality embodied in it. The way to avoid bad or indifferent work is not to discuss it, but to disregard it. It was said of the late James Gibbons Huneker that he was the most ingratiating of all critics, because he studiously avoided subjects of which he must in all honesty, speak disparagingly. When he became disgusted with the theatre, he never entered, nor wrote a line about it. He spent the last years of his memorable life discoursing

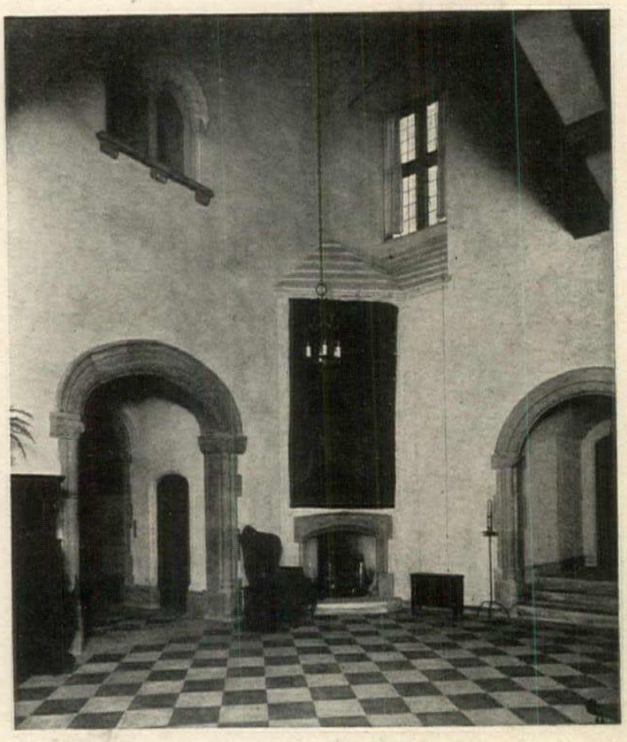


Fig. 2. Great Hall, House of W. R. Coe, Oyster Bay, L. I., N. Y.
Walker & Gillette, Architects

on the three B's, Bach, Brahms and Beethoven! So much for destructive criticism!

The stately interior is not readily arrived at or facilely produced. Actual cost bears it little relation. It is not extravagant to say that the bulk of costly interiors are neither beautiful nor interesting. These plates attest that its most sharply defined characteristic is the happy combination of simplicity, even severity, of treatment, with graciousness and excellent proportioning. The lordly interior is austere, urbane and dignified. It strikes the restless and roving eye as being cold and inhospitable. It is admirably suited to a cultured and polite society, such as is fast being developed in this country today. It is the only proper background for such a society. The environment develops the man, or man the environment.

Turning to the plates individually, Fig. 1 is a Georgian interior in Pope's inimitable manner, of a character similar to his Hitt, Frick, Myers, Burden, Mills and other houses of note. One never tires of these high-ceilinged, panelled rooms with their rich treatment of pilasters and cornice with floral forms. They are never stiff, never overdone, never crowded. Fig. 4 shows the living room in the same house with a classic simplicity together with a Renaissance elegance that lends the room much of its dignity and austerity.

Most architects work in a manner that is undeniably their own, which, if departed from, is likely to bring about less graceful results. John Russell Pope is far too versatile to be so classified, as his Lehman (the most photographed house in America) and Stewart Duncan houses testify. Through the medium of the Tudor style he produces results even more satisfying than the most lordly of his Georgian mansions. It is gratifying to know that a monograph of his work is now being prepared by the publishers.

Fig. 2 illustrates work of an entirely different character but none the less elegant or imposing. The Coe house is one of the gems from the office of Walker & Gillette, all of whose work has an unmistakable quality. Tudor English, especially the earlier Tudor which bears the strong Norman influence, is, in a measure, semi-barbarian as compared with the later and more refined styles, such

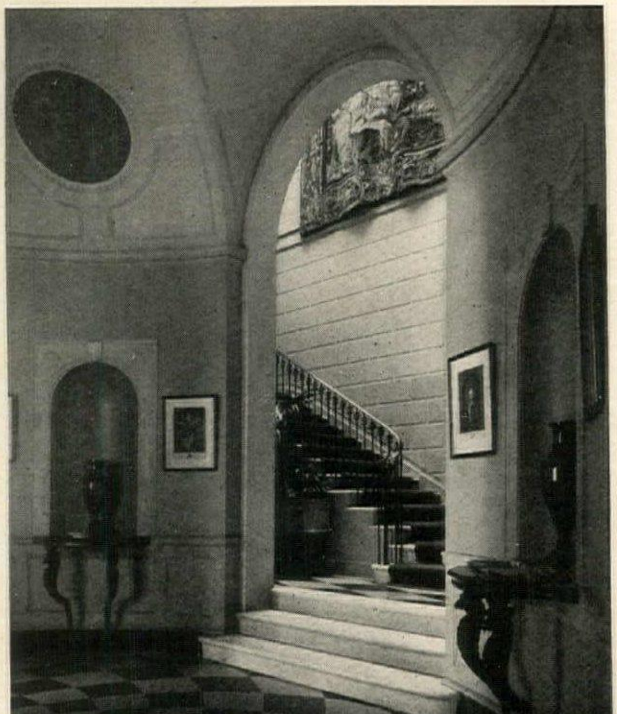


Fig. 3. Stair Hall, House of Mrs. Willard Straight, New York
Delano & Aldrich, Architects

FIG. 4. LIVING ROOM, HOUSE OF HON. HENRY WHITE, WASHINGTON, D. C.

JOHN RUSSELL POPE, ARCHITECT

as the Louis' and the Georgian, but withal it is remarkable to note what refinement and severe taste are brought to play in this great hall. It is at once a most dignified and lordly room. The great hall, as an institution, extending through two stories, often to the roof, has unfortunately gone out of popular favor in this economic age.

The naively carved Norman stone trim about the door openings produces a pleasing contrast to the large wall spaces of hand-finished plaster. The small fireplace opening might appear out of scale were it not for the large medieval tapestry on the chimney breast tying it all into one feature. This chimney breast, together with the lacquered glass casement window above, with its steppings similar to slate courses on an exterior buttress, is a most unusual and interesting detail.

Delano & Aldrich have the masterly, or uncanny, faculty of producing formal and arrestingly beautiful interiors at almost every attempt. Working in a delicacy of moulding and detail which is almost effeminate, yet apparently perfectly suited to interior work, the history of this office is one of an almost continuous flow of gorgeous and handsome town and country houses, illustrations from three of the finest of which are included here, the Straight, Pratt and Work residences, Figs. 3, 5 and 7 respectively.

In studying these particular plates in detail, it is found that they bear an entirely different character from the works of other architects here illustrated. The mouldings are neither so bold, nor so vigorous, yet the entire composition is the utmost in elegance and refinement. The delicate and suave wrought iron balustrades and the beautiful crystal lighting fixtures are characteristic of their work (See Figs. 5 and 7). Nothing surely could bespeak at one and the same time, greater elegance, together with beauty and comfort, than the Pratt living room, nor greater formal dignity than the Straight hall. It is interesting to note in this connection the manner in which the pattern of the floor in the oval hall is disregarded where the white marble step butts down into it. A designer must be either very sure of himself, or very careless, to do that. The beautiful result achieved in this case speaks for itself.

Of Charles A. Platt, what can or need one add?

Fig. 5. Living Room, House of H. I. Pratt, Glen Cove, L. I., N. Y.

Delano & Aldrich, Architects

The writer has thumbed his monograph from cover to cover, and collected plates of all his work that has been published subsequently, and never ceases to admire the strong, bold and fearless character of his work. It is unmistakably individual. He never works like anyone else, yet more men work after his manner than any other architect. Platt is a man of distinct architectural convictions. His work is never furtive, never uncertain, never bald. No matter what style,—some of it is of French and of English, as well as Italian influence,—the houses all bear the same strong and simple character. Study the detail and it often appears heavy and ill-proportioned, but get it as a whole and the composition and harmony are marvelous. Study his drawings on paper and you'd never dream of so detailing, but study the resultant mouldings and note the effect. A man who understands so well the relation between the paper drawing and the finished work is a master.

Fig. 6. Stair Hall, House of Mrs. Alice McLean, New York
DeSwarez & Hatton, Architects

The Parmelee hall (from a new photograph) shown in Fig. 8, is a most beautiful, one is moved to say *the* most beautiful work of its kind in the country. It is spacious, restful and extraordinarily well proportioned. Note the delicate reeded flutings on the columns and pilasters, and the lovely caps. The panel divisions on either side of the stair are an excellent solution of what is ever a difficult problem in detail. The latticed balustrade is engaging and very interesting. The few pieces of furniture are inferior perhaps to so elegant a background, but one would have to seek far and wide nowadays to find modern furniture worthy to grace such lovely surroundings.

The Italian style has been so overdone in this country that it is always pleasing to encounter a piece of work designed and executed in a new and interesting manner. DeSwarez & Hatton have accomplished this in the recently completed house for Mrs. McLean, Fig. 6. This small stair hall is laid out and detailed in such a simple and beautiful fashion that one would not find many more gracious, even in Italy. It has, at least from this particular view, the quality of a Fragonard or Watteau, or a beautiful stage setting. Other plates of this house will be shown in a subsequent article dealing with the Italian influence.

But in the last analysis these plates speak more eloquently to architects, than any paltry attempt to explain them.

The furnishings for these elegant rooms are rarely chosen by chance, or by some decorator who hasn't the spirit of the thing. Exceptions to this rule sometimes occur; the writer has in mind a beautiful California house that was designed by one of the most famous New York architects, and then filled with the worst possible Grand Rapids

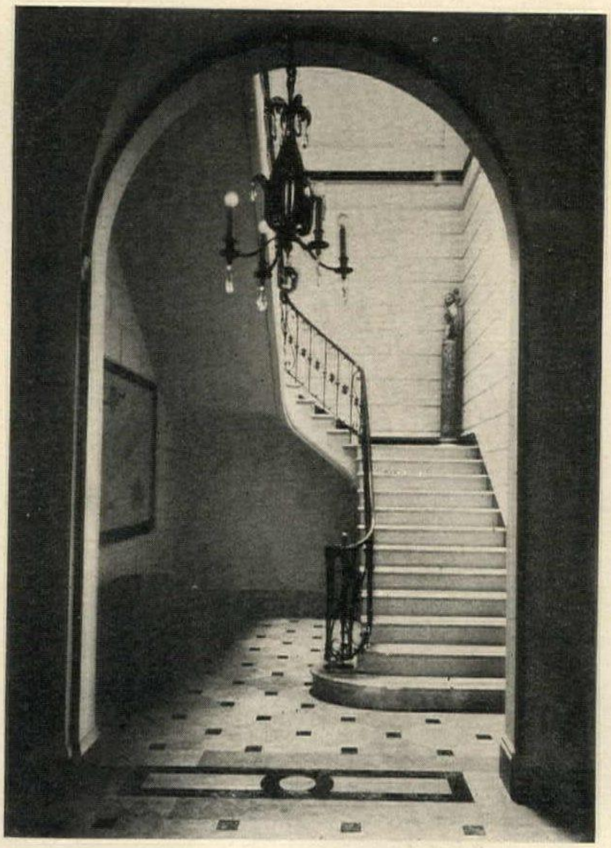


Fig. 7. Stair Hall, House of Bertram Work
Delano & Aldrich, Architects

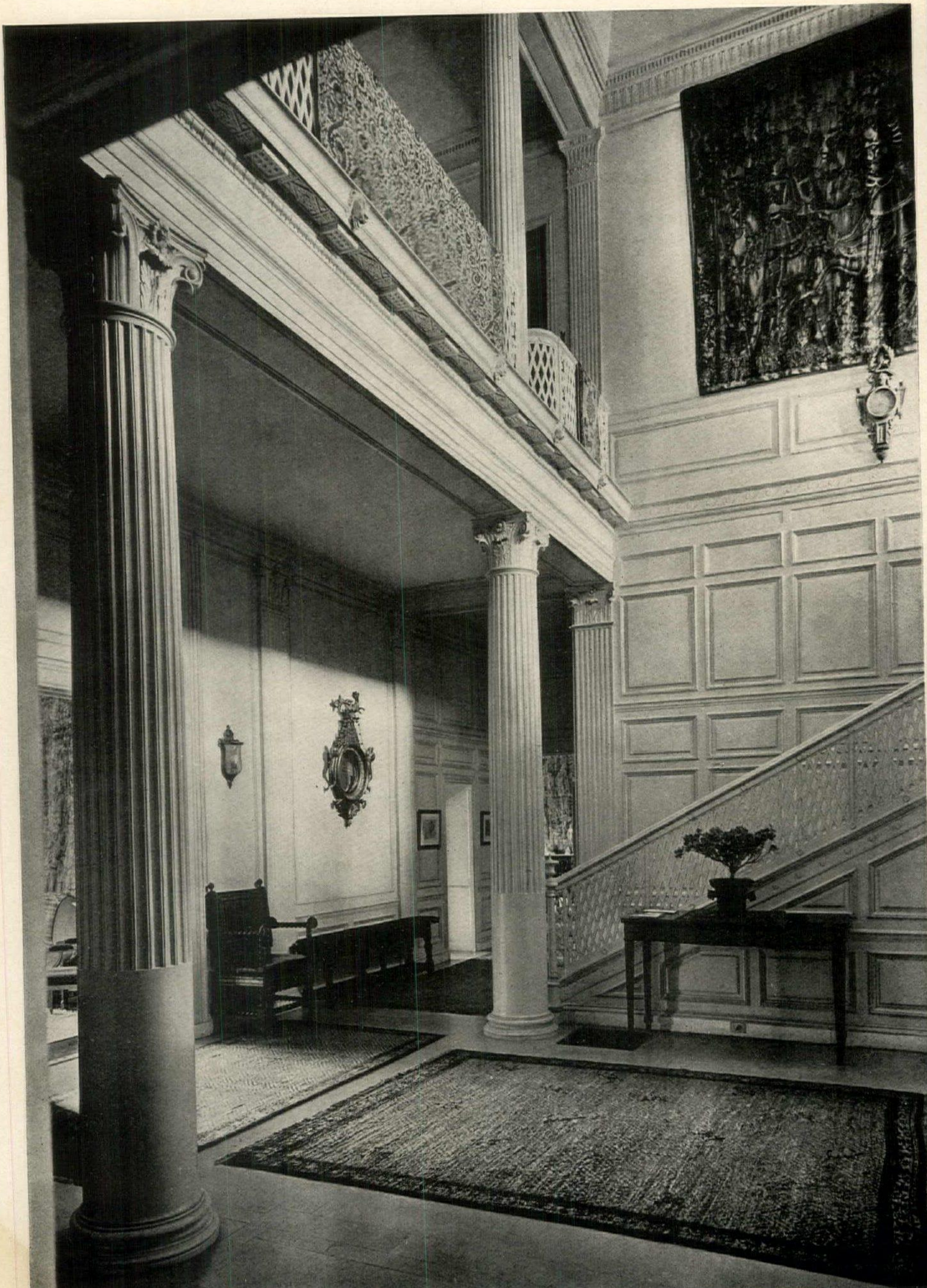


FIG. 8. STAIR HALL, HOUSE OF JAMES PARMELEE, WASHINGTON, D. C.

CHARLES A. PLATT, ARCHITECT

furniture by the owner. But the architect usually not only selects the principal objects of furniture from the various shops, but often designs a number of pieces and has them executed by some cabinet maker of his selection.

Numerous objects, such as bronze clocks, andirons, lighting fixtures, etc., are either chosen by the architect or some of his men from objects in showrooms, or are made up special from some photograph of previous work, plates from old books, or from original sketches by the architect or craftsmen.

There are scores of art and antique shops which are constantly importing objects, antique and spurious, but nevertheless of great merit. One should not quibble about the origin or authenticity of an object provided it is beautiful. It is the amateur and dilettante in art that concerns himself with "period" and the authentic antique. The artist is only interested in line and color.

Considerable skill and unimpeachable taste must be manifest in selecting draperies, hangings, rugs and upholstery in order that the texture of the fabric and its color, as well as the scale of the detail in figure and pattern, match the architectural background, such as the wood carving, plaster work and finish. It is possible today to procure native weaves and needlepoint of rare quality and workmanship.

Occasionally the owner already possesses some fine piece of tapestry, embossed leather or antique landscape, which the designer uses as a *motif* about which to lay out the room. The panelling is then laid out to frame this object. Some gifted architects sometimes paint an overmantel for the client.

Architects are forever bringing back objects from abroad, either for pleasure or to serve some practical purpose. In the case of the Stewart Duncan residence at Newport, most of the furnishings were of John Russell Pope's personal selection, imported from England.

Fig. 9. Library, House of Irving Brokaw, New York

Charles A. Platt, Architect

DEPARTMENT *of* SPECIFICATIONS

Brick Masonry Specifications (Continued)

IT is often required that brick masonry joints be waterproofed, especially where it is known that the brick itself will be waterproof if the joints can be made so. If such is the case, the specification writer should be acquainted with the various patented integral waterproofing compounds that may be used in water. Experience has proved that many of these compounds have value and may be used with success if used intelligently.

Specifications for glazed tile wall copings should set up a certain standard of material for the best classes of work. The usual commercial article is good value, but it will be found upon investigation that parapet walls five years or more old, will have many pieces that have been damaged in the manufacture, the resulting cracks providing good seepage points. If water does leak through, there is nothing to prevent it from accumulating and freezing in cold weather, which, of course, will break the coping, or at least move it on the wall. This seems to be the only reason why good coping remains fixed, while coping that has fire cracks in it oftentimes is lifted or moved sideways sufficiently to form a constant point of danger. The specifications should require that each piece of coping be inspected, and that none has fire cracks that go clear through the thickness of the shell to be laid in the wall, and that after completion of the work the installed material should be inspected and such pieces rejected and replaced. It is quite important that the parapet walls be made watertight especially since the faces, both being exposed to the weather, are especially susceptible to disintegration. This disintegration is accelerated if water is allowed to come in through the top of the wall. Where angles or open ends occur in walls that are to have glazed tile coping, manufactured angle tee or terminal pieces should be specified for such use, as it is impossible to obtain a watertight piece of work if the turns are made by clipping the straight tile. The tile, of course, will be the usual soft glazed material with hubs.

Special tile wall copings that have raggles formed integrally with them, these raggles being designed to receive roof flashings, are readily available in many localities. In such case, of course, it is expected that these patented manufactured articles will be whole, new and perfect in every respect, but it is just as well that the specifications require these various qualities.

In connection with glazed tile copings a similar material is often to be used for raggle blocks on the roof side facing of parapet walls. These pieces should be whole and new, and there should be a sufficient number of manufactured internal and external corners and other special blocks, to provide continuous raggle joints in the selected material. These blocks are all of patent construction.

The brick masonry contractor often is required to install gypsum block partitions. Gypsum block should not be installed where other material that must be set in cement is to be used unless it is known that the blocks will be coated with a tacky dampproofing or bond coating of the usual asphalt variety. The highly absorbent character of gypsum block will take the life out of the mortar in almost every case. Gypsum block are available in practically every locality, and they ordinarily are so well made, that it is sufficient to specify new material that is not broken or otherwise damaged. This material is used ordinarily for partition work and for exterior wall furring and other furring purposes, while in some localities it may be used for fireproofing of structural steel and iron work. Each block should bear the imprint of the manufacturer in order to insure good quality.

The brick mason must always provide anchors of some kind and in a more complicated piece of work may be called upon to furnish a dozen or more anchors of entirely different types. Bond anchors, anchors for brick veneer, of frame buildings, for securing of stone or terra cotta, for the securing of structural floor systems especially in wood construction, and anchors for the various odds and ends in construction constitute this class of material. The material used for anchors may be commercial wrought iron or plain steel bars with brass used for dowel pins or other special purposes where expense is of no consideration, or where it is believed that other materials warrant the use of them. In case the masonry wall is to be wet, steel or iron anchors will, of course, eventually rust away, but a good specification would see to it that the wall would be so nearly watertight that such moisture conditions will be taken care of in the general construction work. Anchors for bond ties or for the securing of brick veneer usually are crimped, galvanized iron or steel strips, while anchors for other material may be either galvanized or dipped in the usual commercial asphaltum paint. The specification writer if he is cautious, will call for galvanized material, leaving the use of asphaltum coated material for those places where it is known that no moisture conditions will exist or where the economies of construction will not permit the slight increase in cost for galvanizing.

For the particular operation the brick masonry contractor may be called upon to furnish many other materials such as metal lath for bonding work, or where the brick mason is to do the small amount of concrete work. In the latter case the reader should refer to the discussions on concrete masonry specifications for suggestions of quality of materials and their use.

Materials when delivered on the building site should be stored at the building and protected against the weather, dirt, or other deteriorating influences. Particular attention should be paid to the storage of cement and lime, especially where quick lime is to be used, and to the storage of face brick that will be damaged if the face edges are spalled. In windy, dusty locations, it is advisable to require the erection of screens near the sand piles to prevent the accumulation of foreign matter which, if present in the sand when delivered, would cause its rejection. For the larger operations where a number of contractors may be at work while the brick mason is doing his work, the question of storage of the more bulky materials used in masonry work should be considered with a view to providing sufficient storage space conveniently located for the use of other contractors. The brick masonry contractor should not be allowed to take all of the space.

The question of layout lines, levels and grades should be specified with care. The brick masonry contractor should be required to lay out all masonry walls to the exact dimensions, checking up in that way the lines that have been established by the concrete masonry contractor, or whoever has put in the foundations. If the foundations are of brick, concrete or other block or stone, laid by the brick masonry contractor, he should, nevertheless, be required to check up his lines when preparing to start the superstructure walls. This is especially important where walls are built directly on the property lines or on street lines. The levels and grades should be checked and the brick masonry contractor should be prepared to establish further grades from the original bench marks as the work progresses. If the size of the work either in length or height, requires it, certain rechecking should be specified, to be done as the work progresses, and in important cases, especially those where legal questions may later arise, the services of a competent surveyor should be used in the checking work. The brick masonry contractor, however, should not be expected to check lines or grades any further back than the original survey, and certainly if the survey is wrong, he should not be expected to discover this, as this responsibility primarily lies in the owner.

Miscellaneous Specification Data

The Forest Products Laboratory of the U. S. Forest Service, in a recent issue of "Technical Notes" recommends as standard the following abbreviations of terms used by the lumber industry. Most of the forms given correspond to those already in common use. In a few cases new abbreviations have been suggested where the old forms overlapped or were misleading.

AD Air-dried
a.l. All lengths
av. Average
av.w. Average width
av.l. Average lengths
a.w. All widths

B1S Beaded one side
B2S Beaded two sides
BBS Bos bark strips
bd. Board
bd.ft. Board foot
bdl. Bundle
bdl.bk.s. Bundle bark strips
Bev. Beveled
B/L Bill of lading
b.m. Board (foot) measure
Btr. Better. Also Bet.

c.i.f. Cost, insurance, and freight
c.i.f.e Cost, insurance, freight, and exchange
Clg. Ceiling. Also C/G and Ceil.
Clr. Clear. Also Cl.
Com. Common
Coop. Cooperage (stock)
CM Center matched; i.e., the tongue and groove joints are worked along the center of the edges of the piece
Csg. Casing. Also C/S
Ctg. Crating
cu.ft. Cubic foot
Cust. Custom (sawed)

D&CM Dressed (one or two sides) and center matched
D&H Dressed and headed; i.e., dressed one or two sides and worked to tongue and groove joints on both the edges and the ends
D&M Dressed and matched; i.e., dressed one or two sides and tongued and grooved on the edges. The match may be center or standard
D&SM Dressed (one or two sides) standard matched
D2S&CM Dressed two sides, center matched
D2S&M Dressed two sides and center or standard matched
D2S&SM Dressed two sides and standard matched
Dim.. Dimension
D.S. Drop siding. Also D/S. Synonymous with cove siding (C.S.), novelty siding (N.S. and Nov. Sdg.) and German siding (G.S.)
D. Edge. Also Ed and Edg.

E&CB1S Edge and center bead one side; i.e., surfaced one or two sides and with a longitudinal edge and center bead on a surfaced face. Also B&CB1S
E&CB2S Edge and center bead two sides; i.e., all four sides surfaced and with a longitudinal edge and center bead on the two faces. Also B&CB2S
ECM Ends center matched
E&CV1S Edge and center V two sides. Also V&CV1S
E&CV2S Edge and center V two sides. Also V&CV2S
EM End matched—either center or standard
ESM Ends standard matched
exp. Export (lumber or timber)

f.bk. Flat back
FAS First and Seconds—a combined grade of the two upper grades of hardwood
f.a.s. vessel (named port). Free alongside vessel at a named port
Fcty. Factory (lumber). Also Fact.
F.G. Flat grain. Synonymous with slash grain (S.G.) and plain sawed (PS)
Flg. Flooring. Also F/G
f.o.b. (named point). Free on board at a named shipping point
f.o.k. Free of knots
f.o.w. First open water
Frm. Framing
ft. Foot or feet
ft.b.m. Feet board measure
ft.s.m. Feet surface measure
Furn. Furniture (stock)

GR. Grooved roofing

h.bk. Hollow back
Hdl. Handle (stock)
hdwd. Hardwood
Hrt. Heart
Hrtwd. Heartwood
1s&2s Ones and twos—a combined grade of the hardwood grades of Firsts and Seconds

Impl. Implement (stock)
in. Inch or inches. Also two accent marks (")

KD Kiln-dried. Also K/D
k.d. Knocked down

lbr. Lumber
l.c. Less carload lots

lgth. Length
lgr. Longer
lin.ft. Linear foot; i.e., 12 inches
Lng. Lining
LR Log run
LR,MCO Log run, mill culls out
Lth. Lath

M Thousand
M b.m. Thousand (feet) board measure
MCO Mill culls out
Merch. Merchantable
m.l. Mixed lengths
Mldg. Molding
MR Mill run
M s.m. Thousand (feet) surface measure
m.w. Mixed widths

No. Number

Ord. Order

P. Planed — used synonymously with dressed and surfaces as P2S&-M, meaning planed two sides and matched
Pat. Pattern
Pky. Pecky
Pn. Partition. Also Par'n.
Prod. Production. Also Prod'n.

Qtd. Quartered—when referring to hardwoods. Also see V.G.

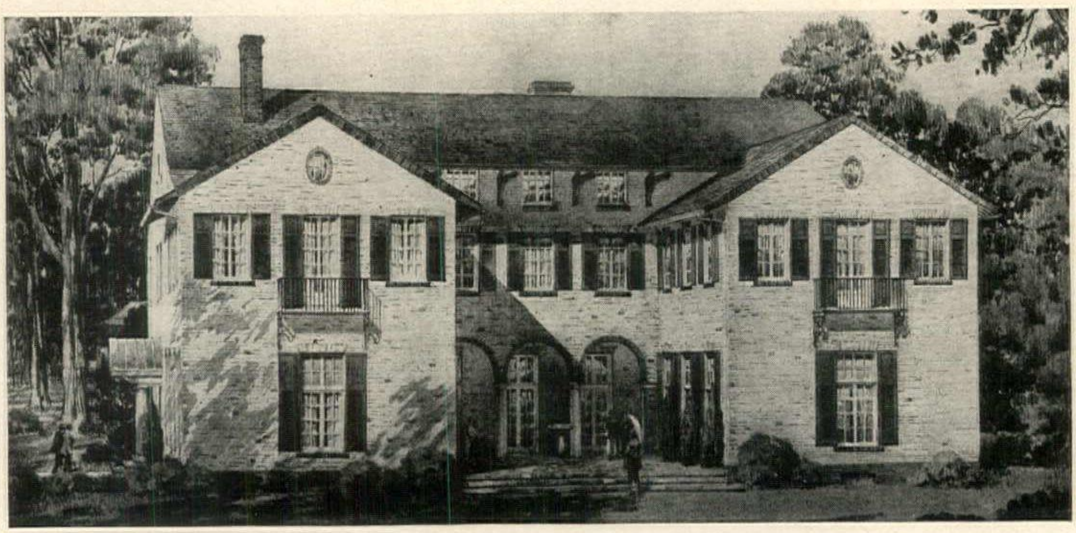
rdm. Random
res. Resawed
Rfg. Roofing
Rfrs. Roofers
rip. Ripped
r.l. Random lengths
rnd. Round. Also rd.
R.Sdg. Rustic siding
r.w. Random widths

S&E Surfaced one side and edge
S1E Surfaced one edge
S2E Surfaced two edges
S1S Surfaced one side
S2S Surfaced two sides
S1S1E Surfaced one side and one edge
S2S1E Surfaced two sides and one edge
S1S2E Surfaced one side and two edges
S4S Surfaced four sides
S4SCS Surfaced four sides with a caulking seam on each edge
S&CM Surfaced (one or two sides) and center matched
S&M Surfaced and matched; i.e., surfaced one or two sides and tongued and grooved on the edges. The match may be center or standard
S&SM Surfaced (one or two sides) and standard matched
S2S&CM Surfaced two sides and center matched
S2S&M Surfaced two sides and (center or standard) matched
S2S&SM Surfaced two sides and standard matched
Sap. Sapwood
SB Standard bead
Sd. Seasoned
Sdg. Siding. Also Sidg. and S/G
Sel. Select
S.E.Sdg. Square-edge siding
s.f. Surface foot; i.e., and area of one square foot
Sftwd. Softwood
Sh.D. Shipping dry
Ship. Shipment or shipments
Shlp. Shiplap. Also S-L and S/L
s.m. Surface measure. Synonymous with face measure (f.m.)
SM Standard matched
smkd. Smoked (dried)
smk.stnd. Smoke stained
s.n.d. Sap no defect
snd. Sound
sq. Square
Sq.E&S Square edged and sound
Sqrs. Squares
Std. Standard
stnd. Stained
stk. Stock
Stp. Stepping
S.W. Sound wormy

T&G Tongued and grooved
TB&S Top, bottom, and sides
Tbrs. Timbers

V1S V one side, i.e., a longitudinal V-shaped groove on one face of a piece of lumber
V2S V two sides, i.e., a longitudinal V-shaped groove on two faces of a piece of lumber
V.G. Vertical grain. Synonymous with edge grain (E.G.) comb grain (C.G.), quartersawed (Q.S.) quartered (Qtd), and rift-sawed (R.S.)

w.a.l. Wider, all lengths
Wth. Width
wdr. Wider
Wgn. Wagon (stock)
wt. Weight



Chapter House for the Phi Kappa Tau Fraternity, University of Illinois, Urbana, Ill.

Alfred Granger, Architect

EDITORIAL COMMENT

IF THE JOURNAL OF The American Institute of Architects really represented the best element in the Institute, the publication of an article by Mr. Cunningham in the June issue of the *Journal* would be lamentable.

It is unbelievable that even the smallest minority of Institute membership are disposed to approve of irreverence. In fact, it is not so long ago that an editorial in the *Journal,* derisively treating a religious topic called forth strong protest and, if memory serves, some resignations.

Mr. Cunningham directs attention to the fact that three speakers quoted St. Paul. *"Not,"* says he, *"the one across from Minneapolis,—the other one. I'll bet that you will agree with me that he was a smart old bird, and were he living in the flesh today, he would not be an architect or a professor, nor even an editor. He'd be a banker or a short story writer or a movie director."* What a disgusting attempt to be humorous!

Not even the Chief Justice of the United States is safe from this man's would-be witticisms. This is the way he introduces Chief Justice Taft into the pageant.

*"At one stage of the dream, a portly gentleman appeared from nowhere in particular. * * * The portly gentleman came out of the dream and was discovered to be Mr. Taft, Chief Justice of the Supreme Court of the United States. He smiled,—he can do so beautifully. The usher apologized for the informality of his reception and informed the Chief Justice that he was expected to come in a burst of glory. 'No,' said Mr. Taft, 'I came in a Dodge.'"*

Such flippant treatment of matters that all well balanced men regard with respect is unfortunate. It seems that the Institute should purge itself of this offense against good taste.

* * *

THE RESIGNATION, for reasons of business, of E. J. Russell, F. A. I. A., chairman of the National Board for Jurisdictional Awards, is an irreparable loss to that Board and the building industry. Mr. Russell from his early experiences with Shepley, Rutan and Coolidge as superintendent of construction and in preparation of specifications and in having control of the construction activities of his own organization, Mauran, Russell and Crowell, was in every way qualified to be a member of the Board. To his work he applied himself with industry, acquired a vast fund of practical building knowledge and further, an intimate contact with and appreciation of mechanics and contractors. Eminently fair, possessing a judicial and open mind and having a regard for his fellow men, he was exceptionally well fitted for the chairmanship of the Board.

* * *

IT IS GRATIFYING to note that Mayor Dever, of Chicago, has appointed Allen B. Pond, F. A. I. A., to be chairman of the Zoning Board of Appeals. It is right and proper that an architect should be chairman of such an important Board. Mr. Pond has, with his brother and partner, Irving K. Pond, always been active in movements for the betterment of Chicago and has served on important committees of the City Club. It is particularly important that this Board be well selected as it will have a tremendous amount of work to do in connection with the zoning ordinance recently adopted in that city. Another appointment to this Board is Charles Bostrom, Building Commissioner. Mr. Bostrom has filled that important post for the past eight years with entire satisfaction, and was chairman of the Zoning Commission and very influential in securing the adoption of the new ordinance. With these two, a real estate expert, an attorney and an engineer will constitute the Board.

* * *

IN THIS ISSUE, Mr. John V. Van Pelt contributes an interesting article on the architectural exhibition held in this city during the "Silver Jubilee" or twenty-fifth anniversary of Greater New York. This article conclusively proves what has been set forth in these editorial pages for a long time past, that the architects in New York, for twenty years and more, have been contributing the most valuable service in every proposition that would lead to a coherent and better architectural development of New York City.

On the occasion of every important celebration, such as the Hudson-Fulton Celebration for example, there has been much talk in the daily press as to the desirability of a national gateway, a proper landing place for distinguished visitors, the development of certain park areas, etc. The safe and sane celebration of the Fourth of July has for several years shown the desirability of certain regional parks and rostrums throughout the city where residents might gather, as at settlement centers, for a proper and patriotic celebration of the Fourth of July.

In every one of these schemes, the architectural profession in New York has unselfishly come forward and evolved the most dignified and artistically valuable plan. These, in every instance, have been published in the daily press and stamped with approval by the general public. And then the changing of political parties has brought about the rejection of every design and every plan that the opposing party has in the past approved. It is amazing to think of the amount of fine suggestion that is packed away in the city's archives. Some of this has been resurrected and hung in the late exhibition. That exhibition was the finest exposition of New York in the past, New York in the present and what New York might be in the future if we could eliminate the political aspect of these matters and get right down to a patriotic attitude toward the development of New York.

