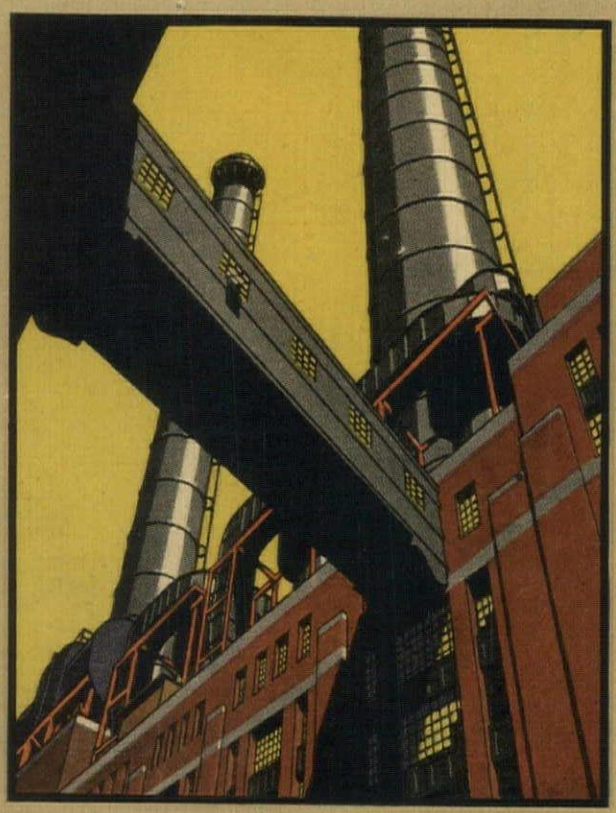
THE ARCHITECTURAL FORUM



IN TWO PARTS PART ONE

ARCHITECTURAL DESIGN

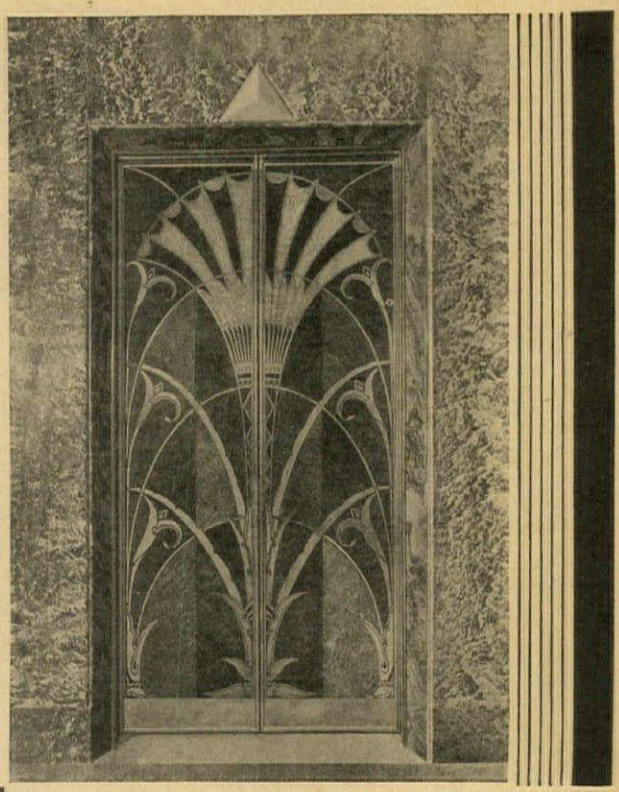
JULY 1930

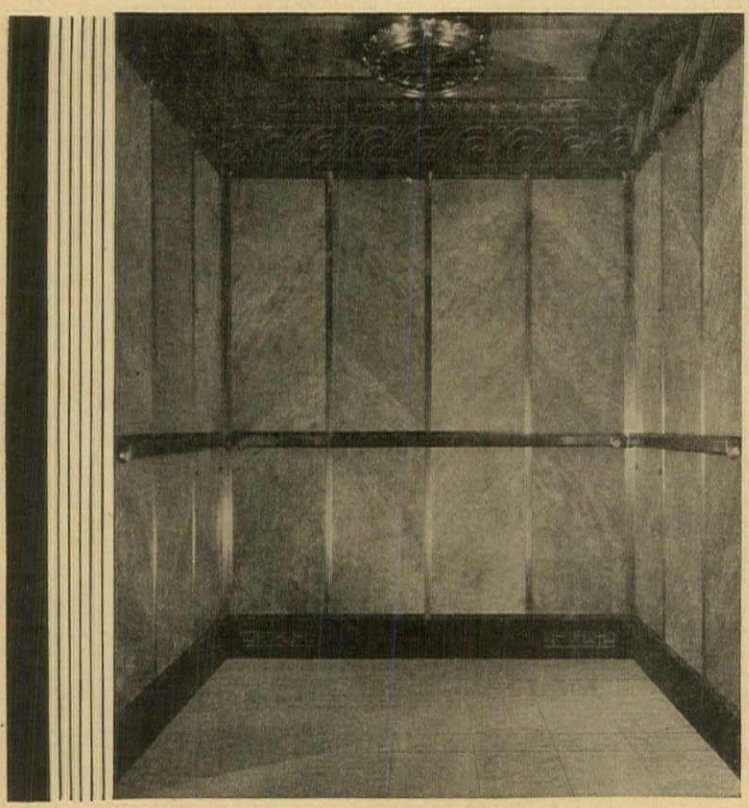
ME-TYL'-WOOD

ELEVATOR CARS *and* ENTRANCES

throughout the

CHRYSLER BUILDING





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General Contractors

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THE
ARCHITECTURAL
FORUM

VOL. LIII, No. I JULY, 1930

CONTENTS

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

THE ARCHITECTURAL FORUM is published monthly by Building Division, National Trade Journals, Inc., 521 Fifth Avenue, New York. H. J. Redfield, Chairman of the Board and Treasurer; Howard Myers, President and General Manager; John Thomas Wilson, Vice-President; James A. Rice, Vice-President; C. Stanley Taylor, Vice-President; Henry J. Brown, Jr., Secretary.

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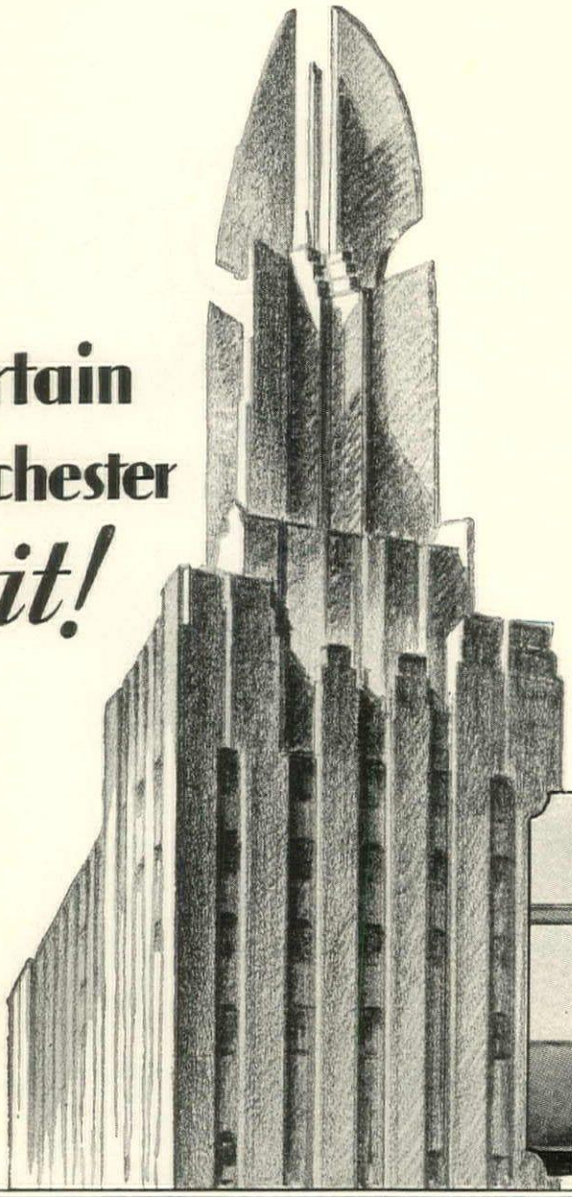
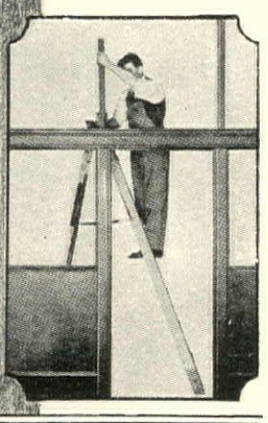
Then...in a certain other building *in* Rochester *they found it!*



Building of the Genesee Valley Trust Co., in Rochester, N. Y. Architects: Voorhees, Gmelin & Walker.

Below: Note how easily Telesco Partition can be adjusted to various ceiling heights. The carpenter is raising telescoping posts and securing them to ceiling strip.



IT WAS designed by Voorhees, Gmelin & Walker. It is regarded as one of the finest buildings in northern New York. It has emphasized anew that in buildings where interior beauty is considered, only one kind of wood is acceptable—*walnut!*

For the Genesee Valley Trust Co. of Rochester, N. Y. looked them all over. One partition after another was inspected. Cheap partition. Expensive partition. Partition painted or stained or photographically treated to look like walnut.

And then, in a certain other building in Rochester, they found it. Here was walnut partition—no imitation. Here was modern design — distinctive, different. Here was partition so reasonable in cost that the Genesee Valley Trust Co. standardized on it for the entire building.

Here was Telesco Partition... with exclusive advantages every building owner owes to his building. The telescoping post shown above. The screw type construction that simplifies overnight tenant changes. The scratchless, ageless lacquer finish. The waterproof, acid-proof base. It's the modern partition for a modern building. If we have whetted your appetite for more facts about Telesco Partition, write for beautiful booklet.

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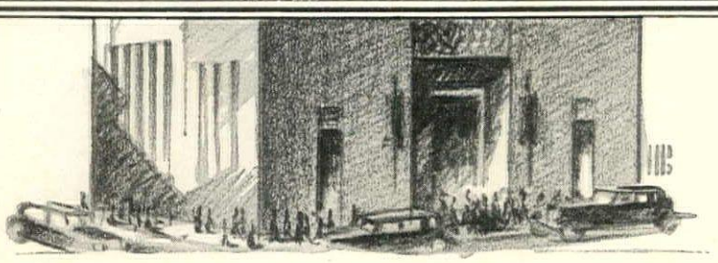
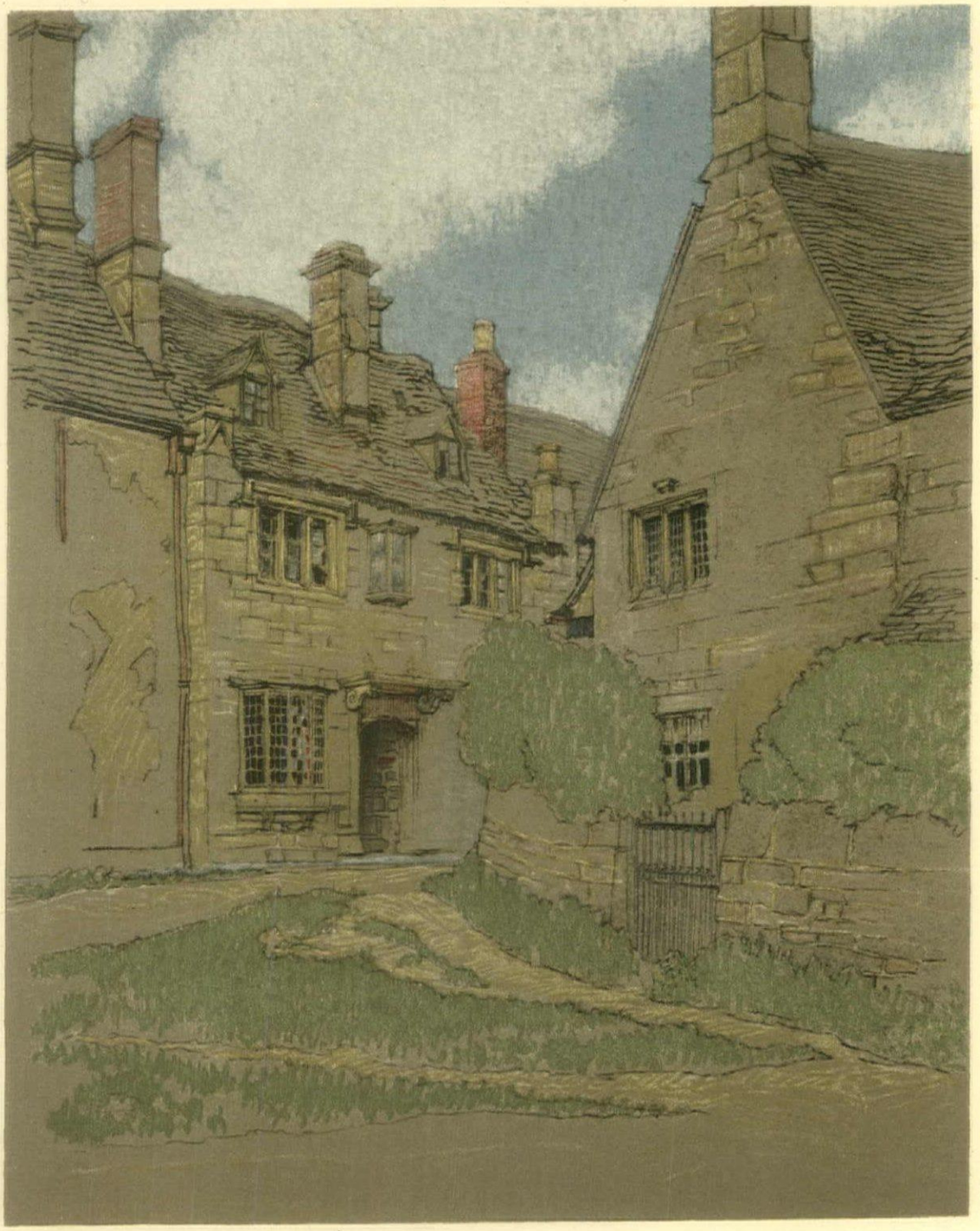


IN Part Two of this issue of THE ARCHITECTURAL FORUM we are fortunate in being able to present illustrations from a series of nine exceptional photographs of the new Hudson River Bridge made by the well known architect, Frederick L. Ackerman. Not only as an outstanding example of artistic photography, but also as record of the human element entering into every great architectural and engineering enterprise, these illustrations are noteworthy. We find here the romance of modern construction remarkably combined with a surprising expression of dramatic power. Such vigor and vitality of composition, such sense of tremendous strength and scale have seldom before been photographically obtained.

In the freezing temperature of February, Mr. Ackerman spent many hours in the dangerous quest, climbing over the great girders and up the curving cables. He waited for just the right angle of the shadows, the right grouping of the men, the right quality of light and atmosphere. Not only in the remarkable handling of the subject, but also in the superb etching-like quality of the prints he made, has Mr. Ackerman shown an artistic sense and a technical skill as yet unsurpassed in photography. A Whistler or a Brangwyn might well be proud of such attainments in the art of monochrome.

THE EDITORS



COTSWOLD COTTAGES FROM A
PENCIL AND CRAYON SKETCH
BY MARIAN GREENE BARNEY

THE
ARCHITECTURAL
FORUM

VOLUME LIII NUMBER ONE

JULY 1930

THE NEW CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE

OFFICE OF JOHN RUSSELL POPE, ARCHITECT

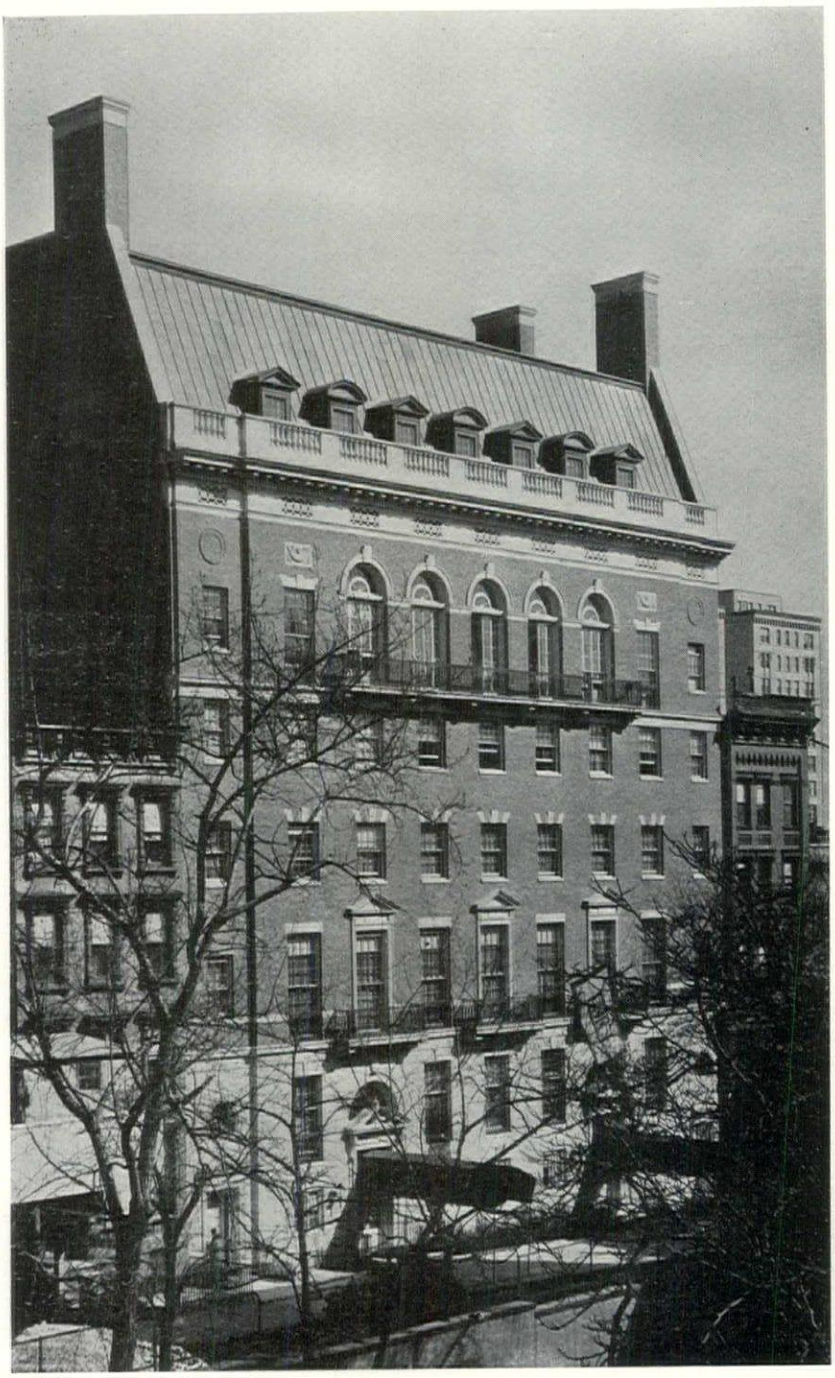
BY MARGARET SHAW TAYLOR

IT was youth,—the essential quality behind the New York Junior League,—which in 1927 started the ball rolling. Today we must hold youth responsible for the distinguished new club house that stands at 221 East 71st Street. In the old club house on 61st Street, there was little space for "eating and meeting." This growing dissatisfaction led to the appointment of a committee, first to find out what was wanted, and then to figure out the cost, and contrive the means of raising it. All this is past history.

THE PROBLEM. The membership was practically unanimous in wanting larger and more adequate quarters. Each committee chairman was consulted about her needs, with the result that to properly administer to the growing activities of the League and the persistent demands of the "young," it was found necessary to give minute consideration to the varying aspects of the League's problems. The office staff needed more space and better equipment. The Arts and Interests Committee and that of Public Education wanted a spacious auditorium suitable for lectures, concerts and other forms of entertainment. The Glee Club asked for a proper room for its rehearsals, and the Theater School demanded a stage with its necessary lighting equipment, dressing rooms, store rooms and work shop. Most important of all, it was wisely decided to house the "Baby Shelter," the League's most important charity, on a separate floor of the club house in order to give it the most complete equipment and maintenance possible. For the enjoyment and convenience of members, there was a demand for squash courts, a sun-lighted swimming pool, exercise rooms, bedrooms, and adequate restaurant space.

The committee in charge of the new building sensibly decided to buy land in a less expensive locality than that formerly occupied by the club. Therefore a plot was acquired in 71st Street, between Second and Third Avenues. In order to meet all the demands made by the different interests of the membership, the committee in consultation with the architect worked out a plan which in its detail is very interesting and comprehensive and as a *fait accompli* bids to be most successful. Virtually three floors of the seven-story building are given over to facilities for entertaining, the rent of which goes a long way toward meeting the yearly upkeep of the entire club house. Moreover, by having the fifth floor devoted entirely to the Baby Shelter, there is a saving of the rent and maintenance of a separate building for that purpose.

ARRANGEMENT OF THE PLAN. The basement contains, in addition to the heating, refrigeration and ventilating plants, a hair dressing and manicure room, and the stage dressing rooms and store room for costumes and scenery. The ground floor, mezzanine and second floor comprise the "guest department," as they lend themselves admirably to various forms of entertainment. On the ground floor there are four entrances,—two main doorways and one for service and one for the Shelter. The service entrance, at the west of the building, has its own stairway and elevator leading to the kitchens, pantries and service quarters on five different floors. East of the service entrance is the members' entrance, at the right of which there is a dog room where canine guests may be temporarily housed. A small members' lobby adjoins the main lobby, whose entrance for guests is beyond the members' entrance farther east, the intervening space occupied by an office containing the telephone



General View, Club House of the New York Junior League. Office of John Russell Pope, Architect

Gottscho

switch boards, whose operators and attendants serve both lobbies. A women's coat room on the right of the guest entrance and a men's coat room opposite are convenient for casual visitors, while additional and more commodious dressing rooms on the mezzanine floor facilitate catering to larger and more formal occasions.

A Georgian room, known as the "great hall," 44 by 76 feet, with a ceiling 18 feet high, has a stage at one end and windows along the north wall, opposite which, on the south wall, are the two main entrances to the hall. Two similar entrances lead to the stage. This hall is used for dances, lectures, picture exhibitions, plays, concerts, dance recitals, etc. At the right of the guests' entrance hall a winding stairway, with wrought iron railings, leads to the mezzanine floor, which contains a well arranged lounge 27 by 32 feet, with a men's smoking and coat room on one side at the head of the stairs, and a card room and dressing room for women opposite. Opposite the windows on the south

Preliminary Study by Otto R. Eggers. Club House of the New York Junior League. Office of John Russell Pope, Architect

Juley

side there is a small recess, at the right and left of which are the elevators, one for members and the other for guests. The remaining space on this floor forms the upper part of the great hall.