FORTY YEARS AGO

Excerpts from THE AMERICAN ARCHITECT, June 7-14, 1883

MEMBERS of The American Institute of Architects will remember that at the last convention, held in Cincinnati, it was voted to enliven the meeting of the present year by a competition between the members, the subject of the competition to be assigned by a committee and the drawings to be either brought in or sent in, in time to be exhibited at the meeting. The committee on the program prepared a sensible and ingenious one, proposing that the competitive designs should be for a building situated on a corner lot, fifty by one hundred feet in New York, intended for the use and benefit of the Institute, which would occupy a certain portion, perhaps a single floor, while the remainder would be fitted up for renting to tenants.

* * *

In March of this year the Commissioners of the new State Capitol at Denver advertised for plans for a building to cost not more than one million dollars, one wing of which is to be built at once. The winner of the competition is to receive a prize of one thousand dollars and one and one-half per cent of the contract price for the erection of the wing, this wing to cost about two hundred thousand dollars. * * Strange as it may seem, this invitation attracted the attention of no less than nine cheap architects or, at least, of nine persons who had some idea of drawing, and the result of their several efforts was duly submitted to the Commissioners. Inspection of the plans showed them at once what five minutes' consultation with a respectable architect would have shown them in the first place, that the program was, to use their own words, in some respects "impossible" and "foolish." The Board has requested the Governor to call an extra session of the legislature to enact a law to enable them to undo what it had done a few months before.

* * *

The people of St. Paul, Minnesota, have done an excellent thing in petitioning the city Government to appoint as Inspector of Buildings, under their new law, a well trained engineer, who has practiced his profession in and about the town for some time. A competent engineer can properly decide on unusual construction so as to promote economy, as he can easily see the course of the strains in a design whereas a practical builder, if Inspector, is likely to be rather afraid of any departure from the ordinary routine, and to require an unnecessary margin of safety.

* * *

Prof. Robert H. Thurston is quoted from the *Journal of the Franklin Institute,* giving an account of an examination, in the course of his professional work, into the systems of steam heating in use on so large a scale in New York City and elsewhere and to report upon the condition and capabilities of one of those "plants" which have been put in operation. In the course of this investigation he was compelled to examine into the peculiar methods of injury to which long lines of steam pipe thus used are exposed. The destruction of these pipes, 8″ in diameter, was undoubtedly due to the enormous pressures induced by "water hammer" which may in many cases exceed 1,000 pounds per square inch. It is, then, evident that it is not often safe to calculate upon meeting these tremendous stresses by weight and thickness of metal, but that the engineer must rely principally, if not solely, upon complete and certain drainage of the pipe at all times as the only means of safely handling steam in long pipes. Prof. Thurston's analysis of the action in "water hammer" is clearly and logically set forth.

* * *

Illustrations: Competitive design for Columbian University, Washington, D. C., by Jos. C. Hornblower, architect, Washington, D. C. The Proposed Cathedral of All Saints (selected design), Albany, N. Y., R. W. Gibson, architect, Albany, N. Y.

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

THE following situation has recently been submitted to me by a subscriber to THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW.

A Committee in charge of the erection of a building employed an architect and entered into a contract with him, substantially in accordance with the standard form of The American Institute of Architects. Bids were received and contracts awarded for the execution of the work, as provided by the plans and specification of the architect chosen. The architect provided for a certain brand of nailing compound. While the work was in progress, a salesman for a different brand placed his case before the Committee and the Committee was so impressed with the possibilities of the new material, that it reached the conclusion that to substitute it for the material specified by the architect would materially improve the work. The Committee so advised the architect. The architect offered no criticism and made no objections to the change of material. He authorized the contractor to substitute the new material for the one originally specified, and the work was completed with the use of the new material. Subsequently, it developed that the material used completely failed to meet the requirements of the specifications, disintegrated, and resulted in a large damage cost.

The architect and the contractor contended that they were not to blame and that the fault was on the part of the Committee, inasmuch as it was at the suggestion of the Committee that the new material was used. The Committee contended that the architect and the contractor were jointly responsible, inasmuch as neither of them offered any objections to the use of the new material or requested that he be relieved of responsibility for its possible failure to fulfill necessary requirements. The Committee contended further, that the material used was subject to the same conditions of the contract and specifications as the original material and that, inasmuch as the contractor had failed to deliver the building in satisfactory condition, he should be held responsible for the damage.

It seems clear, as a matter of law, on the foregoing facts, that the builder cannot be held responsible. A builder is responsible for proper workmanship and for the proper carrying into effect of the work as shown by the plans and specifications. He is not responsible for damage resulting from the fact that the materials specified in the contract are not suitable. His duty is to fulfill the contract conditions and to do the work as provided by the specifications. He is not responsible for defects resulting from his performing the work in the manner directed by the owner or by the latter's authorized representative, although this last conclusion might be modified, if it were shown in a given case that the builder knew, or should have known, that the material which the owner recommended was not suitable or the method recommended by the owner was improper and, knowing this, remained silent.

In the case under consideration, therefore, unless it is possible to establish the fact that the builder knew, or should have known, that the material in question was improper and would cause damage, and so hold him on the ground of negligence, it would seem to me that he is fully protected by the fact that he proceeded in accordance with the direction of the Committee duly authorized to act for the owner.

So far as the architect is concerned, the case differs only to the extent that the architect is charged with a special knowledge. The liability of the architect would come down to a question of negligence, pure and simple. The question, as in the case of the builder, is whether he knew or should have known that the material was not suitable. This question, in turn, depends in large measure on the extent to which the material had been used in the trade and how well known it was to the trade and to the architectural profession. If it was an entirely new material or one in little use or generally unknown to the architectural profession, I cannot see any ground for holding the architect liable. It was not incumbent on the architect or on the builder, as a legal duty, to protest against the use of the new material or ask specifically to be relieved of any responsibility with regard to it, unless they knew, or should have known, its character and defects. It undoubtedly would have been the part of wisdom for each of them to stipulate that, if the change in material were made, they were not to be held liable for any damage resulting. This would be a wise precaution and one which would naturally suggest itself in any case where the builder or architect is asked to substitute material, as to the merits of which he is in ignorance. A failure to do this, however, without a knowledge of the defects of the material, should not involve the builder or architect in liability for the damage which resulted directly from the instructions given by the representative of the owner.

LEGAL DECISIONS

A BUILDING contract in writing contained the following clause: "If any extra work is required, a price for the same must be agreed upon and approved in writing by the architect before such work is begun." The contractor sued the owner for various extras which the architect had authorized. The premium for the Surety Company bond was increased, after the contractors submitted their figures. The architect directed the contractors to charge the difference in premium as an extra. He similarly directed them to charge, as extras, the painting of various roof fences. He also asked them what they would charge to cover the entire basement floor with tar paper and over this place six inches of concrete. They replied $100, and he told them to go ahead and do it, and charge it as an extra. There were various other similar items. In each case, the conversations between the contractors and the architect were oral and the architect did not authorize the extras in writing. In a suit by the contractors against the owner, the court held that the architect could not waive the provision of the contract requiring his consent to these extra items to be in writing, and that, although he orally approved all of the extra work and authorized disbursements, for which the plaintiffs sought to recover, the defendant had never waived the contract or the provision requiring the written approval by the architect of extras. The court therefore gave judgment for the defendant and held that the plaintiff could not recover.

Burns v. Thorndyke, 228 *Mass.* 552.

A BUILDER submitted an unsigned memorandum of bid. It did not contain the names of the parties or a reference to any particular building or any reference to the specifications. The court held that, under these conditions, no contract could be brought into being on the basis of this bid as made, inasmuch as there was no mutuality of obligation as between the parties.

Dolye v. Desenberg, 74 *Michigan* 79.

WHERE a contract employs terms which are peculiar to the particular trade with which the subject matter of the contract is concerned, expert witnesses may give evidence to show the meaning of the terms of the contract as construed in accordance with the custom of the trade and to amplify and explain the meaning of the terms peculiar to the trade, and such evidence will not be barred out on the ground that it is violative of the rule that oral testimony is inadmissible for the purpose of varying the terms of a written contract.

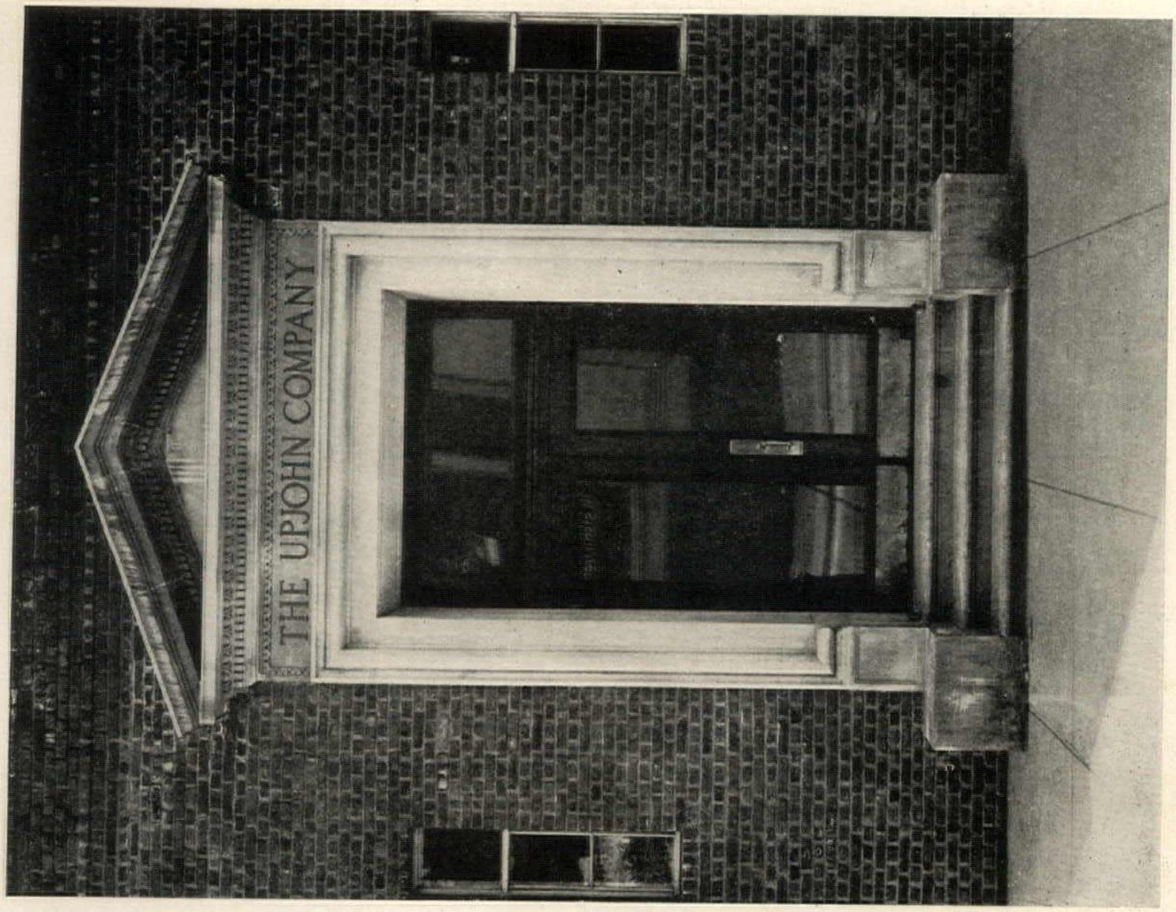
McCarthy v. Krebs Pigment, etc. Co., New York Supreme Court, Appellate Division, New York Law Journal, March 30, 1923.

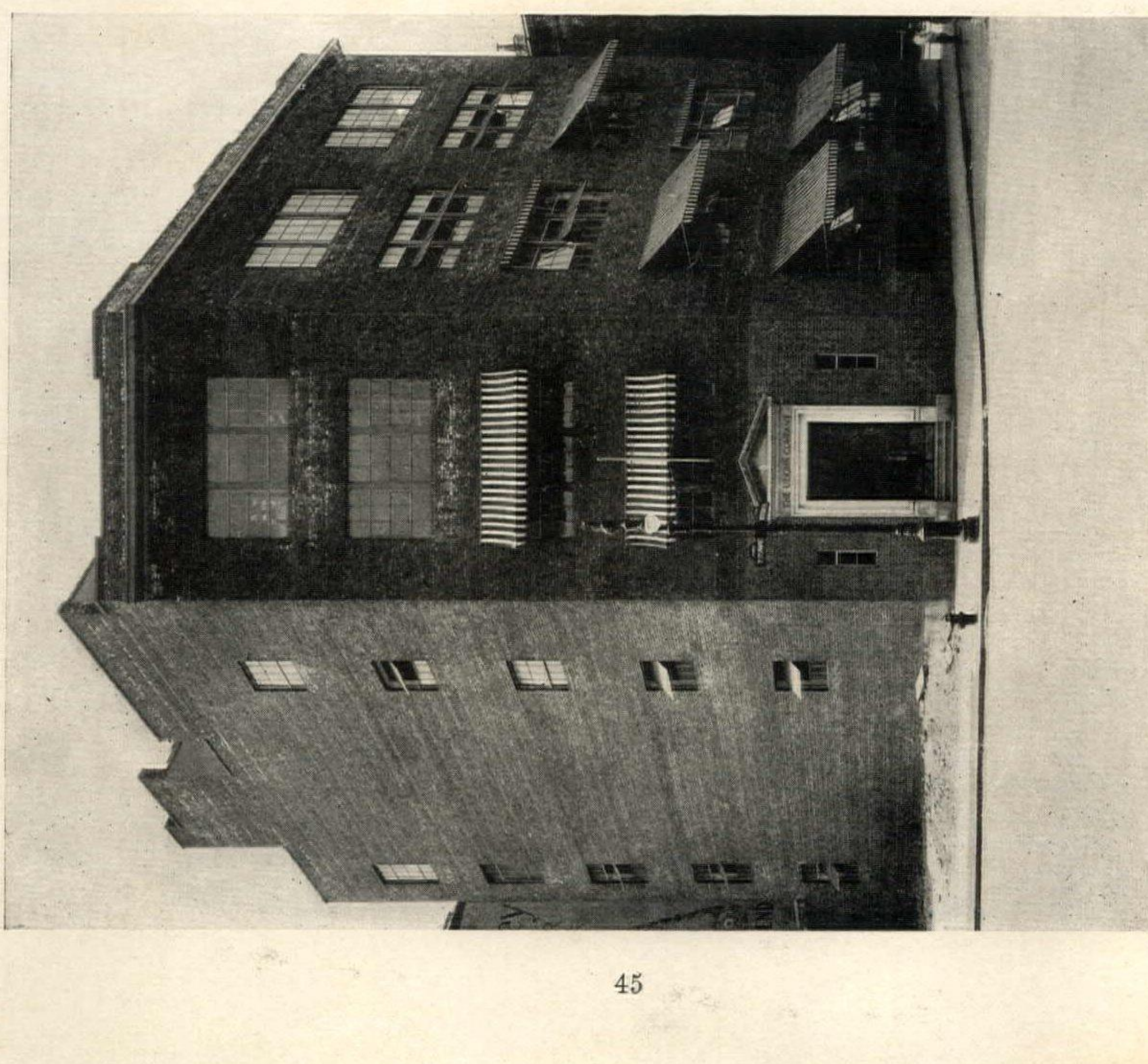
THE plaintiff brought an action against the City of New York, to recover on contracts for construction work. Under the contracts, the City had agreed to furnish plans and to pay for the work performed. Damages were claimed by the plaintiff on the ground that there had been delay on the part of the City in furnishing the plans and that, by reason of such delay, the cost of performing the work had been increased. It appeared that the plaintiff had entered into an agreement with another firm, whereby the latter was to receive 92% of the compensation paid by the City for the performance of the work which the plaintiff agreed to perform, and the court held that the firm with whom the plaintiff had, in its turn contracted, had fully taken over from the plaintiff the performance of the contract, and that consequently, any increase in the cost of the work, arising from the delay of the City in furnishing the plans, would fall upon the firm with whom the plaintiff had contracted. As a result, the delay in the furnishing of the plans could not, therefore, damage the plaintiff, inasmuch as its share of the compensation to be paid was fixed, and the plaintiff could not therefore recover. The plaintiff, in addition, asked for damages on the ground that the engineers employed by the City failed to authorize the contractors to "by-pass" certain gas mains. This by-passing was admittedly necessary. Under the contract, the City agreed to pay for all necessary work of this nature, it being provided, however, that it must first be directed by a City engineer. As to this item, the court held that, inasmuch as the work was necessary, the City engineer was not within his rights in refusing arbitrarily to authorize it, and that the plaintiff could therefore recover damages for the failure of the engineer so to do.

Degnon Contracting Co. v. City of New York, New York Court of Appeals, April 17, 1923. (*Not yet officially reported.*)

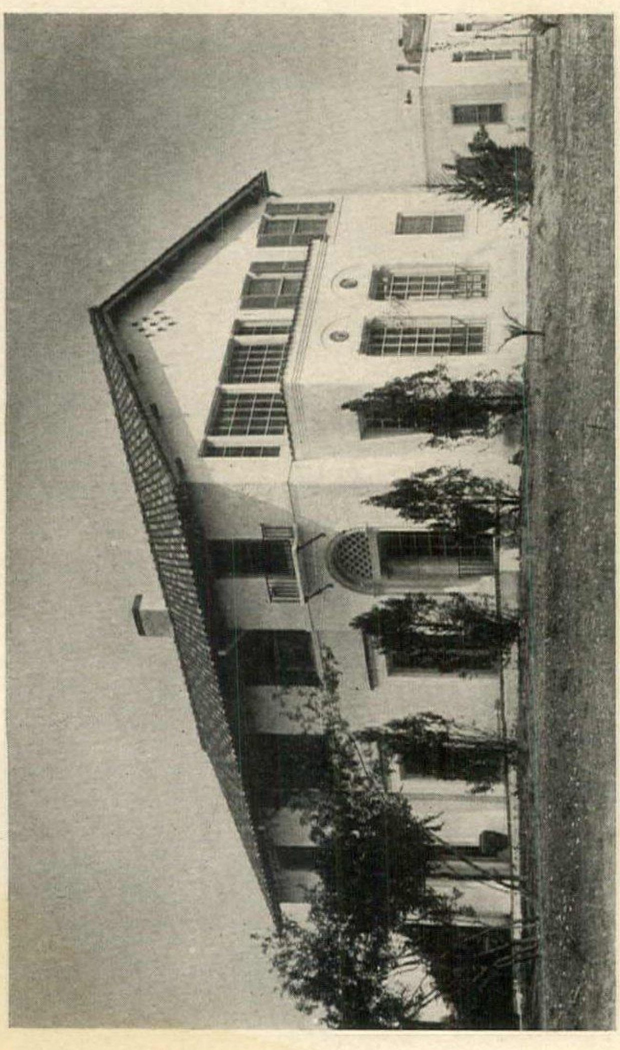
DEFENDANT made a written promise to pay a stated sum to such persons as should build a court house of a particular description. Plaintiffs accepted the offer and erected the court house in accordance with the proposals. The court held that the contract was complete and had been performed and that the plaintiffs were entitled to recover the sum promised.

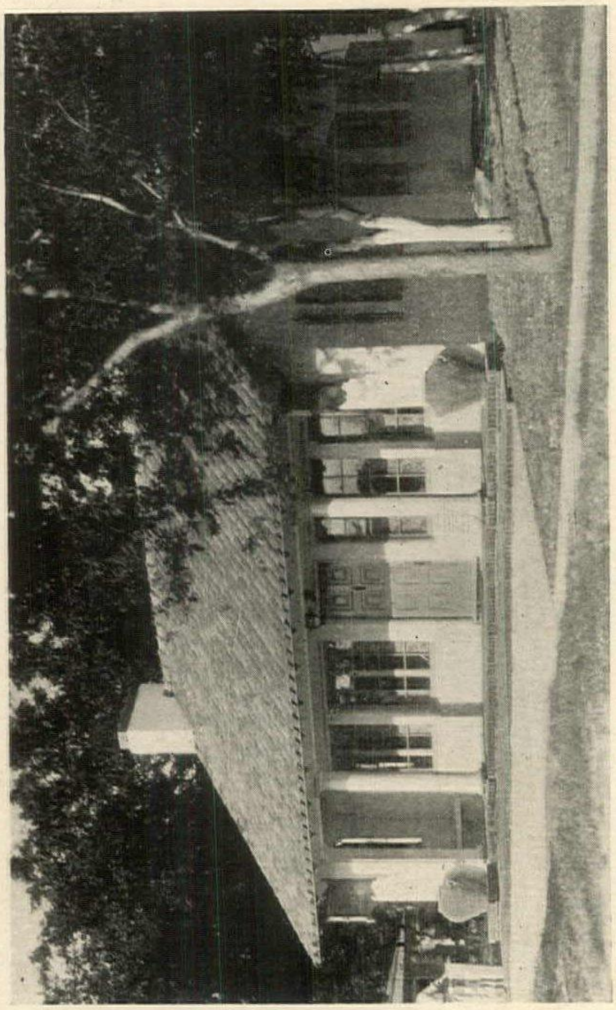
Bull v. Talcot, 2 *Root* (*Connecticut*) 119.

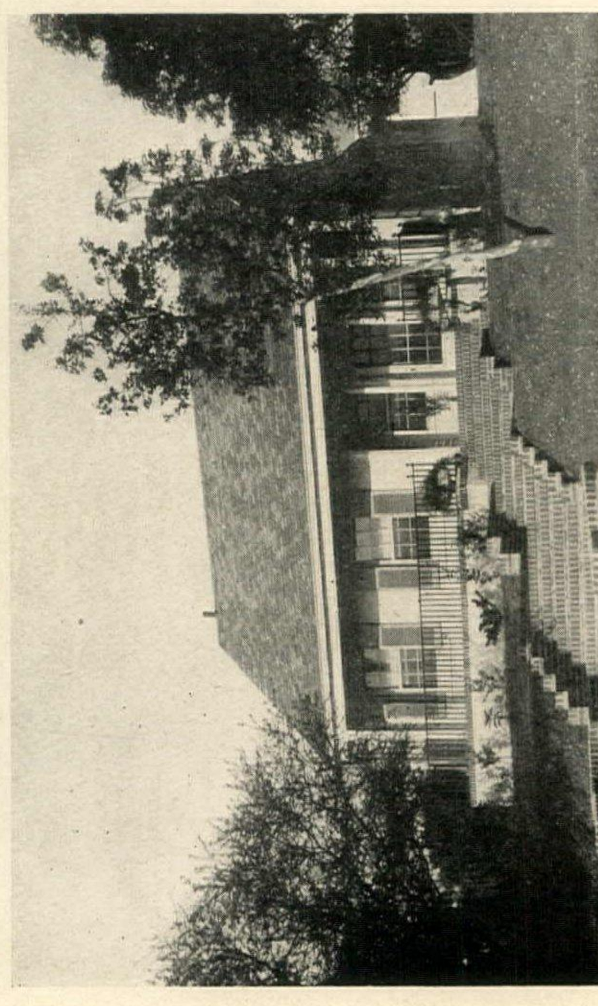




OFFICE BUILDING, NEW YORK CITY
HOBART B. UPJOHN, ARCHITECT







ABOVE, AT LEFT: HOUSE OF DR. ROBERTSON (Rear View)

ABOVE: A GOLF SHOP

AT LEFT: HOUSE OF MR. GUS KRAY

SOME WORK IN SAN ANTONIO, TEXAS

ATLEE B. AYRES AND ROBERT M. AYRES, ARCHITECTS

CAMPANILE, CHURCH OF ST. ANDREW, ROME

THE AMERICAN ARCHITECT
The ARCHITECTURAL REVIEW

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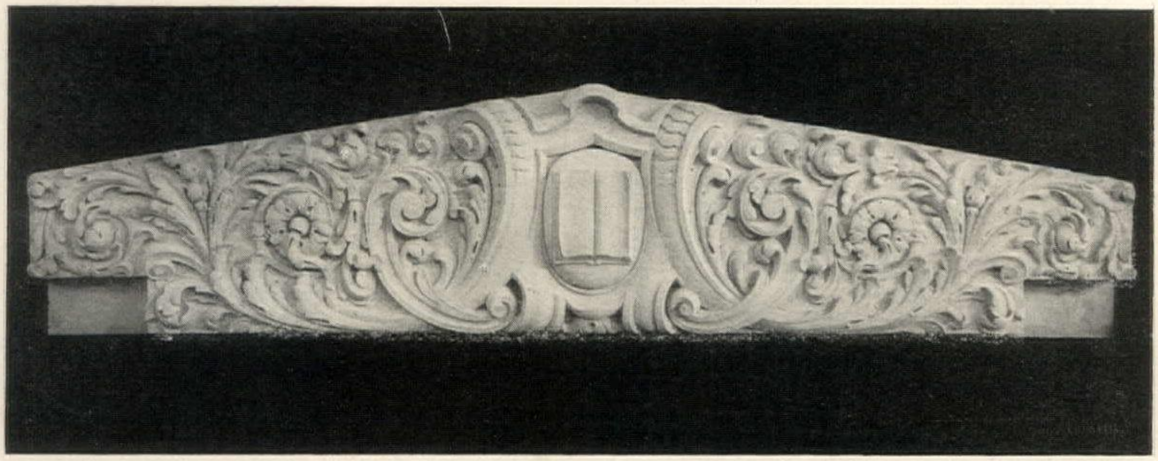


Fig. 1. Elaborately carved lintel

This lintel is 14 feet long by 4 feet in height, cut from a single piece of limestone

LIMESTONE *in* BUILDING CONSTRUCTION

The first of a series of articles giving a general outline of the Use of Limestone in Building Construction together with proper methods of structural detailing

By . . . . . H. S. BRIGHTLY

INTRODUCTION

THE architect, the engineer and the architectural draftsman have found it necessary, and as time goes on increasingly so, for them to know more about the materials of construction. The acquiring of a fairly comprehensive knowledge of the physical properties of building materials, their methods of production or manufacture and limitations as to use, is receiving more attention on the part of the profession than was formerly the case. This fact is attested by the architect's attitude today, as compared with the quite evident intentional neglect given to the consideration of materials by many of the earlier writers on architectural subjects.

The belief that building stone, and especially limestone, constitutes a subject of timely interest to the architectural profession seems patent, both on account of the extent to which this material is being employed by architects, and because of the apparent lack of anything except dry technical reports on American building stones.

Furthermore, with the country's increased wealth there is a natural broadening of education and a more highly developed culture which, along with the now general interest in Fine Arts, also manifests itself in the desire for a higher type of building construction, greater structural permanence and a better standard of excellence in point of design.

This quite naturally affects the choice of building materials. The medium must be worthy of the design, as it affects the execution of detail to an extent that often precludes a determination of the features of the design, if not the type of design itself, until after the decision as to material has been made.

It is not the purpose of this article to devote any space to axioms of this sort which are common knowledge among architects. The point is mentioned here only in order to call attention to another related fact, which is, that in the method of detailing a particular design, there often exists an opportunity to affect the cost of building in a major way without changing materially the character or general effect of the particular design.

The extent to which this is possible is not always appreciated by architects as much as it should be, in order that they may best serve their clients in an economic way and at the same time get the most out of their designs. Especially is this true of natural stone, which must be shaped from or cut out of the solid block; even more so of building stones like Indiana Limestone which are to such a large extent worked by highly developed machine methods.

The architect can often magnify the beauty of his building design by the execution of it in the most appropriate material, a material that will age gracefully; and can be depended upon to assure for all time the good appearance of his creative work.

It will therefore be the effort of the writer of this series of articles to present to the profession a general statement of the use of limestone in building construction, extracting from some of the technical reports on this material, such information as it is thought will be generally useful and assembling it in a very brief form for convenient reference. This will be supplemented with detailed information regarding the proper and economical use of limestone in modern building construction.

While it will, of course, be impossible in the scope of these articles to prepare anything like a comprehensive treatise on the detailing of limestone, an attempt will be made to present all of the more important points and prepare a series of solutions of the many questionable points, which are more or less perplexing to the architectural draftsman and which are all more or less affected by modern machine methods of production.

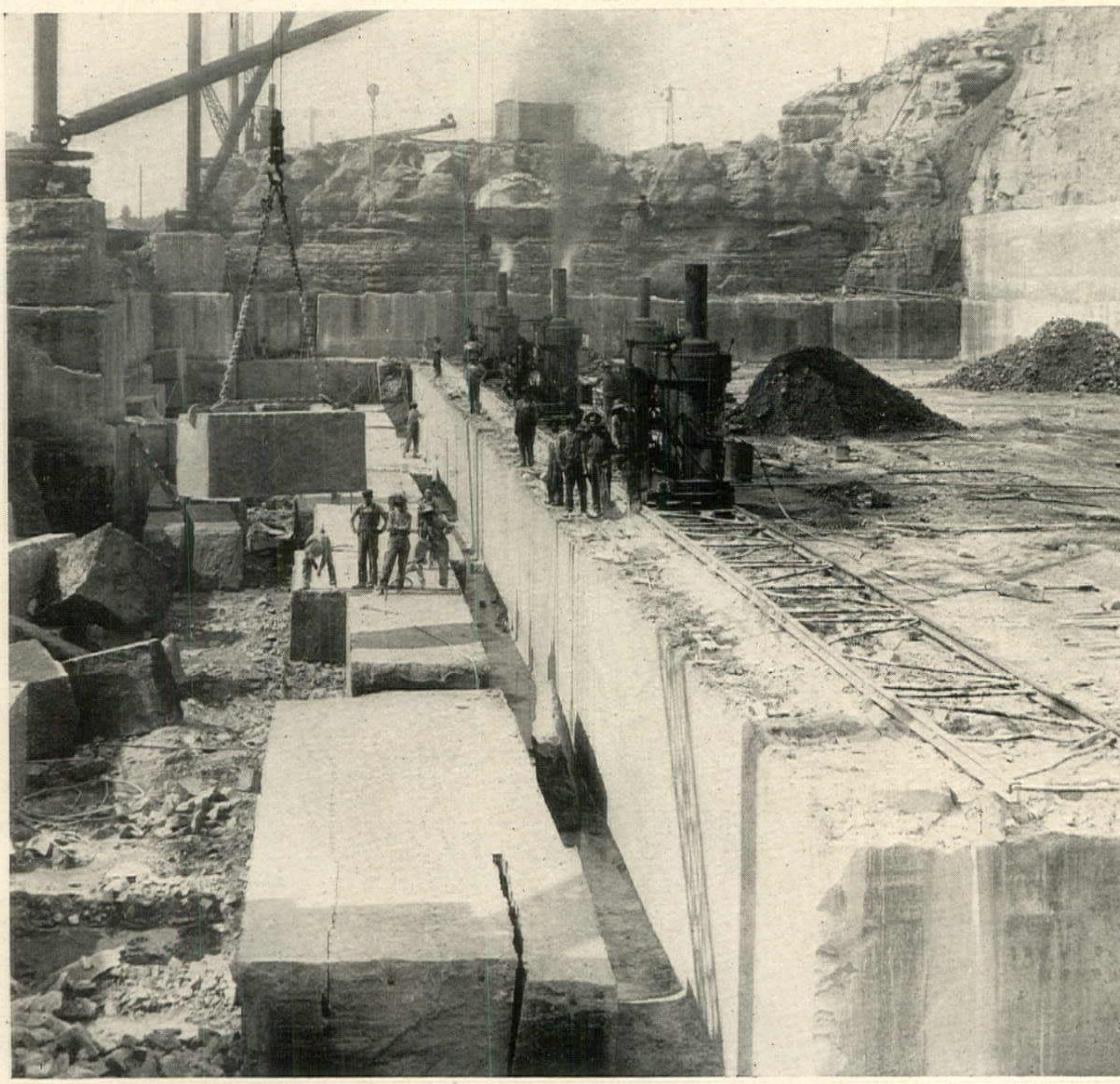


Fig. 2. General view of a limestone quarry

Showing the huge blocks of stone that are cut from the solid ledge by the channeling process and then split up in Mill Blocks for shipment to cut stone plants

Fig. 3. DETAIL VIEW OF DOORWAY IN L. C. HANNA'S LIMESTONE RESIDENCE AT CLEVELAND, OHIO
WALKER & GILLETTE, ARCHITECTS

A later article or chapter will be devoted largely to a brief historical sketch of the use of limestone in building construction and its effect on design, and an outline of the development of architectural practice with this material.

The remainder of the present chapter will be devoted to the material and its formation, and the classes or subdivisions into which it is divided by geologists.

Fig. 4. Corinthian Cap, carved from a single block of limestone

It is thought that the consideration of any material should be prefixed by a clear and concise definition of the various classes into which it is divided, with a general statement of the reasons for this classification of the product, and in the case of natural stone, a brief outline of the geology and economic importance of the products under consideration, their composition, origin and differences in formation, and consequent properties, appearance and comparable features. For a more complete or thorough discussion, the reader is referred to the various textbooks on the Geology of American Building Stones and to the reports issued by both State and Federal Government Departmental Surveys.

Limestones in General

Limestone is a so-called "aqueous" or sedimentary rock, composed principally of the mineral Calcite or calcium carbonate, of which the chemical formula is $CaCo_3$. It is formed by the accumulation of calcium sediment in a body of water, principally in the ocean or one of its seas, but also in certain bodies of fresh water.

Limestone differs from such other sedimentary rocks as sandstone, conglomerate and shale, in consisting almost entirely of calcium carbonate, which is popularly called carbonate of lime. While there is no essential difference in the technical terms, "calcite" and "calcium carbonate," which are frequently used synonymously, and no difference in the chemical composition, there is an untechnical popular usage of these terms which is considered appropriate. This consists of using the term "calcium carbonate" to designate the matter in its original practically non-crystalline shell or only slightly crystalline form, and the term "calcite" for this same matter in crystalline form.

In all forms of carbonate rock, we therefore have the same mineral matter as primary carbonate (shell remains) and often as both secondary and tertiary calcite (crystalline accretions thereto), the predominance of either form, that is the extent of crystallization, determining the appropriate use of the two terms.

Fig. 5. Corinthian Cap and Column, carved from a single block of limestone

At this point it seems appropriate to interject the statement that marbles, that is most marbles which are high in calcite, are converted limestone, i.e.—metamorphosed and recrystallized limestone and when of a pure, or reasonably pure calcium carbonate rock, are quite similar in composition to limestone. The marble, originally limestone has undergone a metamorphic change due to heat, moisture and pressure and in this manner has lost, either entirely or very largely, its original shell or other sediment grain formation, becoming either fully or very nearly crystalline in structure.

So-called marbles, which are only semi-crystal-

Fig. 6. DETAIL VIEW OF MAIN DOORWAY, ACADEMY OF ARTS AND LETTERS, NEW YORK CITY

McKIM, MEAD & WHITE, ARCHITECTS

Fine example of the recent use of limestone in monumental building line in structure, are not really marbles in the technical sense of the term, but are limestones that are sufficiently dense and hard to take a polish, due to the percentage of their basic matter which is present as Calcite rather than as primary calcium carbonate.