SECOND FLOOR

The floor above, which is known as the second, contains a large guests' dining room and two private dining rooms, separated by partitions which can be folded back in such a way that the two rooms are thrown into one. At one end of these rooms there is a door opening into the serving pantries, while at the extreme opposite end is an entrance leading into a small reception room where a hostess may receive her guests. These three rooms, on the north or court side of the building, have French doors, opening onto a broad tiled terrace offering endless possibilities for attractive furnishing and decoration. Two small offices and the members' library, pine paneled, occupy the remainder of space on this floor, in addition to the housekeeper's quarters adjacent to the serving pantries.

THIRD FLOOR

The third floor cannot be approached by the main stairway, which ends at the second floor. It is accessible only by the elevators or by the service stairs at each end of the building. This is the members' floor, containing a sizeable and cheerful dining room on the court side, while an enormous and well proportioned lounge stretches across the front of the building. Dressing rooms, telephone booths (which are on every floor) and its own special kitchen and pantries, complete this floor, given over entirely to the use of members.

FOURTH FLOOR

On the fourth floor, facing south, there are eight bedrooms, each with its own closet and bath. They are single rooms with one exception. A wide hallway serves these rooms, separated by the elevators from a similar hall, off of which the offices open. The offices opening off this latter hallway face the court, and while each is occupied by more than one committee, each chairman has her own desk and telephone and typewriter,—if she wishes. The president's office is the only exception, as she has a small but comfortable office,—to herself theoretically, but not practically. The board meeting room and executive offices are also along this hallway.

FIFTH FLOOR

The Baby Shelter, occupying the entire fifth floor, has its own entrance, stairway and elevator. There is a receiving room for consultation with a room beyond, white tiled, where the babies are divested of their own garments, and bathed and clothed in those of the Shelter,—spotless and sanitary. Two large sunny wards equipped with tiny cribs, surrounded by glass cubicles, insure every comfort and care for the babies' welfare. A quartz glass-enclosed balcony, recessed from the main facade of the building, offers every opportunity for sunshine and fresh air. A tiny isolation ward is used for receiving the new comers as well as for observation in case of illness. On the court side are the nurses' bedrooms and sitting room, their dining room and kitchen; beyond this are the babies' diet kitchen and their laundry, equipped with all the latest devices for washing and ironing clothes.

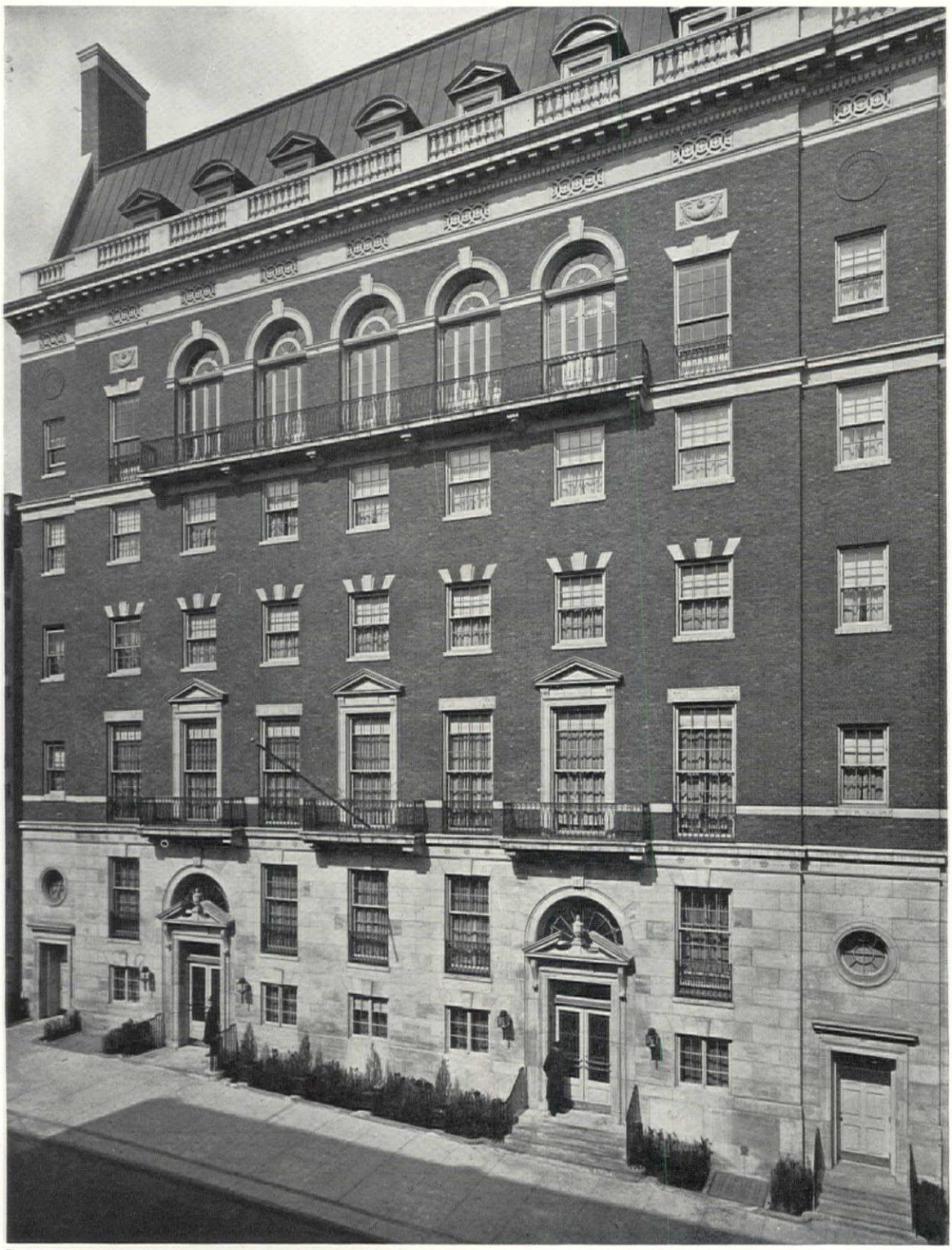
SIXTH AND SEVENTH FLOORS

Above the Baby Shelter are the last two floors, the sixth, containing two squash courts; an exercise room, equipped with wall bars, mirrors and mattresses; dressing rooms; shower baths and lockers; and the seventh floor which houses the beautiful pink-tiled swimming pool, gay with modern decorations and bright from the light coming through its recessed windows and its glass roof, above which artificial lighting may substitute for any lack of sunlight. On this floor also there are additional serving facilities where light refreshments may be ordered and enjoyed.

INTERIOR DECORATIONS. A typically Georgian exterior of red brick and limestone, with monumental doorways, and pleasing proportions, gives this building a quality of distinction and dignity, noticeable to even the casual observer. This impression is confirmed on entering the spacious lobby with its black and white marble floor, refined architectural details, cream painted walls, Chippendale furniture and Colonial fixtures. Two old scenic paintings on opposite walls,—one above a Duncan Phyfe sofa, the other surmounting a console,—decorate the cream-white walls. A glimpse through into the adjoining members' lounge shows two Chippendale painted panels, one above a Chippendale bench and the other over a small table.

The great hall, also Georgian, takes its color scheme from an old ballroom in the American wing of the Metropolitan Museum which was formerly in Alexandria, Va. The pale green of the cornice and woodwork is carried out in the border of the stage curtain which matches in color the gold of the Empire draped window hangings. Empire settees and mirrors; a Chippendale sofa and drum tables; a Colonial cove ceiling, lighted indirectly; and doors, Adam in design with broken pediments, are among the distinguishing features of this well proportioned room.

The winding stairway leading from the ground floor and continuing to the second is bordered by an iron railing featuring the lyre motif. At the head of the stairs is the men's smoking room, the decorating note of which is taken from some aëronautical prints representing famous feats of aviation. Celadon green predominates, used on the walls and in the rug. The lounge itself is one of the most satisfying rooms in the club house. The walls of deep buff reflect the groundwork of a colorful rug of Aubusson pattern, striking in design, whose greens, yellows and rose are carried into the striped fabric of the window curtains. Bronze fixtures, representing sheafs of wheat, decorate the walls, while an Italian Directoire bench, sofas and chairs, upholstered in the colors of the rug, add to the gay cheerfulness of the room. On the other side of the lounge is a card room, opening into the women's dressing room. The latter is vibrant with all the modern modes of decoration; a green *stria* wallpaper makes a background for the sapphire trim and glass of the dressing tables, skirted with white waterproof chintz, and adorned with silvered toilet articles and lighting devices. Footstools and chairs are covered in sapphire waterproof chintz, while the floor is dazzling with diagonal squares of green and black checked tiled linoleum. The green of the French flowered wallpaper of



Duryea

Front Elevation
Club House of the New York Junior League.
Office of John Russell Pope, Architect

the card room is repeated in pale green taffeta curtains at the window and in the rug. The Italian Directoire bench and Sheraton chairs are covered in a striped material of buff and green.

The second floor, with the exception of the pine paneled library relieved by henna rep curtains and furnished with Colonial chairs and sofas covered in yellow and blue-greens, is mainly

occupied by the guests' dining rooms. The main room, similar to that of the members on the floor above, is typically Georgian. The rich Georgian green of the walls is relieved by yellow satin curtains painted with designs from old Chinese panels. Sheraton chairs, upholstered in striped green and tan antique satin, old Waterford crystal wall brackets, and a Chippendale mahogany china cabinet lend dignity and atmosphere to this excellent room. The two dining rooms present a gay picture with their silver-leaf walls decorated with designs from Persian hunting scenes, their Chinese vermilion woodwork, sapphire satin curtains and black marbleized tables. The rug is dark taupe, the chairs Directoire, and the lighting fixtures distinctly modern. Adjoining these rooms there is an Empire reception room, the oyster white of its walls decorated with an old French black and white and chartreuse green border, in striking contrast to the rich yellow Empire draped curtains of Fortuni material at the windows. An ancient white spinet, a black marbleized mantel and Italian Directoire chairs covered in yellow and green striped fabric are the outstanding features of the furnishing.

The members' lounge, with walls of celadon green and rug of light beige, is enlivened with an English hollyhock chintz, whose blue background with rich red and yellow flowers gives the keynote to the other colors used in the room. Red tole lamps near a yellow sofa; Directoire French tulip wood chairs done in rose and tan striped antique satin; a Chinese lacquer cabinet; blue glass Victorian lamps; gilt and black Colonial fixtures; an old portrait, and an old English hunting scene, all harmonize and blend, producing a satisfactory sense of repose and dignity and inviting admiration for the selection and arrangement of the furniture and decorations of such a large room. Entering the members' dining room one is impressed with the homelike atmosphere created by the simplicity of its decoration, antique chintz against ivory walls relieved by a landscape picture over the sideboard and a still life over the fireplace. Borders of Directoire design above the curtains and wall fixtures of Adam design complete the decorations. The chairs and sideboard are Chippendale.

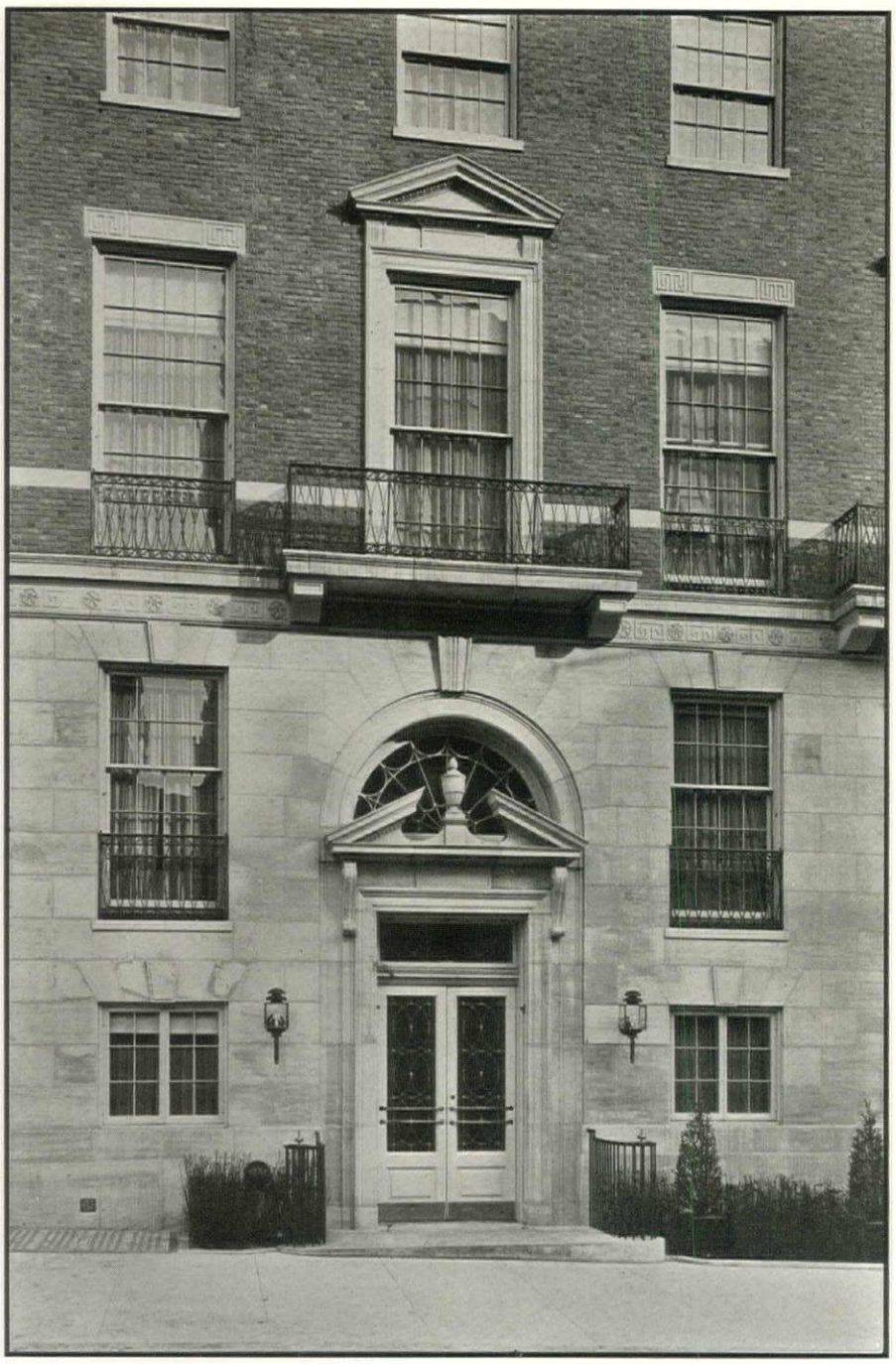
The bedrooms, all of different types of decoration, are unusually attractive. Two are in the modern manner and are in striking contrast to each other. One done in the warm tones of deep rose, browns and olive greens, has an interesting paper in rose-pink on the walls. The adjoining room has its walls covered with a blue figured paper in contrast to a pale yellow ceiling. Silvered furniture and tones of coral used for the covering of the bed and in the velvet of the window curtains make a particularly happy and effective combination. This room is universally admired. The other rooms vary from French Directoire, English and early American to combinations of different styles, all carefully arranged.

The swimming pool is pink tiled, repeated in a wainscoting which meets the oyster white walls decorated in designs of pink to match the tiles. The glass roof is indirectly lighted so even if the sunlight fails, the illusion of it remains. By the light from the recessed windows there are reflected in the pool the graceful palms which border it. A spectators' gallery at one end, done in sapphire, is furnished with modern wicker furniture painted shell pink, while card tables and odd chairs of silver metal upholstered in tan suede piped in silver help to decorate this space, occupied as well by Victorian metal garden furniture. Cushions, some of pink, white and gray waterproof chintz, and others of blue and green add the gaiety of color to the scene.

The interior decorations of the club house were carried out by Elsie Cobb Wilson assisted by Mrs. Ethel J. Babcock, who was responsible for the painting and designing of the private dining rooms, and by Bruce Buttfield, who did the modern rooms, including the swimming pool, two bedrooms and the hair dressing rooms.

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE

OFFICE OF JOHN RUSSELL POPE, ARCHITECT



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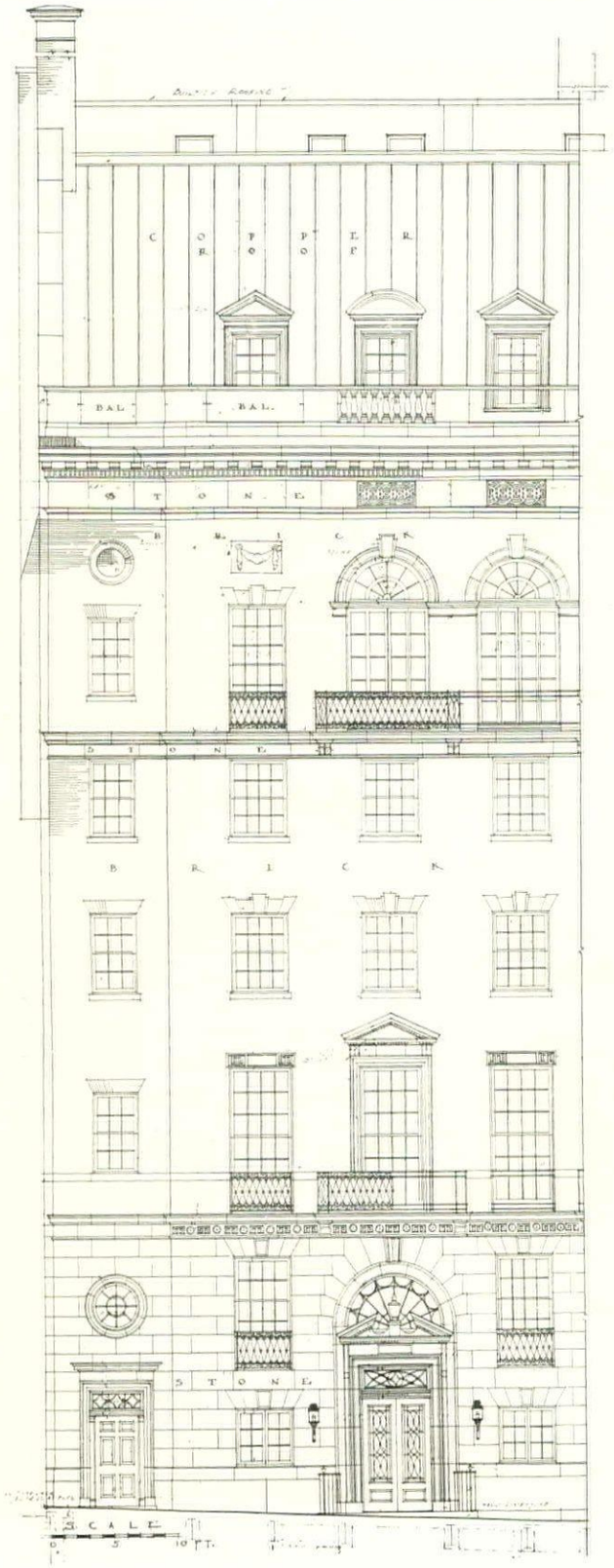
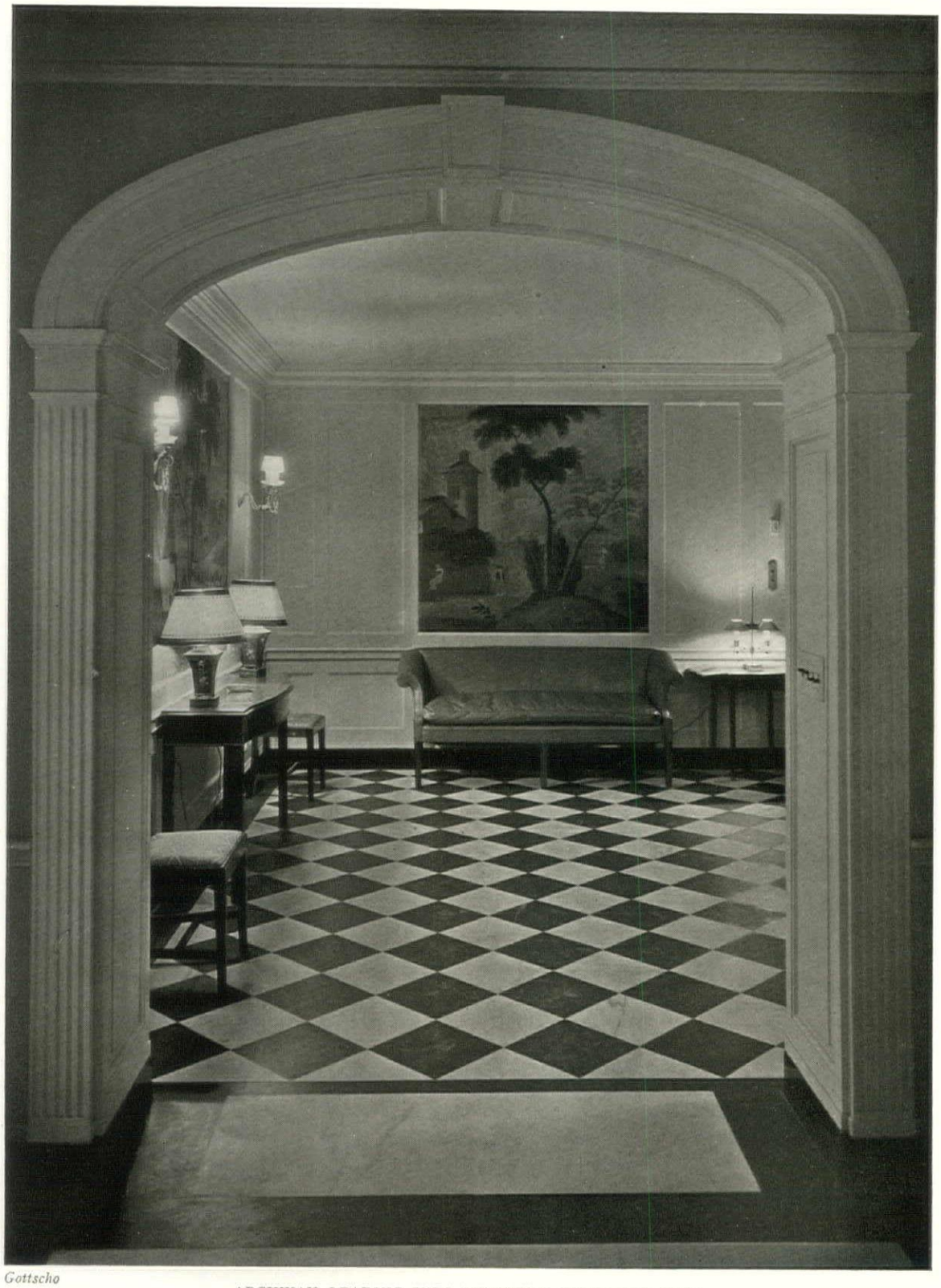
ONE OF THE TWO ENTRANCE DOORS