The line between marble and limestone is therefore a difficult one to draw, as the two merge into one another, and it is more nearly correct when designating monotone or neutral-toned, semi-crystalline calcareous building stones, to base the application of these terms on the trade usage of the material. The term "marble" being reserved for decorative stones, used principally for interior work, and the term "limestone" for that material used for general building purposes, principally exteriors, but including interior work in which the texture, natural color-tone and carved or sculpture detail is the principal feature or a factor governing its usage, rather than the colors and veining or other markings developed by polishing or honing of plain or moulded surfaces.

Fig. 7. Baptismal Font in St. Paul's Cathedral, Toronto, carved of limestone

Having thus explained the close relation of certain limestones with certain classes of marble, we will now proceed further to consider limestone and the several general classes into which it is divided.

In a previous paragraph, it was stated that limestone was composed principally of the mineral "calcite" or "calcium carbonate." There is a varying exception to this, in that stones composed principally both of calcium carbonate and magnesium carbonate are also classed as limestone, when the proportion of the magnesium carbonate ($Mg\ CO_3$) replacing the calcium carbonate ($Ca\ CO_3$), does not exceed a given proportion, since practically all limestone will have some small percentage of magnesium in its composition. When the magnesium carbonate does not exceed 10 per cent the stone is classed as limestone; when it exceeds that percentage, as Magnesium Limestone; and when it equals 30 per cent or more, as Dolomite.

Dolomite and Magnesium Limestones are not very generally used in the production of cut stone for building purposes, but this class of limestone rock is extensively used for burning into quick lime (lump lime) and for the production of hydrated lime for building and other purposes. Dolomitic marbles on the other hand are quite frequently used for ornamental work.

Composition of Limestone

Carbonate of lime is the principal constituent of shells and of corals, and it is largely to the accumulation of the shell remains of small to minute shell-bearing marine organisms, including corals, more or less broken and ground up into fragments of fairly uniform size by the action of the waves or currents, that limestones owe their origin.

Thus a limestone rock is formed of calcium carbonate generally in the form of calcareous sand grains cemented together with the same material, rubbed off of other shells or shell grains and dissolved by the water action, and then again redeposited from solution. Whereas sandstone is composed of quartz or silica sand grains, cemented or consolidated in various ways.

Many limestones and especially those most useful for building purposes may therefore be referred to as calcareous-sand rock. The Indiana Limestone or so-called "Bedford stone" is the outstanding domestic example of this formation, and will be described later.

The shells, when incorporated in the stone in their original form rather than as fragments, are known as fossils. Apart from the differences in composition already mentioned, the different varieties of limestone owe their difference principally to: *first,* their purity and freedom from an appreciable percentage of other mineral elements; *second,* to the form of aggregate or degree of fineness to which the shell fragments are reduced; *third,* the thoroughness of consolidation and cementing together of the grains; *fourth,* the freedom from interbedding of foreign matter in seams and consequent layering or stratification of the formation; and *fifth,* to the degree that crystalline

Fig. 8. THE MEMORIAL ARCH, NEW ORLEANS, LA.

An example of the use of limestone in purely monumental structure calcium carbonate or calcite is present in lieu of the primary so-called non-crystalline carbonate in its original form as shell fragments. Since the original shells may vary in size from several inches in length to microscopic dimensions, the fineness of grain of the stone may be due in part to the size of the original shells, as well as to the degree of grinding by wave or current action.

When this grinding has been so severe that the shell fragments are reduced to grains as fine as a powder, the deposit takes the form of a mud, and the consolidation of such a mass is termed a "chalk."

A partly consolidated stone formed of shells that are microscopic in size, is also called "chalk." When such a calcareous mass is mixed with ordinary mud or clay matter, the resulting consolidation is termed "marl." Very soft or poorly consolidated limestone with quite ordinary size grains is sometimes also called marl.

On the other hand, when the shells are not ground up, and especially where the large shells and other animal remains are well preserved in the solidification of the mass, it is often called a fossiliferous limestone, a shell rock or "coquina" a term that is also applied to recent coral rock formations.

When impurities are introduced into the mass prior to its consolidation, the stone will generally be qualified by a descriptive term. Thus, when silica sand is intermixed we have "arenaceous limestone," and when clay is intermixed "argillaceous limestone."

The Nummulitic Limestones of Egypt and Asia are simply limestones that have been consolidated from a deposit of fairly well preserved nummulite shells.

The term "oölitic" is a little more loosely applied. Theoretically this refers to a calcareous sand rock, in which the grains are decidedly rounded, or in the form of small pellets resembling the roe of a fish, these grains having been formed by the crystalline growth of calcite around an original microscopic shell or shell fragment, and the mass later cemented together with calcite. The European oölites are generally of this type. The principal American oölite or oölitic limestone, is found in Southern Indiana. Formerly this was called "Bedford stone," but is now almost invariably referred to as "Indiana Limestone." There

Fig. 9. The Northcott Memorial, Springfield, Ill.

Ernest Bruce Haswell, Sculptor

A fine example of low relief carving in limestone are numerous other limestone formations in the State of Indiana but only the well known oölitic stone of Lawrence and Monroe Counties that is used so extensively for building purposes, is implied by the term "Indiana Limestone."

A somewhat similar deposit, more or less impregnated with asphaltic oil, is found in Kentucky and there are other somewhat similar deposits at several points in Alabama, Missouri and Texas.

The Bedford oölite is composed almost entirely of shells and shell fragments, and is unlike the European oölite in that the grains are less rounded and are not to such an extent the result of crystalline growth around an original fine particle of carbonate. The grains show a coating of secondary calcite, however, and in certain parts of the deposit the rounded oölitic formation is more evident than in others, justifying the term oölitic, which was first applied specifically to this stone by a state geologist in 1857.

The principal differences between the nummulitic limestones of Egypt, which were so extensively used by those ancient builders, and the oölitic limestone of Southern Indiana that is now so extensively used in America, apart from such differences in mineral composition or purity that may exist, can be briefly stated thus:

The nummulitic stone is a deep sea water deposition composed primarily of nummulite shells and shell fragments; and being a sea water deposit also contains some salt. This is an Eocene or early Tertiary deposit, roughly about 4 million years old, according to the generally accepted geologic time table.

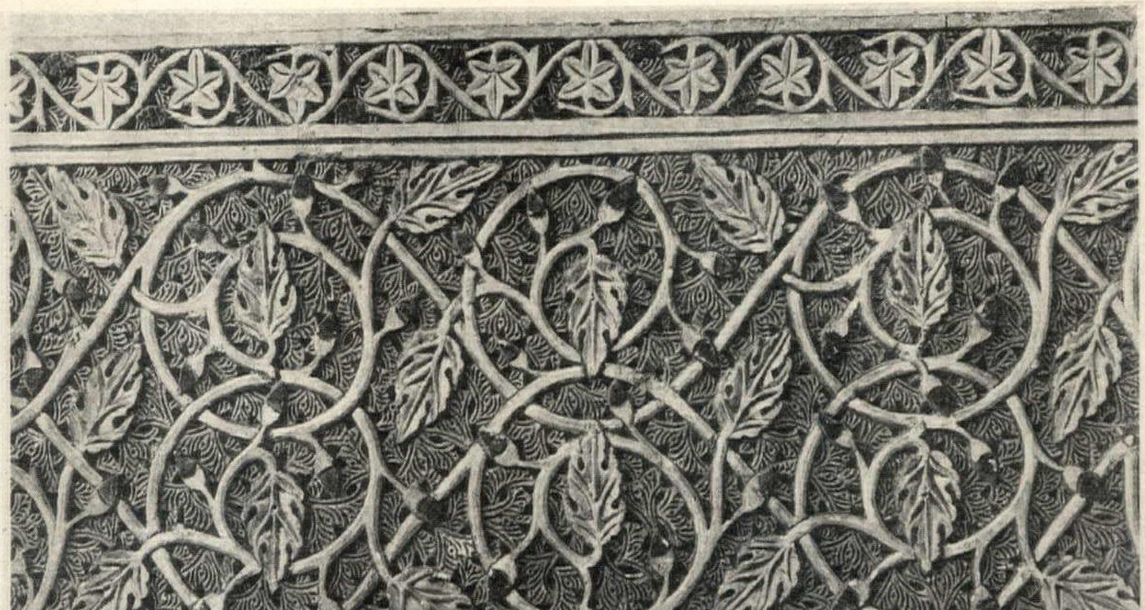
The Indiana oölitic stone is on the other hand a shallow fresh water deposition, composed principally of a low order of foraminifera, like tiny clams, mostly intact, with species of *Bryozoa, Gasteropoda* and *Braceopoda* and other fossil shells, all cemented together with calcite. This is a Mississippian or Sub-Carboniferous (late Paleozoic) deposit, roughly somewhere around 18 million years old according to the same geologic time table.

The oölites of Europe are mostly Jurassic or Cretaceous (late Mesozoic) deposits, roughly from 5 to 7 or 8 million years old according to the same table.

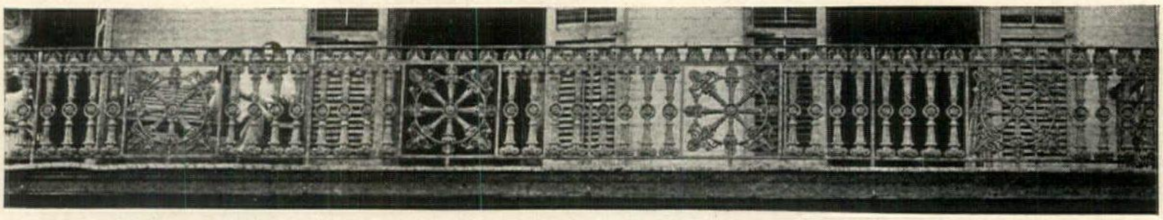
The American stone is therefore much the oldest of these limestone rock formations.

The several illustrations which accompany this article while having no direct bearing on this particular chapter of the series will be referred to in later articles in the series.

In the next article the physical properties and other characteristics of limestone will be discussed and this will be followed by a historical outline of the use of limestone in building construction and its effect on building practice.



Spanish Plasterwork—Second half of XIV Century



Gallery rail, Bourbon Street

ORNAMENTAL IRONWORK *of* NEW ORLEANS

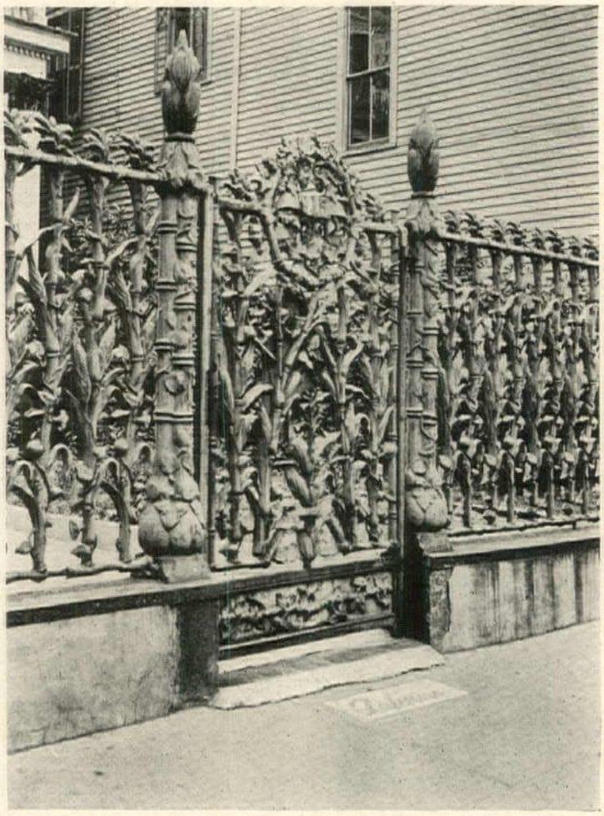
BY I. T. FRARY

ONE who has visited the city of New Orleans can never forget the lavish use of ornamental ironwork on the exteriors of the old buildings. It is found in greatest profusion in the streets of the Vieux Carré, or old French Quarter, where extraordinary ranges of ornamental galleries clothe the street fronts with lacy creations of fanciful design.

Because of the narrowness of the streets, the "galleries" are supported by brackets or by slender iron columns of gas pipe proportions. Above these simple supports the designer's fancy ran riot in all manner of treatment of balustrades, pilasters, crestings and other architectural features, the inspiration for which was drawn from practically every French period, from the Gothic down to the First Empire.

Most of the work is delightful in effect and surprisingly well executed. Although much of the sharpness has disappeared under countless coats of paint, occasional examples that are not thus submerged, show modeling that is sharp and crisp, and casting of excellent quality.

Perhaps the most extraordinary example of cast ironwork to be found here is the famous corn stalk fence. The design is a naturalistic treatment of corn stalks, complete with leaves and ears of corn, growing from a conventionalized stalk, laid horizontally at the bottom, and tied to a similar one at the top, the tassels projecting above and forming a cresting. The effect of naturalism is enhanced by little vines which clamber up the stalks. The gate posts are of conventionalized stalks grouped like clustered columns. These also have the vines twining about them and are surmounted by finials in the form of grouped ears of corn. The member which binds the design together at the top, and to which the stalks are tied, is developed into a large ring in the gate, within which are a wreath and flowing ribbon.

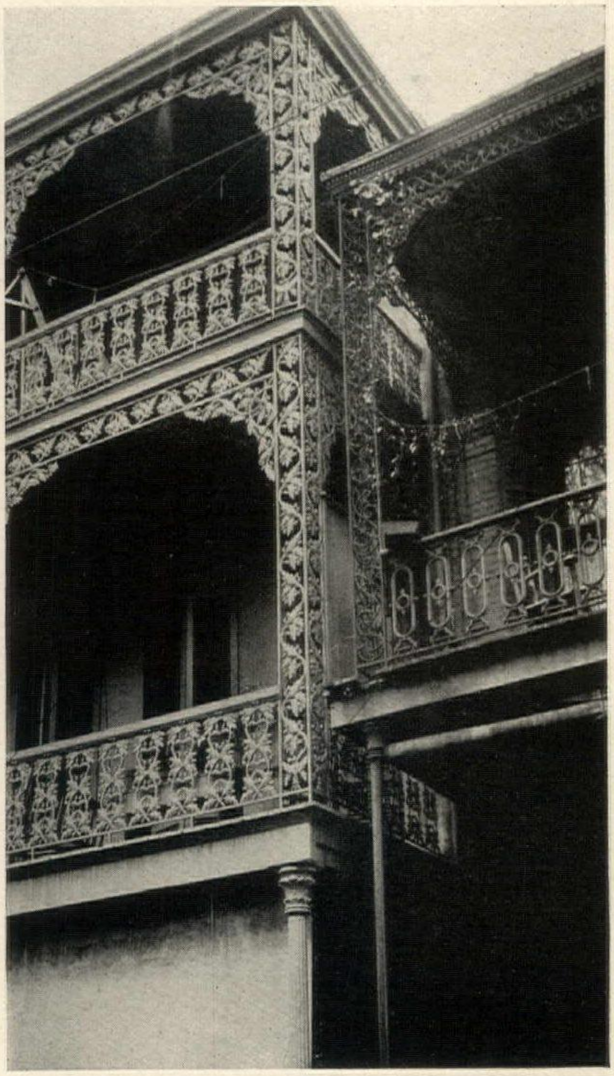


"Corn stalk" Fence, Royal Street

One example of this fence is located near the lower end of Royal Street in the old French Quarter, and a duplication of it is to be found uptown on Prytania Street in the "Garden District." Here a corner post has been worked out with the conventionalized corn stalk motif on the four angles and a bas relief filling the panels between.

This curious design, although it violates most of the canons of art as we are taught them, is so ingenious that it cannot but command the admiration of the most astute stickler for the conventions. Is it possible that this fence was designed by Latrobe, who is credited with designing the corn stalk columns in the Capitol at Washington, and who constructed the water works system of New Orleans?

The extensive use of ironwork in the old part of the city can undoubtedly be traced to a desire for fireproof materials as a precaution against conflagrations such as nearly wiped out the city in 1788 and again in 1794. Then, too, the fact that the city was under Spanish rule at that time and was reconstructed under the personal direction of

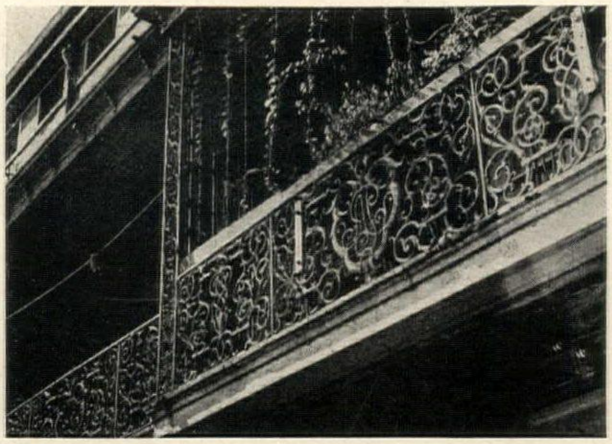


Galleries, Royal Street
Each property owner built to meet the floor levels of his own house

a Spanish governor would naturally suggest the use of a material in the use of which the Spaniards were so adept.

There were formerly many fine examples of wrought iron in the Vieux Carré, but many of these have, unfortunately, been removed. The wrought iron was undoubtedly contemporary with the buildings which it enriched, but the cast iron is of much later date. It is questionable whether any of it antedates 1850; in fact the gallery railing on the Pontalba Buildings, which were erected in 1849, is said to be the earliest example of this work in the city.

During the next ten years the bulk of New



Wrought iron at its best

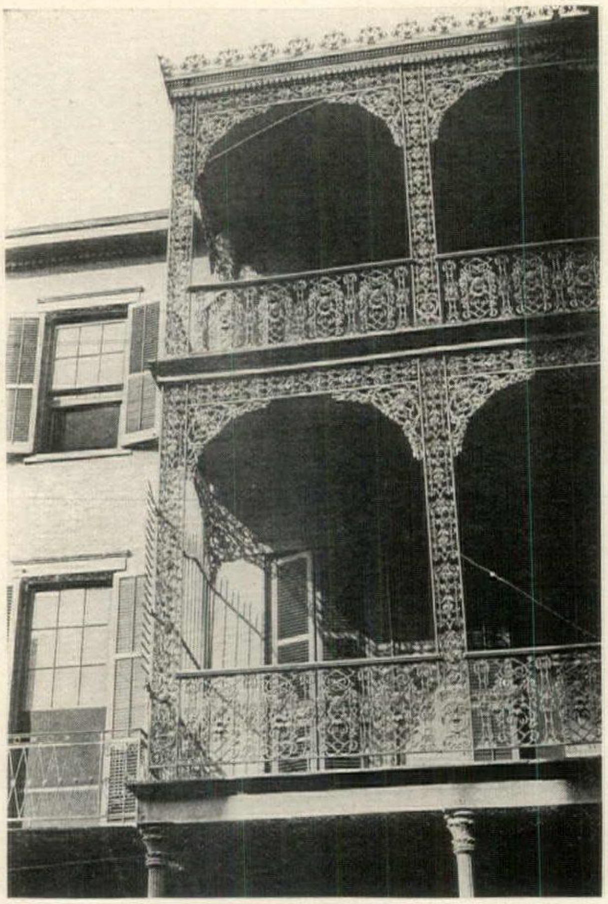
Orleans' cast iron galleries was erected. They were designed by local architects, the patterns were cut by local carvers of exceptional skill, and the castings were made in foundries, some of which are still in existence.

With the blight of the Civil War, fortunes dwindled, and arts such as this ceased for lack of support. Instead of producing new patterns the old ones were recast, catalogs were issued and cast ironwork commercialized until its artistic quality was to a large degree lost. As a result of selling

Gallery rail, Ursuline Street

from catalog, most incongruous minglings of styles are found, in which Gothic, Renaissance and Empire details hobnob in a most delightfully democratic fashion.

In the old quarter where the houses are built solidly to the sidewalks, the galleries often cover the entire fronts continuously for considerable distances, but with an entire disregard for continuity of effect. Each property owner built to meet the floor levels of his own house and to gratify the dictates of his own taste, regardless of the effect upon his neighbors. Thus we find abrupt changes in levels of adjoining galleries and to emphasize the disregard of neighborliness, insurmountable barriers, with discouragingly sharp points sticking out, put a stop to continuous promenades. This apparently unfriendly attitude may have been dictated by the possibilities for juvenile marathons had the passageways been left continuous.

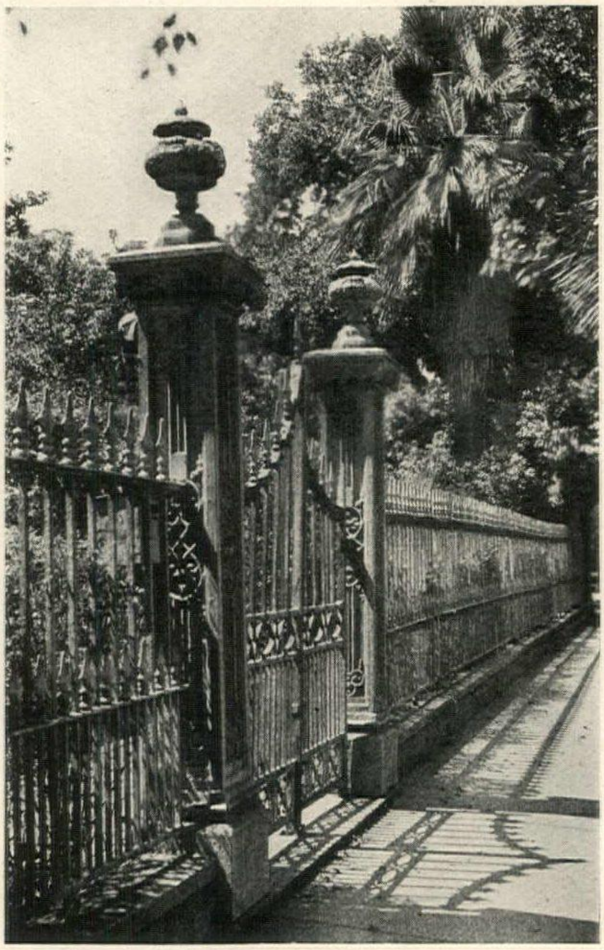


Galleries, Conti Street

The use of ornamental cast iron was not limited to the Vieux Carré but was common throughout the city, particularly in the newer "Garden District" where it was used indiscriminately on houses of all sorts.

There is an amazing variety of pattern and range of styles, and as has already been mentioned, there is scarcely a period of French art that has not left its impress here, though more or less modified in the process of transplanting.

The "Iron Age" of New Orleans occupies an interesting place in our national architectural history, and although the same use has been made of the material in many other cities, there is none probably where it has become so dominant a feature as here. Ornamental ironwork is as inseparably associated with New Orleans as is marble with Rome, and it is to be hoped that instead of permitting it to disappear and be superseded by other types and materials, as seems to be the tendency now, a local pride in the old traditions will dictate the perpetuation of ornamental cast iron as a definite feature of the city's future architectural development.



A New Orleans cast iron fence

EDITORIAL COMMENT

THE NECESSITY for an architect, in his relation to manufacturers of building materials or equipment, to be, like Cæsar's wife, "above suspicion," is conceded by everyone. What is true of the individual is true of an architectural organization and the propriety of such a body receiving financial support from manufacturers of materials subject to specification, has always been questioned by the thinking element of the profession. We are gratified, therefore, to note some promise of the eventual separation of the Structural Service Department from the *Journal of The American Institute of Architects.* As heretofore conducted, this department has been ethically unsound.

* * *

ZONING CRDINANCES are today recognized as a necessity. They safeguard and enhance the value of real property as well as the well-being of the occupants of buildings. The adoption of a zoning ordinance by the city of Chicago is a matter of prime importance, especially to architects, as it vitally affects the design and construction of buildings. Architects everywhere should be active in the promotion and formulation of such legislation.

In order to acquaint them with the general terms and limitations of this, the latest ordinance of its kind to be adopted by a great city, THE AMERICAN ARCHITECT prints in this issue a digest and illustrative diagrams of its principal provisions.

Chicago is fortunate in having the experience of New York, St. Louis, Milwaukee, Newark, Cleveland, Philadelphia and Pittsburgh to guide it in this work. It was also fortunate to have as chairman of the Commission, Charles Bostrom, Commissioner of Buildings, and as secretary, Charles H. Wacker, Chairman of the Chicago Plan Commission and as consultants on zoning, Edward H. Bennett, A. I. A. and William E. Parsons, A. I. A.

* * *

THREE NOTABLE art exhibitions in Washington were many times visited by delegates to the last convention. These exhibitions are the Corcoran Gallery, the Freer collection and the National Academy of Art. In the latter, the people of this country have the nucleus of an art collection that could be made as fine and as valuable as any in the world. The Corcoran Gallery, representing every phase of art in this country, has large possibilities, retarded by influences that mark, and mar, the progress of art in this country. The Freer Gallery, a beautiful building by Charles A. Platt, houses the splendid collection of pictures and examples of Eastern art, generously given to the nation by Mr. Freer. This collection, by the terms of the gift, will always remain a separate unit. It is the National Gallery of Art that the people of this country should in the future regard as a national possession to be proud of.

W. H. Holmes, director of the National Gallery, identified for many years with the best development of national art, in addition to his fine abilities as an executive, is also a painter of unusual merit. In a recent article, contributed to *The American Magazine of Art,* Mr. Holmes asks, "Shall America have a National Gallery of Art?" Commenting on the growth of the present collection and the difficulties of further enlargement due to lack of funds to provide for its care, he states, "Strangely enough, no single work of painting or sculpture has been acquired for the National Gallery of Art by purchase with funds provided by the national Government."

Such a condition on the part of our Government is in marked contrast to that of countries in Europe. There is now as strong a disposition as in the past, on the part of patrons of art, to give generously from their collections to this National Gallery. The shame of it is that the nation cannot accept such gifts for the reason that there are no accommodations for them nor any fund to provide for their care.

"Our people," says Mr. Holmes, "as a natural result of our birth and rapid material advancement, think first of material and political interests, and art has had, until now, little place in their thoughts."

While Congress is appropriating large sums of money without patriotic motive, and altogether for political reasons, it fails to lend a listening ear to the needs of one of its important departments. It is a national scandal that a condition should arise that makes it possible for the director of the National Gallery to appeal to the people to use influence on Congress in a matter of this sort. This purely sordid attitude cannot much longer continue. Continuance would be materially shortened if the people would, through their many important art organizations, let Congress understand that there is a rapidly growing sentiment that may not much longer be ignored.

It is unfortunate, but true, that politicians are eager to meet the views of constituents only when party success or self interest is menaced.

The National Gallery of Art should receive the support of Congress. Its wall space should be greatly enlarged and the maintenance of its collections should be guaranteed by an ample fund.

The present growth and maintenance are largely due to Mr. Holmes' fine ability and the confidence and respect with which he is held by art lovers everywhere. Given a proper building and an adequate fund, under such competent directorship, the National Gallery of Art would at once assume its proper place as a representative gathering of art.

Architects everywhere are naturally very greatly concerned in these matters. There can be no more laudable effort than one that would seek to show the next Congress its duty to itself and to the people it has in these matters so long failed correctly to represent.

FORTY YEARS AGO

Excerpts from The American Architect, July 14-28, 1883

A SOMEWHAT remarkable meeting was held in New York two weeks ago, under the name of the First National Convention of Master Plumbers, which was composed of delegates from nearly all parts of the United States, and probably represented pretty fairly the whole plumbing trade. * * The very first task after the nomination of officers was to make a totally uncalled for assault upon the sanitary engineer by means of a document spread upon the minutes of the convention. This compared "the old time steady and conservative plumber" favorably with the "new excrescence on the body politic" who are also called "magniloquent braggarts and book taught experts." The fact that "the unlucky plumber is relegated to the humble position of a mere fitter-up of whatever fantastic ideas or notions have been evolved from the brain of the sanitary expert" called for "emphatic condemnation" by the convention against "this abuse."

* * *

The Governor of Colorado has decided not to call an extra session of the Legislature to repeal the original capitol building program and substitute a less objectionable one. It was not considered advisable to expend the sum of seventy-five hundred dollars for this purpose and the matter will be deferred until the next meeting of the Legislature in 1885. Meanwhile, the drawings submitted in competition have been returned to their unfortunate authors, the total result of whose efforts has thus been to advertise themselves as persons of character or attainments so inferior to those of other architects as to induce them to accept terms which all respectable members of the profession rejected at once.

* * *

The German architects are engaged in a discussion in regard to a revision of their present schedule of charges, which has been in use for fourteen years, and is now found inadequate for its purpose. The Austrian members of the profession have been the first to propose a change, their proposals being published in the *Bauzeitung*. The main provisions are about the same as those in use in all other civilized countries, the variations applying mostly to minor matters, about which English and American schedules say nothing. They follow: All disputes between architects and their clients should be left to a Court of Arbitration of the Austrian Engineers' and Architects' Association for determination. This suggestion would not commend itself to English speaking clients, who can generally count on a curious prejudice against architects on the part of judges and lawyers, and a dense ignorance of the whole subject on the part of juries, to warp justice in their favor; but it has, for all that, a good deal of merit. The eleventh article prescribes the fees for office consultations, the price for a question and "simple reply" being two dollars, and the remuneration increasing with the difficulty of the subject on which advice is sought. For business on which the architect has to work after seven o'clock in the evening, his fees are doubled; and in measuring or other outside work where the architect is accompanied by an assistant, the services of the latter are charged for at half the price of those of the architect himself. In estimating traveling expenses, the architect is to be entitled, when he has to take a carriage, to use one with two horses and charges also for first class fare on railway trains and boats; but an assistant is expected to travel on land in a one horse carriage or a second class compartment on railways, although entitled to first class accommodations on steamboats.

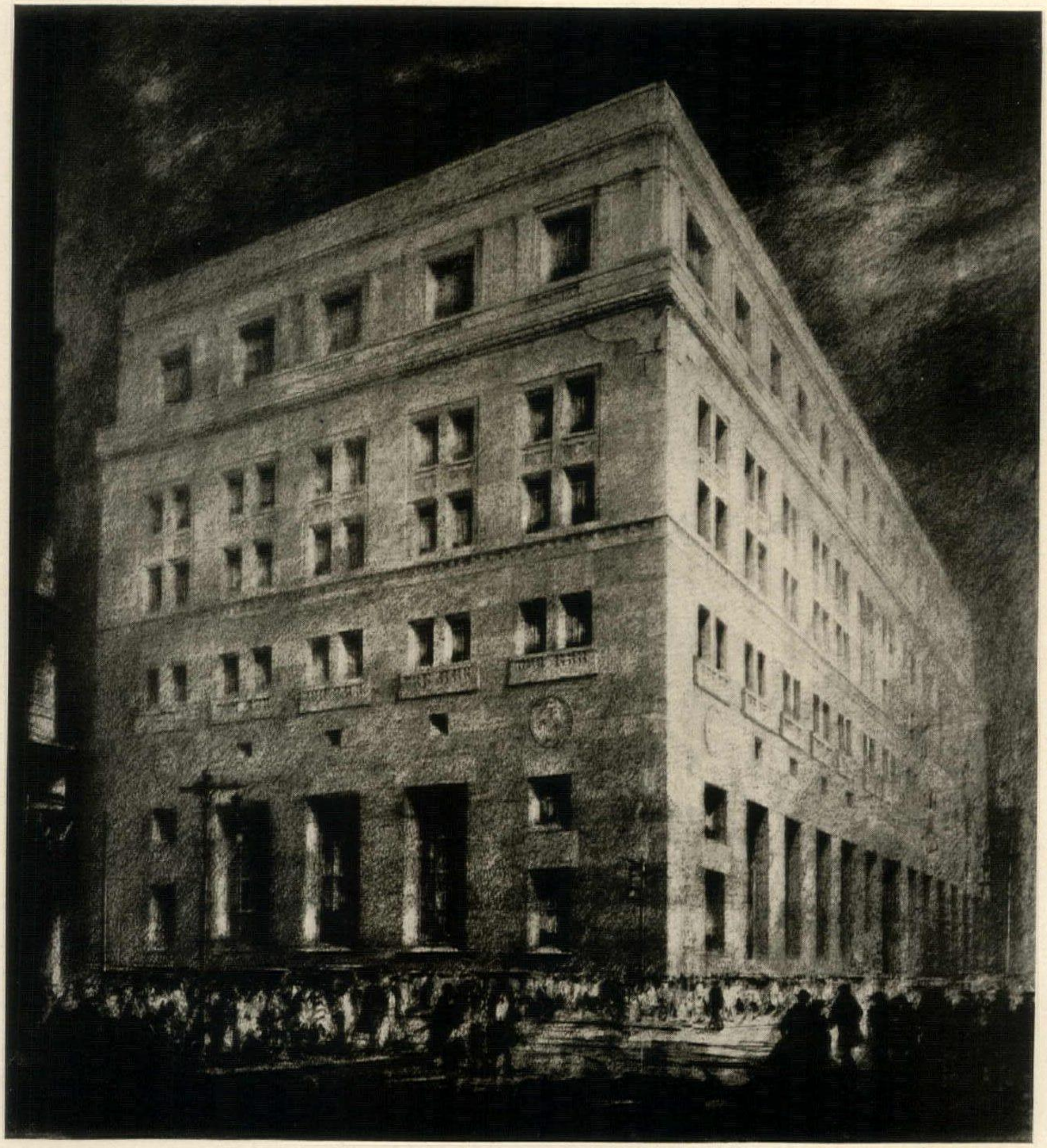
* * *

Chicago, July 5, 1883

To the Editors:
Dear Sirs:—

Can you refer me to any work on the subject of the construction of factory or boiler chimneys?