PART OF FRONT ELEVATION

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



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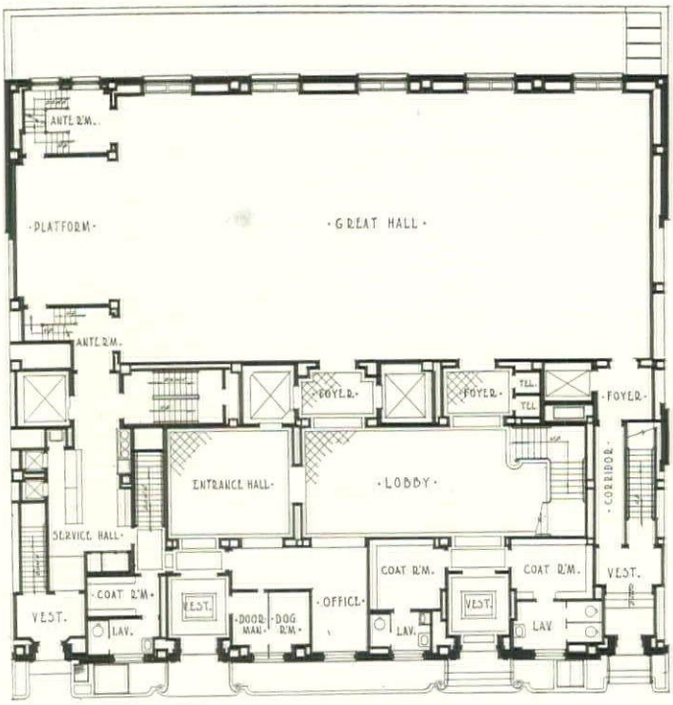
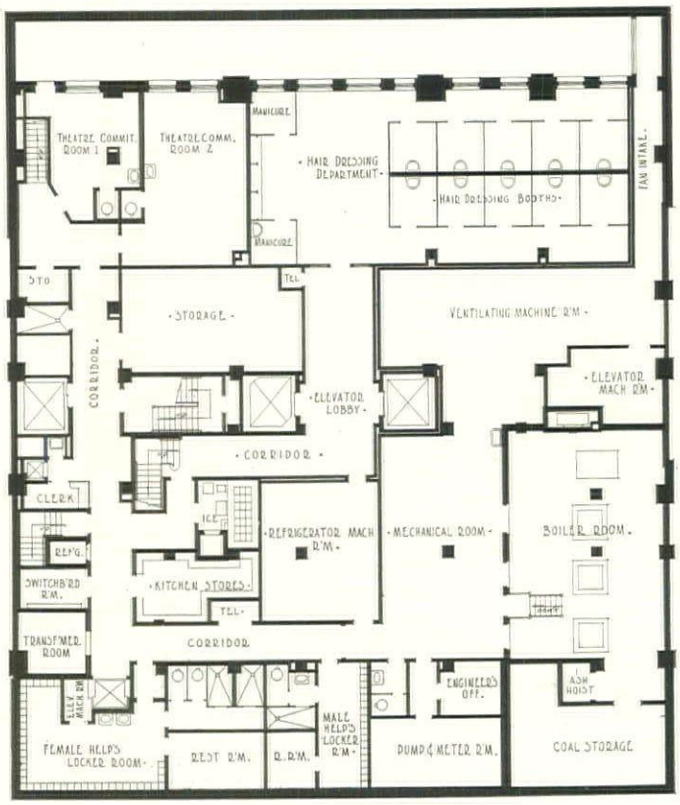
ARCHWAY LEADING INTO MEMBERS' ENTRANCE HALL

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



FIRST FLOOR



BASEMENT

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

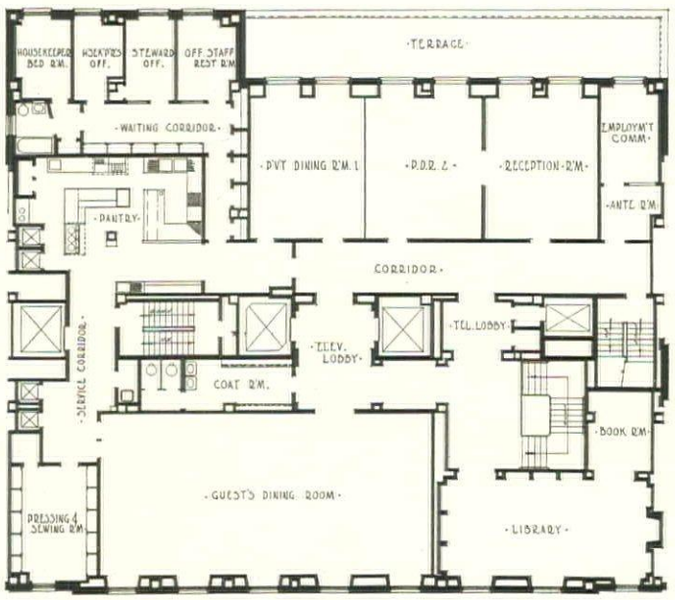
Duryea

MEMBERS' ENTRANCE HALL

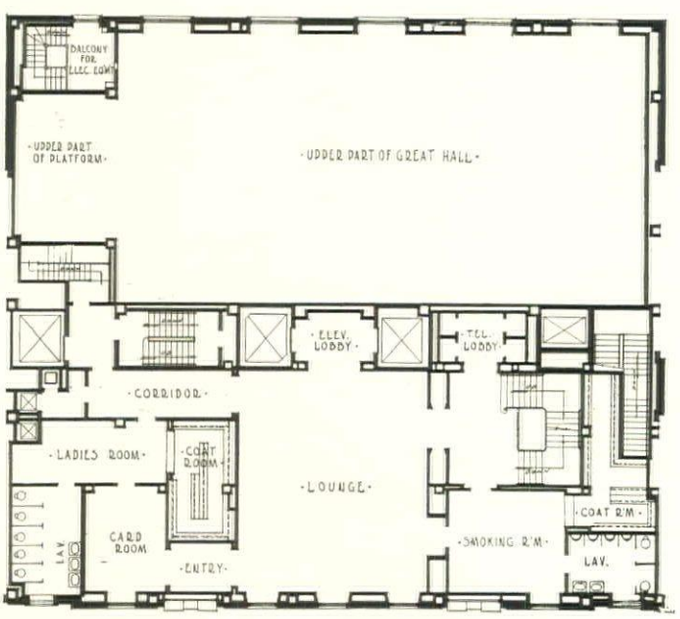
Duryea

DOORWAY BETWEEN MEMBERS' ENTRANCE HALL AND LOBBY

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



SECOND FLOOR



MEZZANINE

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Duryea

GUESTS' LOBBY AND ENTRANCE VESTIBULE. (BELOW) STAIRWAY FROM LOBBY TO MEZZANINE

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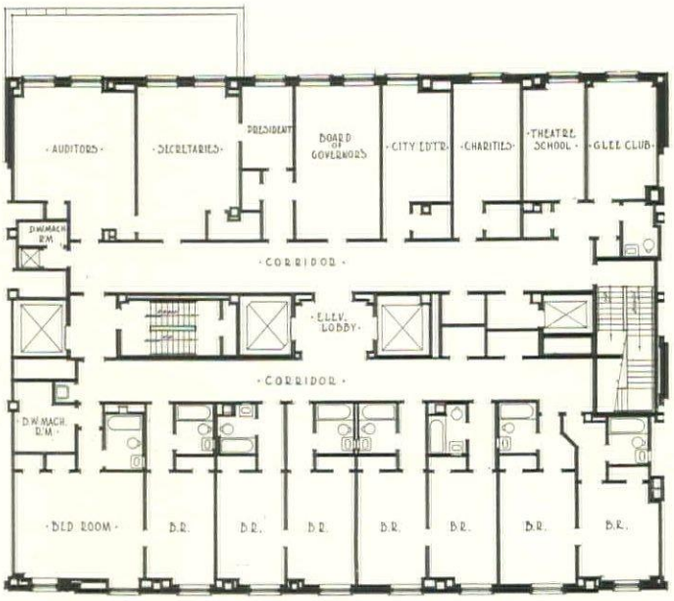
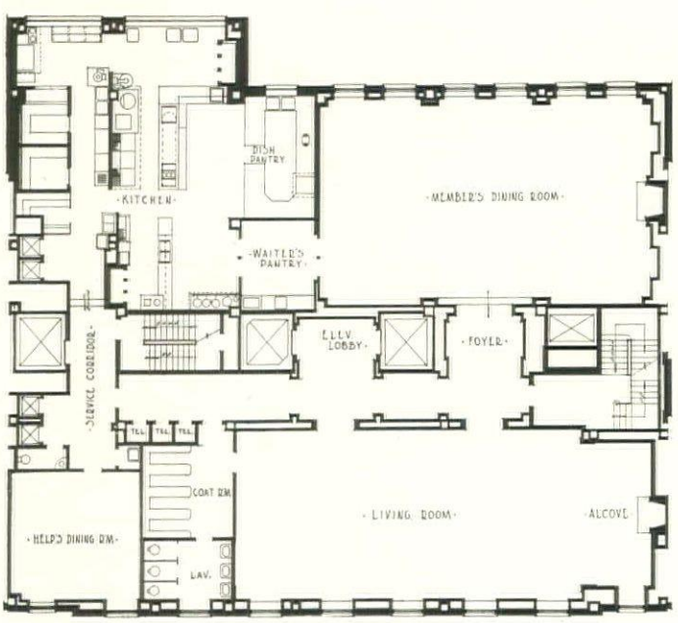
CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE. OFFICE OF JOHN RUSSELL POPE, ARCHITECT



FOURTH FLOOR



THIRD FLOOR

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

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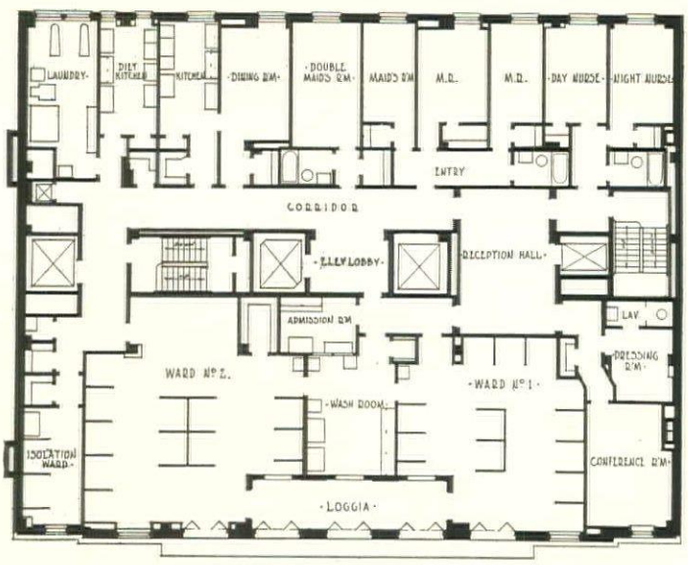
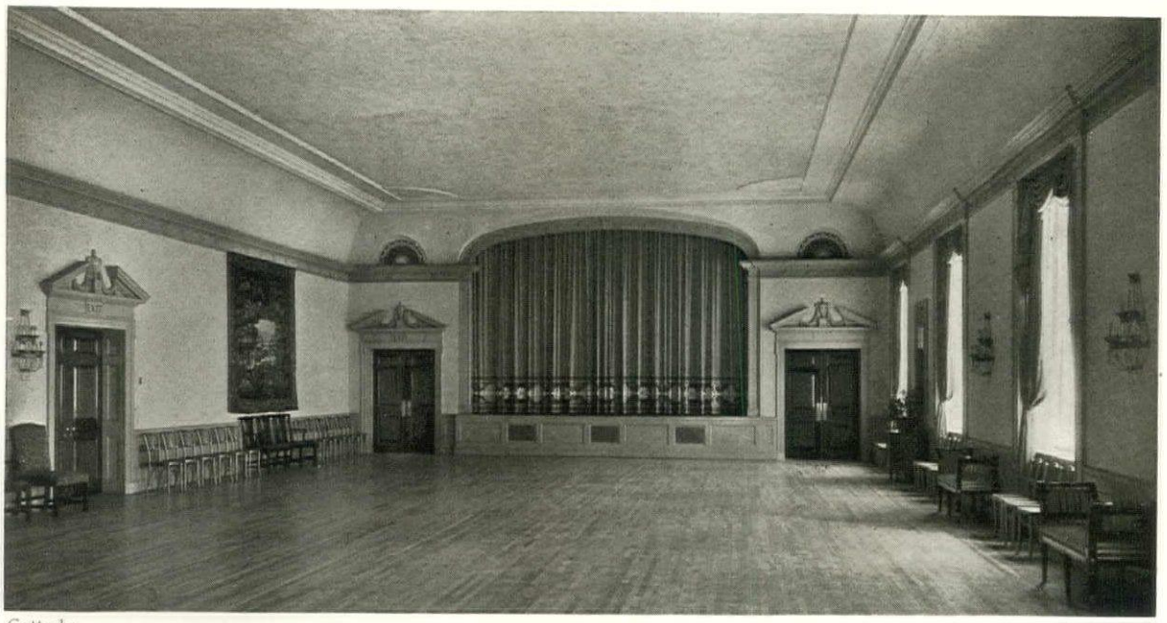
DOOR BETWEEN FOYER AND GREAT HALL
CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



FIFTH FLOOR

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



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THE GREAT HALL

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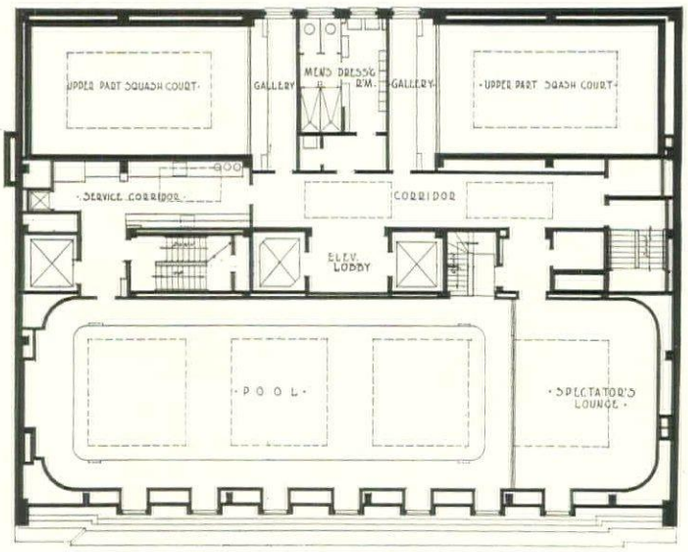
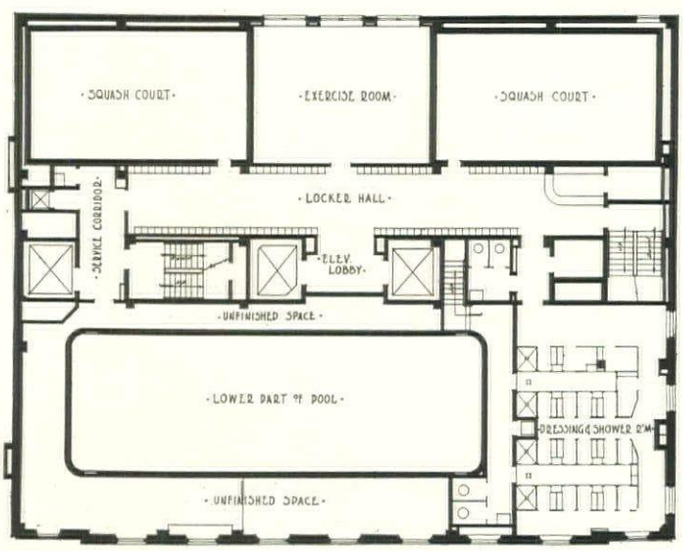
EAST END OF THE GREAT HALL

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



SEVENTH FLOOR



SIXTH FLOOR

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

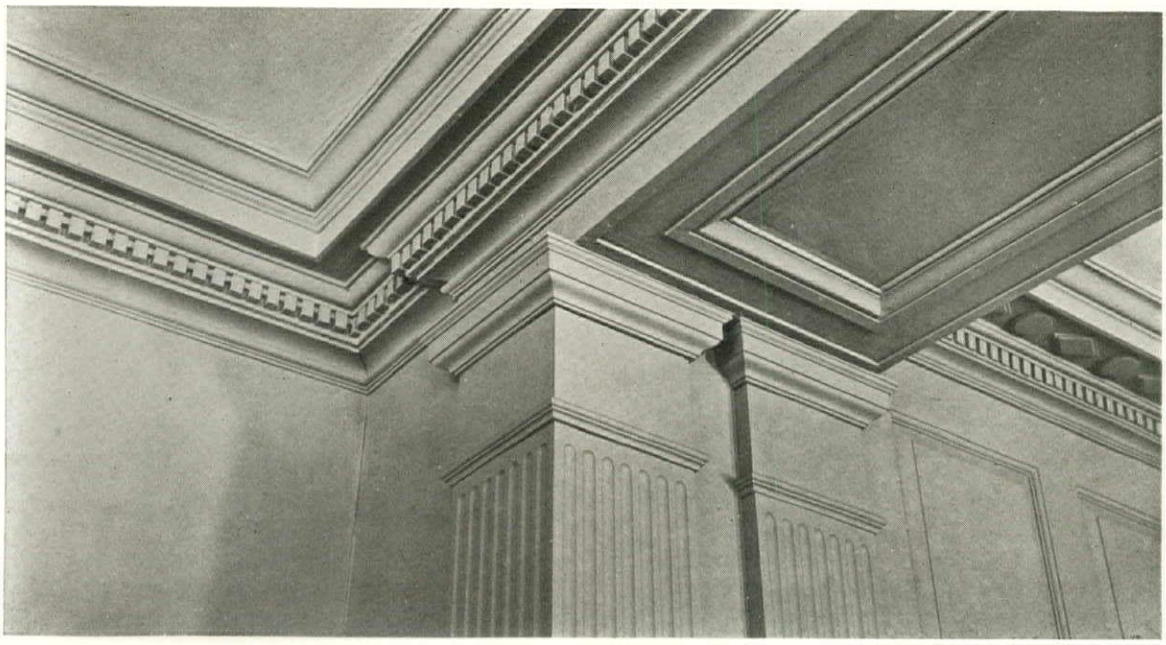
Gottscho

EAST WALL OF GUESTS' LOUNGE

Duryea

WEST WALL OF GUESTS' LOUNGE

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



Gottscho

DETAIL OF PILASTER AND CORNICE IN THE MEMBERS' LIVING ROOM. (BELOW) NORTH WALL OF MEMBERS' LARGE LIVING ROOM

Gottscho

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE. OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Gottscho

THE MEMBERS' LIVING ROOM

Gottscho

ALCOVE, EAST END OF MEMBERS' LIVING ROOM

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Gottscho

GUESTS' DINING ROOM

Gottscho

LIBRARY

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Gottscho

MEMBERS' DINING ROOM. (BELOW) FOYER BETWEEN MEMBERS' DINING ROOM AND THE LIVING ROOM

Duryea

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE. OFFICE OF JOHN RUSSELL POPE, ARCHITECT

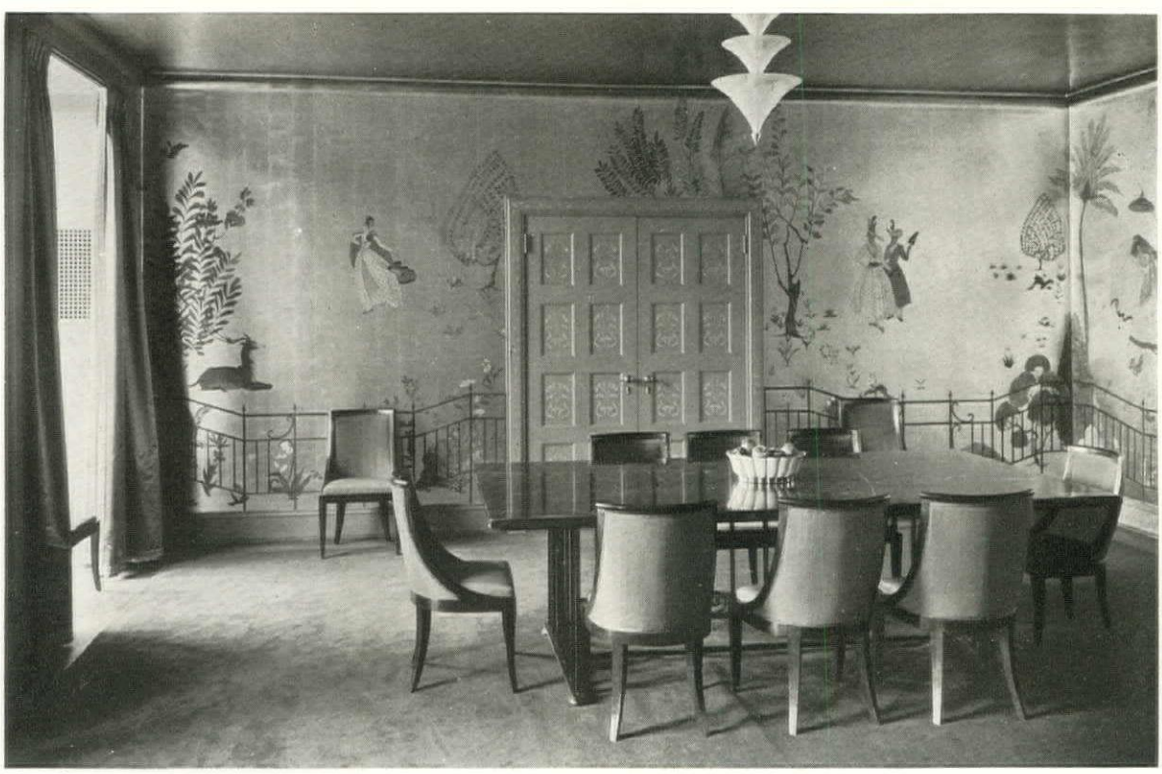
Gottscho

DOORWAY BETWEEN LIVING ROOM AND FOYER

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Gottscho

RECEPTION ROOM ADJOINING PRIVATE DINING ROOM



Gottscho

PRIVATE DINING ROOM

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

DOOR FROM HALL INTO SMOKING ROOM

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE.
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

SMALL BEDROOM ON THE FOURTH FLOOR. (BELOW) SMOKING ROOM ON THE MEZZANINE FLOOR

Duryea

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE. OFFICE OF JOHN RUSSELL POPE, ARCHITECT

Duryea

LARGE BEDROOM

Gottscho

CARD ROOM

CLUB HOUSE OF THE NEW YORK JUNIOR LEAGUE
OFFICE OF JOHN RUSSELL POPE, ARCHITECT

MODERN DESIGN AS INFLUENCED BY MODERN MATERIALS

BY
CHARLES W. KILLAM
Professor of Architecture, Harvard University

NO one man knows enough to discuss this subject in all its aspects. We can each try to contribute from our particular training, experience, and reflection.

No one solution can fit our diversified problems,—a residence, a theater facade, a shoe shop front, an office building, an apartment house, a church, a memorial on the Lake Front in Chicago or in the Charles River Basin in Boston. Some of these structures are by their nature ephemeral; others are to be long-lived. Some have environments without any claim to respect; others cannot in decency disregard their environment.

The interest of the so-called modernist in this country has been largely a matter of superficial appearance, not in the structural use of new materials to give utility, speed, and economy. The so-called modernist is experimenting with the horizontal windows, the black or white bricks, the directional textures, the shiny metals, the unusual woods, and the so-different ornament, all largely superficial things. He has continued to use brick and stone, although sometimes torturing them into forms they had escaped in the past. The student in the architectural school assumes that all facades are to be of concrete or of glass, and that all corners must be built of curved glass. Entrances no longer have horizontal lintels or curved arches; they must be mysteriously and precariously spanned by stone cut into unnatural forms or bricks contorted into wiggly courses. He also assumes that all ceilings are to be stepped in horizontal and vertical planes, a cross-section dating back to the stone corbeled ceilings of the Egyptians and Assyrians, but having no excuse in modern structural methods except cheapness if done in ignoble metal-lath and plaster.

Obviously, we should not limit the usefulness or increase the cost of our modern buildings by clinging to the materials or forms of the past. But we can welcome the new masses of our modern buildings and the new materials and methods now available without being so sure about some of the new ornament. We may admit that a score of columns, a hundred modillions, or a thousand eggs and darts, all alike, leave us cold. On the other hand, it is difficult to get much enjoyment from the modern glorification of the triangle, the groove, the steam radiator, the directional surface treatment, all copied from the savage's whittled paddle or war club, or the curled up fern-like vegetation copied from prehistoric fossils. After all, ornamentation in color or relief or both, from plant life, animal life, and human life, relates us to a past whose beauties we still admire and from which we do not need to break entirely. A square yard of carving executed by a sculptor will give more individuality to a building than an acre of triangles or grooves.

No matter what the change in fashion for the overcoat of our steel or concrete skeletons, we have continued to use masonry as the material of the overcoat. We had to use masonry when walls were bearing walls, and when buildings lasted for more than a generation, but it is one of the most inefficient materials to use with the skeleton construction of today. In the case of cut stone, our labor of today is much more highly paid than in the past, although on the other hand, machinery has greatly reduced the amount of manual labor as far as stone-cutting is concerned, particularly if the designer will acknowledge the twentieth century and see what he can do with machinery. At best, however, brick, stone, and reinforced concrete are extravagant materials to use to keep out weather and fire and to support light floor loads. Should we not try new materials, particularly for our commercial buildings and for our short-lived buildings?

THE EFFECT OF SLENDER STEEL

Modern construction has added steel and reinforced concrete to the masonry pier, lintel, and arch of the past. These new materials allow slenderness in columns. They have much greater resistance to transverse bending than stone, hence shallow beams can be used over longer spans than is possible with stone. They can be used so that the thrust of vaults or domes of large spans may be eliminated or resisted, so that thick abutting walls are not required.

The possibility of slender piers has affected our window sizes and shapes. Windows in vertical walls were an unimportant element in the public buildings of the Greeks and Romans. In Gothic cathedrals, as in our modern factories, the wall became a series of windows between piers which were in general made just large enough to carry their loads. The vault thrust in the cathedral delivered an oblique load to the buttress, thus requiring much heavier masonry

than would have been needed for vertical loads. After the Gothic days architecture reverted to a construction of walls with relatively small openings. The early New England mill building had large wall areas and small windows. The New England textile mill of heavy timber, slow-burning construction, developed in the latter part of the last century, gave us again an architecture of large windows between small piers, the piers being no larger than necessary to carry the loads. The spandrels were thin and often recessed from the outside faces of the piers. The early high office buildings had brick bearing walls. Their designers, although with the already developed mill building before them, adhered to the old scheme of walls with holes punched in them. They did not at first emphasize the piers by setting the spandrels back. Later the iron or steel columns in the outer walls, and still later the complete skeleton construction, allowed the pier to become a mere fire and weather protection for the column, and the spandrel wall a mere enclosure extending from window head to window sill. As the buildings became higher, the designers chose to accent the verticality by setting back the spandrel walls, perhaps using a different material, and thus throwing the narrow vertical piers into greater prominence as though the buildings were built primarily for the columns instead of for the floors. They wasted much valuable rentable space by setting the spandrel wall a foot or more back from the faces of the piers. Now we are swinging round to horizontal lines as though the building were built entirely for the windows and had no vertical structural members, even at the corners. Architects have designed the over-emphasized vertical buildings and the over-emphasized horizontal buildings within a few months and within a few blocks of each other.

THE REAL MODERNIST'S VIEW

Suppose a real modernist dropped into the United States today to analyze our problems and to examine our solutions. Let us consider particularly the commercial building and still more particularly the high building of skeleton construction and of relatively short profitable life. The modernist would see that we have materials in infinite variety,—their fitness to carry loads, to resist fire, to resist passage of heat, cold, and sound, their waterproofness, and all other physical characteristics definitely known and comparable one with the other. Great organizations of producers, with engineers and inventors ceaselessly at work, have in their minds, or even in being, new materials or combinations of materials awaiting only the acceptance by architects or the revision of building laws to put them into use. The modernist would observe the congestion of our narrow streets with loads of brick, stone, concrete, and plaster for new buildings. He would see these heavy materials hoisted hundreds of feet into the air and see the brick and stone set by slow and high priced labor with very little aid from machinery. The owner demands speed in the construction so that his investment can commence to earn, because he is going to tear the building down in 30 years. We stick to slow methods of hand assemblage at the job instead of taking advantage of the rapidity and economy of maximum preparation in factories and a minimum of manual labor at the job. Our masonry walls get dirty, effloresce, and disintegrate on the surface. They drop pieces of stone and terra cotta to the street. They are ill-fitted to keep out moisture, and we spend money and space on flashings, dampproofings, and furrings, often in vain. In 30 years they are obsolescent, and we tear them down and congest our streets again hauling them to the dumps because brick, stone, concrete, and plaster have so little salvage value. We are continually extending the use of the machine in the preparation of materials, but machinery helps us little in setting brick or stone in place. We have specialization among the contractors, each trade demanding that it be free to complete its work without waiting for any other trade. We have labor unions deciding or fighting as to which trade shall do which work.

As soon as the modernist had become acquainted with these facts he would wonder why we went to Greece or Rome or the middle ages or the Renaissance or to the Mayas for our forms, materials, and methods. Still more would he wonder why we go to France, Germany, Holland or to the Scandinavian countries of today.

MANY STRANGE THINGS

If he watched buildings in course of construction he would see strange things. He would see long stone lintels supported by concealed steel or reinforced concrete beams with the stone columns put in later when they arrived from Europe. He would see columns with shafts of marble but with plaster capitals colored to imitate bronze supporting a plaster cornice painted to imitate quartered oak, the columns being tucked in on top of a floor which had to be strengthened to hold them, and beneath another floor which did not need their support. He would see 8-inch rolled steel H-columns supporting floors and roofs and backing up Ionic stone columns 4½ feet in diameter which supported an entablature. The great stone columns shut out light and made the interior area about 4 feet narrower than it needed to be. He would see similar steel columns supporting floors and roofs but concealed by Gothic buttresses 3 feet wide and projecting 4 feet from a thick wall, the

buttresses abutting nothing. He would note that these columns and buttresses were put together, slowly, stone by stone, by high priced manual labor. He would see a great technical school, dedicated to study of the most modern sciences, housed in reinforced concrete buildings overcoated in limestone brought a thousand miles, designed in a style two thousand years old and three thousand miles away from its home. Within a few miles he would see well designed factories far better fitted to house such a school. At the same time in the same cities he would see cathedrals, collegiate buildings, and private residences being built in the old manner with steel and reinforced concrete sometimes left out as sacrilegious and uncraftsmanlike modernisms. He would see vault thrusts resisted by the most extravagant of masonry members, a buttress resisting oblique forces. He would see malformed wooden trusses which would exert a thrust on the walls if they were true wooden trusses but would find that here where buttresses are needed they are not relied upon, concealed steel resisting the deformation of the truss. He would see brick sand-blasted to make it look old, and stone and wood hand-hewn after the machine saws and planers had left it smooth. He would see sway-back roofs, bricks laid crooked to make them look "interesting," moss-covered slates imitated in burnt clay, asbestos, or tin. He would observe that the people who worshiped in these cathedrals, studied in these colleges, or lived in these houses, were not the least bit mediæval. They traveled in motor cars, motor boats, and airplanes whose forms and materials had been revolutionized in a decade, and there was no attempt to imitate mellow age in the finish of any of them.

If he watched the alteration of a building he would see interior bearing partitions of masonry removed to give wider open spaces, masonry exterior piers replaced by a different kind of masonry, reinforced concrete construction noisily and expensively cut through, with no salvage value; plaster removed in a cloud of dust, floor construction patched with heavy and dripping reinforced concrete.

If he watched a town in a hurricane, conflagration, flood, or earthquake, he would see buildings built of bricks, stones, or blocks disintegrating into their primary units, killing the population in the process. If he watched the destruction of a building by fire he would see expensive cut stone spall in moderate heat.

If he watched the destruction of a building to make way for a new one he would see expensive cut stone dropped into a chute to a truck, but the brick taken away to give that "interesting" texture to a new house in the country. He would see reinforced concrete floors noisily and dustily smashed up by skull-breakers and torch, the ruins being without salvage value. He would notice that wooden and steel beams, and metal in general seemed to have some salvage value. He would note that skeleton construction allows arcading the sidewalks as shown in the Barclay-Vesey building of the New York Telephone Co., but he would find that we made very little use of this possibility for street widening.

REINFORCED CONCRETE

We have used, and in some cases abused, a few of these modern materials and methods. We have used reinforced concrete properly for foundations. We have used it honestly and decoratively in some ceilings where the structural coffers, joists or slabs have been designed to show, and have been colored, a welcome relief from metal lath and plaster imitations. We have used reinforced concrete improperly in facades which were made up of vertically reinforced piers but which we have rusticated horizontally. We have formed it expensively into arches which were acting structurally as beams. We have cast it into blocks which imitate quarry-face stone. In bridges the architect is afraid to admit the slenderness of the reinforced concrete barrel and conceals it with a stone arch ring three times as thick, or with a concrete face rusticated into false voussoirs. Reinforced concrete has been pushed by organizations of cement manufacturers and by contractors whose financial interests were dependent upon that one material. From being either a floor material or a wall material it has become a structural whole, whose backers insist that economy and convenience require that they be allowed to do all of their work without reliance upon other trades, a reinforced concrete skeleton being recommended even for the lowest buildings although the masonry walls may be amply thick to support the floors. We have built floors of reinforced concrete which weigh as much or more than the live loads which they support. We make our beams, girders, columns, and foundations twice as strong as the live loads require, because of this over-heavy dead load. The reinforced concrete building is difficult to alter and expensive to tear down. Should we not take a fresh look at our needs and our building materials of today and see if we cannot use lighter, cheaper materials and materials with a larger salvage value?

THE ALL-METAL POSSIBILITIES

Let us now try to face some of our problems as a thoroughgoing modernist would. For years we have used sheet metal to cover roofs, bay windows, spandrels, and shop fronts, as well as for the entire walls covering steel frames in garages and industrial buildings. Why not build our high buildings and our buildings which are

to be obsolescent in 30 years with a steel frame with no exterior masonry whatever? The steel can be fireproofed, perhaps with less thickness than at present, and then the whole outside can be covered with bronze, copper, aluminum, stainless steel, nickel silver or other metals, shop-fabricated as much as possible, light in weight, weather-tight, fire-resisting, requiring no painting or cleaning, resisting earthquakes and gales, having high salvage value. Back of this sheet metal, insulation can be provided by light weight, incombustible materials. Plastering could be omitted altogether except for fireproofing. Such thin walls would save large areas of rentable floor space. That is, let us keep out dampness with the best materials to keep out dampness, and then insulate with the best materials to keep out heat and cold and noise in both cases, disregarding the customs of a past which did not have our modern materials.

LESS FIREPROOFING

Do we need to fireproof steel beams, girders, and columns in all buildings with 1 to 4 inches of tile or concrete or outside columns with 8 inches of brick or stone? At the times of our great conflagrations,—Chicago, Boston, Baltimore, San Francisco, and smaller fires elsewhere,—a few more or less fire-resisting buildings were surrounded by great numbers of combustible building with combustible contents. This condition is now changed in parts of many cities. Large areas of our cities are now built up with fire-resisting office buildings, apartment houses, hotels, banks, railroad stations, theaters, and some other buildings with no great amount of combustible contents, with metal partitions, doors, windows, furniture, and incombustible finished floors. In such cases why is it necessary to fireproof such buildings with the same heavy floor slabs and column protection as for storehouses or manufacturing buildings filled with combustible contents and surrounded by wooden buildings?

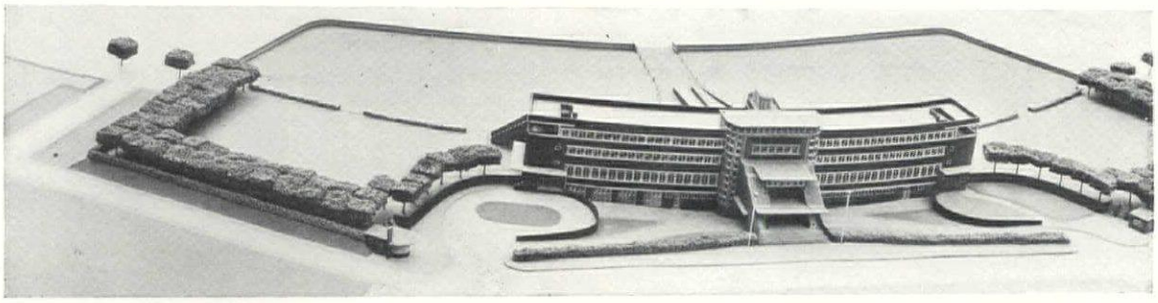
We have for longer or shorter periods used roof constructions much lighter and less fire-resisting than our first class floor construction. Why not use these lighter types for floor construction, such as pressed steel joists, trussed joists, pressed steel floor plates, thin concrete, or gypsum floor and ceiling slabs? We do not need great weight of masonry material for either fireproofing or insulation if we can only get over our prejudices and the limitations of our building laws and pick out each material to do its particular job without regard to what was used ten years ago.

SET-BACKS

The New York zoning ordinance of 1916 resurrected the set-back buildings of the Chaldeans, and it has spread like wildfire to cities where they were needed and to cities where they were not needed but which wanted to look like New York. Setbacks to fit modern needs would be entirely impracticable with the wall-bearing buildings with brick arch or wooden floor construction of a century ago. The steel or reinforced skeleton makes them entirely possible, even if not economical. It still remains true, however, that even with the skeleton construction the rectangular prism is the most economical frame to construct. Some of these buildings have few set-backs, each one a full bay so that the successive faces are on column lines as in the Lincoln Building or the *Daily News* Building in New York. Others have more numerous set-backs, many of them of less than a bay, and thus start new wall columns, not on the lower columns but on heavy girders, thereby increasing the steel weight as well as complicating its design, shop-work, and erection. Some of these buildings set back a full unit of the plan, for instance, the width of a typical office. Others are more complicated both in cross-section and in plan. They copy the silhouette of a Gothic tower which set back 4 inches by thinning the wall, but the skyscraper is ten times as high as the tower, and the set-back becomes 40 inches, and therefore cannot be gained by thinning a 12-inch curtain wall. Then the various faces are played with, battered and bent, hollowed and curved, as though a thousand-foot high building were a 10-inch high wedding cake. It isn't; it is a combination of 12-foot high stories enclosed in masonry walls supported at each floor on steel beams which would like to run straight from column to column. Such a building is not moulded by hand in plastic clay nor carved in Ivory Soap. Its surfaces are masonry walls preferably vertical and preferably flat. It has certain rights to dignified treatment which the wedding cake and the Ivory Soap have not.

If the plan of an office building or an apartment house is economically arranged in one story it is difficult to believe that it is equally well planned in six or eight other stories of varying areas and shapes. A set-back terrace may be a real advantage in an apartment house. Is it an advantage or disadvantage in an office building or hotel? Has anyone analyzed the problem and found out whether the set-back buildings can be as economically planned, constructed, and operated as the earlier rectangular prisms, or is the owner paying a high price for the architect's good time?

In conclusion, if architects are to dominate the design of buildings, must they not be modern in more than mere surface treatment? Must they not use modern materials, methods, and economies not reluctantly but enthusiastically?



View of Model Looking Toward the Flying Field

TERMINAL STATION OF THE HAMBURG AIRPORT

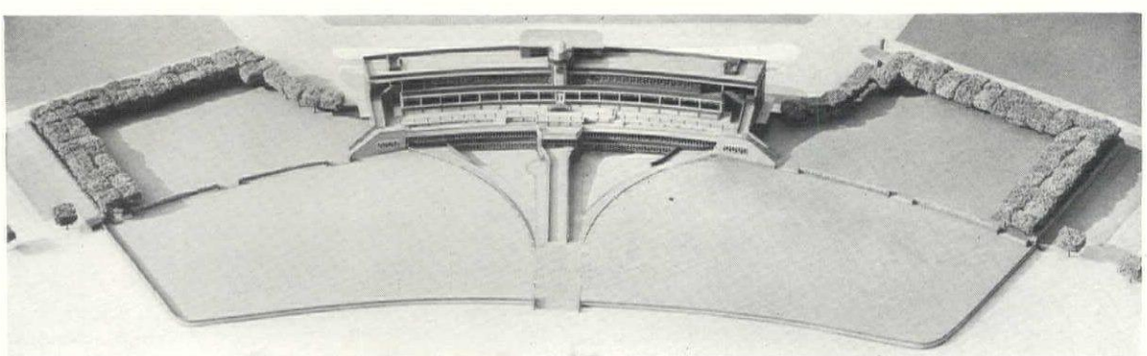
BY
DYRSSEN AND AVERHOFF
ARCHITECTS B. D. A., CHILEHAUS, HAMBURG

AMONG the contemporary architectural problems is that of designing the buildings required in connection with airports. Air transportation is of such recent origin that experience has given us few models as guides, and we are also confronted with the practical certainty that the further development of airplanes may materially alter the technique of such transportation. It is certain, however, that two kinds of structures will be required,—one, the hangars used to house the airplanes or airships, along with repair shops and store houses for supplies, and the other to house passenger and freight facilities. Probably the latter is less likely to experience radical changes than the former.

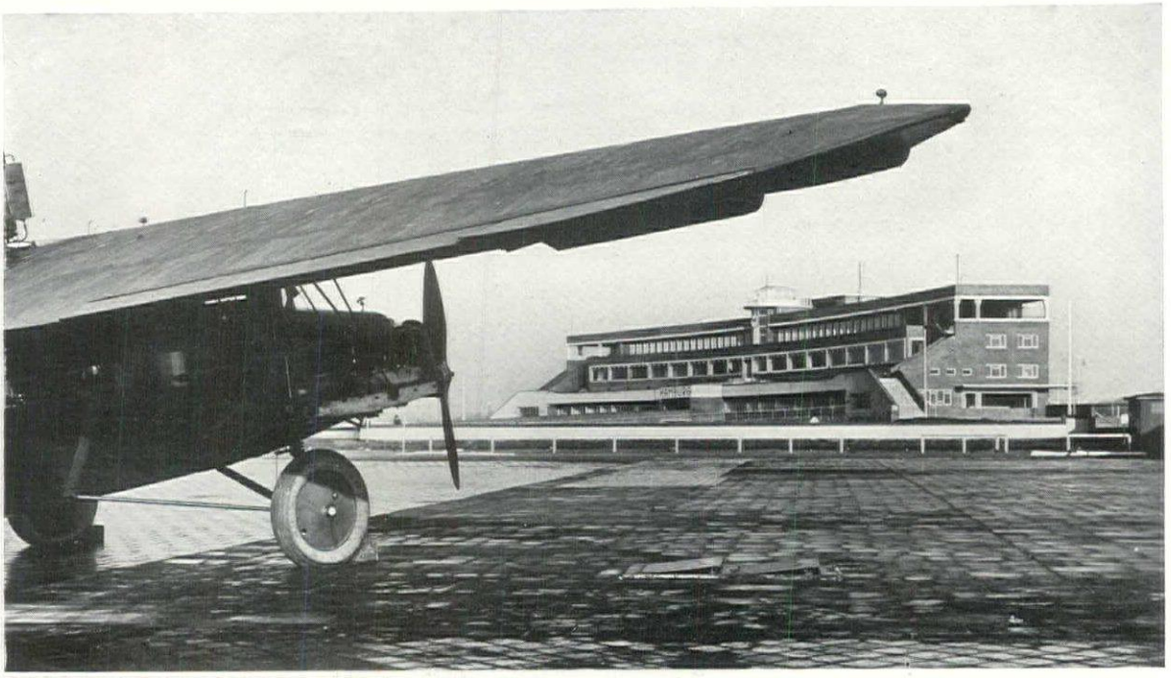
The requirements of the passenger and freight terminal building are not yet standardized. They may be reduced to the bare necessities or expanded to include hotel accommodations for passengers, and they usually include restaurant facilities at most European airports. It is to be expected that airports will be located at some distance from the business centers of the terminal cities, because of the large ground areas required. The high prices of ground close to business centers are prohibitive for such use. The take-off and landing of airplanes and airships require a large area of unoccupied ground at present, because of the influence of the wind direction. Their ground coverage is excessive per passenger or per ton of freight, as compared with that of the railroad passenger or freight car. It is apparent that railroads can afford to own and operate passenger and freight terminals on more expensive land than can be afforded by air transportation lines.

Another unusual feature of air transport terminals is the assembling of sightseers, which is entirely absent from railroad and steamship terminals. To accommodate these sightseers it is necessary to provide extensive restaurant and parking facilities. Such accommodations are provided at most European airports, but their use in America is not yet very well developed.