Yours truly,
S. A. Treat

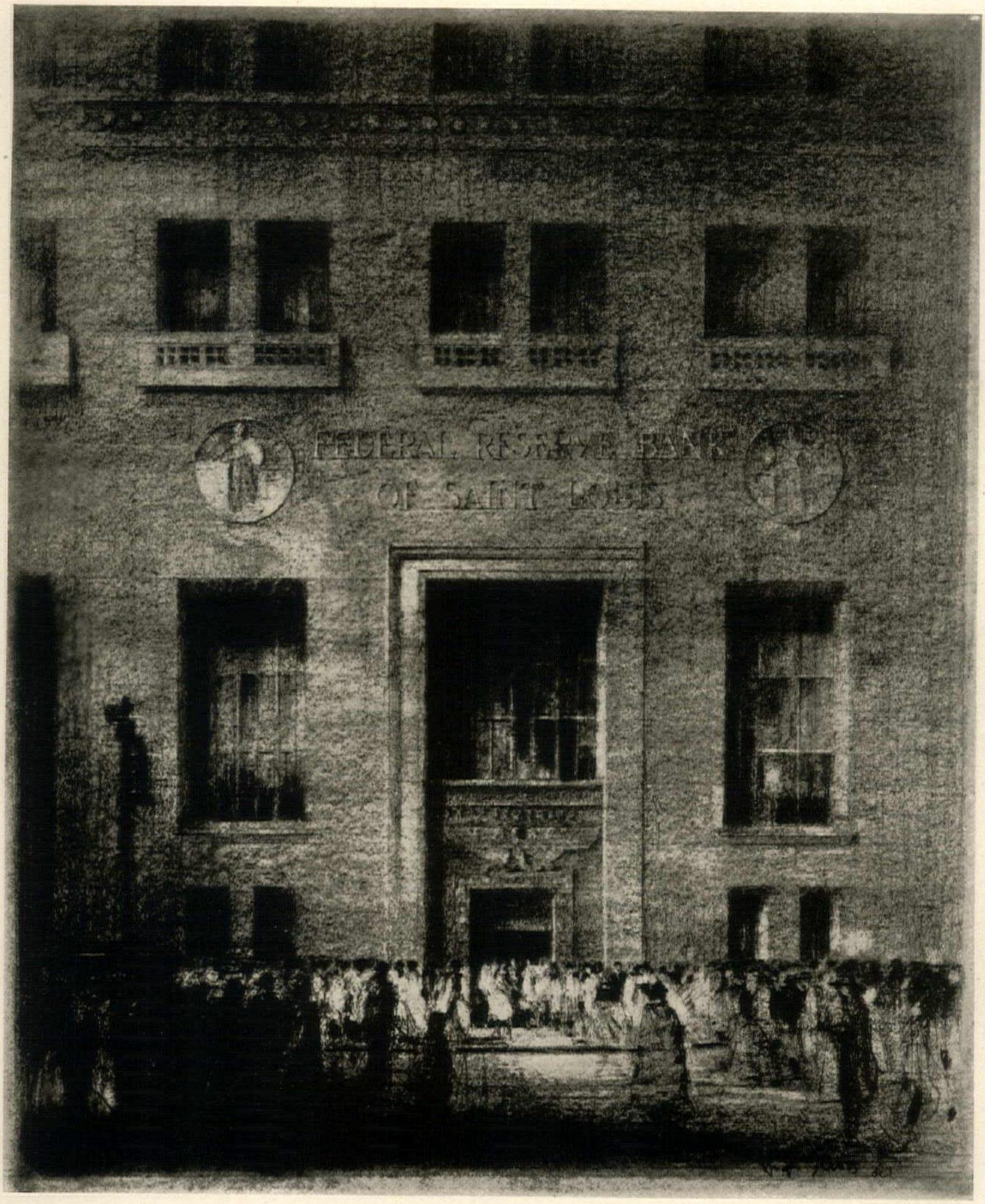


FEDERAL RESERVE BANK OF ST. LOUIS, MO.

MAURAN, RUSSELL & CROWELL, ARCHITECTS

(Reproduced from the original drawing by Hugh Ferriss)

VOL. CXXIV, NO. 2424 THE AMERICAN ARCHITECT—THE ARCHITECTURAL REVIEW JULY 18, 1923



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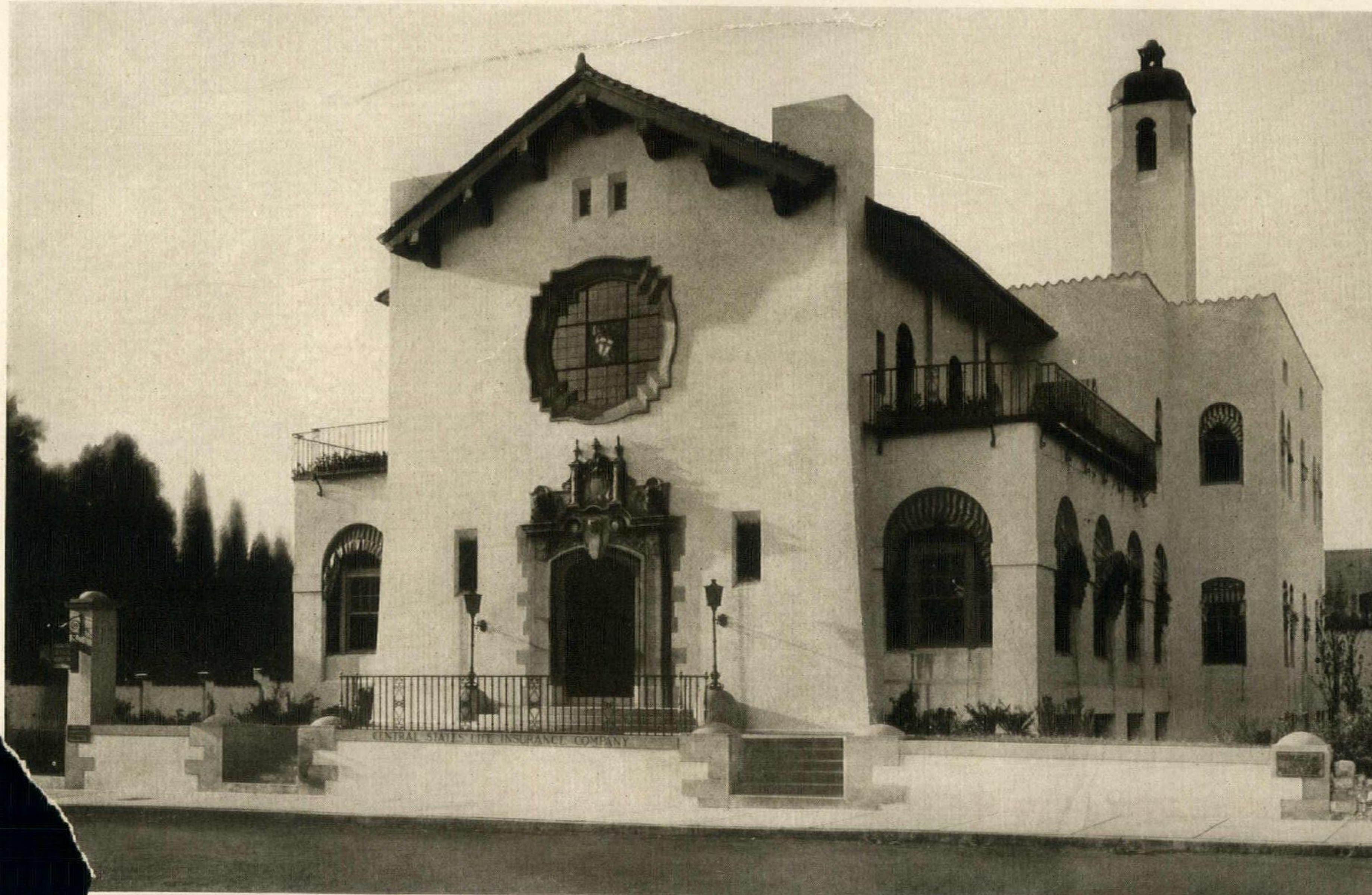

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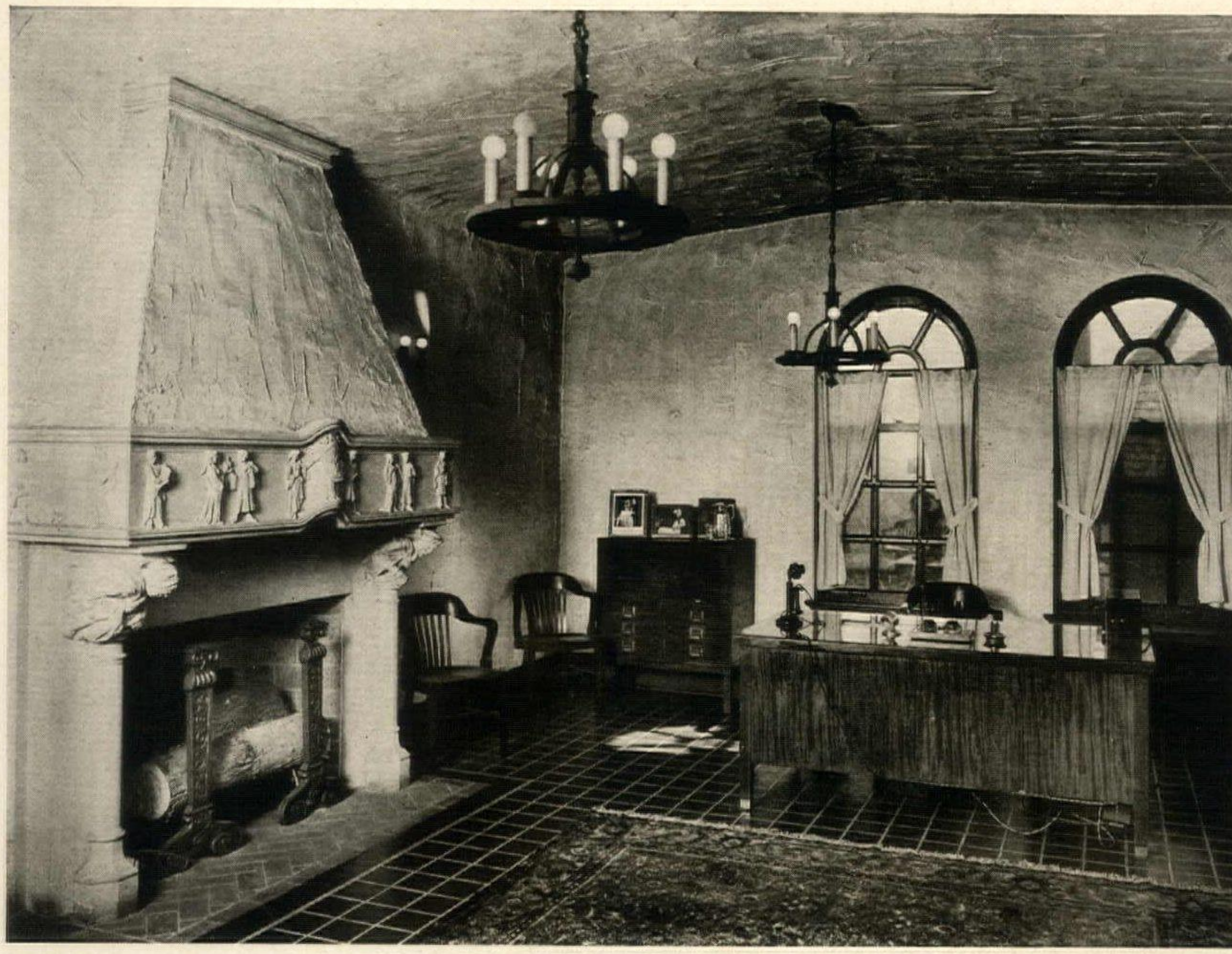

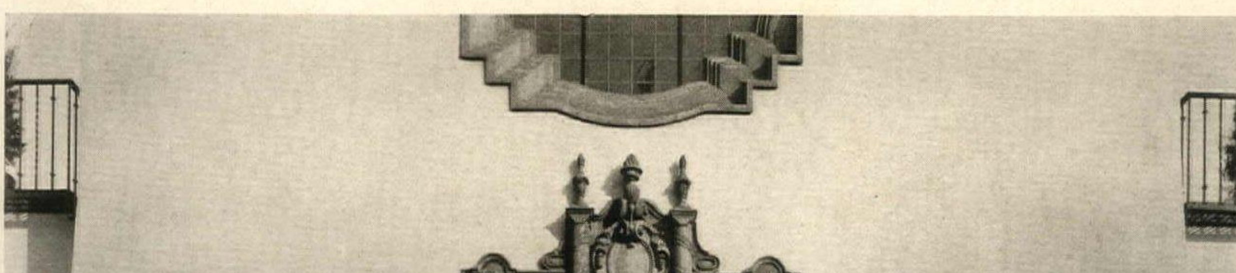

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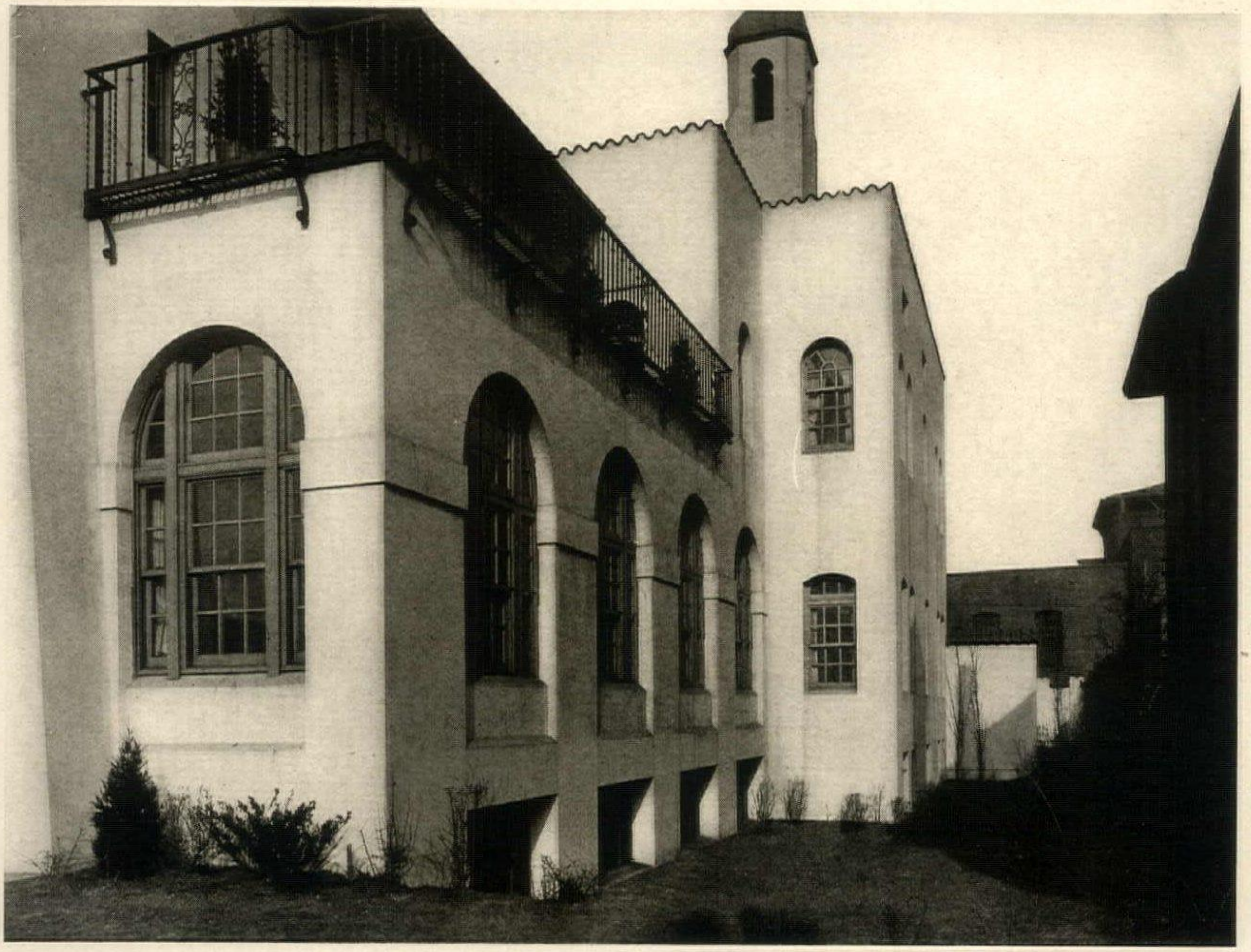

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MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK

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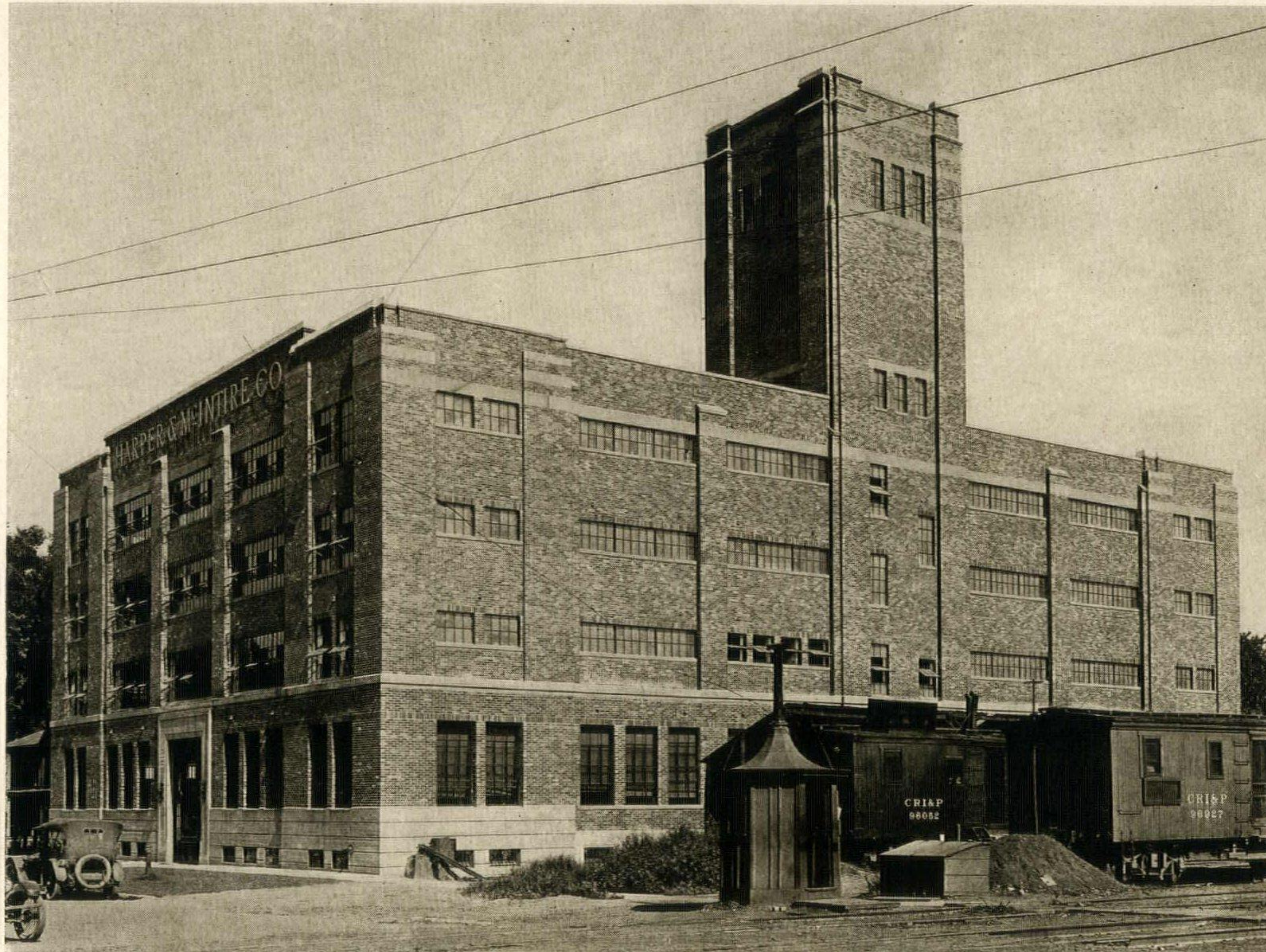
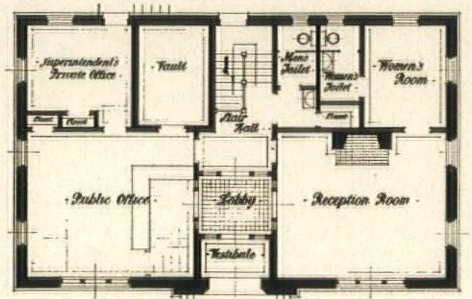
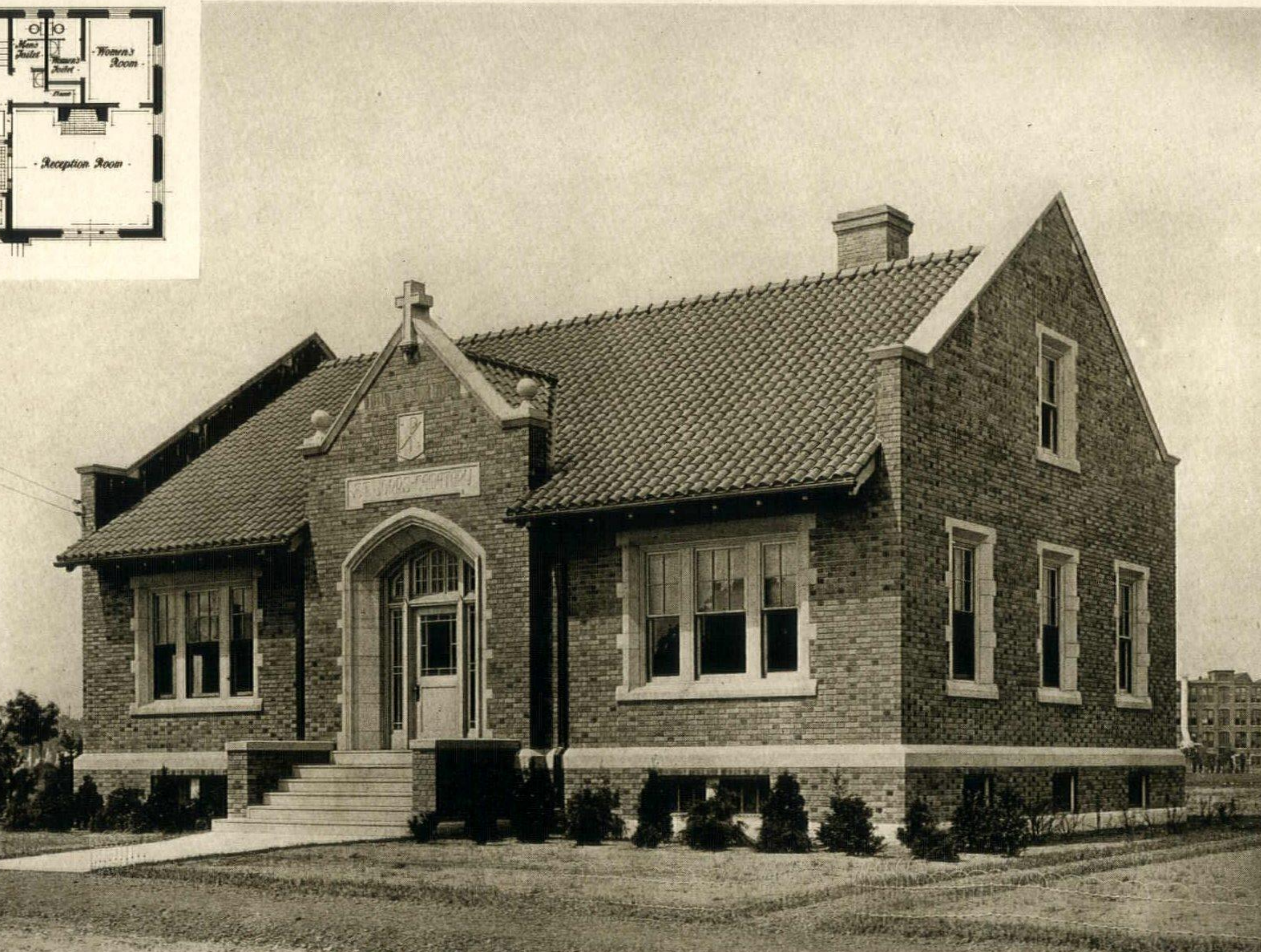


HARPER & McINTIRE WAREHOUSE BUILDING, CEDAR RAPIDS, IOWA

CROFT & BOERNER, ARCHITECTS AND ENGINEERS



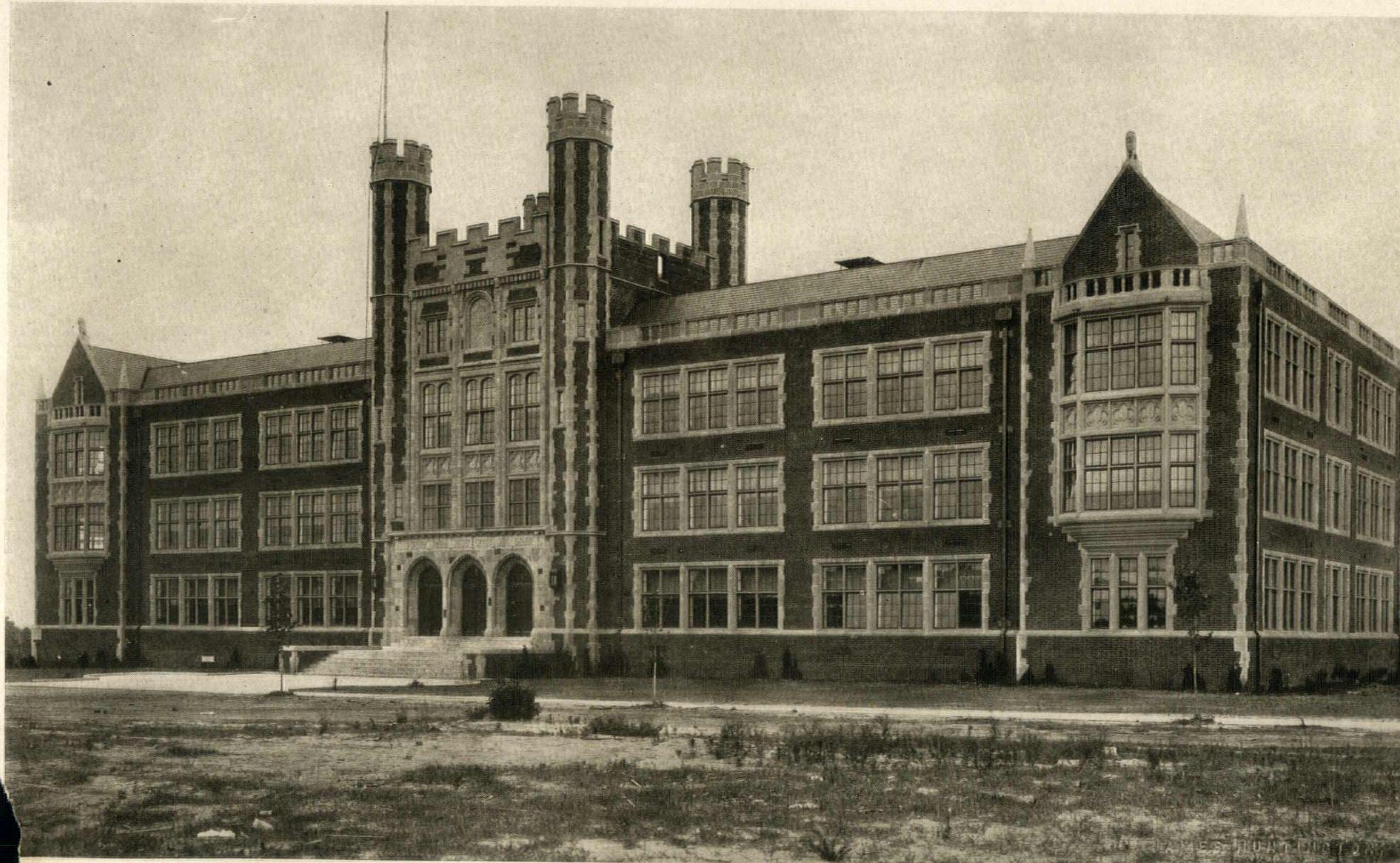


OFFICE BUILDING FOR ST. JOHN'S CEMETERY, WORCESTER, MASS.

JNO. WM. DONAHUE, ARCHITECT

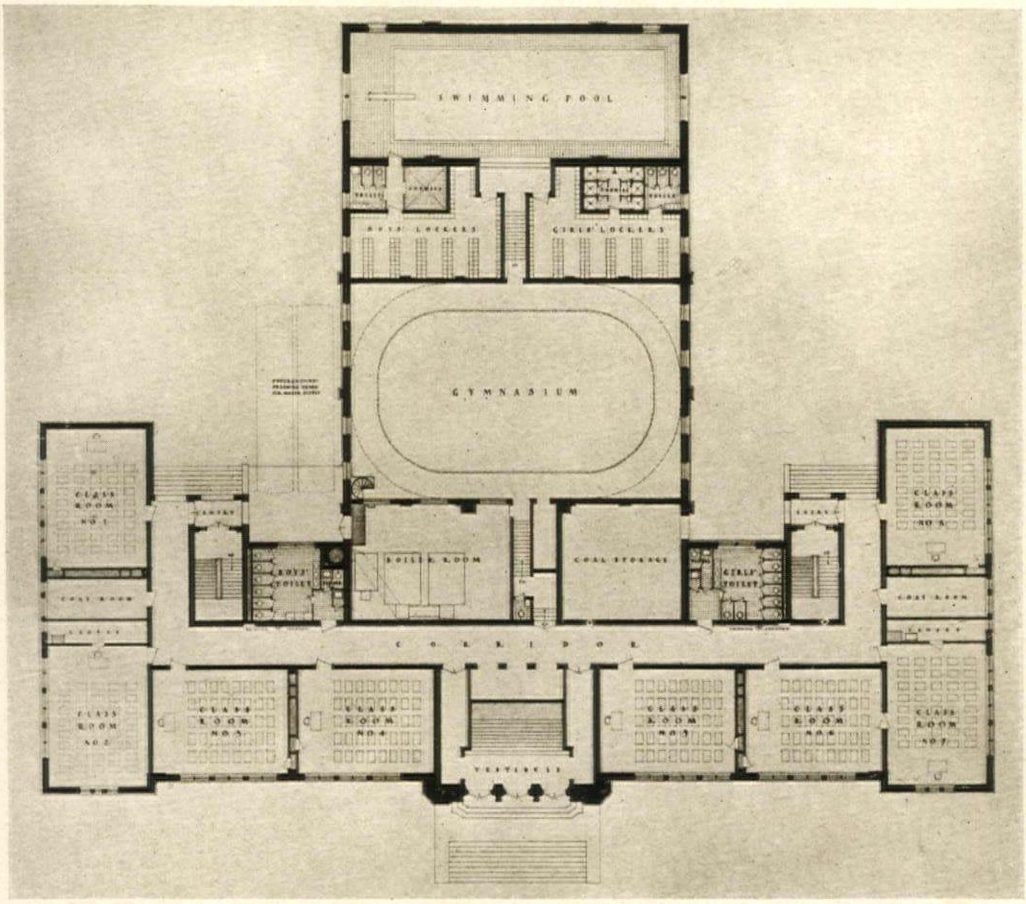
WALTER BARKER MEMORIAL HOME FOR THE FRIENDLESS, PEORIA, ILL.