In the Hamburg Airport Terminal Station are centralized all of the administrative and operating departments and concessions that pertain to airports. In addition, provisions are made for the accommodation of sightseers without interfering in any way with the routine operations involved in the despatch and reception of passengers and freight. These two requirements controlled the



View of Model Looking From the Flying Field



View of the Terminal Station From the Flying Field

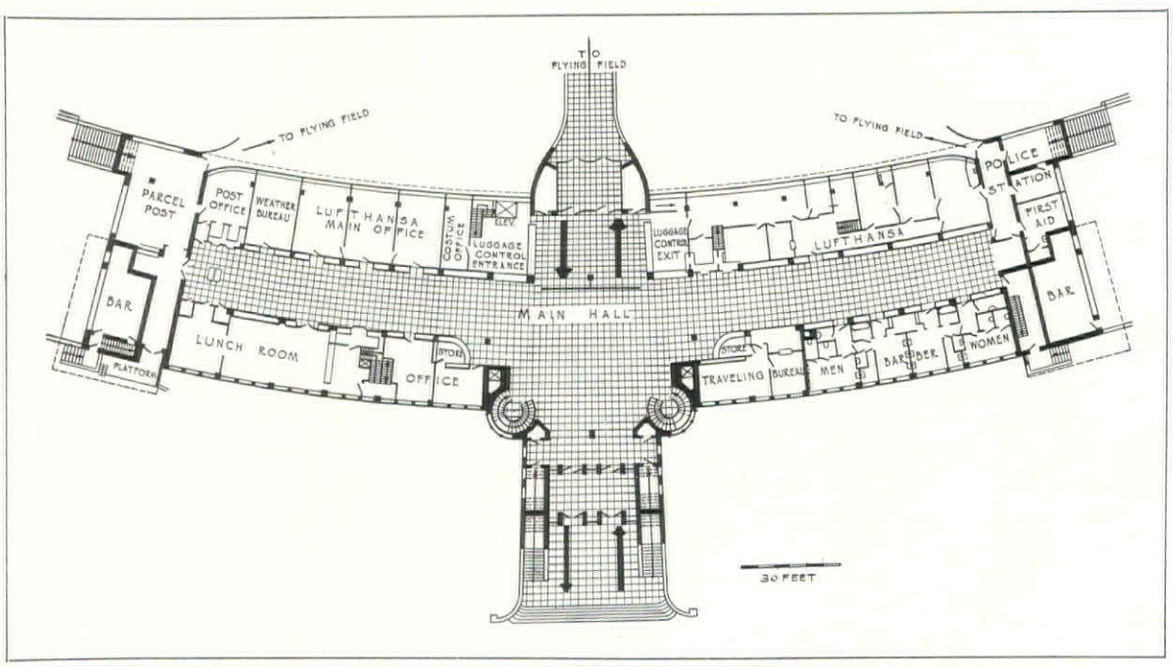
design of the station in regard to its functioning.

Four principal divisions of activity are provided for in the terminal station:—(1) administration; (2) reception, circulation, comfort, convenience and despatch of passengers; (3) reception and despatch of freight, mail and baggage; and (4) the facilities for sightseers. The building is so planned that an entire story is used for one of these divisions, i.e., accommodation of sightseers, with a restaurant having a grand view of the field.

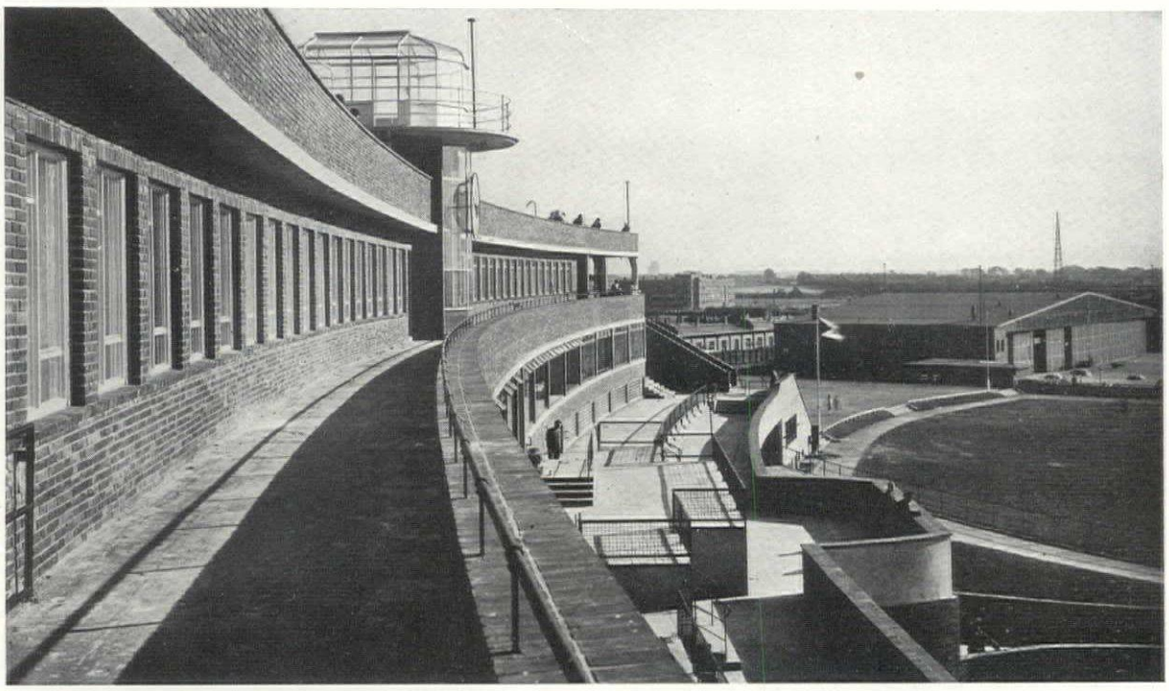
The disposition of these divisions is,—

Basement. Reception and despatch of freight, baggage and mail.

First Floor. Passenger transportation, reception and despatch of passengers, ticket office, post office, passport office, customs office, waiting room, bathrooms, barber shop, air police station, first aid station and concession shops.



Plans of First Floor, Used Exclusively for Passengers, Ticket and Customs Offices and Other Conveniences

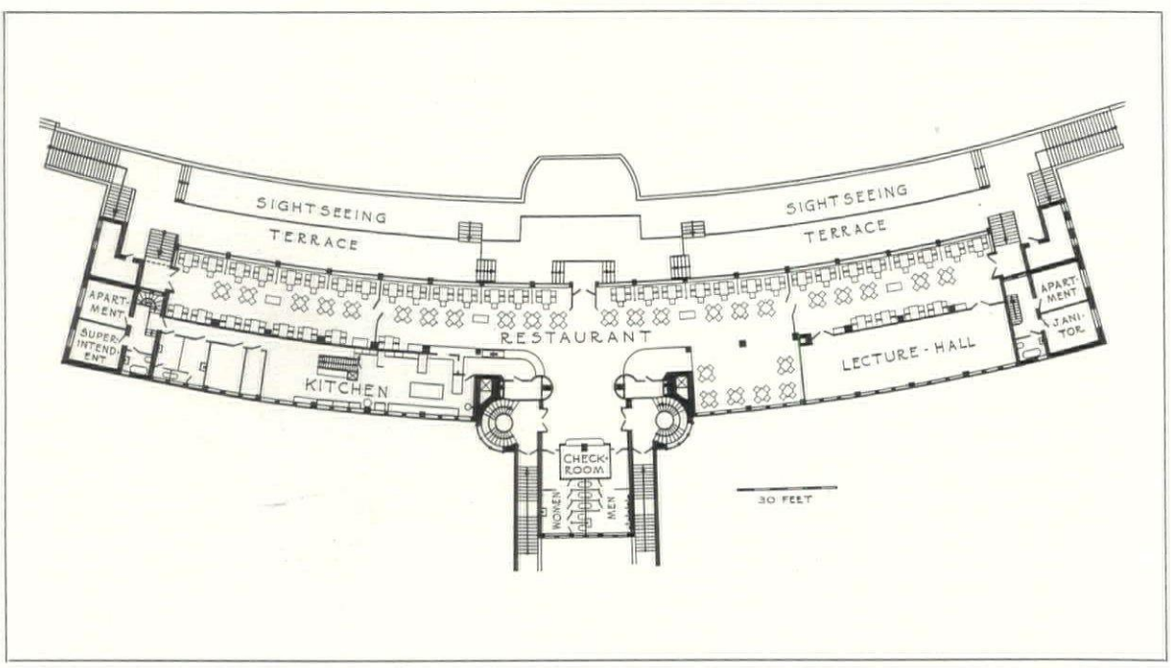


View of the Third Floor and the Two-level Second Floor Sightseeing Terraces

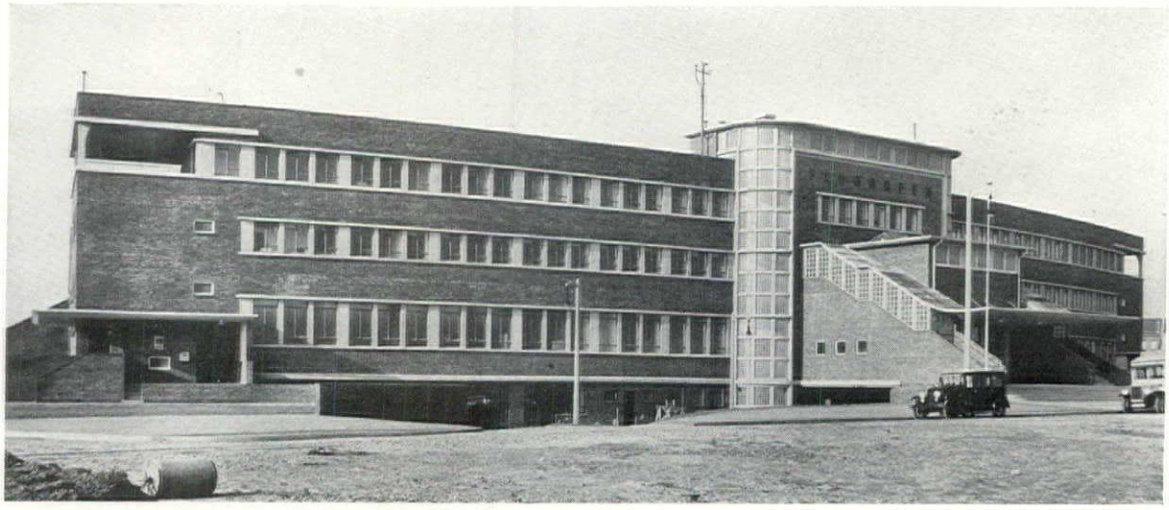
Second Floor. Accommodations for sightseers. Restaurant containing 400 seats and two level terraces for sightseers. Kitchen, store rooms and managers' offices, toilets, check rooms and conveniences. The stairways through all stories lead to the roof terrace, which has about 200 seats and standing room for about 300 persons. With the lawns, which have seats or standing room for about 25,000 persons, provisions are made for between 30,000 and 35,000 sightseers, without the least interference with the operation of the airport terminal itself.

Third Floor. Administration offices, and hotel accommodations having direct connection with the restaurant located on the floor below.

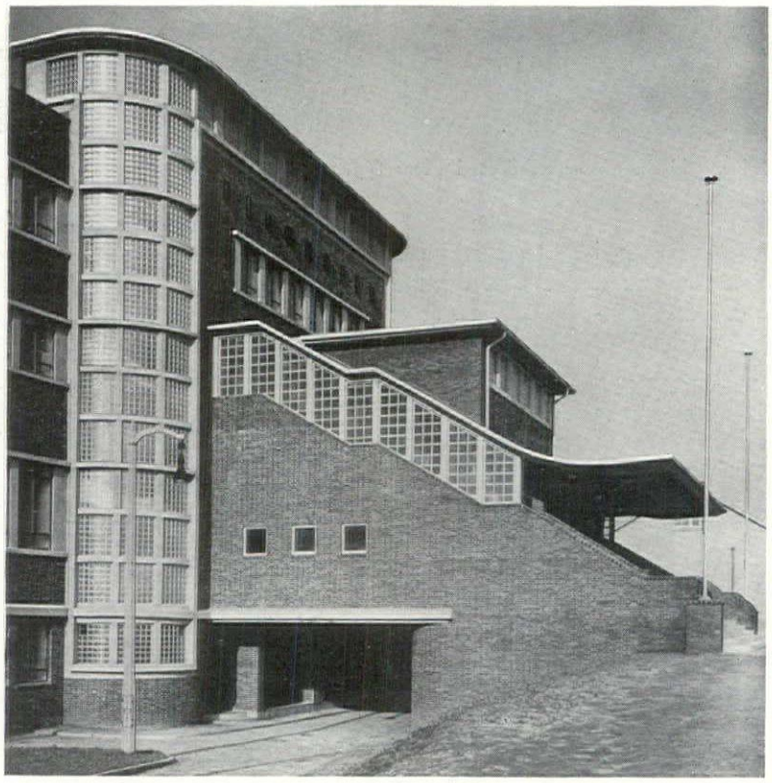
The comparatively flat curve of the building makes possible a complete view of the flying field from all the offices, restaurant and terraces.



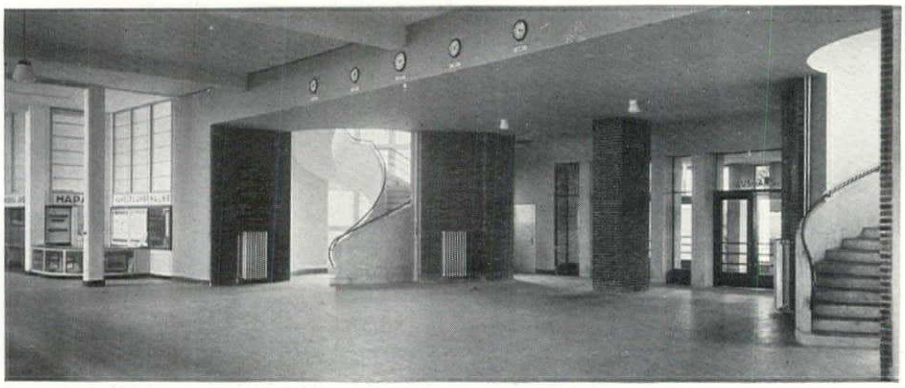
Plan of the Second Floor, Used as Restaurant, Lecture Hall and the Two-level Sightseeing Terraces



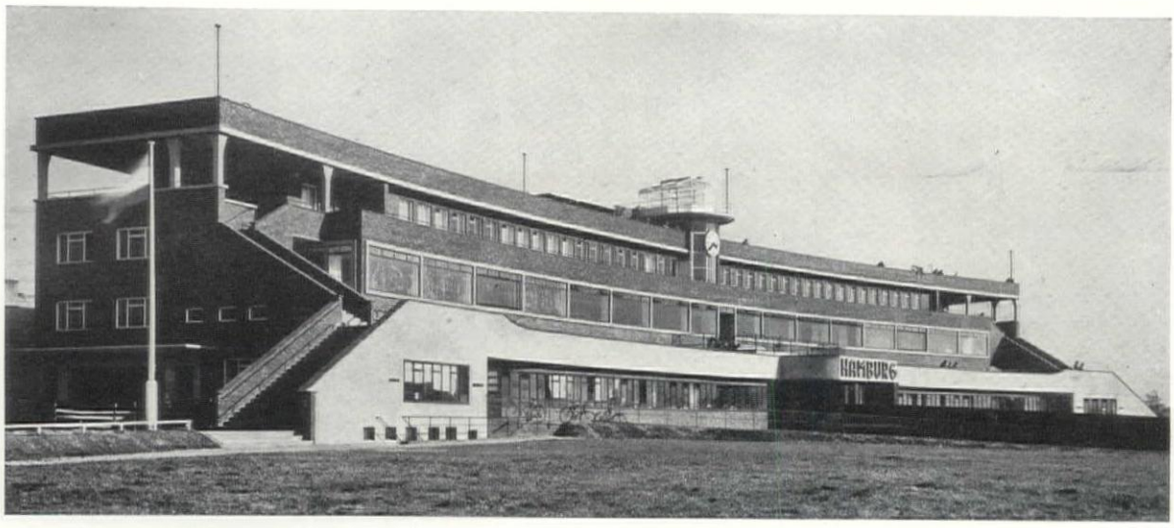
Street Front of the Terminal Station, Passenger and Sightseers' Entrance in Center and Inclined Drive Down to Baggage and Freight Rooms in the Basement Level



One of the Glass-enclosed Stairways Connecting All Floors and Glass-enclosed Steps to the Second Floor Restaurant and Sightseeing Terraces. Baggage and Freight Delivery on Lower Level



Entrance From the Street to Main Hall and Stairways



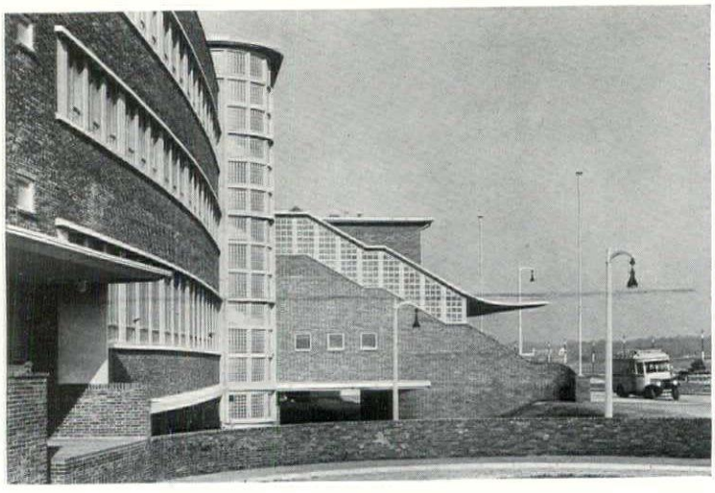
Flying Field Front of the Terminal Station Showing the Sightseeing Terraces and Stairs at Ends Leading to the Parking Spaces

Gangway Leading From the Flying Field to the First Floor Luggage and Customs Inspection Offices. Control Tower, Sightseeing Terraces and Restaurant Windows Are Seen Also

Luggage Control Exit and Entrance From Flying Field

Unloading Passengers and Baggage in Front of Station From an Incoming Airplane

Main Hall on Ground Floor Giving Access to Offices and Rooms for Passengers' Accommodations



Automobile Entrance to Parking Space in Foreground and Stairs to Restaurant and Terraces

MODERNIST AND TRADITIONALIST

AT THE 63RD CONVENTION OF THE A.I.A., WASHINGTON

Being a Few Pertinent Points From the Addresses of
GEORGE HOWE
C. HOWARD WALKER
RALPH T. WALKER

GEORGE HOWE

IT is necessary to emphasize the static and inorganic quality of tradition to establish that the choice between modernism and traditionalism is not academic. It is a choice between freedom and authority. The traditionalists have anointed archæology king in the name of the discarded political doctrine of divine right. . . .

• • •

"The modern movement is a conscious effort to direct and canalize the stupendous energy of modern civilization between its proper architectural embankments. . . . The movement has developed slowly, out of the realities of modern existence through the observations and experiments of many men. All of them, whether Sullivan and Wright in this country, or Le Corbusier and Gropius abroad, have been preoccupied essentially by technique, as their works and writings show. . . .

• • •

"The traditionalist argues always as though all buildings produced by traditionalism were beautiful, whereas it is apparent to all that an overwhelming majority are ramshackle, sentimental, pretentious, dishonest and ugly. . . .

• • •

"Even on the score of beauty I believe the traditionalist will have to acknowledge himself beaten if he will fairly throw in with his lot all the fake gables, colonnettes, tortured chimneys and variegated roofs of the suburbs, together with the classic and romantic vagaries of the filling station and the snobberies of the tea 'shoppe.' . . .

• • •

"The modernists have accepted the theory taught in every school, and concisely formulated by Sullivan in 'The Autobiography of an Idea,'—'Form follows function.' . . .

• • •

"For the machine's lack of personality in execution he (the modernist) intends to compensate by a greater intensity of form, design, color and material. He has worked in simple forms and masses because no school of modern decorators has yet taken its place within his technical framework. He does not regard decoration as a fundamental necessity in architecture, and is convinced that any great monument of the past would remain a great monument by its function, proportion, and execution, even if stripped of every detail. . . .

• • •

"The modernist accepts the fact that structural masonry has disappeared from our industrial architecture, and is doomed to disappear everywhere. He recognizes the functional character of openings, and that modern standards of health demand unlimited light and air, while commercial enterprise demands large areas of glass." . . .

C. HOWARD WALKER

TO a certain point the old architecture was *raisonne*, and the logical design of its structure was accented by mouldings, by color, and by carving and sculpture, its joints being announced, its interstices enriched. Different materials, different functions in far separated lands created from the factors local individual expressions, and so-called styles. Each one of these was modern at the time for a time and then became a tradition, but all were architecture *raisonne* for the time, and individual in character locally, but universal in character as to their regard for the elemental laws of statics, and none were carried to excess, for the materials used did not permit excess. . . .

• • •

"The modernist is between two schools. If his architecture is *raisonne* to the limit, it eschews the arch, the vault, the dome, and can eschew surface, and is not bound by those designating lines of stability, the vertical and horizontal. Pandora's box is open, and Hope is struggling to emerge. Disorder is defended by logic, because it is possible, and excess and license are the natural result.

• • •

"A cult of elimination of everything that is not strictly utilitarian is a callow conception. As a matter of bald fact, the arts are not necessary to the material life of man, which is the utilitarian life of man. They are a plus quantity having intrinsic qualities which are not utilitarian but add the expression of man's ideals to utility, and create emotion. Probably nothing is so little welcome as the gratuitous forcing of emotions upon an observer, yet architecture has the power of creating aspiration by height, nobility by mass, stability by lateral extension, any one of which can be enhanced by

associated detail, but the large emotions like great themes in music, demand simplicity of treatment, and the details careful association with such treatment. . . .

• • •

"Dominance only by itself, can be crude, details overdone or ineffective. It has been and is characteristic of beginnings that they are incompetent and only reach the fine skill of accomplished art by degrees, and that excess long precedes sanity. Impressionism, Cubism, L'Art Nouveau, each has had expression with manners, courtesies or finesse, each has left a modicum of value, and faded away. So-called Modernism is going through the same phases, and it is a significant fact that the best in all these types resembles work of the past. . . .

• • •

"The Impressionists recall Giotto; the Cubist resembles Egypt; L'Art Nouveau at times is Greek; i.e., the best in each resembles simple work of the past. It has been reserved for the so-called Modernists to be irritated at any resemblance to anything that has calm, and to adore excess in every direction, to be shapeless, crude, eliminated in detail to nothingness, explosive in detail to chaos and to create sensation with the slapstick and the bludgeon. It may change its methods, but when it does, it will necessarily have in it traditions of sound previous methods, with which at present it is in arms. It is at present at times infantile and often callow and has growing pains. Occasionally it reaches a serious adult stage. Therefore Hope is struggling at the bottom of the open Pandora's box." . . .

RALPH T. WALKER

WE should remember that a style is known and judged not by its beginnings but by its endings, when the case is closed and a fair judgment can be made. It is then named not by its creators nor by its critics but by historians, in whose hands the verdict must be left. . . .

• • •

"I believe in the architect doing architecture and not the engineer. The architect should have a more all-around comprehension of the human needs of society and is not so inclined to be single-minded. It is his broadness which makes possible the expression of the human over the material, for a continuing fallacy is that structure is the reason for architecture. . . .

• • •

"We have been taught that the plan is the generator of design. That when it is most orderly it therefore approaches greatness. Actually the human need is the generator which faultily expressed through lack of understanding of the problem makes most plans inadequate. The plan breeds order only insofar as the human need is understood and expressed. It is not a matter of abstraction or rhythm, it is not the work of a mathematician, but of a humanist. . . .

• • •

"Europe has exalted the plumber, and the T-square and triangle are rampant. The right angle is the cross of the new European theology of architecture. The European architect is so engrossed with the two dimensions of Euclidian geometry and a theory of structure, that he has ceased to produce architecture for human beings. His guiding star is the engineer. Not the engineer of imagination, but one who has replaced the old builders' rule of thumb methods by a rule of textbooks. . . .

• • •

"Architecture should be considered as much from the mental reactions it creates as from the bodily satisfaction it renders. The physical side of architecture is always more readily solved, but no one gives serious thought to mental comfort. The modern architect should be much more a psychologist than an engineer, for the economies to be arrived at are human and not structural. . . .

• • •

"The machine to my mind is not an invention of Frankenstein, but bears the same relation to our lives as does the old familiar hand tool. It too has the same limitations—the limits which the human mind can conceive. It too is possible of either great refinement and precision or a brutal austerity, just as willed. . . .

• • •

"The great danger from any crystallized school of thought is that it is a blight upon creative effort. We are fortunate in emerging from just such a blight which swept over the western world with the Renaissance, when imitation of classical thought became the idea and creative effort ceased as a force. . . .

• • •

"The sorrowful thing to me is that with the influx of European books the profession here, about the time the European architects appreciate their uselessness, will start imitating this architectural vocabulary, with just as little true understanding as the European architect who took over the American factory and the ideas of Frank Lloyd Wright. . . .

• • •

"It will be noticed that I have not referred to modern detail or its absence, to windows placed about corners, to any of the vocabulary that has crystallized into a precedent. I personally cannot see any real gain to be made in creative thought by merely substituting one precedent for another, one set of details for another; if that is all modern architecture is to be, in my opinion it will die."

Van Anda

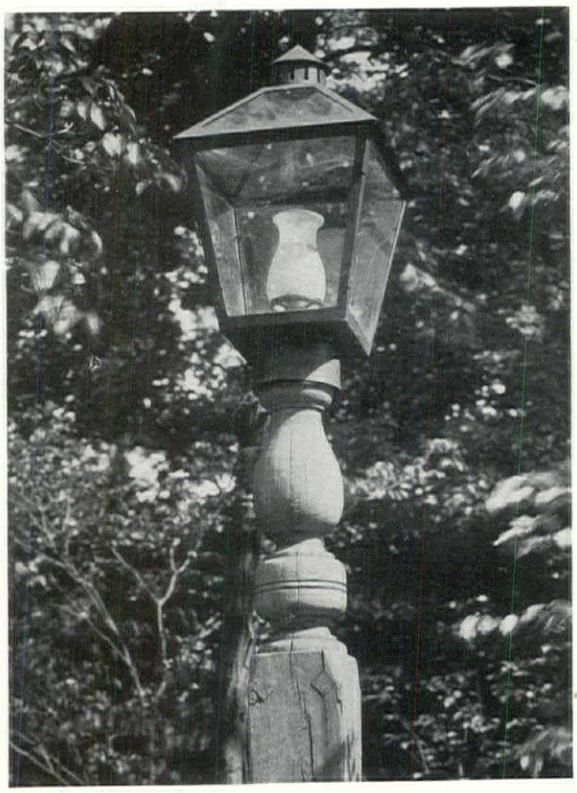
"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y.

ROGER H. BULLARD, ARCHITECT

"RYNWOOD," the home of Samuel A. Salvage at Glen Head, New York, is a free interpretation of a British-American country house. Planned so as to take full advantage of its natural surroundings, a rolling terrain thickly wooded with large oak trees, the house and its immediate gardens conform to the varying levels in a naturally graceful and related whole. There is no evidence of a forced arrangement or an attempt for effect, but rather a feeling of repose and inviting simplicity. For a house of such proportions this is not always easy to attain, but it has been accomplished here by a logical irregularity of plan which allows for a low-lying, rambling structure with varying courts and terrace gardens adjoining, each designed so that it is an integral part of the whole.

Approaching the property from the main highway, one passes through a walled cottage garden flanked on one side by a small stone gabled gate house. The roadway winds easily up the wooded rise to a stone bridge which leads across a ravine to the low-walled entrance forecourt so characteristic of the English home. The main front being unsymmetrical in design, establishes the simple and informal character which prevails throughout. This is apparent also in the disposition and treatment of the window openings and the bays, the windows of minor importance being leaded with diamond panes and the others with rectangular. The entrance porch and large two-story bay are so placed as to conform to the interior arrangement of the plan. At the right and left of the main front, which rightly faces the north, are iron grilled gateways; that on the right leads to the walled-in main garden, and that on the left to a paved court, flanked on two sides by service wings, and on a third by the owner's study and the billiard room of the main house. In this paved court a feature was made of a large oak tree, the roots and base of which are carefully protected by flagging laid on edge as a coping. Ferns and a small drinking trough for dogs occupy the small enclosure around the tree. The paving is laid in a pattern by using worn cobblestones and flagging, with borders left for planting against the walls. Beyond this paved court an archway leads through the service wing to the service yard beyond.

The south side of the main house has a commanding view overlooking rolling country, the main rooms having the full benefit of this exposure. A grass court formed by the library wing on one side and the dining room wing on the other is in interesting contrast with the paved court on the northeast. These courts, which serve a practical purpose in adding circulation and privacy, have much to do with making the whole design cohesive and complete. The grass court connects by broad stone balustraded steps with a wide terrace below, which in turn leads down by succeeding flights of steps, to a lilac walk and wooded ravine. West of this lower terrace there is a formal walled-in rose garden which is just below the main flower garden. At one corner of this rose garden a round dove-cote with steps gives access to the upper garden. Opposite, on the north side of the main flower garden, is a small tea house open on the front which, with the high stone walls, shuts in and protects the garden on the north. West of the main garden an apron of semi-circular steps leads down to the swim-



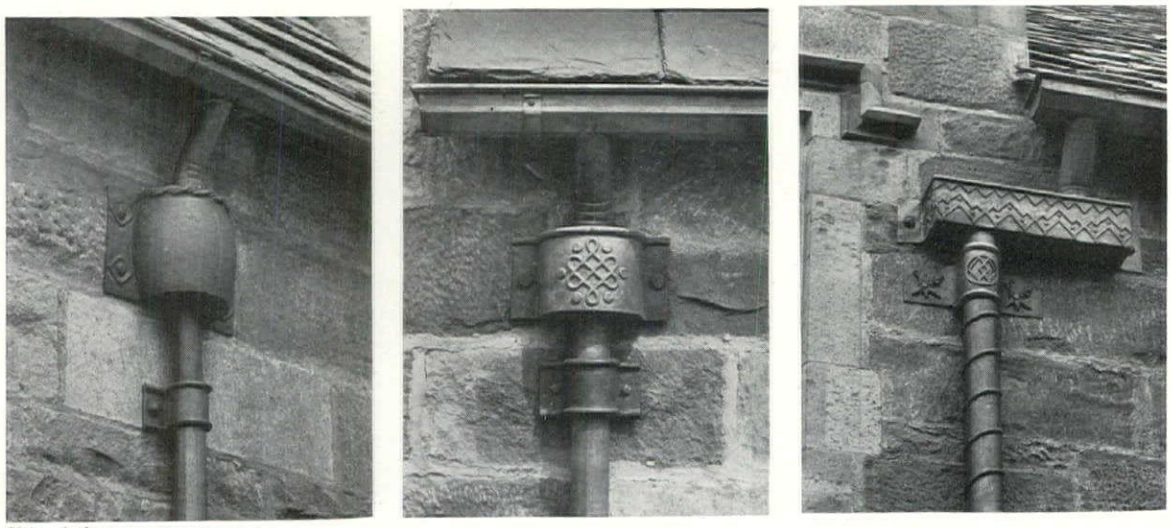
An Old Fashioned Lamp Post in the Forecourt. (Below) Decorative Leader Heads and Straps

"Rynwood," House of Samuel A. Salvage, Esq., Glen Head, N. Y. Roger H. Bullard, Architect

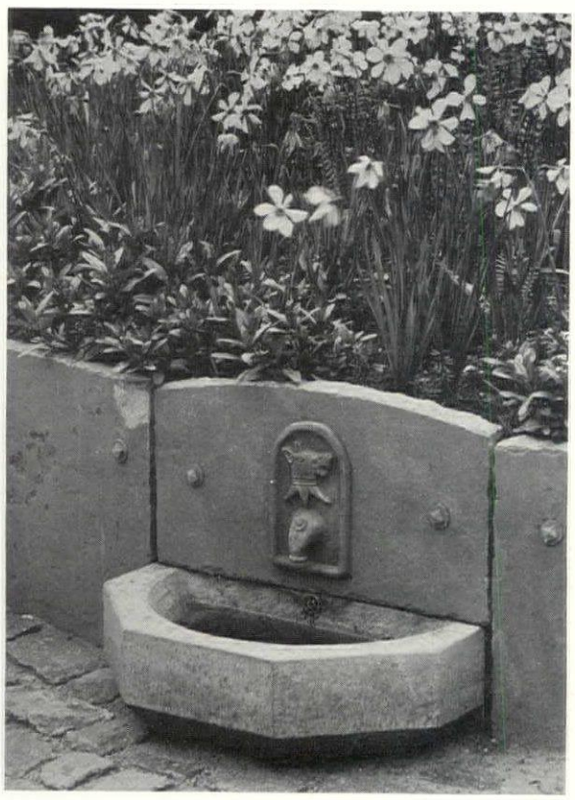
ming pool and lower garden, at the west end of which a further flight of winding steps leads to the tennis court below. These terraces and gardens surrounding the house and intimately connected with it have solved the difficult problem of fitting the house into the irregularities of the site, without sacrificing either the original character of the landscape or the many fine existing trees.

To return to the design of the house itself, the outer walls of "Rynwood" are of rough limestone, buff in color with a good deal of warmth which has already acquired a certain quality of age despite its having been exposed to the elements for only three years. This limestone is adaptable to the careful cutting necessary for the many details which contribute to the charm and intimate quality of the exterior design. All of the several doorways differ in design, and each has been individually treated in the matter of trim and detail. Some suggest a Scottish origin and others a Cotswold precedent. In fact the entire house strongly suggests the simple character of the stone houses of the Cotswold hills.

The wall sun-dial combined with a small lat-



Van Anda

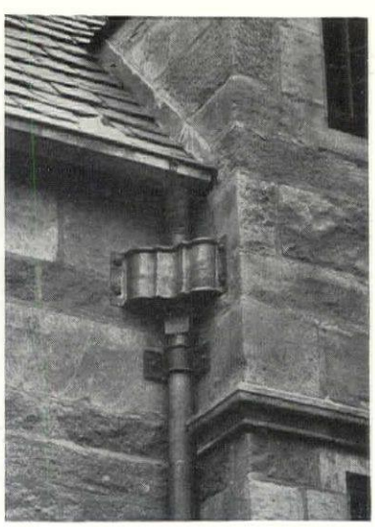


Dog Drinking Trough and Flower Bed in Paved Court. (Below) Details of Decorative Leader Heads

"Rynwood," House of Samuel A. Salvage, Esq., Glen Head, N. Y. Roger H. Bullard, Architect

ticed window in the gable end over the arched west loggia on axis of the main flower garden, is an example of an architectural decoration used for a practical purpose.

The chimney stacks of varying shapes compose with the gable ends to give interesting compositions from all angles. Some of the chimneys are carried up from the ground in stepped weatherings and terminated by diagonal stacks. The roof slates, which are gray with a slight variation toward russet, are laid with a fairly narrow weathering, which diminishes slightly as they approach the lead-covered ridge. Lead, which combines well in color with the limestone, has been used throughout for the casements, leaders and gutters. Many different designs have been used in the leader heads and leader straps to give added interest and freedom to the exterior design. Iron has been used for the railing and flower pot holders of the second floor overhanging balcony and for the grilled window openings of diamond shape in the tea house and garden loggia and for the garden gates. The bell cote surmounting the garage, which serves as a motif of design as well

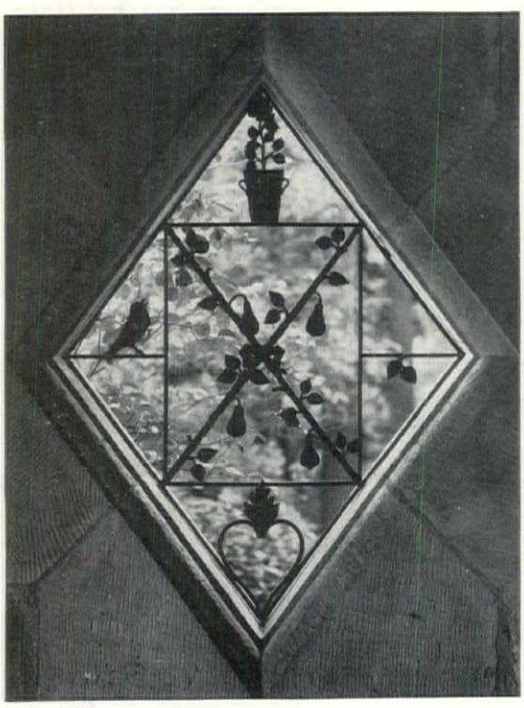


Van Anda

as a practical use, is operated by a push-button in the owner's private study. By means of this bell any of the outside servants may be summoned. As the chauffeur's cottage, gardener's cottage and greenhouse are all made integral parts of the entire group of buildings, the relation of these various units and courts to the main house gives a composition of unusual interest.

Entering the house through a stone gabled porch of modest proportions, with balustered openings on the sides, and through a stone-arched vestibule, one comes into a spacious stair hall having an uninterrupted view through the corner bay window at the opposite end out onto the grass court and south terrace. A warmth of color is secured by the use of some English stained glass medallions set into the latticed casements, and by the hangings of crewel work. The walls are of sand-finished plaster broken by sturdy stone-arched openings leading to the important rooms, and by small doors leading to numerous closets and duffle rooms. The ceiling of the hall is of oak planks supported on hand-cut timbers with chamfered edges. The floors of the hall, the loggia and the sun room are all of a buff-toned flagging, cut on a diagonal in the hall and sun room, and laid as a pattern in the loggia. This loggia which leads from the stair hall to the sun room has a groined vaulted ceiling and arched openings giving onto the grass court.

The large living room is paneled in English oak in the Jacobean style with carved frieze and fluted pilasters and a large fireplace with carved limestone shelf and facing, and carved oak overmantel. The fireplace linings in all of the rooms are of Guastavino tile laid on edge in various patterns. The large room known as the library, which occupies the entire west wing, is open up to the roof ridge, with huge supporting timber trusses and roof rafters. At one end a gallery is reached by a stone spiral stairway under which is the entrance into this room from the sun room. The two-story bay window on the south side floods the room with sunlight a good part of the day. The dining room has sand-finished plaster walls with a moulded plaster frieze, overmantel and door trim, making an interesting contrast with the several paneled rooms. Lead grilles of interesting design have been used over the openings of the heating ducts in the loggia and sun room.



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Grilled Window in Tea House, "Rynwood." House of Samuel A. Salvage, Esq., Glen Head, N. Y. Roger H. Bullard, Architect

"RYNWOOD"

HOUSE OF SAMUEL A. SALVAGE, ESQ.
GLEN HEAD, N. Y.
ROGER H. BULLARD, ARCHITECT

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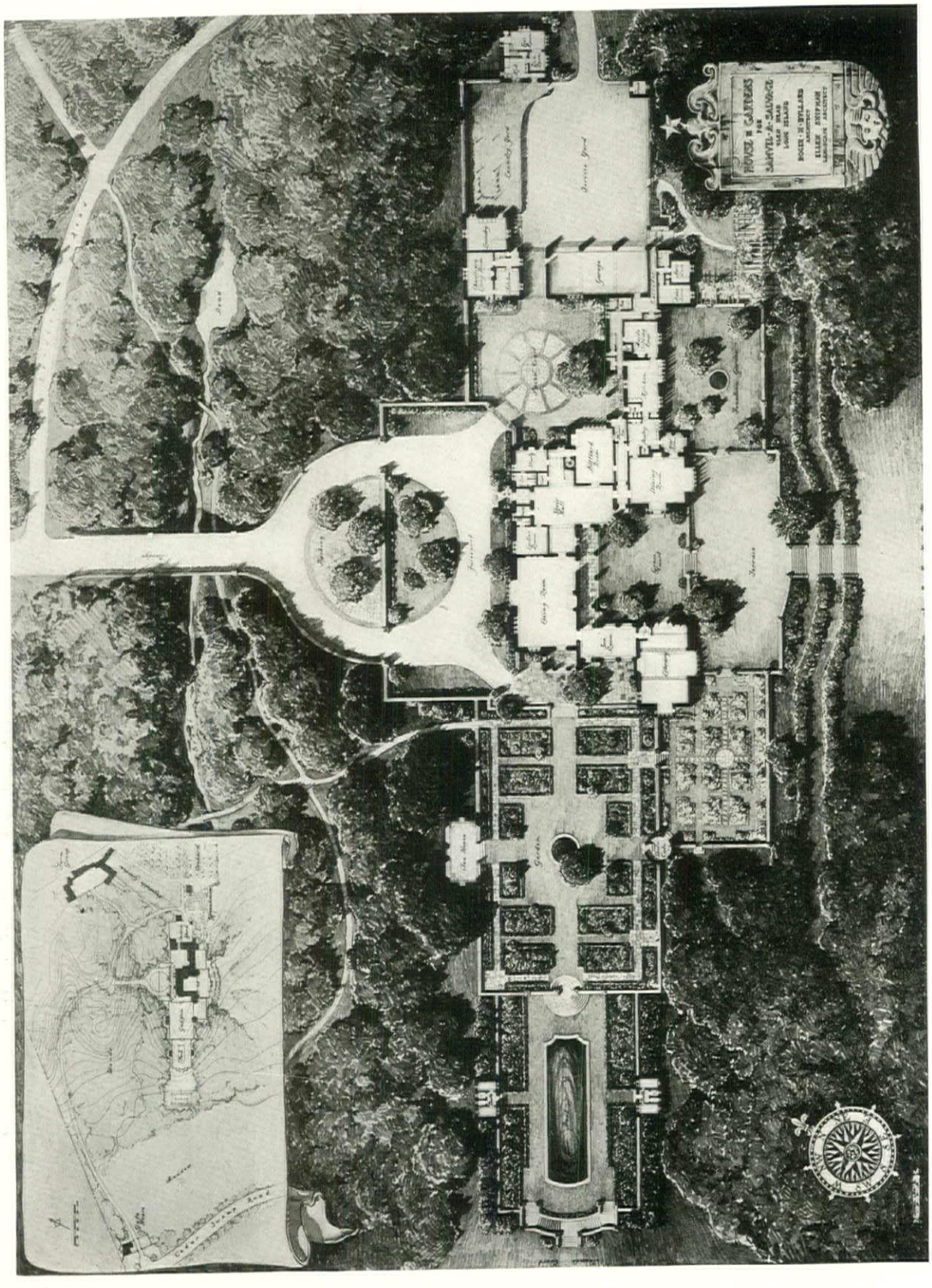
THE "APRON" STEPS LEADING FROM THE SWIMMING POOL GARDEN UP TO THE MAIN FLOWER GARDEN



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

ENTRANCE FORECOURT

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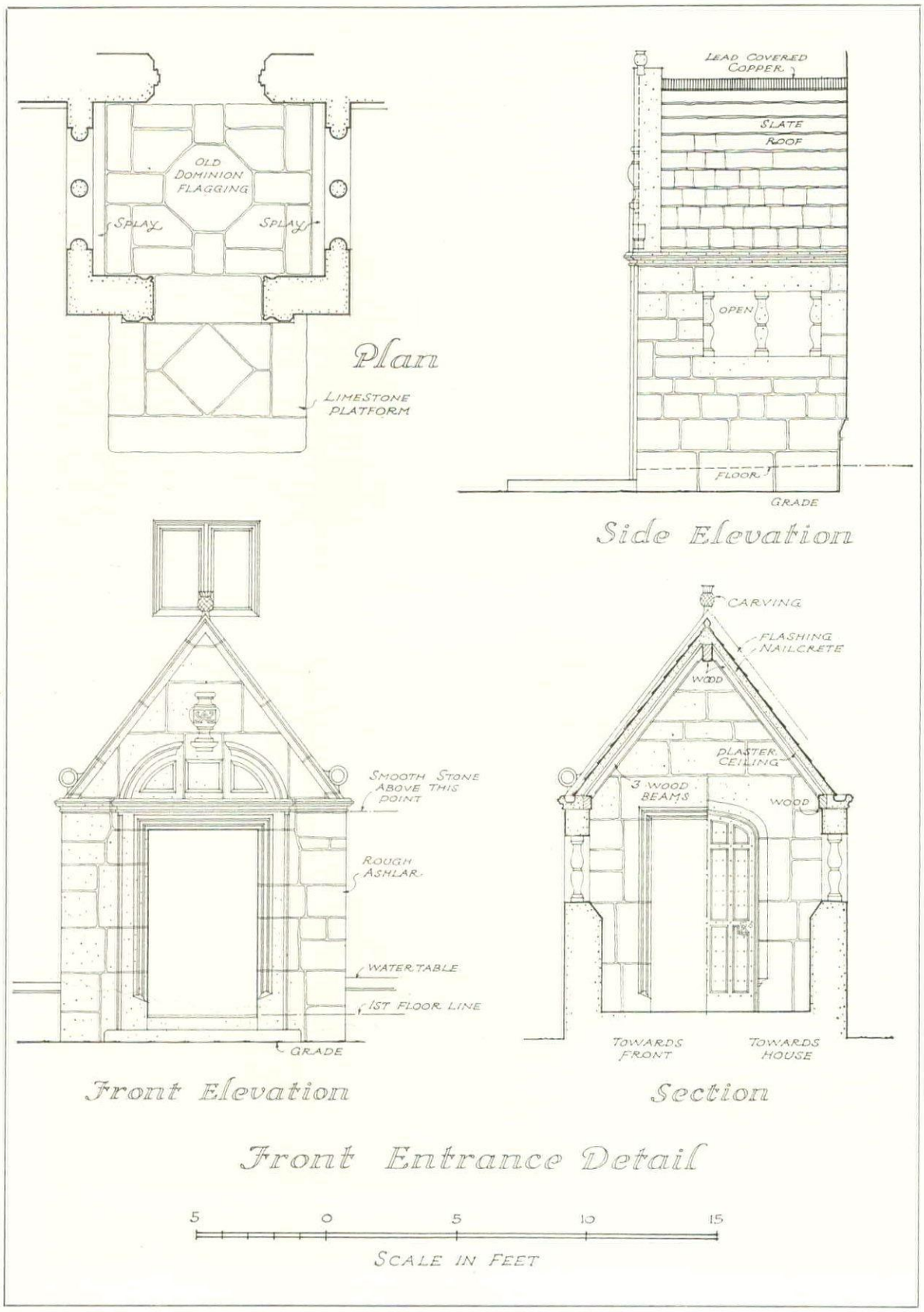
BRIDGE OVER RAVINE, MAIN ENTRANCE DRIVE