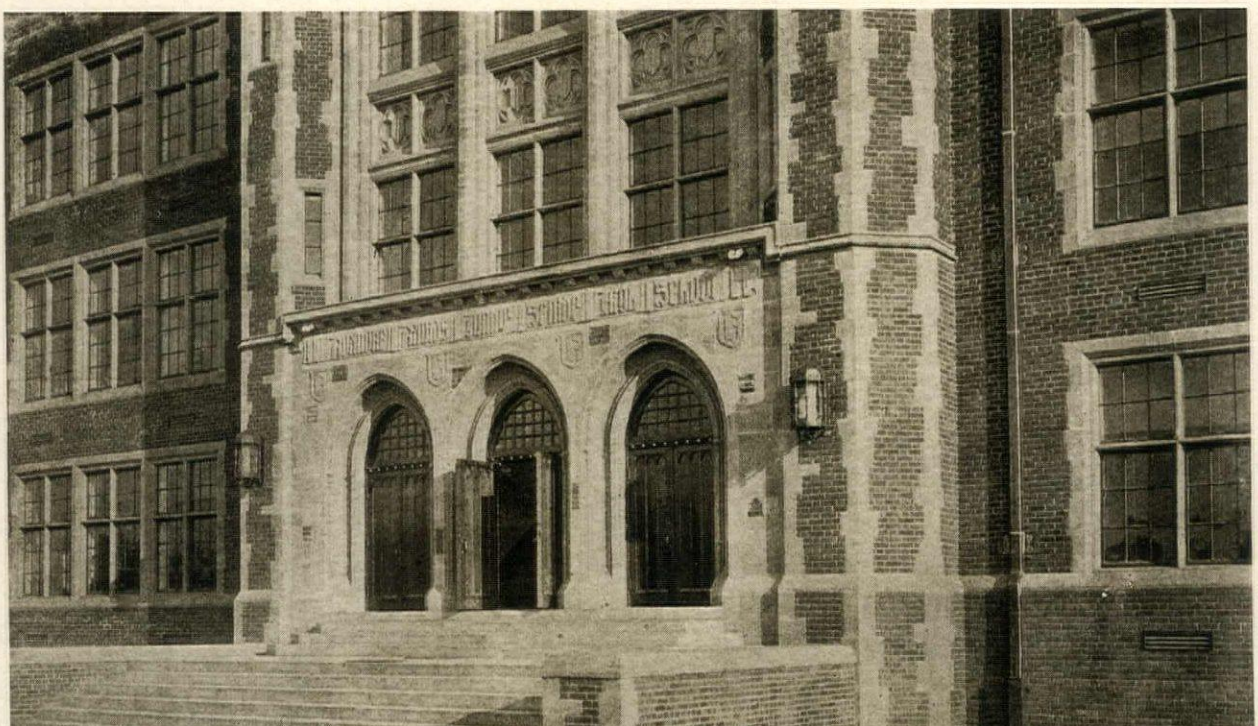
HEWITT & EMERSON, ARCHITECTS



JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBART B. UPJOHN, ARCHITECT

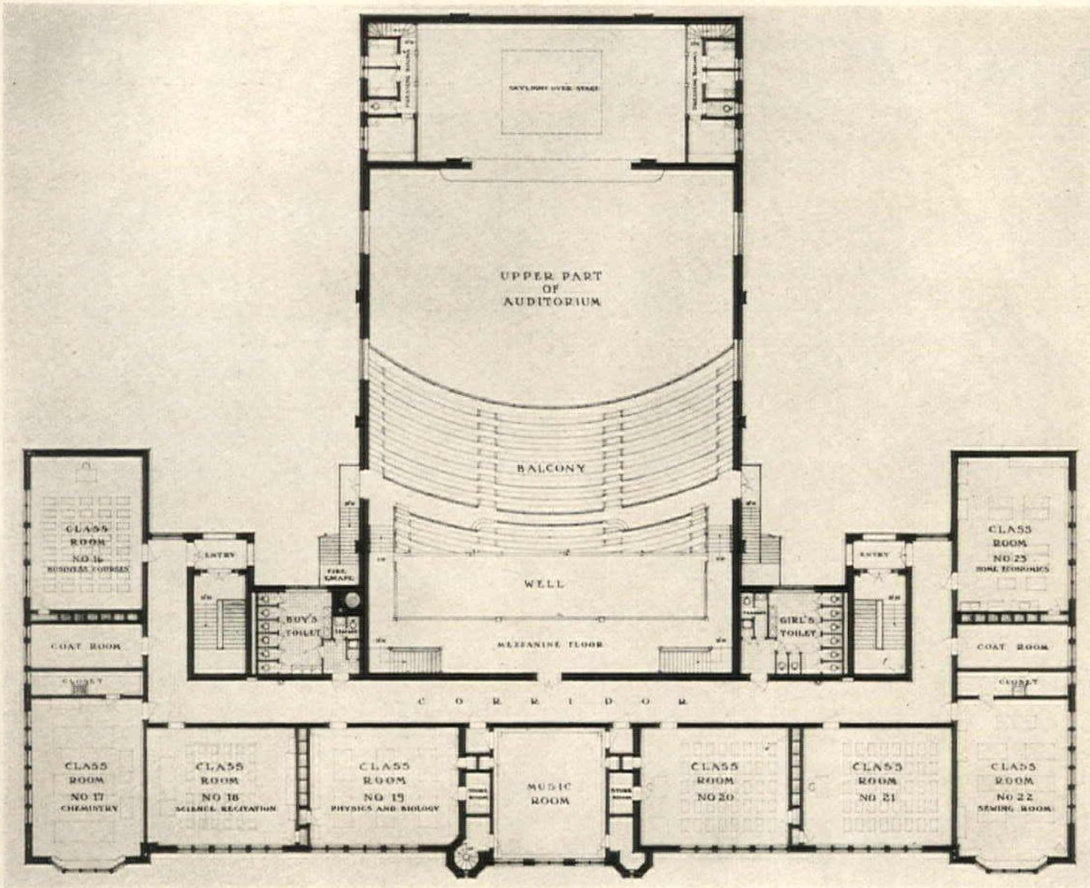


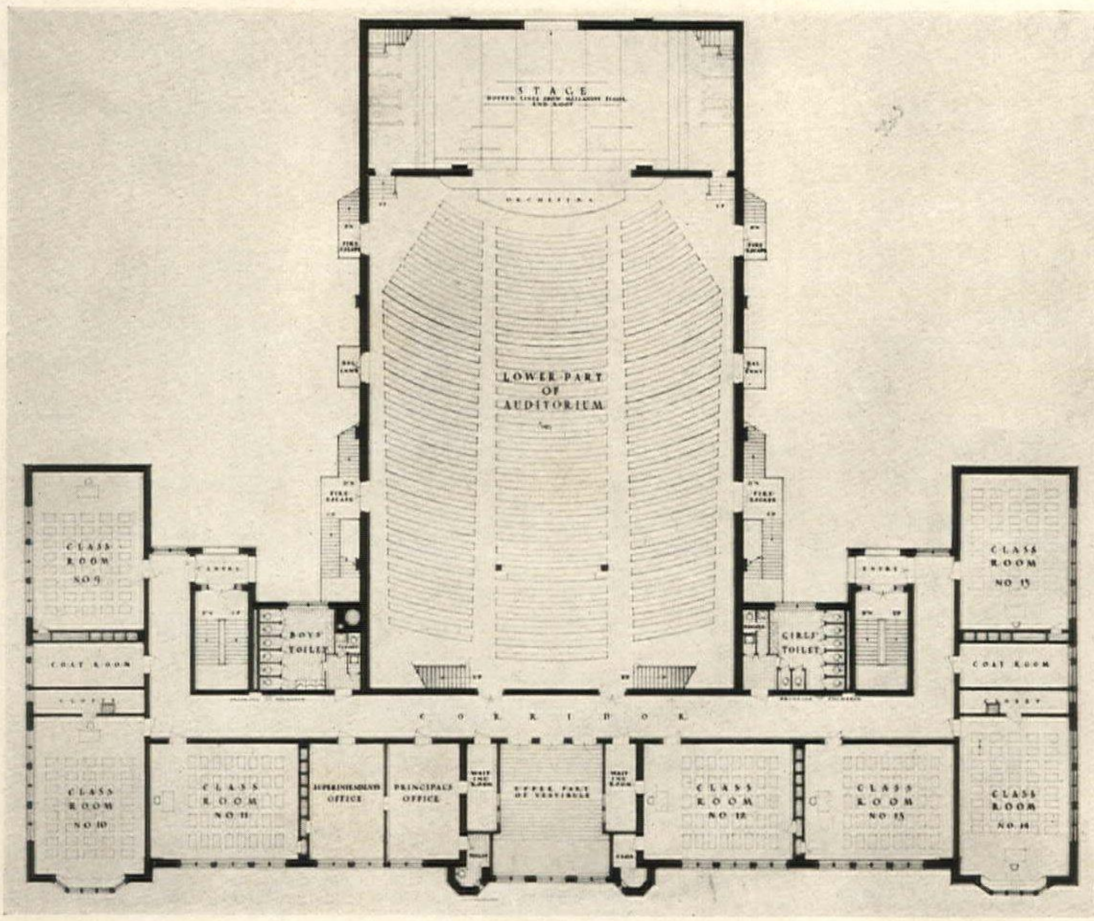


FIRST FLOOR PLAN AND MAIN EN

JUNIOR-SENIOR HIGH SCHOOL, ROAN

HOBART B. UPJOHN, AR





SECOND AND THIRD FLOOR PLANS

JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBART B. UPJOHN, ARCHITECT

JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBART B. UPJOHN, Architect

THIS building was erected by the Board of School Trustees of Roanoke Rapids and is dedicated to the memory of the young men of Halifax County (in which Roanoke Rapids is situated), who gave their lives during the World War.

Anyone familiar with this section of North Carolina will be surprised to note the size of this building, in comparison with the population of the town. The building is located between the two small towns of Roanoke Rapids and Rosemary, and the combined population of the two is in the neighborhood of three thousand people. This is an example of the spirit that is being carried on throughout the South today.

The building contains twenty-four classrooms, including a manual training room and a chemical and biology laboratory, as well as a music room. The main façade is two hundred and ten feet long and the wings are seventy-nine feet deep. There is an auditorium in the rear extending ninety-five feet. It is seventy-six feet wide.

This auditorium has a seating capacity of two thousand people and is fitted with a stage twenty-seven feet deep which has a proscenium arch of thirty-two feet by twenty-eight feet. The stage is equipped with complete dressing rooms, located on the mezzanine floor.

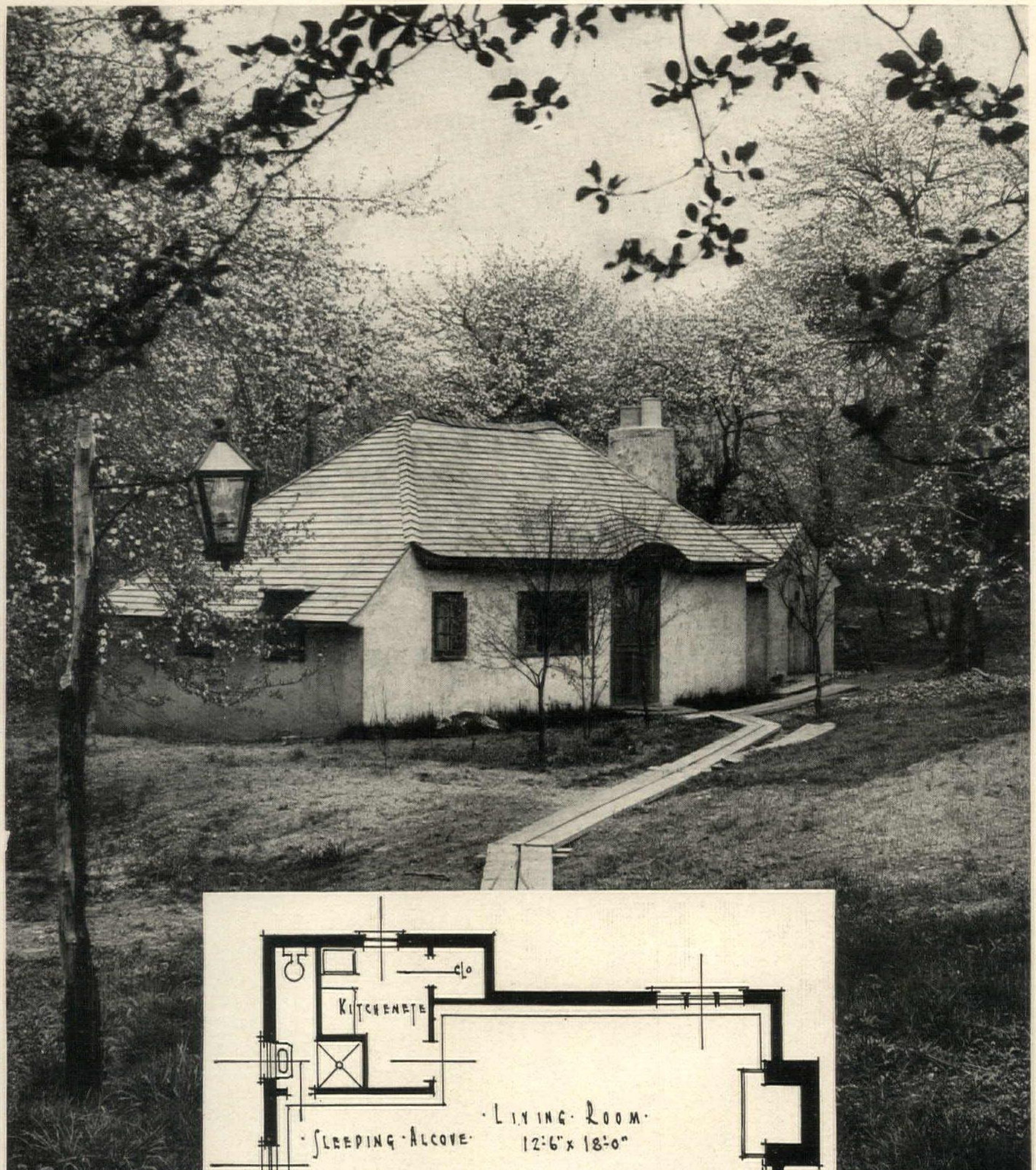
The basement of the auditorium section is used for a gymnasium and swimming pool, together with lockers and showers.

The design contemplates repeating the present front to the rear of the auditorium and forming two courts on either side.

A unique feature is the detail of the windows, which are ordinary factory sash. To obtain a good line the steel sash were set in a wood frame giving the detail shown in the illustrations.

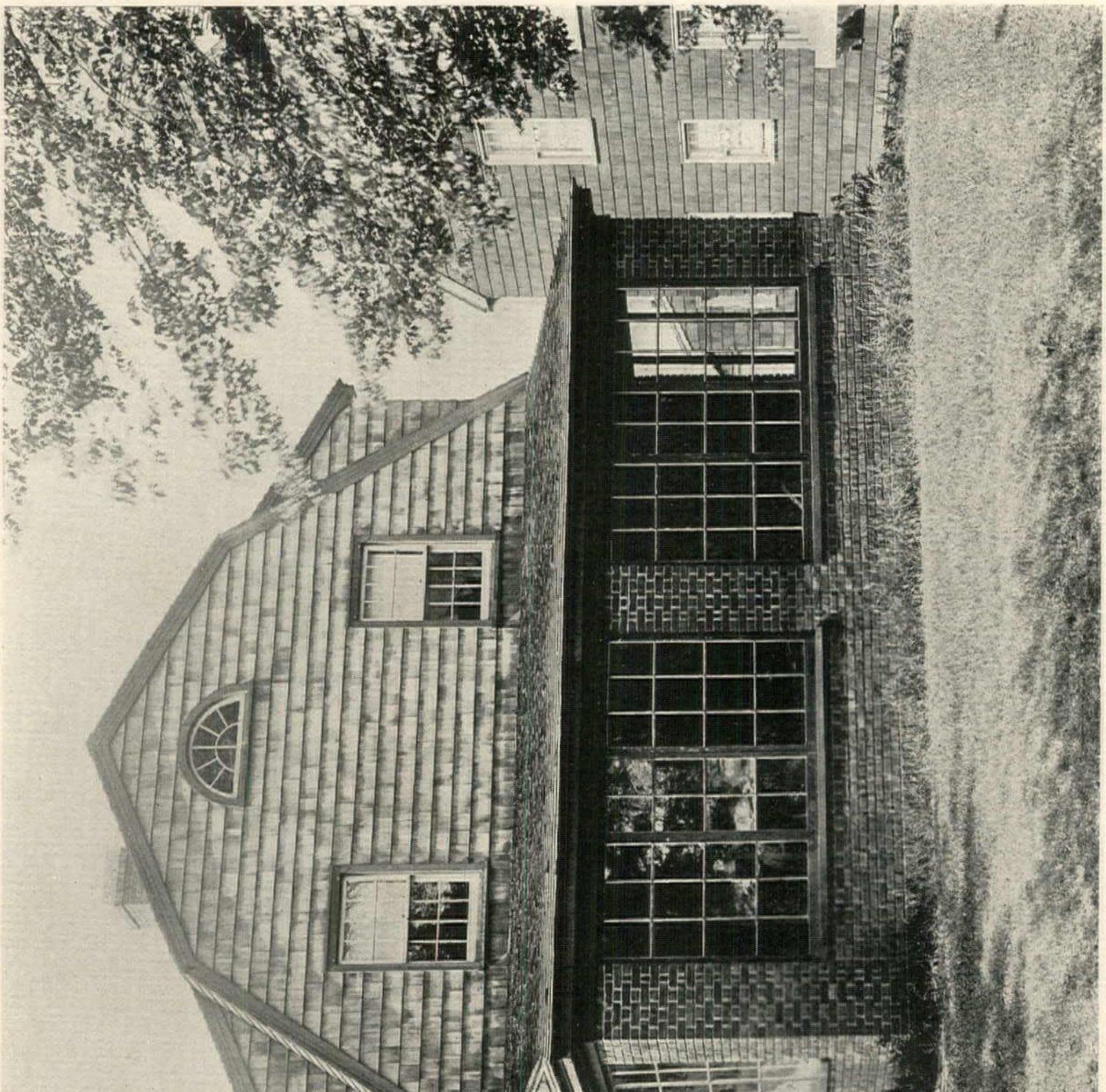
Another feature is the stair towers, situated at either end of the hall. This is a requirement of the North Carolina State Insurance Commission, and although it has its merits would not do for a Northern climate, as each time pupils go from floor to floor they are required to step out into the open while passing from the corridor to the stair tower. The stair tower is completely surrounded by fireproof material and stairs made of channel strings and slate treads. The doors entering the same are fireproof, so that once the pupil is on these stairs, he is out of danger from any fire in the building. In getting from the building into this stair tower, pupils have to pass an open portion, which at all times has a cross draft. This keeps the tower free from smoke, the greatest danger of panic during a fire. This overcomes the disadvantage of an interior stairway.

A Greek Panel—Arthur Covey, Painter



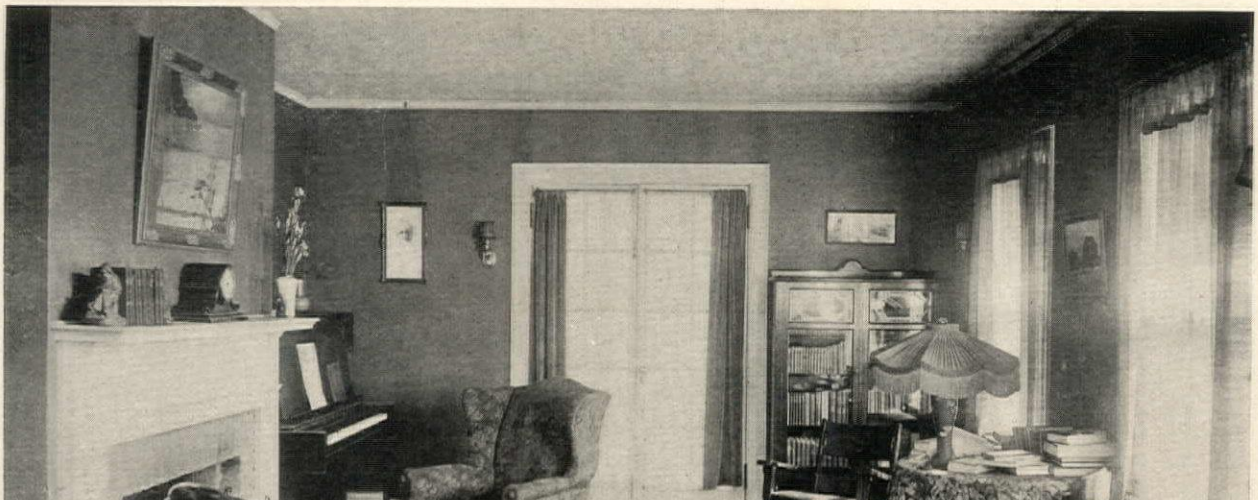
LIVING STUDIO OF JOHN E. SHERIDAN, PORT JEFFERSON, L. I., N. Y.

FRANK J. FORSTER, ARCHITECT



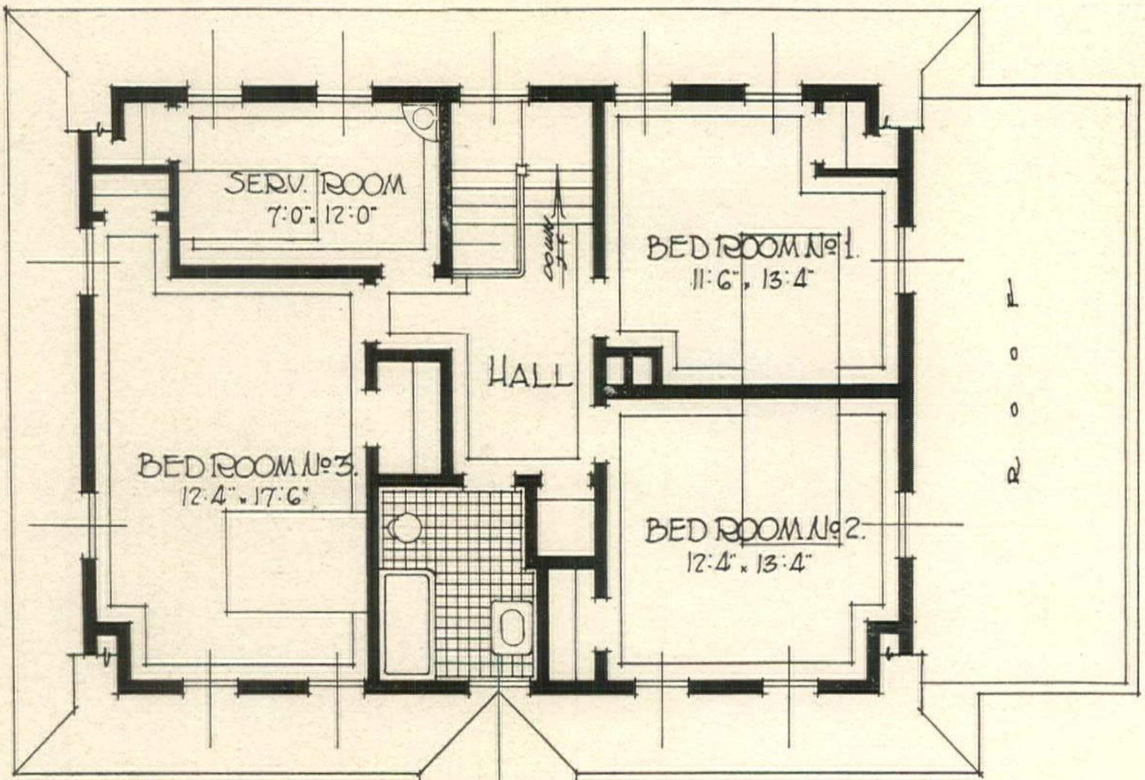
HOUSE OF W. R. RICHARDSON, ENGLEWOOD, N. J.

R. C. HUNTER & BRO., ARCHITECTS

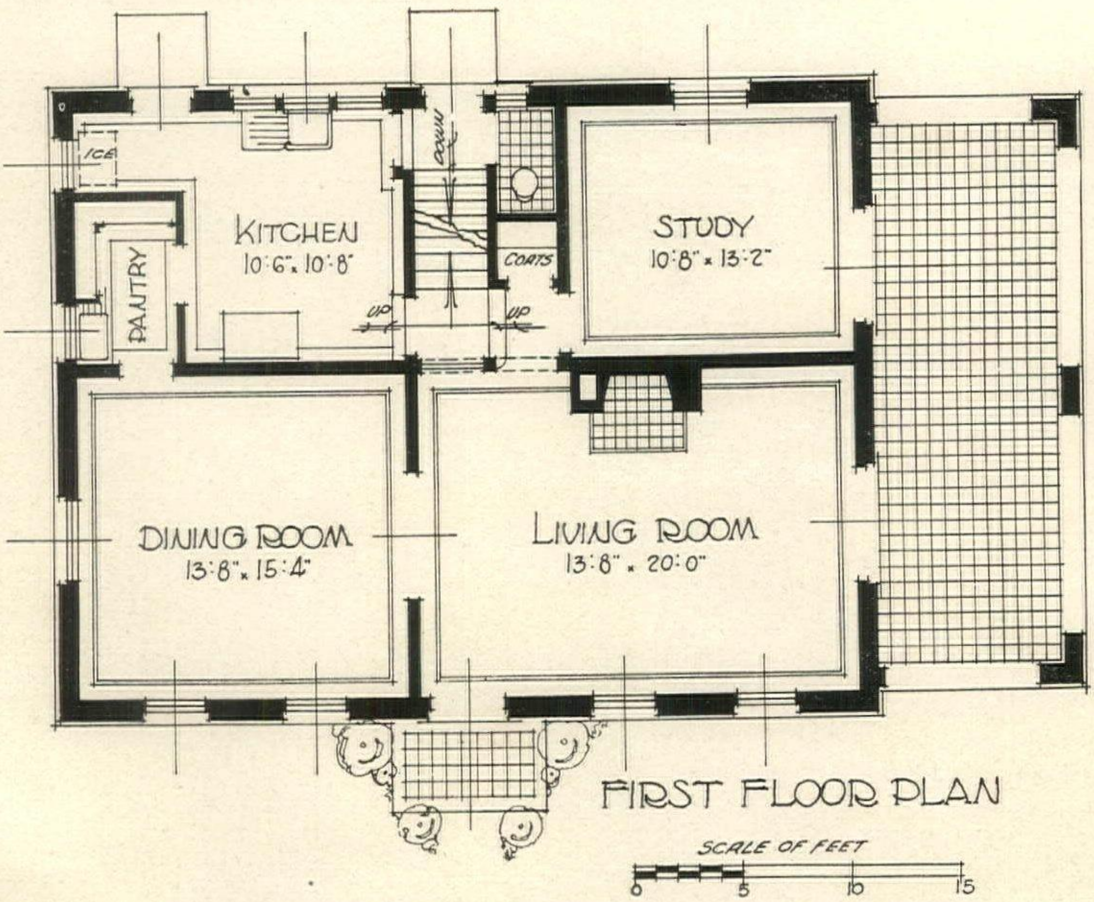


HOUSE OF W. R. RICHARDSON, ENGLEWOOD, N. J.

R. C. HUNTER & BRO., ARCHITECTS



SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF W. R. RICHARDSON, ENGLEWOOD, N. J.

R. C. HUNTER & BRO., ARCHITECTS

BEAUX-ARTS INSTITUTE *of* DESIGN

Acting Director of the Institute—WHITNEY WARREN
Architecture, RAYMOND M. HOOD, Director—Sculpture, JOHN GREGORY, Director
Interior Decoration—ERNEST F. TYLER, Director
Mural Painting—ERNEST C. PEIXOTTO, Director

Special Notice to Students

By special arrangement with the Society of Beaux-Arts Architects, there appears in each issue of The American Architect *an average of five pages devoted to the presentation of drawings selected from the Beaux-Arts Institute of Design exhibitions, and also the listing of awards and the promulgation of all notices to students. These matters will be exclusively presented to students of the Beaux-Arts Institute of Design through the pages of* The American Architect. *By arrangement with the publishers of* The American Architect, *a special student subscription rate of* $5.00 *per annum has been secured. Further particulars with reference to this service to Beaux-Arts students may be obtained by addressing* The American Architect, 243 *West* 39*th Street, New York City.*

Official Notification of Awards

Judgment of May 22, 1923

CLASS "A"—V PROJET

"A SMALL OPERA HOUSE"

A group of music lovers propose to erect in one of the large cities of the United States a small Opera House, suitable to the production of light opera, (such as for instance, La Boheme, Manon, Tosca, et cetera) and similar in purpose and scope to the principal national theatres of Europe, of which the Opera Comique in Paris is an example. As an adequate endowment is assured for the maintenance of the Opera, the building should be conceived not from a commercial, but from an artistic standpoint and special attention given in the plan to the provision of large public entrances, grand staircases leading to the Foyer, Smoking Room, Retiring Rooms, et cetera. The Auditorium will seat about 1500 persons distributed in the parquet, one tier of boxes and galleries. The Foyer, a gathering place for the audience during the intermission, should be a large and handsomely decorated room on the approximate level of the Boxes and should be readily accessible from all parts of the house. A Smoking Room with buffet will be provided on the same level as the Foyer and a Restaurant may be placed, if desired, in the Basement. Separate carriage entrances, under cover, should be provided for subscribers as well as special entrances for the occupants of the top galleries. Elevators for the public will be required and an adequate number of staircases to assure the rapid egress of the audience.

The detailed requirements for the Stage and dependencies are as follows:

A Stage of ample proportions, placed upon the level of the outside grade with rooms known as scenery docks in immediate connection with the Stage for the storage of scenery to be used in current productions. Other scenery will be stored in the scene loft above the Stage.

A Property Room on the level of the Stage for the storage of furniture, decorations, hangings, et cetera.

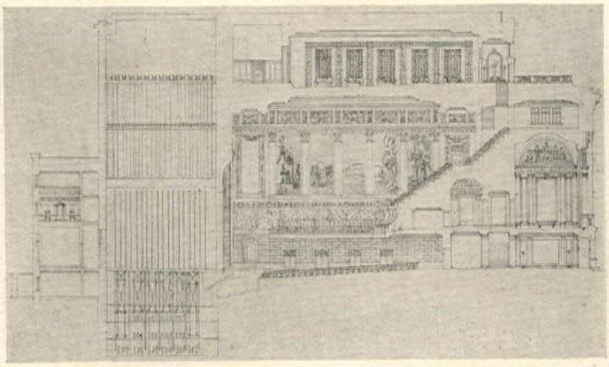
A Green Room readily accessible to the Stage to serve as an assembly and waiting room for the performers.

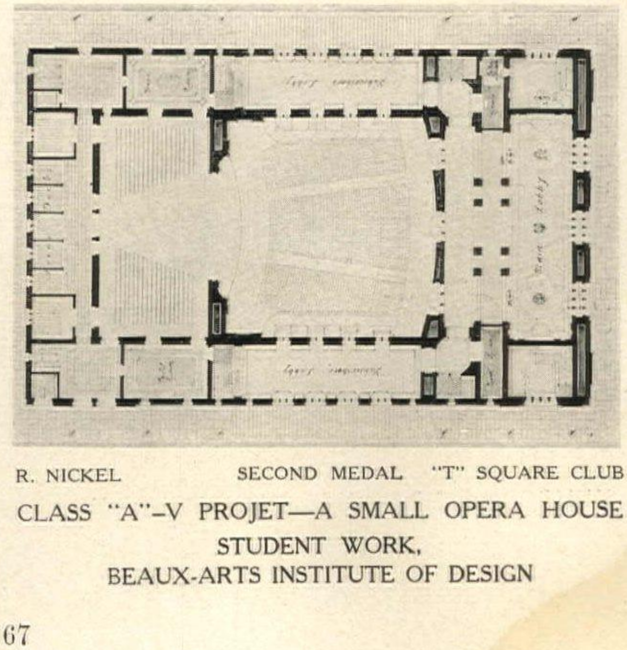
A Ballet practice room for the dancers with direct access to the Stage.

Dressing Rooms, Chorus Rooms, Stage Managers Rooms, et cetera, arranged on different levels but accessible to the Stage. These rooms should have outside light.

A special entrance should be provided for the performers with elevators and adequate stairs.

The Orchestra may be placed, if desired, below the Stage.





R. NICKEL SECOND MEDAL "T" SQUARE CLUB

CLASS "A"-V PROJET—A SMALL OPERA HOUSE
STUDENT WORK,
BEAUX-ARTS INSTITUTE OF DESIGN

A site 170′ x 280′ has been acquired, the narrow frontage being on one of the main avenues of the city. Public thoroughfares bound the other sides of the site and the building will be prominently visible from all four streets.

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, J. H. Freedlander, H. R. Sedgwick, J. O. Post, J. W. O'Connor, W. F. Paris, E. S. Hewitt, R. H. Pearce, P. P. Cret, F. R. King, H. W. Corbett, H. Sternfeld, F. C. Hirons, E. S. Campbell, and S. W. Morgan.

NUMBER OF DRAWINGS SUBMITTED:—75.

AWARDS:—

FIRST MEDAL:—P. F. McLean and K. H. Snyder, Carnegie Inst. of Tech., Pittsburgh.

SECOND MEDAL.—J. Franklin and H. C. Brockman, Carnegie Inst. of Tech., Pittsburgh; T. M. Prentice and A. Marshall, Columbia Univ., N. Y. C.; R. Nickel, "T" Square Club, Phila.

FIRST MENTION:—C. E. Landefeld, H. B. Tross, W. Z. Bane, J. H. Delo, R. A. McKee, D. D. McGervey, L. E. Considine, R. Patterson, J. J. Keil, E. H. Beckman, A. Staples and L. A. Brink, Carnegie Inst. of Tech., Pittsburgh; A. Dick, K. Matsunoi, A. Ehrenrich, S. Whinston, Elsie Pollak and O. W. Wilson, Columbia Univ., N. Y. C.; R. L. Linder, Atelier Denver, Denver; E. Fuhrer, Dept. of Architecture of Armour Inst. of Tech., Chicago; C. L. Martin, H. R. Russell, and E. V. Gauger, Univ. of Illinois, Urbana.

SECOND MENTION:—V. H. Stromquist, M. D. Smith, H. C. Kreisle, C. J. Pellegrini, W. Harris, E. M. Griesser, and P. Hohorst, Carnegie Inst. of Tech., Pittsburgh; A. Erdman, Columbia Univ., N. Y. C.; W. H. Speer, Atelier Denver, Denver; O. F. Cerny, A. R. Hauser, E. A. Johnson and W. L. Suter, Dept. of Architecture of Armour Inst. of Tech., Chicago; P. Simonsen, Atelier Hirons, N. Y. C.; E. R. Perry, H. C. P. Harth and R. Stillwell, Princeton Univ., Princeton; E. Malczewski, Syracuse Univ., Syracuse; R. Billerbeck, R. D. Henderson, A. Fordyce, J. D. Geffers, J. A. Drielsma, E. E. Lundeen, J. D. Tuttle, and C. O. Beeson, Univ. of Illinois, Urbana; F. L. Hutchins and S. Chao, Univ. of Pennsylvania, Phila.

H. C.:—J. B. Blair, Carnegie Inst. of Tech., Pittsburgh; G. M. Burch and C. L. Cummings, Columbia Univ., N. Y. C.; A. S. Phillips and W. D. Sorgatz, Univ. of Illinois, Urbana.

CLASS "A"—V ESQUISSE-ESQUISSE

"THE GREAT HALL OF A STEAMSHIP"

The trans-oceanic liners have developed in size and luxury until the problem of the interiors is more that of the architect than of the ship designer.

The important feature around which center the activities of the passengers is the great hall. This problem calls for the design of such a hall. Its main level is that of the main deck with balconies at the level of the promenade deck above. At the balcony level the hall gives access to the salons, smoking rooms and promenade decks. On the main floor level are the information desk, the offices of the Wireless Telegraph Company and a Travel Bureau. The chief architectural feature of the hall will naturally be the grand staircase, leading up to the promenade deck level and down to the dining room which occurs on one of the lower decks. The entire space to be devoted to this hall, including the staircase and balconies is 45′-0″ in width and 80′-0″ in length. The promenade deck is 10′-0″ above the main deck and the entire height of the hall from the level of the main deck shall not exceed 40′-0″.

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, H. Sternfeld, F. C. Hirons, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—33.

AWARDS:—

SECOND MENTION:—G. A. Brink, Carnegie Inst. of Tech., Pittsburgh; A. F. Euston, Atelier Hirons, N. Y. C.; C. G. McTaggart, Univ. of Illinois, Urbana; E. A. Lehti, Yale Univ., New Haven.

THE KARNAK TEMPLE CHAPTER OF THE SCARAB FRATERNITY PRIZE COMPETITION

CLASS "B"—V ESQUISSE-ESQUISSE

"A VASE"

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, J. O. Post, H. Sternfeld, F. C. Hirons, and E. S. Campbell.

JURY FOR THE AWARDING OF THE PRIZE:—R. M. Hood, P. A. Cusachs, J. O. Post, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—60.

AWARDS:—

PRIZE—($50):—Wm. C. Pyle, Carnegie Inst. of Tech., Pittsurgh.

FIRST MENTION:—Wm. C. Pyle and B. G. Martin, Carnegie Inst. of Tech., Pittsburgh; R. V. Merwin, Columbia Univ., N. Y. C.; J. J. Wallwork, Atelier Hirons, N. Y. C.

SECOND MENTION:—F. Martinelli, Atelier Corbett-Koyl, N. Y. C.; E. D. Stevens, Univ. of Virginia, Charlottesville; H. F. Neville, Univ. of Kansas, Lawrence.

CLASS "A" AND "B" ARCHÆOLOGY—V PROJET

"AN ENGLISH 18th CENTURY PUMP ROOM"

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, H. Sternfeld, F. C. Hirons, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—7.

AWARDS:—

SECOND MEDAL:—H. A. Dumper, Columbia Univ., N. Y. C.; Alberta Raffl, Univ. of Illinois, Urbana.

MENTION:—O. Betts, Columbia Univ., N. Y. C.; Elizabeth Kimball and Fay M. Harris, Univ. of Illinois, Urbana; W. Douglas, Yale Univ., New Haven.

EMERSON PRIZE COMPETITION

"THE BASE OF A FLAG STAFF"

JURY OF AWARDS:—P. A. Cusachs, J. H. Freedlander, J. O. Post, J. W. O'Connor, W. F. Paris, E. S. Hewitt, and H. W. Corbett.

JURY FOR THE AWARDING OF PRIZE:—P. A. Cusachs, J. H. Freedlander, J. O. Post, J. W. O'Connor, W. F. Paris, and E. S. Hewitt.

NUMBER OF DRAWINGS SUBMITTED:—28.

AWARDS:—

PRIZE—($50):—Charles Fuller, Columbia Univ., N. Y. C.

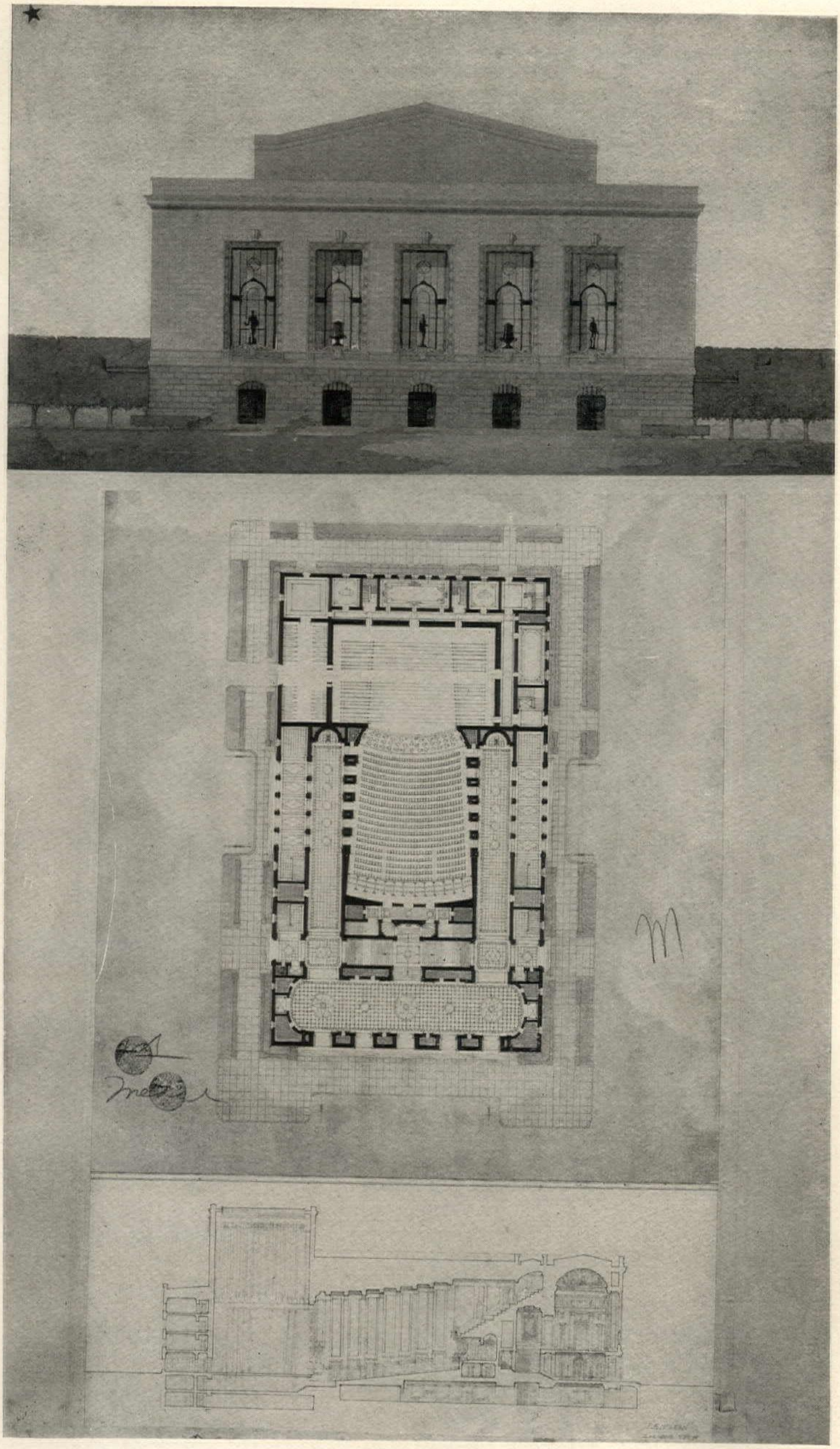
FIRST MEDAL:—Charles Fuller, Columbia Univ., N. Y. C.; P. Goodman, Atelier Licht, N. Y. C.

SECOND MEDAL:—M. C. Hills and N. B. Mead, Jr., Columbia Univ., N. Y. C.

FIRST MENTION:—V. H. Stromquist, Carnegie Inst. of Tech., Pitts.; R. Trow and E. Fuhrer, Dept. of Architecture of Armour Inst. of Tech., Chicago; J. F. Mullins, Atelier Penn State—Pennsylvania State College, State College.

SECOND MENTION:—S. R. Moore, Columbia Univ., N. Y. C.; K. C. Kreisle, Carnegie Inst. of Tech., Pittsburgh; F. E. Sloan, W. L. Suter and O. F. Cerney, Dept. of Architecture of Armour Inst. of Tech., Chicago; H. B. Hoover, Univ. of Washington, Seattle; K. McLeary and R. H. Hugman, Univ. of Texas, Austin; J. D. Tuttle and A. Fordyce, Univ. of Illinois, Urbana.

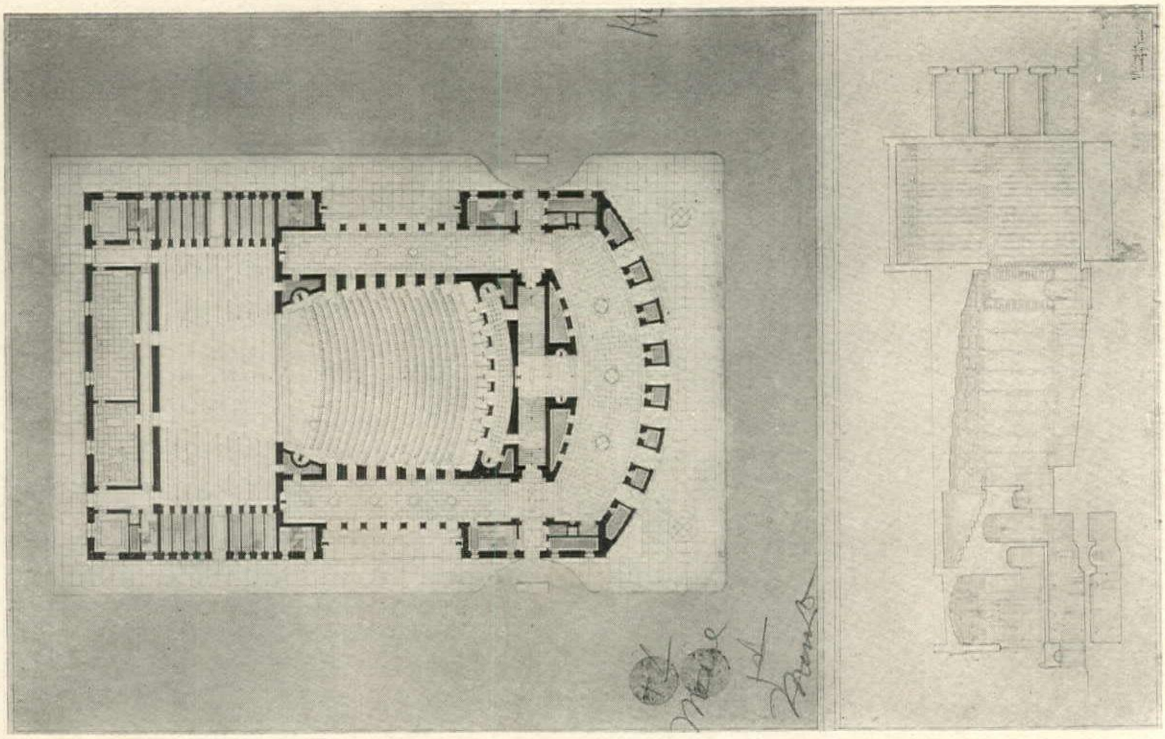
H. C.:—R. Patterson, Carnegie Inst. of Tech., Pitts.; H. H. Stewart, Atelier Penn State—Pennsylvania State College, State College.

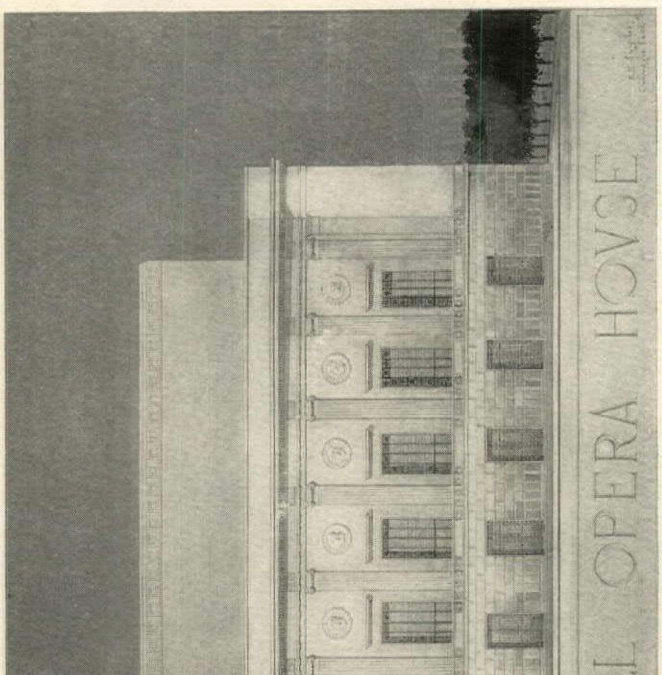


P. F. McLEAN FIRST MEDAL CARNEGIE INST. OF TECH.

CLASS "A"–V PROJET—A SMALL OPERA HOUSE

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

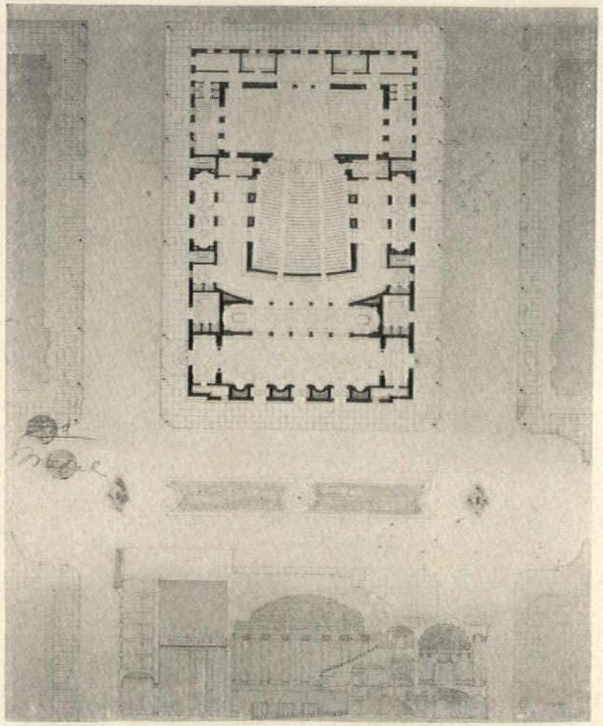


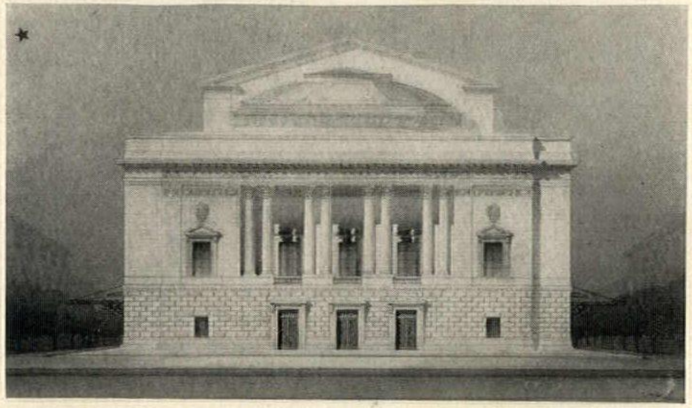


K. H. SNYDER FIRST MEDAL CARNEGIE INST. OF TECH.

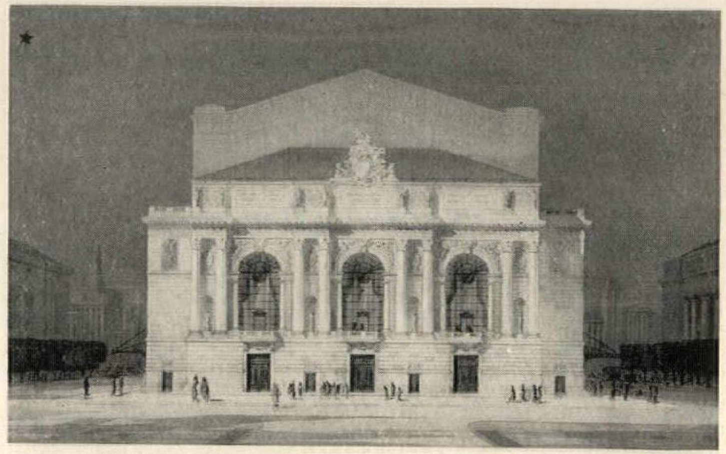
CLASS "A"-V PROJET—A SMALL OPERA HOUSE

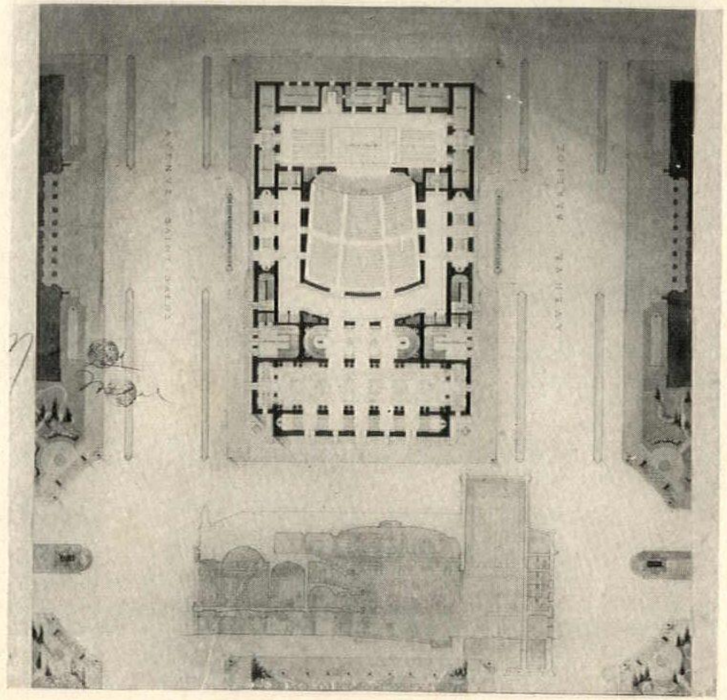
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN





A. MARSHALL SECOND MEDAL COLUMBIA UNIVERSITY

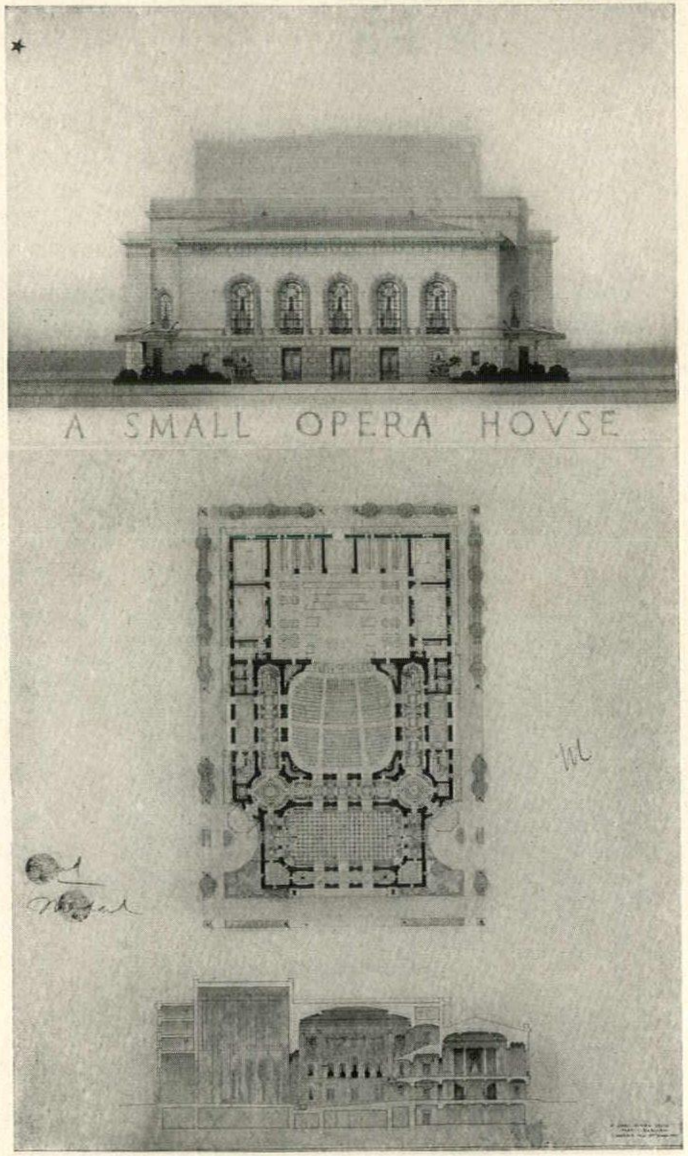




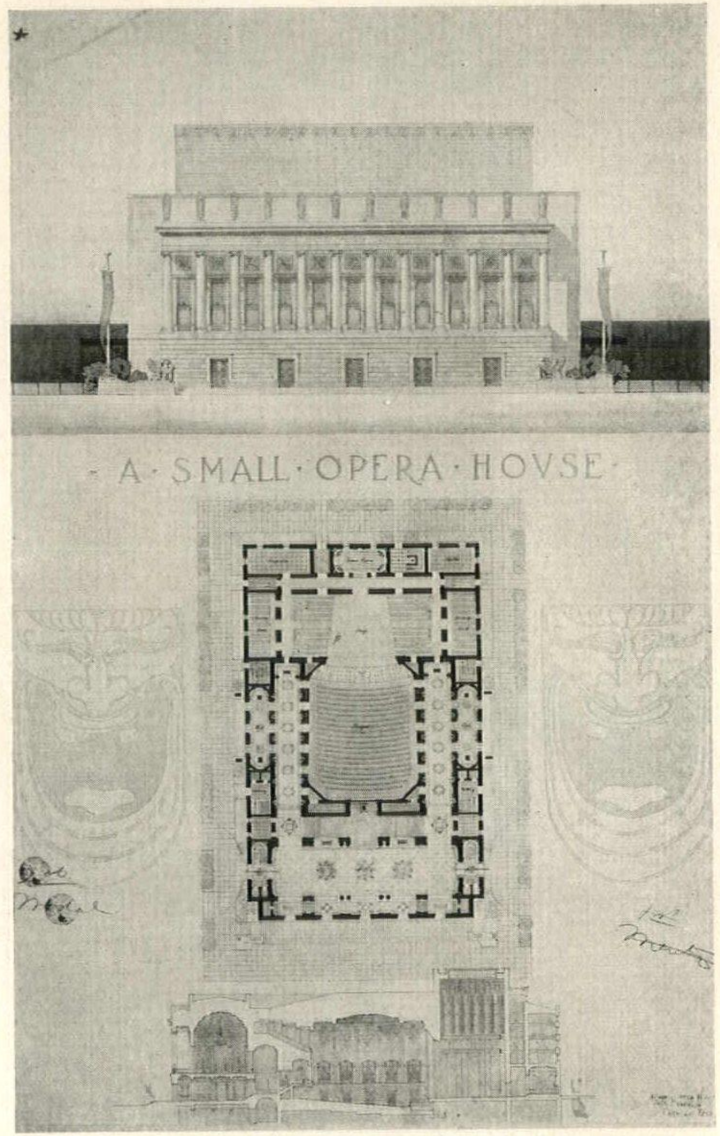
T. M. PRENTICE SECOND MEDAL COLUMBIA UNIVERSITY

CLASS "A"-V PROJET—A SMALL OPERA HOUSE

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



SECOND MEDAL
H. C. BROCKMAN — CARNEGIE INST. OF TECH.



SECOND MEDAL
J. FRANKLIN — CARNEGIE INST. OF TECH.

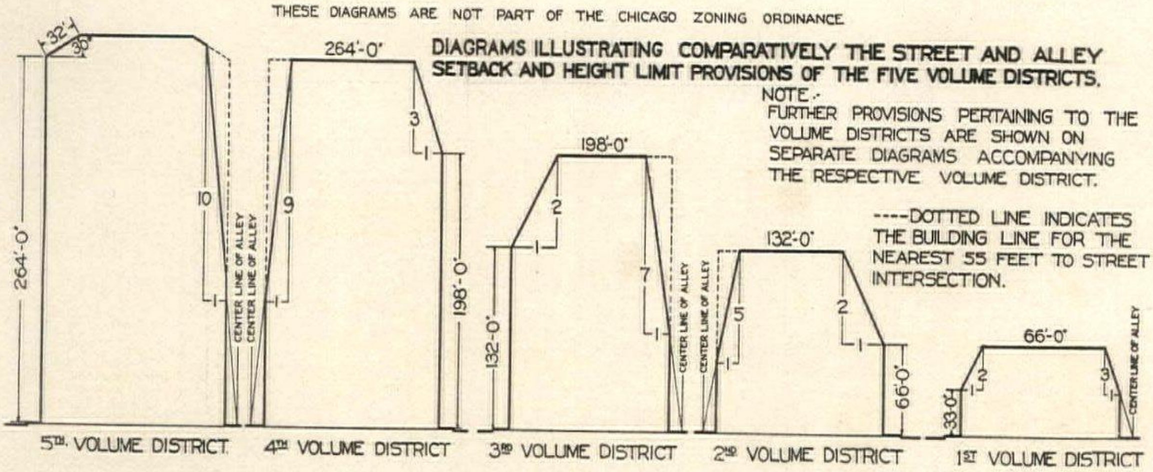
CLASS "A"-V PROJET—A SMALL OPERA HOUSE

STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

DEPARTMENT *of* ARCHITECTURAL ENGINEERING

The CHICAGO ZONING ORDINANCE

THE zoning ordinance, recently adopted by the City Council of the city of Chicago, may well be considered a model of its kind. It is brief and concisely written, consisting of thirty-two sections and use and volume district maps each consisting of forty-nine sections. The ordinance is to be enforced by the Commissioner of Buildings. A Board of Appeals is to be appointed by the Mayor, consisting of an architect, a structural engineer, a builder, a real estate dealer, each of whom shall have had ten years' practical experience in his profession. In addition a chairman shall be appointed. The appointments must be approved by the City Council.



The function of the Board of Appeals is to adopt from time to time such rules and regulations as it may deem necessary to interpret and to carry into effect the provisions of the ordinance and to recommend to the City Council such ordinances or amendments as it may appear desirable and to permit variations from the present ordinance under certain conditions.

The city is divided into Use Districts controlling the kind of occupancy. These districts are designated as Residence, Apartment, Commercial and Manufacturing districts. Certain special and non-conforming uses are regulated. Each section of the city, in addition to being in one of the four Use Districts, is also in what is called a Volume District, of which there are five. The technical restrictions pertaining to these districts and illustrative diagrams are given herewith.

USE DISTRICTS

The entire city is divided into four classes of use districts, shown on the *Use District Map* and designated as:

RESIDENCE DISTRICTS, in which private residences, churches, schools and parks are permitted and in which no business, commercial and manufacturing of any kind is allowed.

APARTMENT DISTRICTS, in which all residence uses as named above, also apartment houses, hotels (without store fronts), public libraries, hospitals, private clubs and other similar buildings are permitted and in which no business, commercial or manufacturing use is allowed.

COMMERCIAL DISTRICTS, in which all uses as named above are permitted and in which commercial uses are permitted, subdivided into three groups:

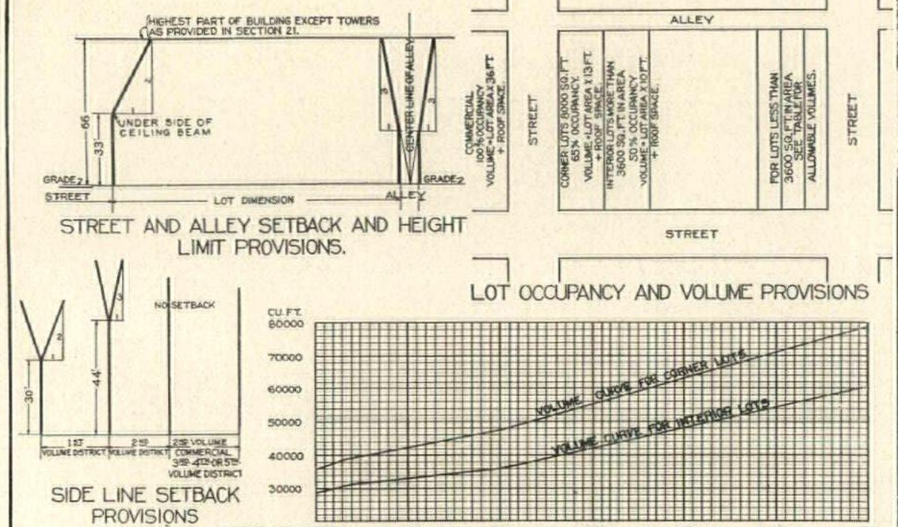
C1 Uses. Those of the first group may be located anywhere within a Commercial district. They include retail businesses, garages and filling stations, storage buildings, banks, offices, theatres, laundries, showrooms and similar activities.

C2 Uses. Those of the second group in a Commercial district if located within 125 feet of a Residence or Apartment district may be prevented from operating at night, and they cannot occupy a greater area than one-half of the floor space of the building in which they are located, but they may occupy *at least* space equal to the lot area in any case. (Exceptions are made to this rule if the commercial property is located on a railroad.) This group includes light unobjectionable manufacturing when conducted wholly within substantial buildings.

C3 Uses. Those of the third group in a Commercial district cannot be located nearer than 125 feet to a Residence or Apartment district. They include certain activities which frequently are objectionable to residence, such as dyeing and cleaning establishments, large food products manufactures, coal yards, ice plants, milk distributing stations, large stables.

MANUFACTURING DISTRICTS. The uses permitted in a Manufacturing district are subdivided into three groups:

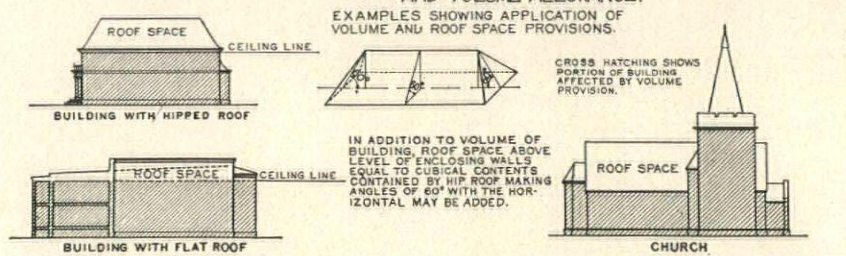
M1 Uses. Those of the first group are permitted in any part of the Manufacturing district and incl



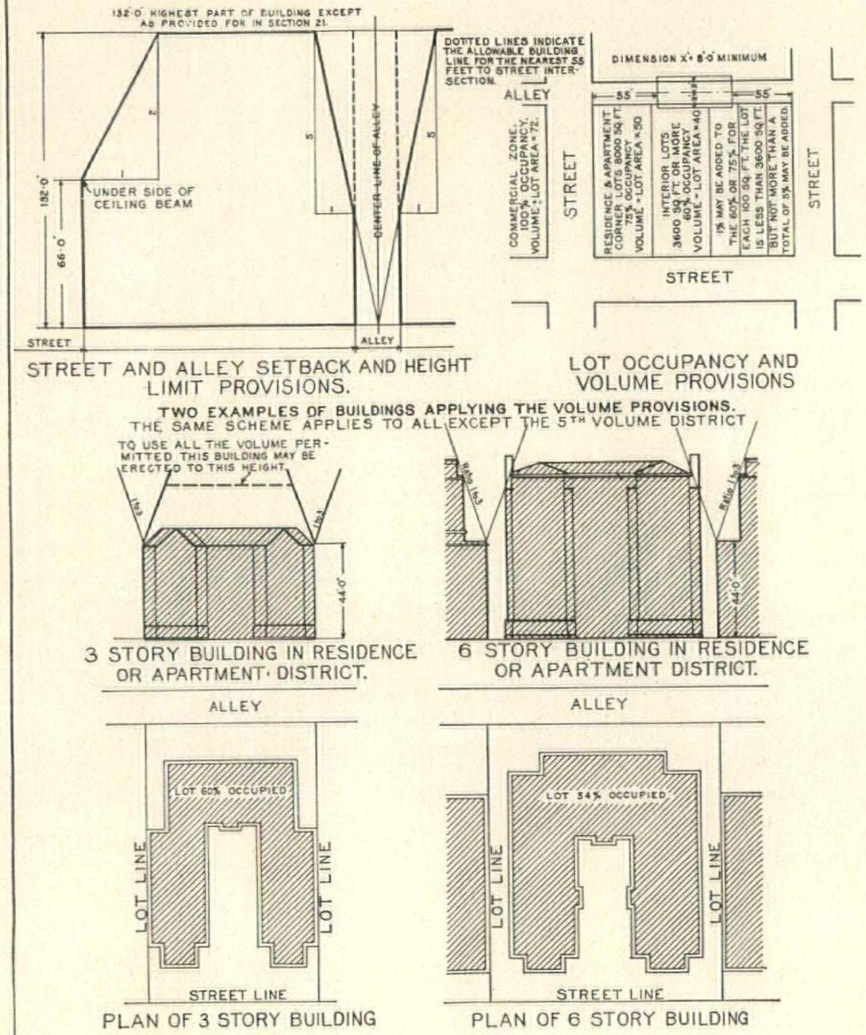
		WIDTH OF LOT 20 FT.		25'		30'		35'	40'	45'	50'
		AREA OF LOT 2400 SQ.FT		3000#		3600#		4200#	4800#	5400#	6000#
	BUILDING HEIGHTS	OCCUPANCY OF 20 FT. LOTS		OCCUPANCY OF 25 FT. LOTS.		OCCUPANCY OF 30 TO 50 FT. LOTS.					
INTERIOR LOTS.	20'	50%	1200 SQ.FT.	50%	1500 SQ.FT	50%	1800 SQ.FT.	2100 SQ.FT.	2400 SQ.FT.	2700 SQ.FT.	3000
	22'	50	1200	50	1500	45	1620	1909	2160	2430	2722
	25'	48	1152	45	1344	40	1440	1680	1920	2160	2400
	28'	43	1028	40	1200	35.6	1282	1500	1709	1922	2136
	30'	40	960	37	1120	33	1188	1400	1600	1782	1980
	35'	34	823	32	960	28.5	1026	1200	1368	1539	1710
LOTS 120 FT DEEP											
CORNER LOTS.	20'	65%	1560 SQ.FT.	65	1950 SQ.FT.	65%	2340 SQ.FT.	2730 SQ.FT.	3120 SQ.FT.	3510 SQ.FT.	3900
	22	65	1560	64	1936	59	2127	2478	2832	3186	3540
	25'	60	1440	56	1704	51	1870	2143	2448	2754	3060
	28'	53	1285	51	1529	46	1670	1932	2208	2484	2760
	30'	50	1200	47	1420	43	1560	1806	2064	2322	2580
	35'	42	1030	40	1210	37	1336	1554	1776	1998	2220

CURVES AND TABLES FOR DETERMINING LOT OCCUPANCY AND VOLUME ALLOWANCE.

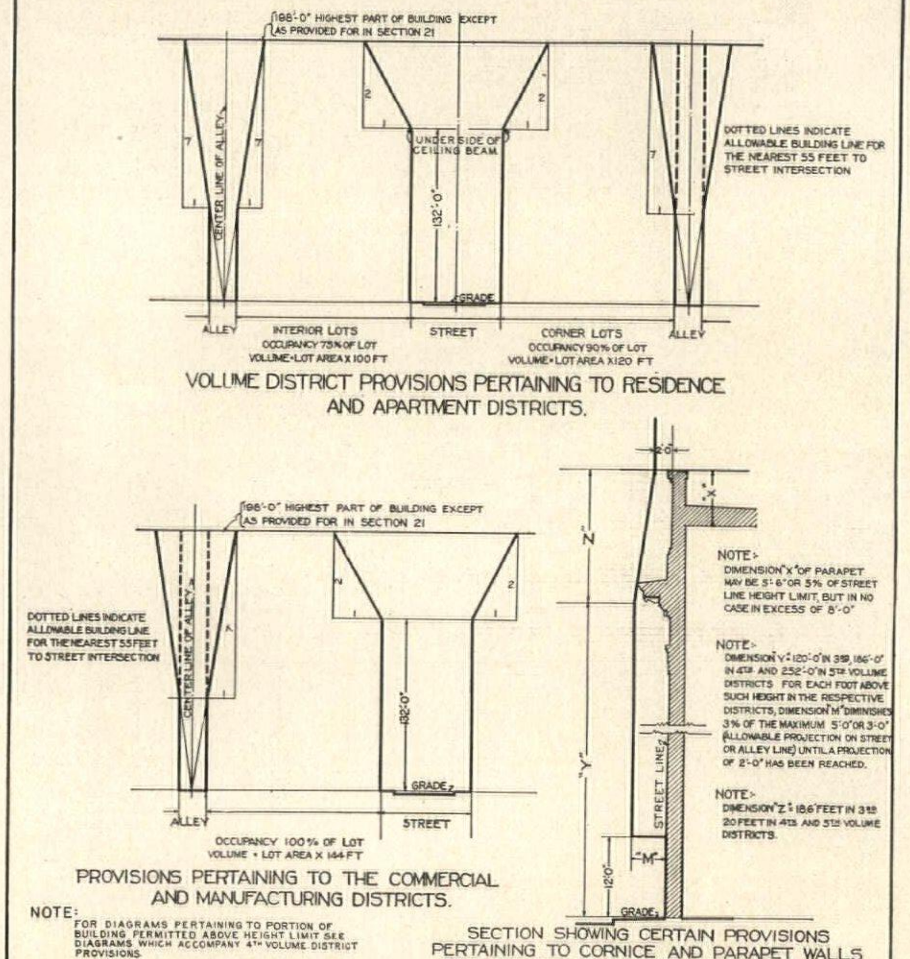
EXAMPLES SHOWING APPLICATION OF VOLUME AND ROOF SPACE PROVISIONS.