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

Van Anda

ENTRANCE PORCH FROM FORECOURT

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

LIBRARY WING FROM SOUTH TERRACE

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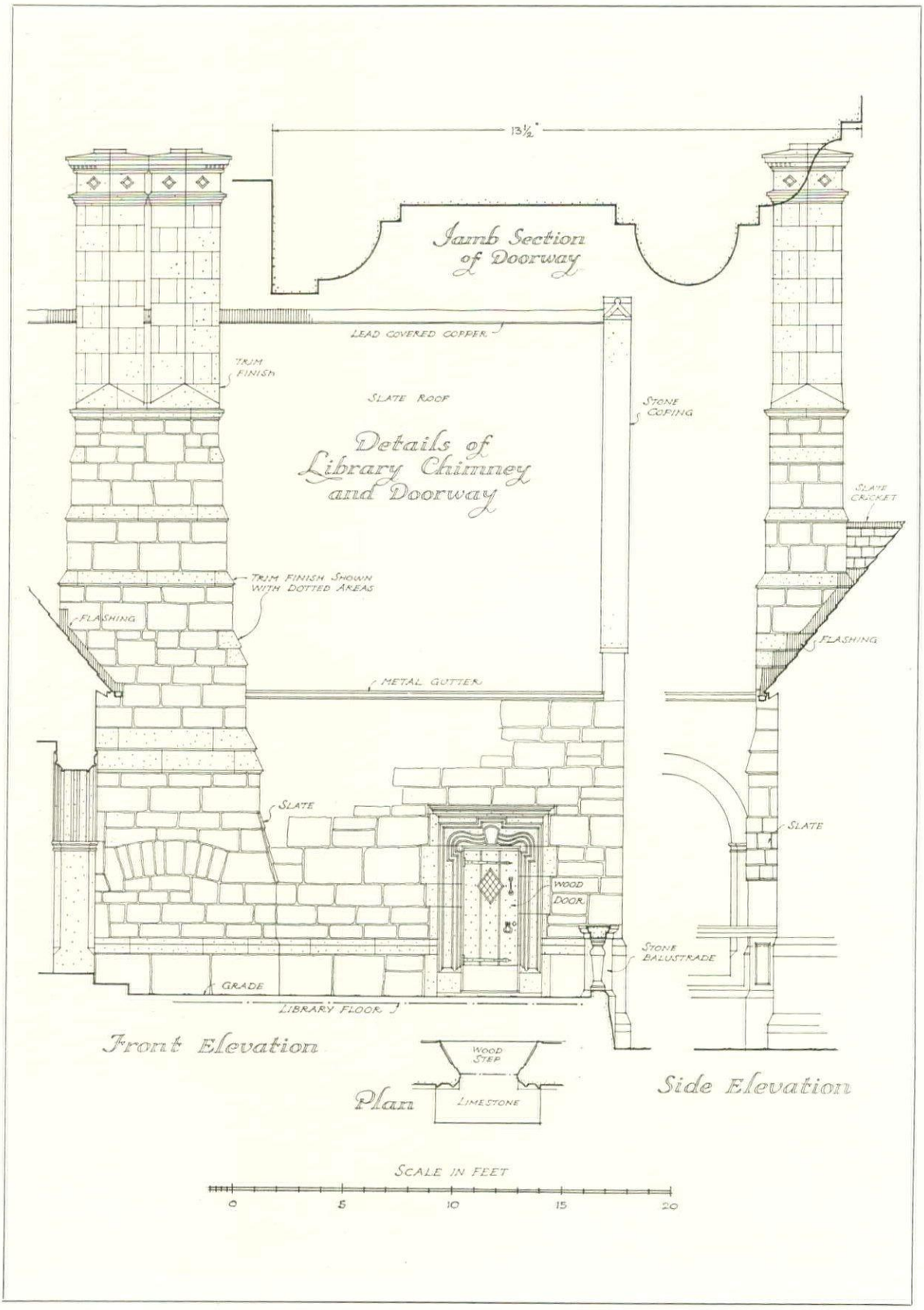
WEST FACADE FROM UPPER FLOWER GARDEN

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

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LIVING ROOM PORCH

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

LIVING ROOM PORCH FROM SWIMMING POOL GARDEN

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ENTRANCE DRIVE

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

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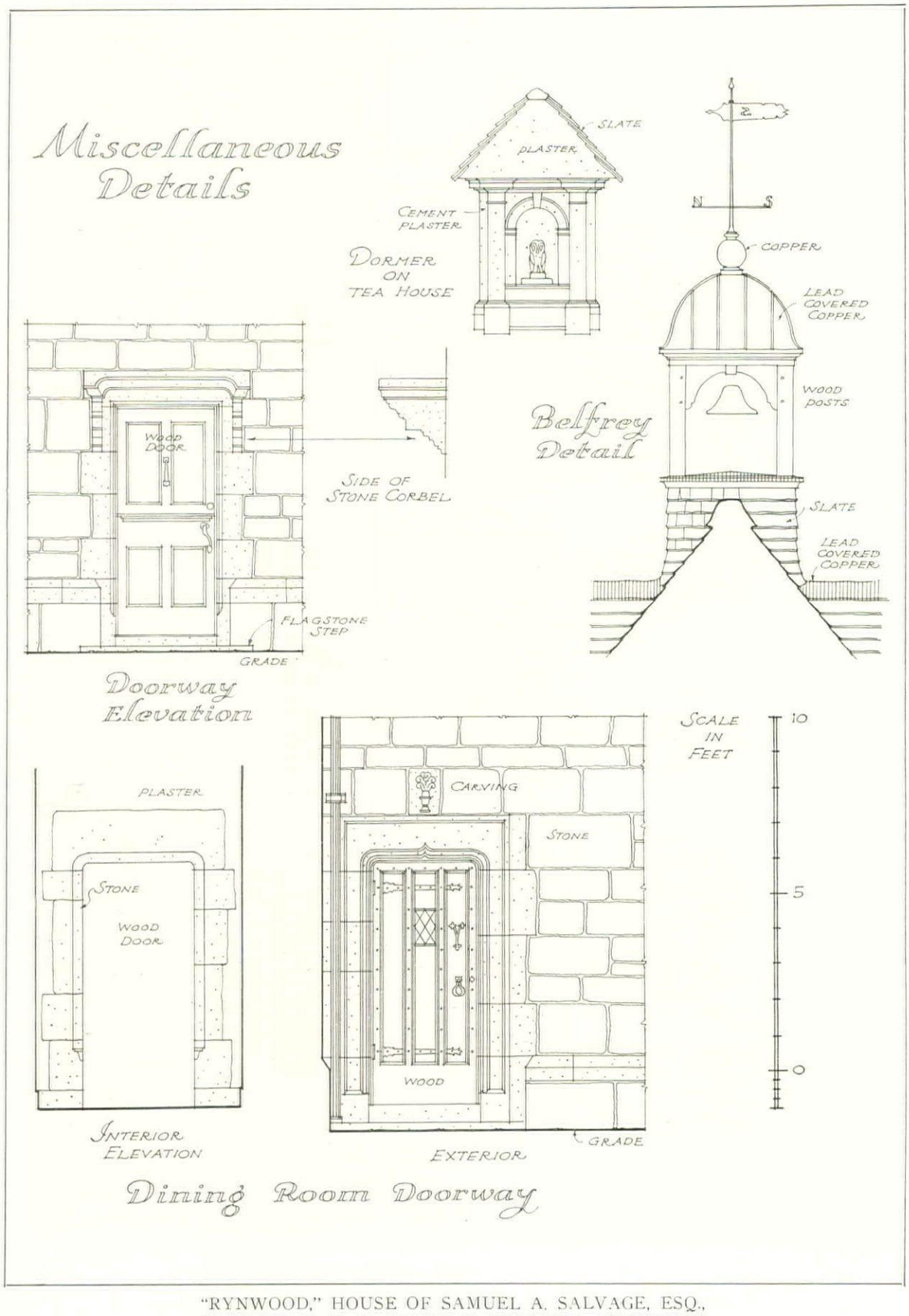
WALL AND STEPS BETWEEN GRASS COURT AND SOUTH TERRACE

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

GATEWAY FROM FORECOURT INTO PAVED COURT

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MAIN ENTRANCE GATES AND LODGE
"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

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DOOR AND OVER-BALCONY IN NORTHWEST CORNER OF GRASS COURT
"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

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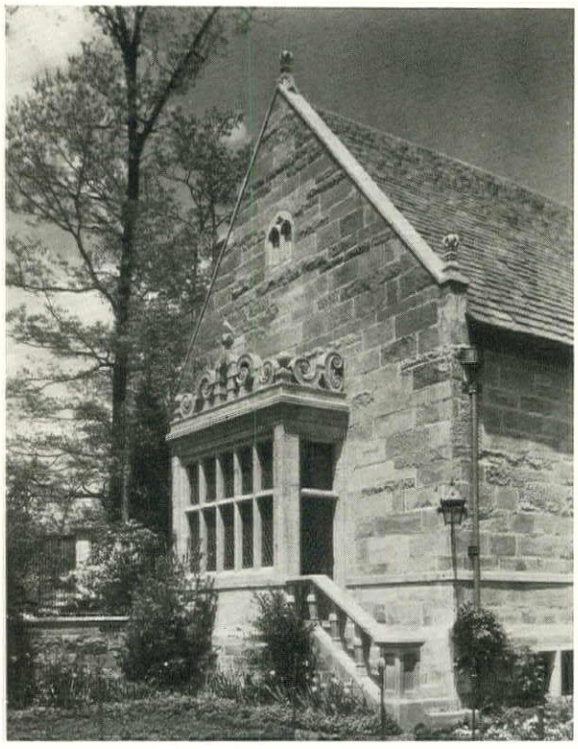
WINDOWS OF LIVING ROOM ON ENTRANCE FACADE. (BELOW) GABLE END OF LIBRARY WING



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

ENTRANCE TO BILLIARD ROOM AND FLOWER ROOM. (BELOW) CORNER OF SERVICE YARD

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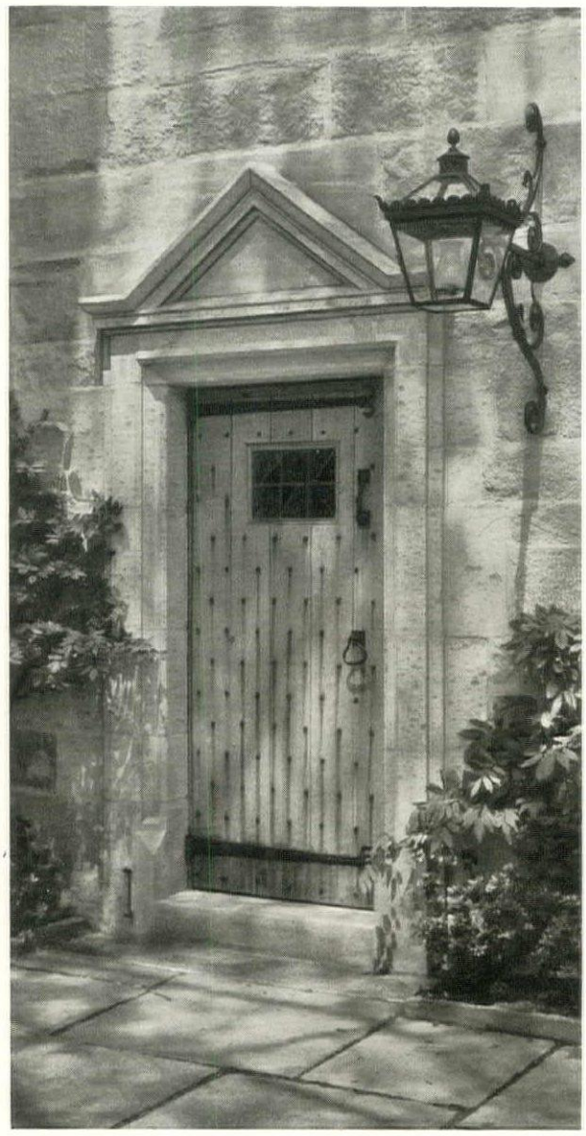
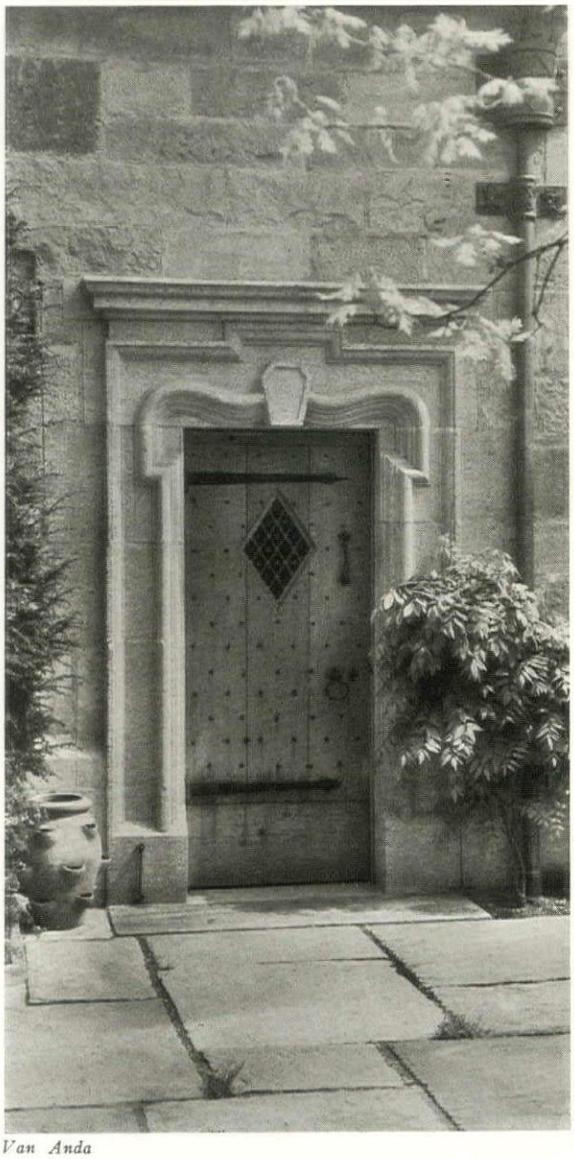
"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

DOOR FROM WESTERN TERRACE INTO SUN ROOM. (BELOW) DOOR FROM SUN ROOM TERRACE INTO LIBRARY





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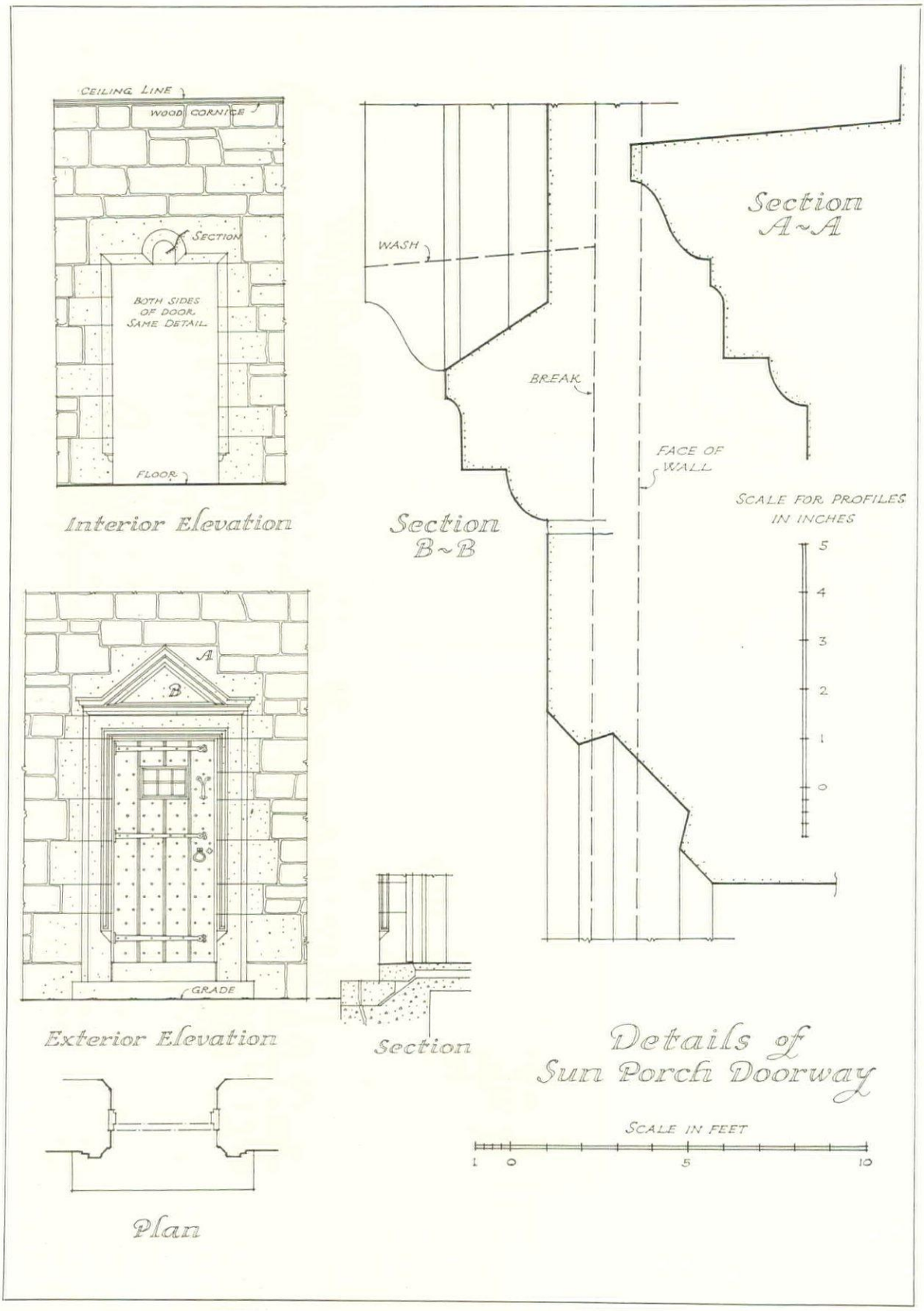
"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT



"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

TEA HOUSE AND POOL IN UPPER GARDEN. (BELOW) SUN ROOM ARCHES AND WESTERN TERRACE

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

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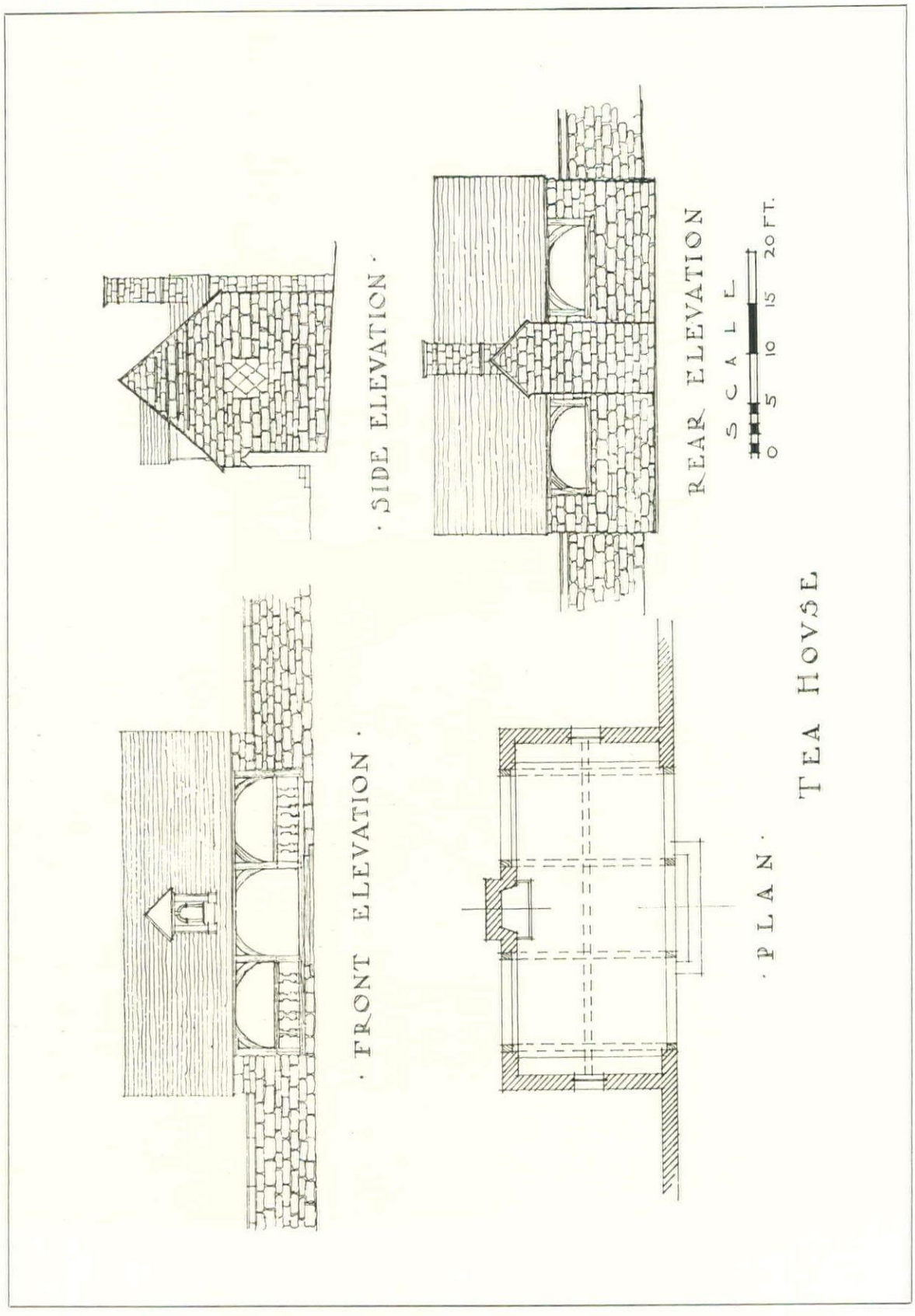
FIREPLACE IN BILLIARD ROOM

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

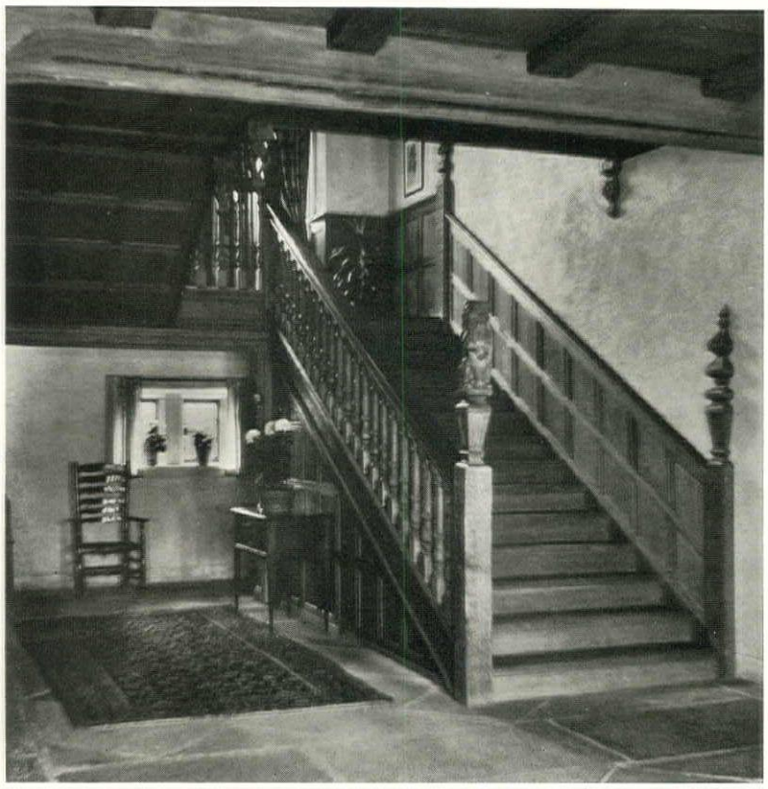


"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

Van Anda

DINING ROOM

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ.,
GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT