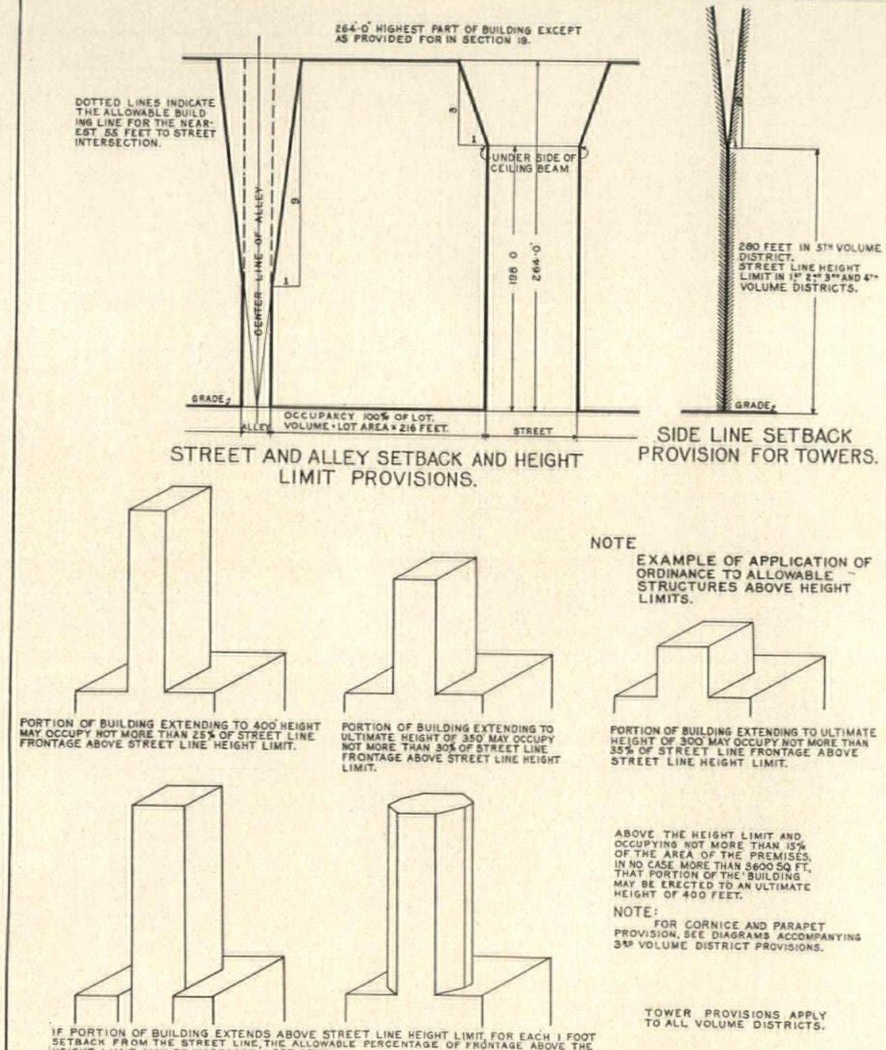
ZONING ORDINANCE PROVISIONS FOR THE 1ST VOLUME DISTRICT.
THESE DIAGRAMS ARE NOT PART OF THE CHICAGO ZONING ORDINANCE.



ZONING ORDINANCE PROVISIONS FOR THE 2ND VOLUME DISTRICTS.
THESE DIAGRAMS ARE NOT PART OF CHICAGO ZONING ORDINANCE.



ZONING ORDINANCE PROVISIONS FOR THE 3RD VOLUME DISTRICT.
THESE DIAGRAMS ARE NOT PART OF THE CHICAGO ZONING ORDINANCE.



ZONING ORDINANCE PROVISIONS FOR 4TH VOLUME DISTRICTS.
THESE DIAGRAMS ARE NOT PART OF CHICAGO ZONING ORDINANCE.

unobjectionable manufacturing activities even though conducted on a large scale.

M2 Uses. Those of the second group cannot be located nearer to Residence or Apartment districts than 400 feet and include manufacturing activities which may create, to a certain degree, dust, gas, smoke, noise, fumes or odors.

M3 Uses. The third group may not be located nearer to a residence or Apartment district than 2,000 feet and include all nuisance type of manufacturing activities, such as fertilizer, glue, cement and starch manufacturing, petroleum refining, tanning, and the like.

Non-conforming Uses. Uses which existed at the time of the passage of the ordinance and which do not conform to the district in which they are located are called non-conforming uses. They are permitted to remain; but limits are placed on their expansion and on changes which might take place in their activities.

Volume Districts

Each section of the city, in addition to being in one of the four use districts, is also in what is called a volume district. There are five volume districts, and in each of these the amount of land area which can be occupied by a building and the height of the building are regulated. In each of the five volume districts the regulation for corner lots is slightly different from that for interior lots; while the regulation for commercial and manufacturing properties is slightly different from that for Residence and Apartment districts. The volume districts are outlined on the *Volume District Map* and indicated by the numerals 1, 2, 3, 4 or 5, and are designated as 1st, 2nd, 3rd, 4th and 5th Volume districts.

1st Volume Districts. These districts cover areas of the city devoted to private residences, two-flat buildings and similar residential uses where existing buildings have provided ample yard space and where buildings do not cover a large percentage of the lot area. They also cover the business districts of these neighborhoods.

In 1st Volume districts which are also in a Residence or Apartment district, the building shall not occupy more than 50% of the area of an interior lot, 65% of a corner lot, and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 10 times the lot area (13 times if a corner lot or 36 times if in a Commercial or Manufacturing district). Roof spaces are allowed in addition to the above cubical contents.

The height limit at the street line is 33 feet; the maximum height is 66 feet, provided the allowable cubical content is not exceeded.

2nd Volume Districts. These districts cover areas of the city where the tendency is toward large three-story apartment buildings. They also cover the business districts of these neighborhoods.

In 2nd Volume districts, which are also in a Residence or Apartment district, the building shall not occupy more than 60% of the area of an interior lot, 75% of a corner lot and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 40 times the lot area (50 times if a corner lot or 72 times if in a Commercial or Manufacturing district).

The height limit at the street line is 66 feet; the maximum height is 132 feet, provided the allowable cubical content is not exceeded.

3rd Volume Districts. These districts cover areas of the city where the tendency is toward tall apartment buildings and apartment hotels, as well as highly developed business and manufacturing centers outside of the central district.

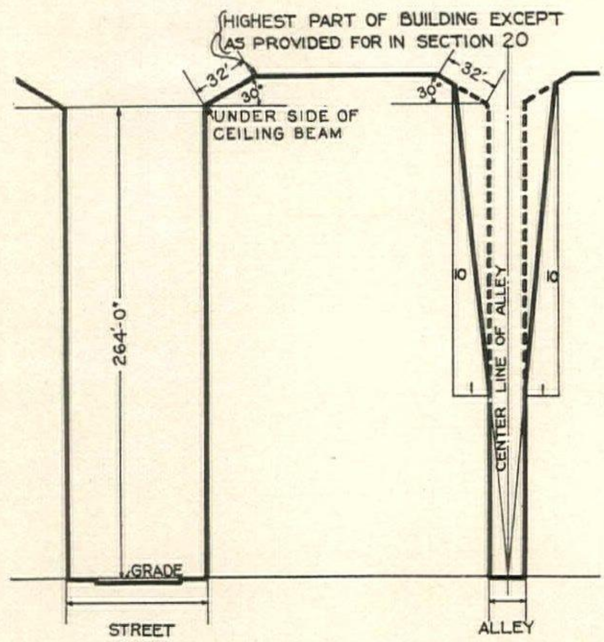
In 3rd Volume districts, which are also in a Residence or Apartment district, the building shall not occupy more than 75% of the area of an interior lot, 90% of a corner lot, and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 100 times the lot area (120 times if a corner lot or 144 times if in a Commercial or Manufacturing district).

The height limit at the street line is 132 feet; the maximum height is 198 feet, provided the allowable cubical content is not exceeded.

4th Volume Districts. These districts cover areas of the city lying close to the central section and are largely warehouse and office building districts.

In 4th Volume districts, the lot area provisions are the same as those of the 3rd Volume district.



Envelope for 5th Volume District

(No volume provision)

Dotted line indicates the allowable building line for the nearest 55 feet to street intersection

Note: For cornice and parapet provisions, see diagrams accompanying the 3rd volume district provisions
Above the height limit and occupying not more than 15% of the area of the premises, in no case more than 3,600 sq. ft. that portion of the building may be erected to an ultimate height of 400 ft.
For diagrams pertaining to portion of buildings permitted above height limit, see diagrams accompanying 4th volume district provisions

The cubical contents of the building shall not exceed 216 times the lot area.

The height limit at the street line is 198 feet; the maximum height is 264 feet, provided the allowable cubic content is not exceeded.

5th Volume District. This area covers the downtown district.

In the 5th Volume district, the lot area provisions are the same as those of the 3rd and 4th Volume districts.

The height limit at the street line is 264 feet. Limited space above this height generally used for pent houses, water tanks, storage and similar purposes is allowed if set back from all street lines.

Buildings are required to set back from alley lines above certain heights so as to provide adequate light and air along rear and sides. Towers are permitted in all volume districts. Cornice projections are limited to 2 feet at the top of tall buildings.

The PRESERVATION *of* STONE BUILDINGS

THIS country is old enough for us to be confronted with the decay of stone buildings and it is timely that consideration be given to the problem. The preservation of stonework is receiving attention in England and Scotland where an extensive series of experiments has been under way for a considerable period of time. Certain phases of this work have been put in charge of Prof. A. P. Laurie by the Office of Works. In a lecture delivered at the Royal Academy last Fall Prof. Laurie made a report of conditions and progress.

The problem of arresting decay in old stonework is not the same as that of preserving new work. A new stone, like a freestone, can be treated with certain preservatives and have its life increased and in the same way sound stone in old buildings can be treated. The problem of decayed stone in old buildings is very much more difficult. We have there the problem not only of preserving from future decay, but also of reconstructing the stone itself and of replacing the lost cementing material by some new cementing material, and in many cases the building is a ruin exposed to weather on every side. There was a time when ancient monuments suffered terribly from restoration. Old carved work and old mouldings were not only cut out and replaced, often very carelessly and with unsuitable material, but, in addition, when the stone preserver came along he first began to scrub with a wire brush and take off everything he could, and when he got down to the raw stone put on his preservative. It is not altogether a scientific problem, it is to a certain extent an æsthetic problem as well.

There are also obvious limits to what a stone preservative can do. For instance, if there are fissures in the stone, and the surface is treated with preservative, the stone will come away in lumps presently because of the cracks behind; or if the stone is falsely bedded in the first instance it will come away in sheets of considerable thickness.

The problem, therefore, is not a problem for the chemist alone, but for the architect, too, for he has to decide what can be done to preserve what remains of artistic value. The chemist having told him exactly how far he can go, the architect must consider each case on its merits to decide whether he is going to replace, whether he is going to fill up the cracks through which water may penetrate, or whether he is going to treat with preservative and so get his result. There is, however, one treatment which is quite unjustifiable—the treatment with the wire brush. Far better leave the carving and mouldings alone.

One thing to which not very much attention has been given yet, and much more ought to be given, is the question of the filling up of cracks. More study ought to be devoted to the filling up of fine cracks so as to prevent water getting in and disintegrating the stone.

It is absolutely essential, if we are to make any progress at all, that photographs as near full size as possible should be taken at different stages. In Elgin they experimented with one group of mouldings, leaving the other set untreated. They have taken photographs, and every Summer we have compared the photographs to find out exactly what has happened. One of the reasons why more progress has not been made in this matter is that, in the past, whole surfaces have been treated. If you treat small portions at a time, leaving other portions untouched, and take photographs as you go along, it is possible to obtain results that may lead to definite conclusions.

The main causes of stone decay are, in the first place, the effect of wind. Wind, carrying sand, acts as a sand blast and wears away the stone. We have heat and cold, expansion and contraction of the stone. In the case of granite, where you have the expansion with change of temperature of different kinds of closely packed crystals with different coefficients of expansion, fine openings are formed through which moisture and injurious gases can enter. There is also the action of ice. If we have a stone saturated with water, and it is caught by the frost, the ice expands and breaks up the stone. The main disintegrating agent that we have in a country like this for the breaking down of rocks is the action of frost. Another disintegrating agency is the carbonic acid gas in the air. Carbonate of lime is the main constituent of limestone, and is in a great many cases the binding material. It is a very common binding material for sandstone in a crystalline form known as calcite. If we put some carbonate of lime into a vessel suspended in distilled water, and pass carbonic acid gas through it, we notice that the solution gradually clears. This is due to the fact that carbonate of lime is soluble in an excess of carbonic acid gas. There is carbonic acid gas in rain water. It is present in the air, and this solution of carbonic acid gas acts upon limestone and gradually dissolves it. These are the main natural causes we have of stone decay.

That is not all that we have to suffer from under modern conditions. The coal that we burn, owing to the sulphur it contains, pours into the air sulphur compounds, sulphurous acid, sulphuric acid, and ammonia sulphate. These powerful agents act upon carbonate of lime. If you put a[illegible] into a vessel containing suspended carbonate of lime the whole liquid will at once clear, showing the solubility of carbonate of lime in the acid. These acids, then, dissolve carbonate of lime—*i.e.,* they will dissolve limestone. If they did that only it would not matter so much, but the result of the action of these sulphur gases on the limestone is to form a compound known as gypsum or sulphate of lime, which is, when heated, plaster of Paris. This sulphate of lime crystallizes, and in crystallizing exercises tremendous pressure and breaks up the stone.

The problem of sandstone and the problem of limestone are somewhat different. We can, roughly speaking, divide stones into two divisions, sandstone and limestone. We can divide sandstone roughly into two other divisions: sandstones which have carbonate of lime as their cementing material, and sandstones which have an insoluble cement such as silica. There are other cementing agents, but these are the most important for our present purpose. Sandstone consists of particles of quartz which are practically indestructible; consequently, if it comes to pieces, it comes to pieces because the cement which holds it together has perished. If the cement is a silica cement we have a very durable sandstone, because it will not, at any rate, be attacked chemically, though it may be mechanically. In some cases it is not so durable as it should be because there are not enough connecting points. The Elgin stone is a stone with a silica cement, and therefore is not easily attacked chemically; but as the connecting points are very few it is a stone which yields readily to mechanical attack, such as frost and the infiltration and crystallization of sulphate of lime.

In the case of the sandstone we have already a material on which the chemist can build, while in limestone we are dealing with a material in which the stopping of stone decay is very much more difficult. It is also known that some limestones are much more durable than others for reasons which are, to some extent still obscure.

In the last twenty or thirty years no really new and original material for dealing with the question of stone decay has been suggested. The proposed materials can be divided roughly into three groups. There are, first of all, the silicates and silico-fluorides. The principle upon which they act is that lime in combination with the silicates gives an insoluble precipitate. Take some lime water and add a little silicate of soda to it and a white precipitate is at once thrown down. Silico-fluorides are even better from a chemical point of view for the formation of insoluble compounds of lime. If, then, you take a limestone or a sandstone that contains calcite you can convert a part of it into an insoluble substance, hardening the stone to a certain depth and partially converting it into insoluble material. At the time when the House of Commons was built the chemist spoke highly of silicates. The results from its use were most disappointing. Then silico-fluorides came into favor. They have a certain value for the hardening of certain surfaces, but they have been found of little value for re-cementing rotten sandstones and limestones. We have a whole variety of mixtures of paraffin wax, of oil, of resin, and insoluble soaps of which the permutations are endless, but none of these solutions has been found satisfactory from the point of view of reconstructing a decaying stone surface.

The experiments that Prof. Laurie made on stone preservatives soon made him realize a very great danger which may result from their application. The first question is not whether the stone preservative is going to make the stone last longer, but whether the stone preservative is going to destroy the stone. The question after soaking the stone with a preservative, is whether the solution as it dries is going to leave the preservative in the pores of the stone or is going to deposit itself near the surface. Every solution has to be tested from that point of view. In a great many cases it comes to the surface. What is going to happen? The preservative will not prevent water getting in. Water gets in and dissolves some of the substance of the stone, and crystals are formed behind the layer of preservative because the water containing dissolved material cannot get out to crystallize on the surface. The result is that the stone comes off in flakes. You have to be very careful that your stone preservative is not going to do more harm than good. In the same way you can get a water-lock owing to a preservative which keeps the stone saturated with water so that it breaks up from the action of frost. It is for that reason that the architect always quite wisely says the stone ought to be able to breathe.

An architect can easily test for himself the value of a preservative for re-cementing rotten stone. Take a little sand and make a little sand brick with the preservative and allow it to dry, and see whether it is going to dry hard. If your brick dries hard just drill a little hole with the point of a knife, and see whether the sand pours out from the inside. If the distribution of the preservative has been right, the brick should stick together all through, though it will never be quite so hard inside as at the surface. If the preservative is coming to the outside as it dries, you have only to make a little hole and you will be able to pour out the sand. If it stands these tests, soak the brick in water, and see whether you have got a chemical binding there or not, and if you find it stands these three very simple tests, it may be worth while giving it a further trial outside. Besides sand, you can try some of the stone you wish to preserve crushed into a fine powder and mixed with the preservative.

There has now been experimenting for some five or six years in Scotland with thin solutions of resin, and some interesting results have been obtained. The mistake made in the application of resin in the past has been that the solutions have been too strong, and, consequently, they have penetrated a very little way and produced scaling. The solutions should not be stronger than 15 per cent to 5 per cent of common resin in toluol; the denser the stone the thinner the solution. Penetration is also helped by treating the stone first with the pure solvent, and then following up with the resin solution. If the stone is shiny after treatment sponge over with the solvent, and if darkened sponge over with lime water. In the case of close-grained sandstone, excellent results have been obtained so far, but in the case of limestone sufficient penetration has not been obtained, and in the case of very coarse-grained open rotten sandstone surfaces, while the stone no longer comes away in large pieces after a Winter's weathering, a slow surface decay goes on, owing to the destruction of the resin itself by the action of the weather. In some cases the surfaces have actually hardened with time. In no case has any injury been done or scaling caused. The penetration aimed at was about one inch, and the amount of resin applied sufficient to close about 20 per cent of the pores so as to enable the stone to breathe. For interiors where the stone is sufficiently porous it should be very successful.

A word or two should be said about lime-washing, which is now very popular. In a great many cases the idea of lime-washing is sound. You protect the surface of the stone with a coat of lime-wash, and it may very well preserve the stone. On the whole, there is a great deal of evidence to show that lime-wash was used in mediæval times, and that lime-washed buildings have stood the test of time very well. Some people object to it on æsthetic grounds—they don't like the look of a lime-washed building. The feeling is that if it really can be proved that lime-wash is going to preserve, even though it does not reconstruct, then any question of æsthetic feeling must be put on one side. The main thing to do is to save the ancient monuments.

On the subject of lime-wash, Prof. Laurie concludes with a word of warning. He recently saw a case of lime-washing which had been done in 1914, and in which, apparently, the effect had been to tear the stone all to pieces. Part of a moulding had been treated with lime-wash, and had fallen to pieces, while the untreated portion of the moulding was all right. There it was, not only scaling off, but taking one-eighth to one-quarter of an inch of the stone with it. It is quite possible for lime-wash to act as a destroyer, and the explanation seems to be this. The building was a ruin of porous sandstone, and had only been lime-washed round the moulding. It was exposed to rain and weather, the lime-wash did not cover the whole of it, and the result was that there was plenty of room for water to soak in; the water formed a water-lock behind the lime-wash, and there had been freezing, probably, and breaking up of the stone. If you take a building with a straight wall and a roof on it, lime-wash could, it is believed, be applied without the slightest danger. If you have a pinnacle of stone exposed in all directions you must consider whether you are going to do more harm than good by locking in water. This, again, will depend on the porosity of the stone. Lime-wash, while preserving close-grained limestone, may well destroy a porous sandstone. Therefore, it is evident that lime-wash, though there is a great deal to be said for it, needs careful investigation. You must be careful not to let water in to form a water-lock behind the lime-wash.

In cases such as roofed buildings where lime-wash can be safely used, and where the stone is sufficiently porous to absorb weak solutions of resin, it is believed something permanent could be done by soaking the rotten surfaces first with a weak resin solution, and then lime-washing the whole. For lime-wash a mixture of lime and salt, is preferred to a mixture of lime and tallow. Projecting cornices should either be flashed with lead on the top, or if this is too expensive, thoroughly saturated with a weak solution of resin.

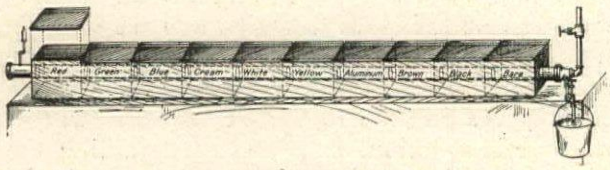
Prof. Laurie has recently been experimenting on a very interesting solution which has never been tried before as a preservative: silicon ether. It is a compound which can be dissolved in alcohol, and on exposure to air and moisture it is decomposed and deposits thin layers of hydrated silica, cementing the particles of stone together. The experiments being made with this new material on rotten sandstone surfaces look very hopeful, and a definite conclusion should soon be reached as to its value. Experiments on rotten limestones have not turned out so successfully, mainly owing to the difficulty in penetration.

Quoting Prof. Laurie: "I fear I have rather uttered words of warning than given a solution of this most difficult problem, but little has been done in the way of systematic experiments in the past, and the chemist today is on his guard against making the mistakes of the chemist in the past, and assuming from successful laboratory experiments that he is going to get equally good results outside. The whole situation is gradually clearing, a great deal of rubbish has been removed, and I have no doubt that the time is approaching when the chemist will be able to tell the architect exactly what he can and cannot do, and the architect will frame his policy accordingly."

Color and Radiation

TESTS have recently been made by Henry A. Gardner and Harold C. Parks to ascertain the effect of color on the efficiency of radiating surfaces. They used a very simple apparatus which is hereafter described and illustrated. This apparatus was entirely adequate for establishing, in a general way, the relative effect of painting radiating surfaces. To have secured correct results each compartment of the test apparatus should have been insulated from the adjoining one as the transmission of heat from one to the other through the galvanized iron naturally tends to equalize all of the temperatures.

The results of the three tests correspond very closely with those made by the late John R. Allen which were described in THE AMERICAN ARCHITECT of February 13, 1918, page 195. The outstanding feature of this investigation is the fact



View of apparatus used in tests

that color has a decided influence on the transmission of heat and that flat finish is preferable to gloss finish paints.

Economy of fuel consumption demands efficient radiating units and the percentage of variation due to color is such as to justify consideration, especially in large installations. It will be noted with pleasure that the gaudy copper and aluminum bronzes used for finishing radiators is the least efficient of all coatings. In part, the report of tests reads as follows:

The difficulty of obtaining coal for heating purposes suggests to the consumer the importance of using every safeguard to conserve fuel values. That the color of a radiator may have some direct effect upon the situation, at least from the standpoint of increasing the efficiency of transmission, is apparent from recent tests conducted by the writers with the apparatus shown above. Subsequent to the presentation of the following data will be found information regarding previous work that was afforded by a research of the literature on heating and ventilation.

The apparatus shown in the illustration, made specially for the tests, consists of a trough of galvanized iron eight feet long, six inches wide, and six inches deep, inside measurements. This trough is divided into ten compartments, each nine and one-half inches long. Through the trough runs a two-inch iron steam pipe, the compartments dividing this pipe into ten lengths, nine of which were painted with a different paint, namely: Cream, white, yellow, red, green, brown, black, aluminum, gold bronze, one section being left bare.

Ten cover pans one-half inch deep were made, each one fitting into a compartment. Five hundred cubic centimeters of water were placed in each pan. Steam from a [illegible]iler was turned into the pipe.

[illegible]wo sets of temperature readings were taken; one [illegible] in the compartments and another of the water in the pans. After a number of tests the following average results were obtained:

Order of radiation efficiency as calculated from several tests.

1st	(Best)	White
2nd		Cream
3rd		Red
4th		Green
5th		Yellow
6th		Black
7th		Aluminum
8th		Brown
9th	(Poorest)	Bare Iron Pipe

The greatest observed differences in temperature between the white and the dark colors or bare iron was about 10 per cent, which is considerably lower than the results obtained by Prof. Allen.

Tests also indicated that additional coats of paint (up to four coats were applied) do not reduce the radiation efficiency, if the same colors are applied as finish coats.

Tests were also included of flat versus gloss paints in the same colors, and the indications were usually in favor of the flat. Inasmuch as a flat paint film is generally considered as being more porous than a gloss, this might have some bearing upon the matter. The results would suggest the use of washable flat wall paints on radiators, and preferably of the same light tints that are used upon walls. Such paint bakes to a firm film upon radiator surfaces, and practical tests with such paints upon radiators in the laboratory have indicated a life of at least ten years without showing defects.

Starved Glue Joints

MANY failures in glued-up wood are caused by "starved" joints, or joints in which the film of glue between the wood surfaces is not continuous. Such joints, according to the Forest Products Laboratory, Madison, Wis., are not necessarily the result of a lack of glue spread on the wood; heavy spreads are as likely to produce them under ordinary commercial conditions as light spreads. They are caused rather by the application of pressure to the joint while the glue is too fluid.

Starved joints are more likely to occur with glues of low viscosity, such as warm animal glue and most blood albumin glues, than with casein, vegetable, and other thick glues.

Some woods are more susceptible to the production of starved joints than others. Birch, maple, red oak, and ash, which have open pores, absorb glue from the spread in such considerable amounts that they often leave the joints starved. Basswood and yellow poplar also take up a great deal of glue, but weak joints are not very noticeable in these woods because the woods themselves are weak. Other woods with smaller cells open to the gluing surface do not seem to be so subject to starved joints.

To avoid starved joints it is necessary to mix a glue solution thick or allow it to thicken on the wood from drying or chilling before pressure is applied. When it is necessary to glue under conditions which might produce starved joints, the use of light pressure is advantageous.

From "The Architects' Journal," London

The Entrance to the first Roman Exhibition of Agriculture, Industry and Applied Art

REVIEW *of* RECENT ARCHITECTURAL MAGAZINES

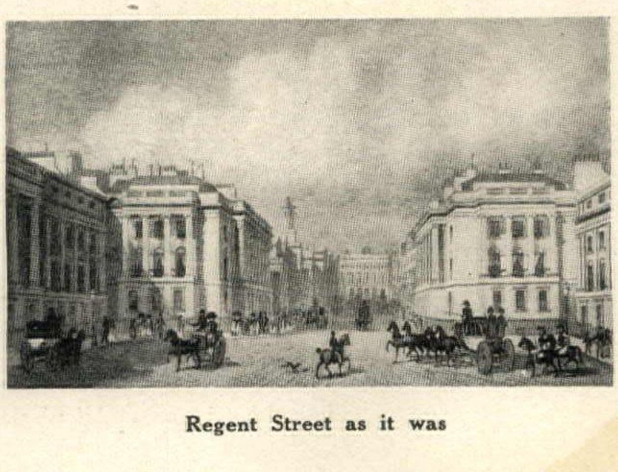
BY EGERTON SWARTWOUT, F.A.I.A.

WHILE in this country the authorities in general, and in New York in particular, are trying to regulate and reduce the height of buildings by zoning ordinances and the like, over in England there seems to be a persistent effort not to make them lower but to make them higher. While we, having experienced the blight of the high building, realize that once we have started we can never absolutely stop, and that the best we can do is to control the output by rigorous restrictions, and attempt to preserve for ourselves thereby some modicum of light and air, locking the stable door as it were after the horse has been stolen, the English architects, some of them, and their clients, many of them, have shown the most persistent intention of unlocking the door entirely and inviting the thieves in to supper. The most persistent of those anxious to issue invitations is a gentleman by the euphonious and somewhat oriental sounding name of Delissa Joseph, whose agitations have recently culminated in a paper read before the Royal Institute of British Architects and published in their Journal of the 16th of June. Mr. Joseph is very much in earnest

From "The Journal of The R. I. B. A."

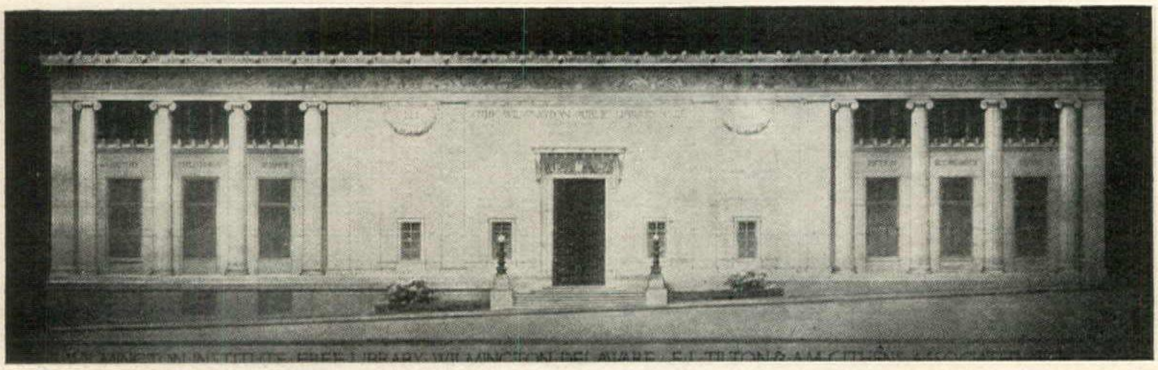
The Quadrant and part of Regent Street

From "The Journal of The R. I. B. A."



Regent Street as it was

From "Architecture"

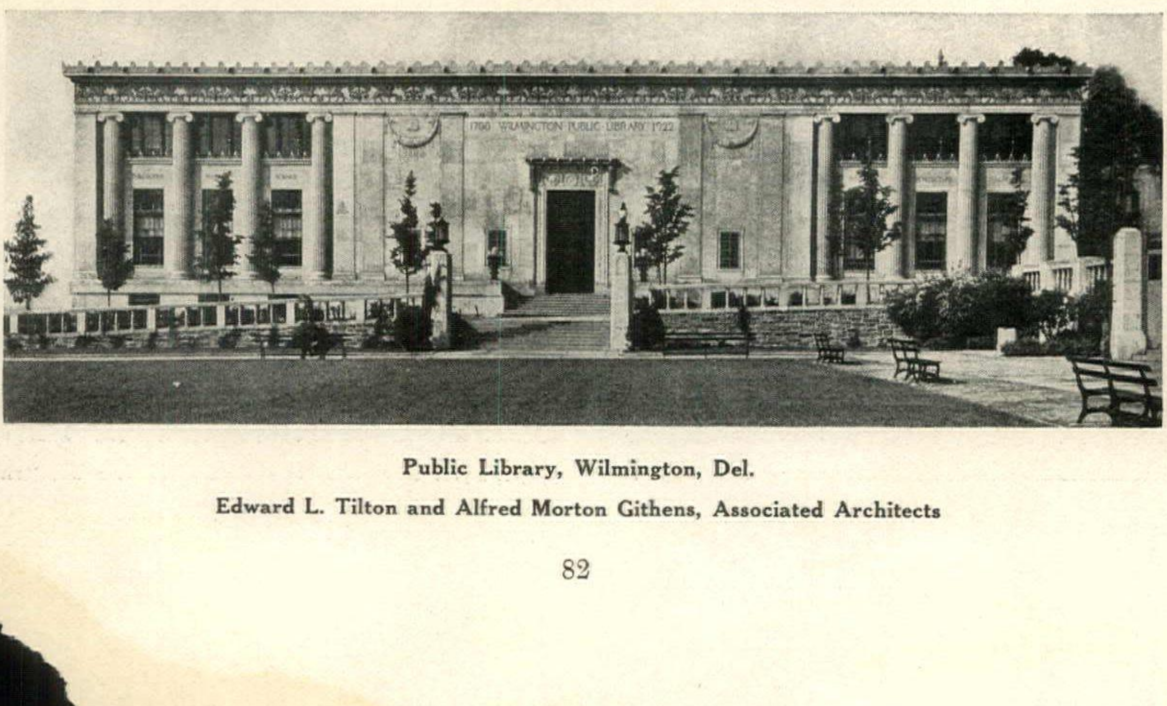


Public Library, Wilmington, Del.

(Final design exactly as built)

about it, and, seems not to have a very high regard for Parliament, or the lawyers or the Law of Ancient Lights, which last is apparently such a nebulous and uncertain thing that to object to it seems almost like objecting to the Milky Way. But Mr. Joseph does object, not only to the law but to the statement that he is advocating skyscrapers, when he has made it perfectly evident that he is only advocating buildings of a mere 150 feet in height, and everybody knows that skyscrapers are 600 feet high, and in case they don't know it he shows them in a neat design of his which is apparently inspired by the Flat Iron Building, and which, Mr. Joseph seems to think, might be found on every other corner in Manhattan. And to show that Mr. Joseph was not alone in his position, Sir Sydney Skinner, the chairman of a large distributing firm, in seconding a vote of thanks, said that high buildings are a necessity to his business and merchants "want to be allowed to build to a greater height than 80 feet. Otherwise the floor space is very considerably limited or you have a narrow height in which goods will not show to advantage," a statement in which Sir Sydney palpably shows who is taking the role of Potiphar's wife. The idea of anyone thinking that goods would show to advantage in a narrow height! But, in spite of all the earnestness and the oriental imagery, the Royal Institute did not seem to be impressed; they callously preferred the narrow height of their own London, and they spoke rather bitterly of the change in Regent Street and of the few high buildings that had been built. The English are too familiar with the dreadful results of our unrestrained development to take such chances with London. They are in a position to see, and the remarks that followed Mr. Joseph's address clearly show that they do see, that a building of abnormal height is an offense artistically and morally as well, for it steals the light and air of its neighbor, and, because of the greater number of those that it houses, arrogates for itself the greater part of the public thoroughfare that was meant for others. Primarily such structures were built for greed, and when it became evident that

From "Architecture"



Public Library, Wilmington, Del.

Edward L. Tilton and Alfred Morton Githens, Associated Architects

there was an economic limit of height, they were built for advertisement; they are never built for necessity. Artistically they are generally failures. Some few are good and a very few fine, and they all have, by their very size, a certain

From "Architecture"

West Branch Library, Bridgeport, Conn.
Leonard Asheim, Architect

crude grandeur which is imposing, as Mr. Dooley says, to those who are easily imposed on. Of course, if owners want to build them, there will always be found architects to design them, and the only safeguard is to restrict future work rigorously in those localities where the idea has taken root, and to keep established a low limit of height in those fortunate localities in which it has not.

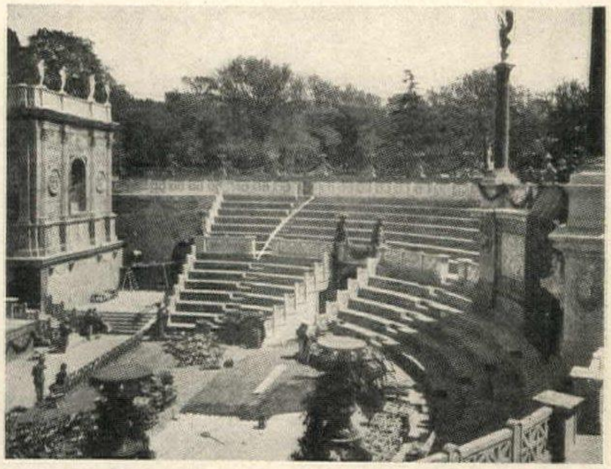
For the last hundred years or so, from the time when the ruins of classical architecture in Greece have been explored and measured, there have been a series of attempts to show that in the design of these great works the Greeks were governed by some mystic formulae; that they had by some

From "The Architectural Review," London

The University Club, New York
(From a sketch by William Walcot)

happy chance stumbled on these formulae or that the formulae had been perhaps handed down on tables of stone in the Mosaic fashion; at any rate, they knew just how to do it and the secret had been lost and now rediscovered. Mr. William B. Dinsmoor gave a most interesting and authoritative discussion of this question in the June number of *Architecture,* and in the July issue completes an article which should be read with interest by all architects or laymen as well, who are concerned with such things. It should be read aloud into the unwilling ears of those theoretical gentlemen who have lately taken up so much space in architectural journals, even if the aforesaid gentlemen have to be hogtied in order to render this possible. Referring to the Parthenon, "What then," says Mr. Dinsmoor, "was the method employed in the design? During an investigation of the problem extending over more than a dozen years, I was forced, in spite of myself, to see that the method adopted was hardly different from that of modern times. I find no mystery in the plan of the Parthenon, nor in that of any other Greek temple; I have no secret to disclose—It is my thesis that the Greek architects worked entirely with proportions based upon linear measurement; and I must ask

From "The Architects' Journal," London



The Theatre at the Roman Exhibition

you to believe that all the measurements hereafter quoted have been faithfully transformed into Attic feet of 12-7/8 inches (327 millimetres)." As I see it the great trouble with all these theoretical gentlemen is, that not being designers themselves, they are not able to conceive the mental processes by which any design is made. They are in the position in which I would find myself if, knowing nothing of music, I should attempt to analyze mechanically the composition of an opera. They are unable to appreciate that modular or lineal measurements are useful only for drawing out or describing a conception so that it can be built by others, or in preserving the pro-

From "Architecture," London

Cartoon for the painting in the eye of the Dome, Missouri State Capitol

By Frank Brangwyn, R. A.

portions of a structure built in some distant locality. A sculptor makes a model of his statue in clay and casts it in plaster and from this model the bronze is cast or the marble cut. He cannot give verbal directions, nor can he write out a series of dimensions. In the case of a building it is different. You can't model a complete temple

From "Architecture," London

The Home Builders
Pendentive at base of Dome, Missouri State Capitol
By Frank Brangwyn, R. A.

in plaster; you can only draw it on paper, and if you haven't got the paper or the drawing materials, the next best thing is to express your contemplated design in some dimensional way, by some standard unit such as the foot and its subdivisions, or by modular dimensions starting with the assumption, say, that the lower diameter of the column is so much and making subdivisions of that. The latter way is, of course, the only way by which can be made a careful comparison of one building with another. Then, too, these theoretical gentlemen, not being designers, fail to realize the different elements that enter into a design, the peculiarities of the site, the material available, the question of cost, the use of old material, the requirements of the client, and above

From "Architecture," London

The First Landing
Pendentive at base of Dome, Missouri State Capitol
By Frank Brangwyn, R. A.

all they do not realize that the workings of the human mind are probably just the same now as they were in the classic days of Greece. What would happen if an architect nowadays ignored all the requirements of his client and the regulations of the Building Department and made his design over a system of crisscross lines and squares? Where, as they say colloquially, would he get off? And yet, such things are seriously advocated and this advocacy is spreading much more rapidly than one would think possible. I had a case in point recently. The graduating class of a high school we had built some years ago decided to erect a gateway, an entrance to the school, as a memorial to their class. One of the members of the class who was interested in architecture made a design for it, and submitted it to me for approval. It was very simple and good, a little crude naturally, but what chiefly attracted my attention was a brick wall at each side of the entrance which was figured 4 feet 2-3/5 inches high. At first I supposed it connected up with an old wall which he had measured but upon inquiry I found the young man had worked out this height on the Hambidge theory which had been explained to him by his teacher of Art. And so it goes. Years ago when I first came in contact with these theoretical gentlemen and their theories I was merely amused, later I was bored, and now I feel strongly it all should be suppressed, and I have animadverted on it at length in these columns and elsewhere, but not being an archeologist, and not having given years of personal study to the ruins, I was not in a position to speak with authority as to measurements.

From "Architecture," London

The Pioneers

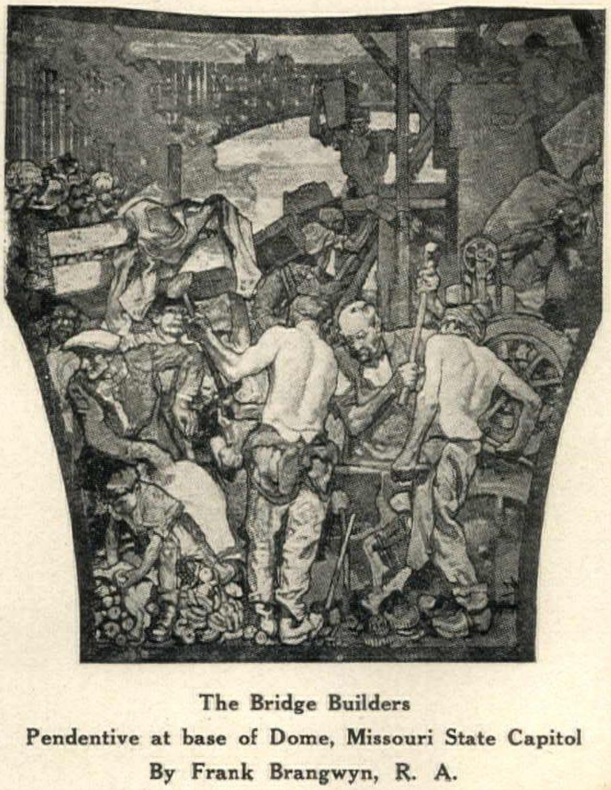
Pendentive at base of Dome, Missouri State Capitol

By Frank Brangwyn, R. A.

I could only look at it all from the standpoint of common sense design. I knew from analogy that no one ever designed anything by rule, and that in the case of a standard, such as the scheme of a Doric temple, it was all a matter of the development and study of proportions, a gradual improvement over the proportions of former temples, governed of course by the limitations and requirements of each particular case. Mr. Dinsmoor's article is the result of many years of study of the ruins and of all existing records, and the publication of his book on the Culmination of Greek Architecture in the Age of Pericles is eagerly awaited.

There has been a great deal of loose talk lately to the effect that modern architects, when they attempt the Classic are only copying old forms and playing the same old tune on the well-worn strings of the same old classic instrument, and that the spirit of free America is to be found in the covering of the steel frames of skyscrapers and so on *ad nauseam*. It's perfect rot, of course. The best work done in this country is the monumental work, and it's much better done here than anywhere else, just now, and as a whole it compares very favorably with that done in any age in any modern country and it's generally very original. The orders are the same old orders, but why not? There may be other possibilities in an order that have never been tried, but I question it. The detail and to some extent the proportion, and the general feeling, can be changed a little, but the originality of a building lies in the use of the parts, not of the parts themselves. A particularly good example of modern monumental work is the Wilmington Public Library which is profusely illustrated in the same paper as Mr. Dinsmoor's article, the July number of *Architecture*, a very good number, by the way. The architects of this building, Edward L. Tilton and Alfred M. Githens had an unusual and difficult problem to solve and they did it in an original and interesting manner. Here is no slavish copy of the antique, but a real live piece of architecture. The

From "Architecture," London



The Bridge Builders

Pendentive at base of Dome, Missouri State Capitol

By Frank Brangwyn, R. A.

idea of a solid central mass flanked by a four column colonnade is as novel as it is daring. Unfortunately I have not seen the building itself; I can only judge from photographs, but viewed merely in front elevation it is remarkably good. The detail is charming and the building as completed looks very like the fine rendering of Mr. Githens. I am just a little in doubt about the combination of terra cotta and stone in the entablature; they are such radically different materials that I question if in time they may not weather differently. Undoubtedly they look well now. I think I would also prefer it if the first story of the colonnade were more intimately joined to the columns, particularly as there is no second story screen wall. It might be that if the flutes were omitted this effect would be gained, and yet, the order unfluted would not be as good. I'm inclined to prefer the effect of Mr. Githens' rendering to the photograph at this point, and I was going to suggest that the columns be half columns instead of over half, but on closer inspection of a side view of the Library it seems as if they were half columns after all. I remember in this connection a very interesting statement of William Walcot, the English artist, who told me he much preferred half columns, as they were so much more a part of the wall, and did not seem to detach themselves as three-quarter columns do. It's an interesting point. But in any event, Messrs. Tilton and Githens have made a notable contribution to the architecture of this country and I can only wonder at the vast amount of work they have gone through to accomplish this result. Surely this is the very antithesis of commercialism and I hope the library authorities appreciate what they have got, or rather, I hope they have paid for what they have got. There is another interesting library in this same magazine, the West Branch Library in Bridgeport by Leonard Asheim, which is excellent, barring the end bays and possibly the cupola, which is small; the gable and the main wall are charmingly done.

Speaking of modern classic work, there is an exhibition now being held in Rome of Agriculture, Industry and Applied Art for which some really good temporary buildings have been erected, as can be seen from the accompanying illustrations which are taken from *The Architects' Journal*, London, June 6, which says that "the architect responsible for the entire scheme and for the carrying through of the works was Professore Armando Brasini." The entrance recalls to some extent the arch of Constantine; but the treatment is novel and the detail good, and the open air theatre is very interesting. The whole exhibition seems architecturally head and shoulders over any recent attempt.

In the June number of *Architecture*, London, there are published a number of reproductions of the decorative paintings by Frank Brangwyn for the Missouri State Capitol, the originals of which have recently been placed in position. They consist of the four pendentives at the base of the Dome and the oculus of the Dome, and are rather large size, the oculus being about 32 feet in diameter and the pendentives 22 feet high, and 16 feet at the base, and about 30 feet from the floor, the Dome itself being about 63 feet in diameter. All the side walls up to the top of the pendentives are of a local limestone of a warm gray tone, hone finish, and above this the plaster is simply treated in the same color so that the general effect is a monotone which serves as an excellent background for the brilliant decorations of Mr. Brangwyn. His treatment of the spaces is unusual, but in my opinion the only correct treatment. The pendentives are exceptionally broad for their height, in fact on account of the width of the splayed corners they become much more of a wall surface than is usually the case, and they are much too big to be treated in the conventional manner with a central motive or panel surrounded by two panels at the side and one at the bottom. Such a treatment would destroy the fine, large effect of the pendentives. It was always the idea of the architects that these spaces should be treated as wall surfaces and the motive should be continuous around the entire dome, and Mr. Brangwyn has followed out this scheme in a very remarkable manner. I have not yet seen the work in place, in fact the scaffold is not yet down, but I did see the pendentives in the Brangwyn studio at Hammersmith last Fall. The treatment is big and robust as all of his work is, and the colors are kaleidoscopic, brilliant and rich, and carry wonderfully well. The subjects are mainly historical, but after all the subject of a decoration is only of interest to the guides of the Capitol and to the casual visitor who is more concerned with the story than with the general effect. In this case they are pure decoration and they have that flat quality so essential to decoration. No one thing stands out clearly; for example, notice how the wagon top in the Pioneers panel fades into the sky. If it didn't the whole effect would be lost. Much has been written about Mr. Brangwyn's method of work, but one has to see all his sketches in his studio to appreciate how he goes about it. He does not use the ordinary run of models; if he is making a study of a man with a sledge hammer he sends to some factory and gets a man who is accustomed to handling a sledge, and he makes him actually hammer something in the studio, and sketches him while he hammers. He draws with marvelous dexterity and sureness and makes hundreds of small sketches and from these he works up his scale cartoons. The consequence is that all his work has a vitality which is noticeably lacking in most decorative work. I think it can be said safely that this dome treatment of Mr. Brangwyn's is the most successful of any in modern times.

DEPARTMENT *of* ECONOMICS

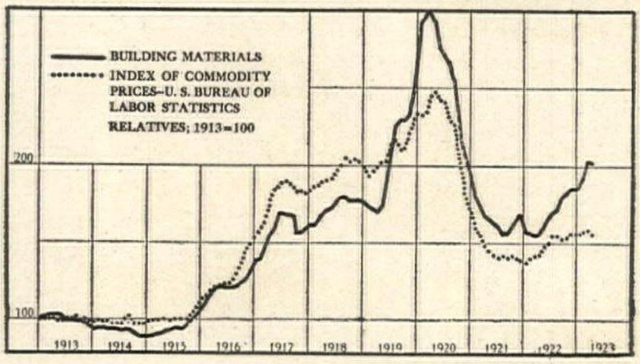
Economic Factors Which Underlie Construction Activity—Prepared for THE AMERICAN ARCHITECT *by the* American Chamber *of* Economics, Incorporated*

CONSTRUCTION costs are still rising, but, happily, the ascendency of one of the chief factors contributing to that movement has been arrested. Building materials prices, according to the Bureau of Labor index, declined scarcely 1 per cent in May in contrast with April. June figures have not appeared at this writing. The quotations of builders' materials have increased more than 30 per cent between March, 1922, and May of this year, which is in excess of increases enjoyed by other commodity groups in the same period. In April, 1923, the Bureau's index stood at 204, the peak of the present movement, and it contrasts with 300 (April, 1920), the high mark attained in the intensely active post-war period. The depth to which the index subsequently fell was 155 (March, 1922).

The fractional loss disclosed by the index during May is of itself immaterial, of course; it is the direction in which the curve of materials prices is headed that is full of meaning. Further recessions will undoubtedly occur, particularly throughout the Summer months, but there isn't the slightest indication that the readjustment will be of a drastic, malicious, or malignant character.

The trend of materials prices will be influenced very probably by the course of general commodity prices, for the broad, underlying forces that shape the tendencies of general prices would have a similar reaction upon a specific market, such as that of building materials. The trend of these basic economic forces suggests that there will be some probably fair sized recessions, but present indications are that this process of realignment will be mild, gradual and orderly, and that it will probably extend over a period of several months.

Building Material vs. General Prices.



(By courtesy of the Standard Statistics Co.)

The degree to which building materials have worked out of line with the trend of general commodity prices is obvious from the above chart. During the Autumn and Winter months much of this maladjustment will be remedied if economic trends, now in their incipient stages, are permitted to grow to maturity

The growth of the building program beyond the limitations of the capacity of the industry and its culmination in prohibitive costs and consequent recessions has been no small part of a broad comprehensive wave of caution and retrenchment, which has had an extreme effect upon the psychology of the present situation. Confidence, rudely shaken, and depressed far more than the facts and developments of the situation warranted, has again begun to lift its head. Speculative feeling has not yet lost its pessimism, and in some circles is unjustly apprehensive. In conservative quarters it is simply disinterested. Production is running at a level under its March peak, and the indications are that it is seeking stabilization at a slightly better than normal level, where "business will be good" but not exceptionally active for a protracted period. Commodity prices, like materials prices, are receding, having encountered a stiff consumers' resistance in their last advance, but the increasing buying strength of the consuming public generally is sufficient security against a drastic decline. Therein lies the strength of the present price situation, and it has especial application to the materials market. Above the present level the market has encountered determined, active and convincing resistance. At a certain lower level there is every indication that the slowly growing but steadily accumulating buying strength of the consuming public will serve as an effective barrier against a shattered market. This buying power is evidenced by general employment, and increasing wages for workmen the country over. Farmers are gradually coming into a more comfortable financial position. Corporate statements taken at random in widely representative fields reveal improved earning power, which is sure to find reflection in the buying ability of salaried men and stockholders. Finally the banking resources of the country could finance com-

The American Chamber of Economics conducts a consultation and educational service for executives, in economic principles. Its Supervising Director is George E. Roberts, Vice President of the National City Bank of New York. Co-operating with the Chamber are James B. Forgan, Chairman of the Board of First National Bank, Chicago; Frank A. Vanderlip, Financier and Economist, New York; Samuel Insull, President, Commonwealth Edison Company, Chicago; Joseph H. Defrees, Ex-President, United States Chamber of Commerce; Henry S. Pritchett, President, Carnegie Foundation; Edward J. Nally, Managing Director, International Relations, Radio Corporation of America.

fortably a greater volume of business than is being transacted today. Credit stringency, hitherto forerunner of fear and depression, is a possibility far removed. So it would seem that there is little justification for much of the fear and apprehension that exists, and there are many reasons why the architect should encourage a brighter and more confident attitude toward the future.

Lumber has been the first of the four major materials, lumber, structural steel, Portland cement, and common brick, to reveal weaknesses. According to the composite price index computed by *The American Contractor,* lumber has declined from $40.39 in the week of April 28 to $36.61 during the seven days ending June 23. Demand has been light as a result of the suspension of construction, variously estimated from $150,000,000 to $200,000,000 in a movement confined almost wholly to the Northeastern states, and to the decided improvement manifested in the transportation situation. According to the reports of the National Lumber Manufacturers' Association for the week ending June 16, orders were 72 per cent and shipments 88 per cent of production. Output is still above last year's turnover at this time, but orders and shipments are both lower. Yards are reported to be well stocked. Staple grades are holding up well, the noticeable weaknesses occurring most frequently in the less popular classifications. The outlook is for still further gradual and moderate declines.

Structural steel likewise has experienced some readjustment. *The American Contractor's* index reports a recent high (May 2) of $2.56, which represents a composite price of shapes, plates and bars, f. o. b. Pittsburgh. During the week of June 23 this index had dropped to $2.49. New business is appearing in better volume, however, and in some instances premiums for immediate delivery have been called back into vogue. Inasmuch as output normally declines in response to seasonal influences during the Summer months, not much change in structural steel prices is expected.

The demand for cement is exceptionally heavy, and *The American Contractor's* index has held firm at $2.55 for the past two months. Production is expanding to meet this growing need, and output for May has been estimated at 12,910,000 barrels, establishing a new high record for any single month. Shipments approximated 14,257,000 barrels for the same period and stocks in the hands of manufacturers were diminished by 1,348,000 barrels. The lull in Eastern construction, better transportation facilities, and the weakness in other materials markets are saving the cement market from a wild carnival of hysteric buying that probably would have culminated in a severe shortage. Cement prices are not likely to undergo any immediate appreciable change, for the market seems to be firm and stable at present levels.

Quotations from common brick have been advancing, and the composite price, computed from quotations in fourteen cities by *The American Contractor,* has risen from $16.79 on April 28 to $17.07 June 23. For an average movement that reflects strength. The advance is due to higher production costs brought about by wage increases and attempts to unionize the brick plants along the Hudson, and the curtailment of output occasioned by these labor troubles has left supplies on hand uncomfortably low. A brick shortage is again the subject of conversation among architects in some quarters. Such a condition would at once suggest a firm market possessing a great deal of pent-in strength. However, should production and shipments be allowed to continue undisturbed, and should the lull in construction continue, conservative opinion is that brick prices may seek easier levels in the late Autumn.

This review of the materials markets emphasizes several elements of strength which the architect, in discounting present day trends, should carefully consider. In the first place, new business is no longer swamping the industry, and the longer it is confined to manageable limitations the better off the architect, builder, banker and general public will be. The seller's position in the markets is weakening, and this fact of itself should make for saner and more reasonable prices. Inventories, with the exception of brick, are fairly adequate, although not evenly balanced. Shortages are not a certainty. Transportation has ceased to occupy a major position in the minds of the trade, which is a source of considerable satisfaction. The practice of speculative buying and the policy of overextension of commitments have been abandoned. And finally, the banking situation is strong enough to finance any materials movement that is basically sound and reasonably priced.

But the price of building materials is only one of three essentials that make up the cost of construction. The other two are wages and the rate of mortgage money. Coming at a time when labor was almost fully employed, building and construction in assuming boom proportions merely helped to accentuate the existing labor scarcity and to start contractors bidding against one another for the available workmen. The supply of workmen has been held inflexible by restricted immigration and in the face of an extraordinarily active demand wages have risen. Union officials were not long in appreciating fully the advantageous position in which they found themselves, and they began to exploit the situation assiduously. To say whether the bidding of the contractors or the demands of the unions have been the more responsible for present high wages is to attempt to name the blade of the shears which does the cutting. The fact is that wages are at their previous high levels as a result of these two forces. Other strikes and more unreasonable demands may materialize, but public opinion, the lull in building activity, and the present downward trend in commodity prices are at the moment working to the disadvantage of labor. A recession in wages, if one does occur, will depend upon the development of these trends into ripe maturity. Such a contingency will take months to crystallize, and there is nothing in the immediate future to indicate that labor costs are going to follow materials prices downward.

The demand for new building carries every indication that wages will lag and linger long before taking the downward step. Conservative architects are advising their clients to postpone all but urgent business until next year, for the Autumn months are not expected to bring much relief from these high labor costs. Much depends upon the trend of general business and general employment, and the architect should attentively watch developments in these lines. The present indications are that business will settle possibly a little lower, but still on a better than normal plane, and then continue at a fairly stabilized pace. The building industry pointedly hints at the same sort of a future. A recession in wages obviously cannot be of material character as long as employment remains at present levels, and as long as so much work remains to be done—unless, of course, cheaper labor is imported from abroad.

There are still memorials to be erected, and industrial and business structures to be built. Schools and churches are crowded, and clubs and social organizations are seeking new and more commodious lodgings. Residential building has not yet lost its urgent character in some sections, and will be generally active as long as rents hold doggedly to their present high levels. A recent survey conducted by the Department of Labor reveals the fact that housing is adequate in only 8 states; that an acute shortage exists in 9 others, and that conditions are described as improving in the remaining 31.

May's record building shows how stubbornly construction holds its high levels in the face of mounting costs. That alone is evidence of the wealth of demand back of the industry. May construction was the heaviest of any month on record, according to the F. W. Dodge reports, covering 27 Northwestern states. Building during that month was almost 5 per cent ahead of May, 1922, the previous high record, and the first five months of this year have run about 13 per cent ahead of the same period a year ago. As long as these evidences of demand exist, they will militate against any material reduction in wages, provided the general industrial situation does not slump, and provided the bars raised by the present immigration law are not let down. If labor has any political foresight it would realize that it cannot afford to antagonize public opinion for fear of increasing its receptivity to an amended immigration law, and such a piece of legislation might turn the tide of wages and cripple the strength of the unions.

Rates of mortgage money have undergone no market change, generally speaking. Still, 6½ per cent money is more frequently encountered in some districts than it was several months ago, and bankers have not yet altered their rigid policies in regard to construction loans. They continue to refuse applications for loans on building of a speculative character, and they pass upon that construction only, which they feel will relieve an urgent situation. New applications are receiving increasingly critical scrutiny, and the owner is being compelled to provide his banker with more ample margins of safety. While money is in good supply to finance construction at a safe and reasonable cost, bankers are united in the stand that their and their depositors' funds are not to be used to finance boom-price building. The risk is both unattractive and unsafe, and their position can be seen to be an economically sound one.

Conservative opinion among architects seems to be that construction costs will not be easier until the Spring or early Summer of 1924, and they are advising clients to hold jobs in abeyance until then. Costs are still mounting, and they may continue to move upward for several months yet. *The Engineering News-Record's* index on June 1 was 221 (1913 equalling 100). This represents a rise of about 35 per cent since March, 1922, and the present level is only about 20 per cent below the record high, 274, established June, 1920. The peak of building and construction for this year is impending, if it hasn't already occurred, and costs will probably linger high for some months after the curve of volume has turned downward.

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Publishers, The American Architect and The Architectural Review.

OUTLINE OF TENTATIVE SPECIFICATIONS FOR TRAVELING GRATE STOKER

(The form of this Bulletin conforms to the arrangement of Elements of a Specification as given in Bulletin No. 5, Analysis of a Specification, revised January 20, 1923.)

I. CONTRACT AND LEGAL

1. Parties:
2. Drawings:
3. Agreement:
4. Terms of Payment:
5. General Conditions:
6. Regulations and Codes:
7. Standards:

II. ECONOMIC

8. Patents:

Scope of Contract:

9. Work Included:
10. Work not Included:
11. Methods:
12. Basis:
13. Form of Bids:
14. Conditional Payments:

III. GENERAL DESCRIPTIVE

15. Characteristics:

Service Conditions:

16. Location of Stokers:
17. Shipping Instructions:
18. Visiting Site:
19. Working Facilities:
20. Ultimate Requirements:

IV. PRELIMINARY PREPARATION

21. Field Measurements:
22. Shop Drawings:
23. Samples:

V. MATERIALS

24. Properties, Chemical and Physical:
25. Sizes, Weights, Gauges:
26. Quantities:

VI. DESIGN AND CONSTRUCTION

27. Shop Work:
28. Stoker:
29. Grates:
30. Stoker Frame:
31. Stoker Hopper:
32. Stoker Rails:
33. Floor Sleeves:
34. Shafting, Hangers, Belts, etc.:
35. Special Tile Arch:
36. Fire Clay:
37. Water Backs:
38. Stoker Engine:
39. Engine Accessories:
40. Stoker Motor:

41. Motor Starter:
42. Foundation:
43. Electric Wiring Conduit:
44. Piping:
45. Furnace and Boiler Tools:

Field Work:

46. Erection:
47. Finish:
48. Protection of Work:
49. Co-operation with Other Contractors:

VII. SCHEDULES

50. Shop Production:
51. Field Operations:
52. Shipment and Delivery:

VIII. RESULTS

53. Inspection and Performance:
54. Guarantees:
55. Tests:
56. Rejection:

CURRENT NEWS

Columbia Graduate Wins Prix de Rome

THE Prix de Rome, which carries an award of $1,000 a year for three years and study at the American Academy in Rome, has been won by Arthur F. Deam of Springfield, Ohio. He is a graduate of the School of Architecture of Columbia University, New York, and of Ohio State University, Columbus.

Seven men were selected to compete for the prize, and they were allowed three weeks to complete their drawings. Deam was adjudged the winner by the jury composed of Breck Trowbridge, William M. Kendall, Charles A. Platt, Henry Bacon and William A. Delano.

Honorable mention was awarded to Fritz Stephens of New York, William Douglas of New London, Conn., and Paul F. Simpson of Pittsburgh.

New York Architect Wins Prize for Design of K. of C. Clubhouse

AS a result of a competition conducted in New York City by the Knights of Columbus for the selection of an architect to design its New York Chapter clubhouse at the Southeast corner of Eighth Avenue and Fifty-first Street, the jury of award recently announced that the first prize had been awarded to Edward F. Fanning of 522 Fifth Avenue, a native New Yorker and a Columbia graduate.

The award carries with it the commission to design and supervise the construction of the building. The building is to be twelve stories, 100 by 150 feet, the exterior walls being of granite, limestone and brick.

The clubhouse will have an auditorium on the ground floor seating 1,700 persons.

On two mezzanine floors, running parallel with Eighth Avenue, and included in the height of the auditorium, will be council chambers, executive offices, coat rooms, etc. Leading from the upper of these mezzanine floors will be a stone staircase connecting with the club floor above, which will contain a lounge, dining rooms, smoking, billiard and card rooms.

Above the club floor will be eight bedroom floors, with all modern hotel accommodations. On the top floor have been placed the gymnasium, swimming pool and necessary locker and shower facilities.

The approximate cost of the project, on which it is proposed to start construction immediately, will be $1,650,000.

Yale and Union to Teach Building Construction

THROUGH gifts from the trustees of the Louis J. and Mary E. Horowitz Foundation, courses in building construction have been established at Yale University, New Haven, and Union College, Schenectady. The organization in charge of the course will be known as the Thompson-Starrett Foundation.

The Thompson-Starrett Company offers to provide two annual prizes of $2,500 each to be awarded each year to graduates of the course who shall commend themselves by the quality of their work and by their promise as practical building constructors, and who desire to connect themselves with the Thompson-Starrett Company for practical training in their chosen calling.

The course in building construction is to be offered as a development of the civil engineering course, rather than an appendage to a course in architecture. This move is made upon the theory that building construction is looked upon more as a profession in itself than subordinate to architecture.

In proposing the establishment of such a course and undertaking to support it, the purpose in view was to supply a number of technically trained and educated men to perfect the capacity and work of the constructor with the hope that building construction would become a profession as dignified as architecture, and on a parity with it. In establishing the courses the donors do not propose to diminish the importance of the architect or exalt that of the constructor, but to recognize the trend of events and the conditions existing in the building industry and to make every effort to meet them to the satisfaction of the public.

West Virginia Chapter, A. I. A., Organized

THE West Virginia Chapter of The American Institute of Architects was recently organized in Charleston, W. Va., with sixteen charter members, including the following officers: President, Jas. L. Montgomery, Charleston; First Vice President, Elmer F. Jacobs, Morgantown; and Secretary-Treasurer, L. G. Tucker, Charleston.

West Virginia also has a License and Registration Law which has been in effect two years, and was enacted through the efforts of the West Virginia State Society of Architects. The present officers of the Society are: President, H. Russ Warne, Charleston; First Vice President, J. C. Burchinal, Fairmont; Second Vice President, E. J. Wood, Clarksburg; and Secretary-Treasurer, Carl Reger, Morgantown.

Jersey Forms Building Congress

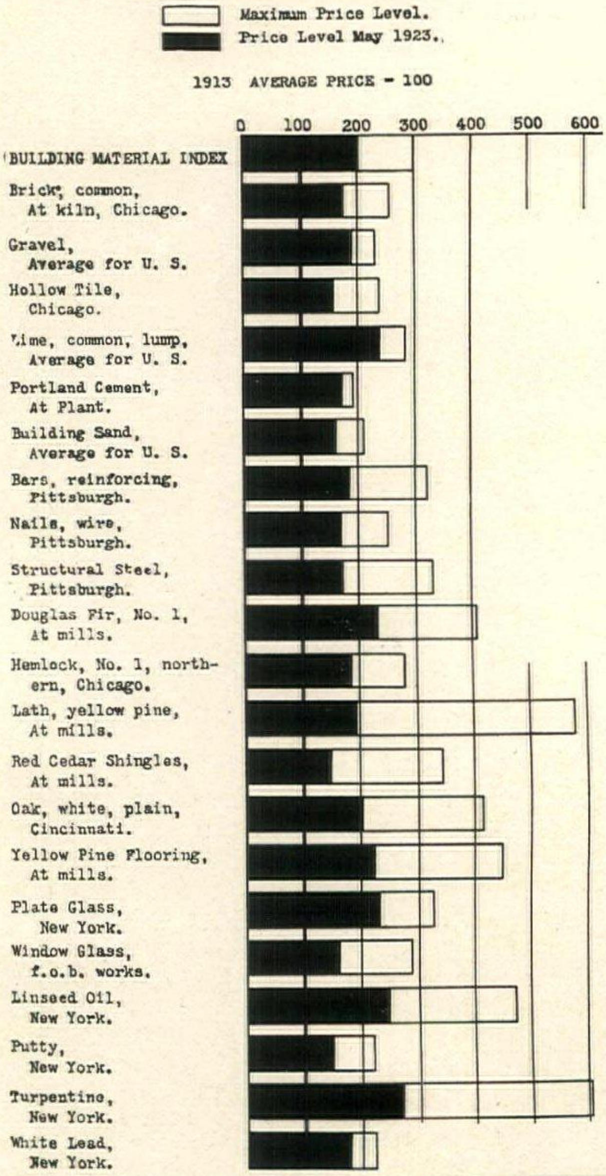
THE New Jersey Building Congress, which will seek amicable settlement of disputes in the building trades, was recently organized at Newark at a meeting of a committee of sixty employers from various parts of the State at the Essex Club.

Appointed Head of the Department of Architecture, Carnegie Institute of Technology

HENRY K. McGOODWIN, A. I. A., was recently appointed Head of the Department of Architecture, and Chairman of the faculty of the College of Fine Arts, at Carnegie Institute of Technology, Pittsburgh, to assume his duties with the next college year. In his twofold capacity, Mr. McGoodwin will succeed Professor Harry Sternfeld, Acting Head of the Architectural Department, and E. Raymond Bossange, Director of the College of Fine Arts, both of whom have resigned. Incidentally, Mr. McGoodwin's choice is a reappointment, as he was Acting Dean of the College of Fine Arts, and Head of the Department of Architecture when he left the institution five years ago.

Professor Sternfeld leaves Carnegie Tech after ten years of service to accept an appointment as Professor of Architecture at Pennsylvania. Director Bossange goes to Princeton University as Head of the Department of Architecture.

Wholesale Prices of Building Materials
Bureau of Labor Statistics Figures



COMMODITY	INDEX NUMBERS				
	At Peak		March 1923	April 1923	May 1923
	Date	Index	Index	Index	Index
Building material index	Apr. 1920	299.7	197.8	204.3	201.5
Brick, common, at kiln, Chicago	Oct. 1920	251.1	175.2	178.0	*
Gravel, average for U.S.	Jan. 1921	233.7	196.2	191.4	192.3
Hollow tile, Chicago	June 1920	236.9	105.3	105.3	161.3
Lime, common, lump, average for U.S.	Oct. 1920	286.0	232.1	232.9	240.6
Portland cement, at plant	Sept. 1920	192.9	173.1	173.1	173.1
Building Sand, average for U.S.	Jan. 1921	209.6	167.2	163.7	164.9
Bars, reinforcing, Pittsburgh	July 1917	327.1	145.4	145.4	187.2
Nails, wire, Pittsburgh	Jan. 1920	252.9	160.8	166.3	170.4
Structural steel, Pittsburgh	June 1917	331.0	145.7	172.1	173.8
Douglas fir, No. 1, at mills	Jan. 1920	407.3	233.5	233.5	233.5
Hemlock, No. 1, northern, Chicago	Mar. 1920	282.1	183.8	187.4	187.4
Lath, yellow pine, at mills	Feb. 1920	582.0	197.7	199.3	198.7
Red Cedar Shingles, at mills	Feb. 1920	346.8	173.9	166.3	151.5
Oak, white, plain, Cincinnati	Mar. 1920	419.0	216.3	216.3	202.7
Yellow pine flooring, at mills	Feb. 1920	455.3	229.9	232.4	224.4
Plate glass, New York	Aug. 1920	329.5	185.9	232.4	232.4
Window glass, f.o.b. works	Aug. 1918	295.2	162.7	162.7	162.7
Linseed oil, New York	Aug. 1919	480.4	220.7	251.0	248.3
Putty, New York	Jan. 1920	226.4	162.3	150.9	150.9
Turpentine, New York	Apr. 1920	601.8	361.8	356.1	272.7
White lead, New York	Mar. 1920	229.3	181.2	181.2	181.2

*Brick, common, at kiln, Chicago is as of April.

Chart prepared by Department of Commerce, Division of Building and Housing of Bureau of Standards.

LADY CHAPEL, LIVERPOOL CATHEDRAL, ENGLAND

G. G. SCOTT, R. A., ARCHITECT

See Article, Daylight in Buildings

(From Modern English Churches)