STAIRWAY OFF ENTRANCE HALL. (BELOW) WEST WALL OF LIBRARY SHOWING BEAM CONSTRUCTION OF ROOF

Van Anda

"RYNWOOD," HOUSE OF SAMUEL A. SALVAGE, ESQ., GLEN HEAD, N. Y. ROGER H. BULLARD, ARCHITECT

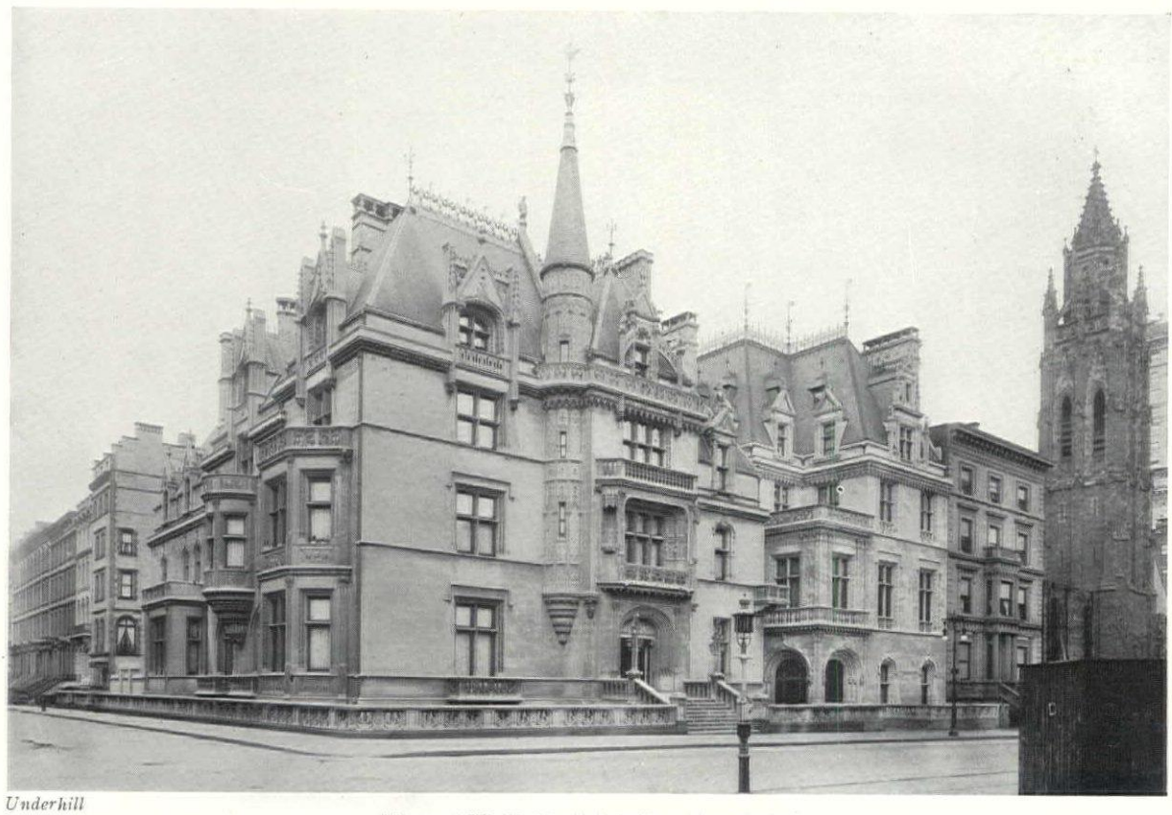
GHOSTS IN NEW YORK

BY

ROYAL CORTISSOZ

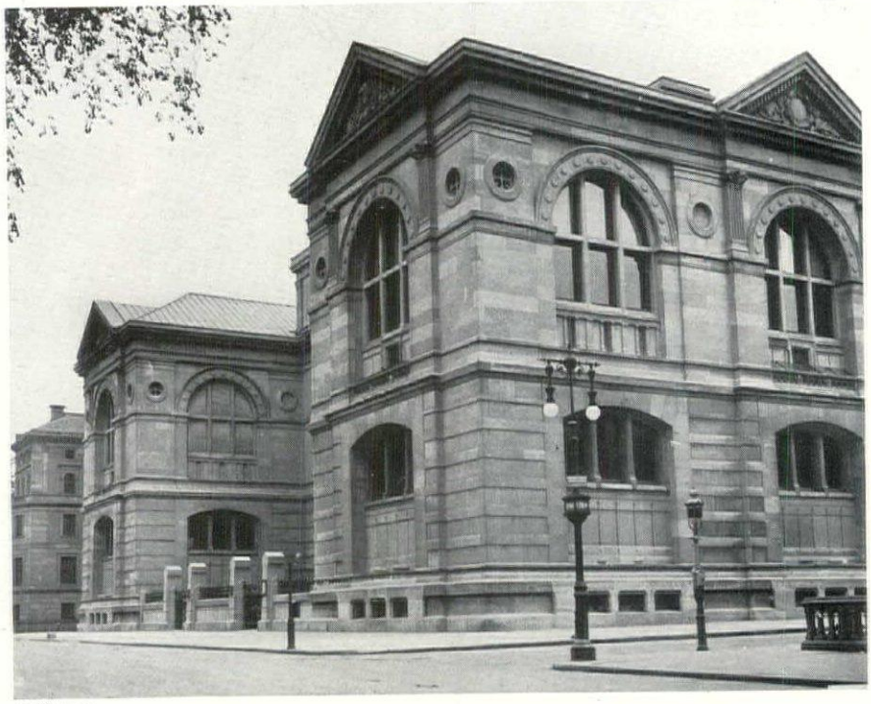
NEW YORK is, among other things, an architectural graveyard, populous with the ghosts of distinguished buildings. If death loves a shining mark anywhere it is in this place of "land values," where the noblest edifice must be sacrified to ever larger and larger renting possibilities. We have suffered in this way the loss of some buildings which in France, for example, would have been declared national monuments and preserved forever. Such a loss was that of the gem-like chateau which Richard Morris Hunt designed for William K. Vanderbilt in the late 70's, at Fifth Avenue and 52nd Street. When it disappeared a year or two ago a masterpiece was erased. It had not realized Hunt's dream in the fullest degree. In his beautiful monograph on this building Mr. Van Pelt recalls how, in the course of preparing his drawings, the architect went to his client and urged him to buy the entire frontage from 52nd to 53rd Street, the house to be placed in the middle. It is added, by the way, that Vanderbilt later acknowledged the mistake he had made in not taking this advice. But even without the larger environment it needed, that house was a triumph in French Renaissance design, one that we could ill afford to do without. There are thousands of New Yorkers who would join me, I believe, in saluting its memory. And architects must remember with peculiarly keen appreciation Hunt's old Lenox Library, so long looming majestically on the ground where the Frick mansion now stands. His bust remains, across the street, but his building is gone. It was the strongest, stateliest, most monumental thing he ever did, perhaps the most personal fruit of his academic training in Paris, a great building, with true power in its massive simplicity, its austere lines. I doff my hat to its ghost.

There is a paradoxical element in the origin of this devastation among some of our finest buildings. The leaders in our architectural renaissance, back in the 70's and 80's, were destined ultimately to pay a heavy penalty for their very leadership. Being in the front rank of their profession they received commissions to build upon the city's choicest sites. Those sites, steadily increasing in value, turned upon them, so to say, and displaced their works with more profitable structures. It was so with Hunt and the Vanderbilt house. It was so with McKim, Mead & White, and an almost incredible list of



Underhill

House of W. K. Vanderbilt, Esq., New York.
Richard Morris Hunt, Architect



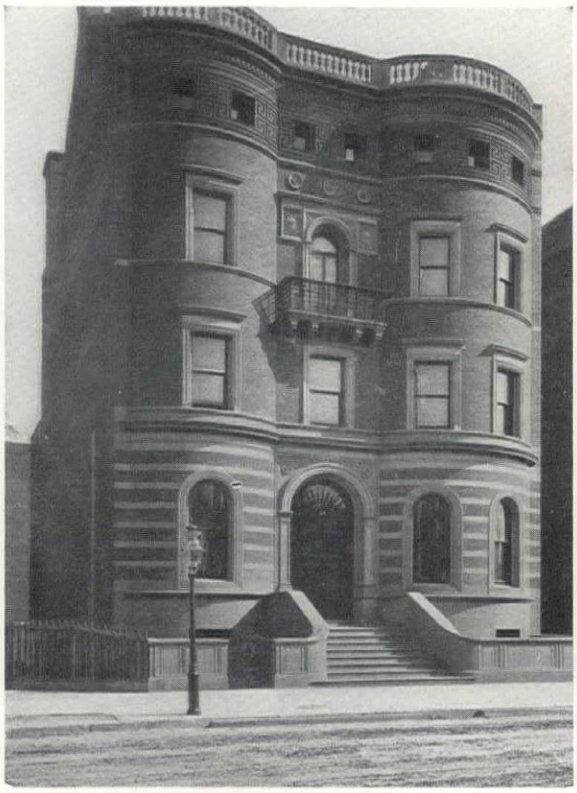
Lenox Library, New York.
Richard Morris Hunt, Architect

Galloway

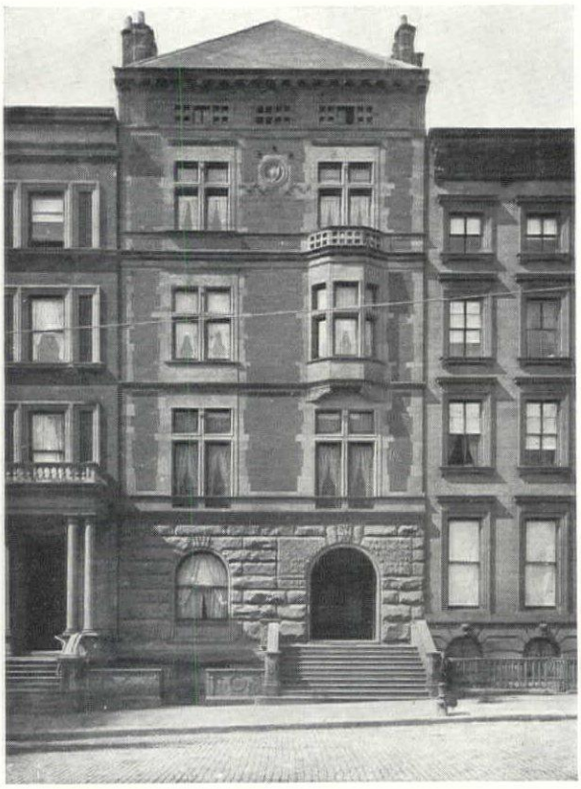
Bank Formerly at Fifth Avenue and 42nd Street. McKim, Mead & White, Architects

buildings once seemingly permanent but now gone, or going, to join the ghostly band. A positively unique fate has pursued the earlier New York work of this firm. The most resplendent piece of it is still happily intact, the old "Villard Block" on Madison Avenue, back of St. Patrick's. But the number of demolitions is, as I have said, almost incredible. One of the first I have to touch upon has always struck me as particularly malign. It is impossible to say how often, when I have passed the southeast corner of Fifth Avenue and 42nd Street, there has risen before me the ghost of the lovely bank building—yes, "lovely" is the word—which they erected there some time in the 80's. It was in the style of a Florentine *palazzo,* rusticated sandstone below, brick and terra cotta above, with the charmingest loggias supporting the cornice. McKim, Mead & White were then in the first flush of their Italianate designing, and they used in this building, comparatively narrow on the avenue and deep on the street, a delicacy and an elegance I shall never forget. But that building vanished so long ago that few indeed in the throngs passing its site are minded, as I am, of its ghost.

There are divers other old designs of theirs,—private houses, whose identity has faded out as completely, I imagine. Who recalls the Fulton Cutting house at 724 Fifth Avenue? Or the house at 431 Fifth Avenue for Le Roy King, or that in the same thoroughfare, on the west side, at about 35th Street, for J. Coleman Drayton? Or the Lloyd Phoenix house in East 33rd Street,



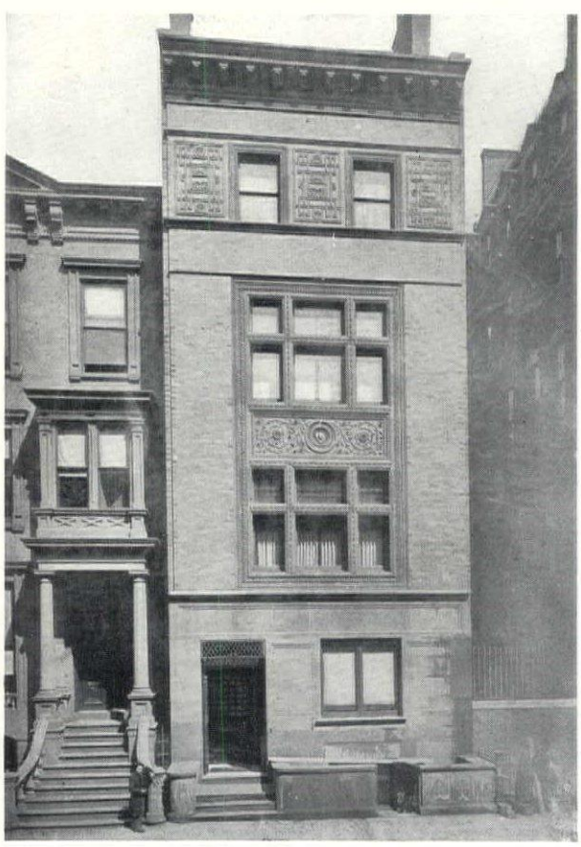
House of Alfred M. Hoyt, Esq., New York.
McKim, Mead & White, Architects



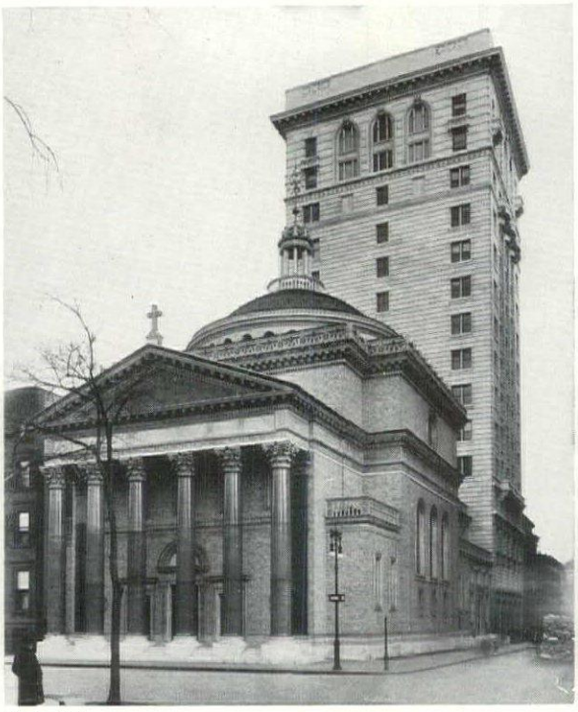
House of J. Coleman Drayton, Esq., New York.
McKim, Mead & White, Architects

or the Alfred M. Hoyt house at 934 Fifth Avenue, a broad-built affair, with two bays? I can hear some malcontent replying: "Well, what of it? Were these houses indispensable?" The interesting thing is that they *were*, that they were absolutely original contributions to the subject, revolutionizing the domestic architecture of a period, substituting for the banality of the "brownstone front" a new harmony in stone and brick, and banishing ugliness to make way for grace and beauty. It is not sentiment alone that leads me thus to revive recollection of these houses, to pay tribute to their ghosts. It is the conviction that we ought never to forget buildings that helped largely to make over American taste and that must still, in the mysterious ways of the spirit, exert a salutary influence upon the minds of men.

I suppose that when announcement was made in April that the Pulitzer house in East 73rd Street was to be replaced by apartments, the modernist saw no occasion for tears. He could easily be reconciled to the destruction of a Venetian *palazzo*, and I dare say he will contemplate with equal equanimity the impending disappearance of the Kane house at Fifth Avenue and 49th Street with its strong reminders of the Italian tradition, as of the Redmond house at Park Avenue and 69th Street, with its suggestions of the French. The modernist, I fear, has no

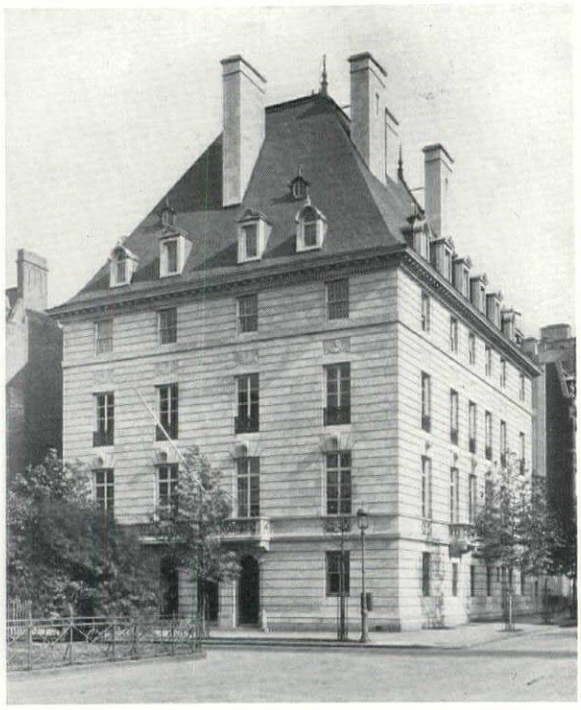


House of Lloyd Phoenix, Esq., New York.
McKim, Mead & White, Architects



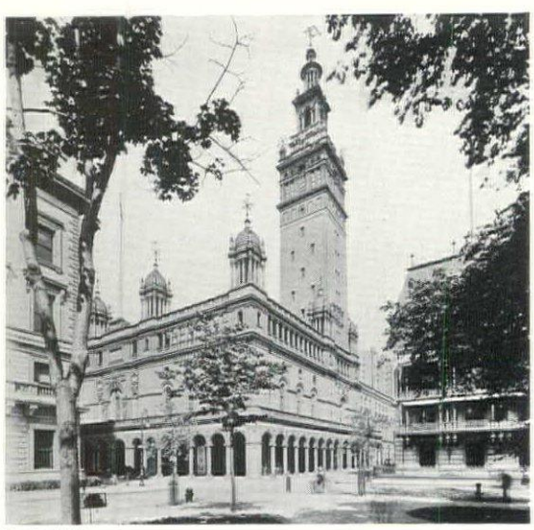
Underhill

Madison Square Presbyterian Church, New York.
McKim, Mead & White, Architects



House of Mrs. Henry S. Redmond, New York.
McKim, Mead & White, Architects

regrets for Dr. Parkhurst's church, which would make him think too much of the Pantheon, or of the Madison Square Garden, with its echoes of Spain. But I should think that even the modernist would remember with a wistful sigh the mere beauty in these buildings, and, besides, the fact—on which too much emphasis cannot be placed—that they made history. They made it, too, when it was needed most. Let me reiterate that those private houses to which I have alluded, the Cutting, Hoyt, Drayton houses and so on, were erected forty-odd years ago, when ideas of architectural refinement, beauty and true individuality were generally unknown. The other buildings I have cited were in some cases of more recent date, but all of them represent an artistic energy which was liberated in a world habituated to a fairly degraded standard of taste. What was done by Hunt, McKim, and the other members of a glorious company is not to be lightly forgotten. It was constructive and transforming. Without it we would not be leading the architecture of the world today nor would we have developed the degree of what I may call architectural consciousness that differentiates the public now from the public then. That is why I have been moved to pause for a moment among some of the architectural ghosts of New York.



Underhill

Old Madison Square Garden, New York.

McKim, Mead & White, Architects

MONT-SAINT-MICHEL

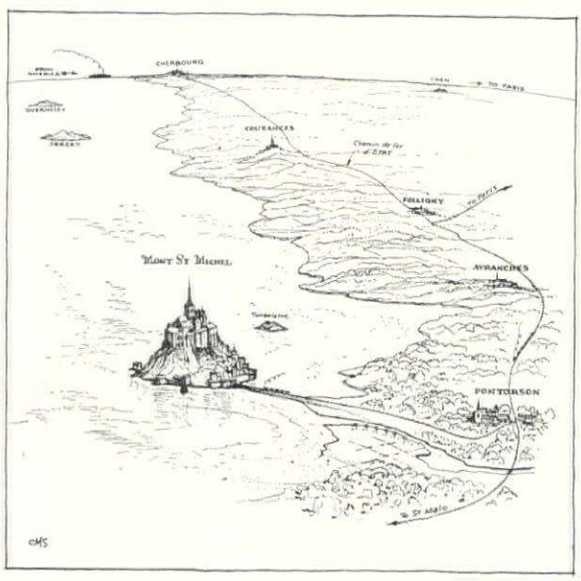
BY
CHARLES MORSE STOTZ

"Le seul nom du Mont-Saint-Michel evoque ce que les paysages de France ont de plus grandiose, ce que le patriotisme a de plus inviole, ce que la religion a de plus saint."—Simeon Luce.

JUST as the hill that became the Acropolis lay waiting until the time grew ripe for the Greek to ravish men's eyes with his orderly, spatial music, so this superb pedestal, with its magnificent setting of sand and sea, seemed destined by Nature to be crowned with the supreme effort of another age when man, impelled by totally different motives, again achieved the expression of his spiritual self in forms of beauty.

The life that once animated this structure has flowered and died; yet, as we pause to marvel at the empty sea shell, we feel an enrichment and refinement of our sensibilities when we walk among these deserted stones. We cannot know the same sensations as those pilgrims of all estates of mediæval France when they first caught sight of the dramatic silhouette of the Mount; but our enthusiasm may be equally great in its own way, coming as we do from a country with a meager historic architectural background, in a more skeptical age, still struggling to adjust its art to a mechanical and commercial heritage. With refreshment of spirit we regard this ingenuous product of a day when men, working with the power of a common impulse, happily undisturbed by too much information, built directly with the simple means and materials at their disposal, overcoming tremendous natural obstacles and complicated requirements with hardiness of spirit and delicacy of touch.

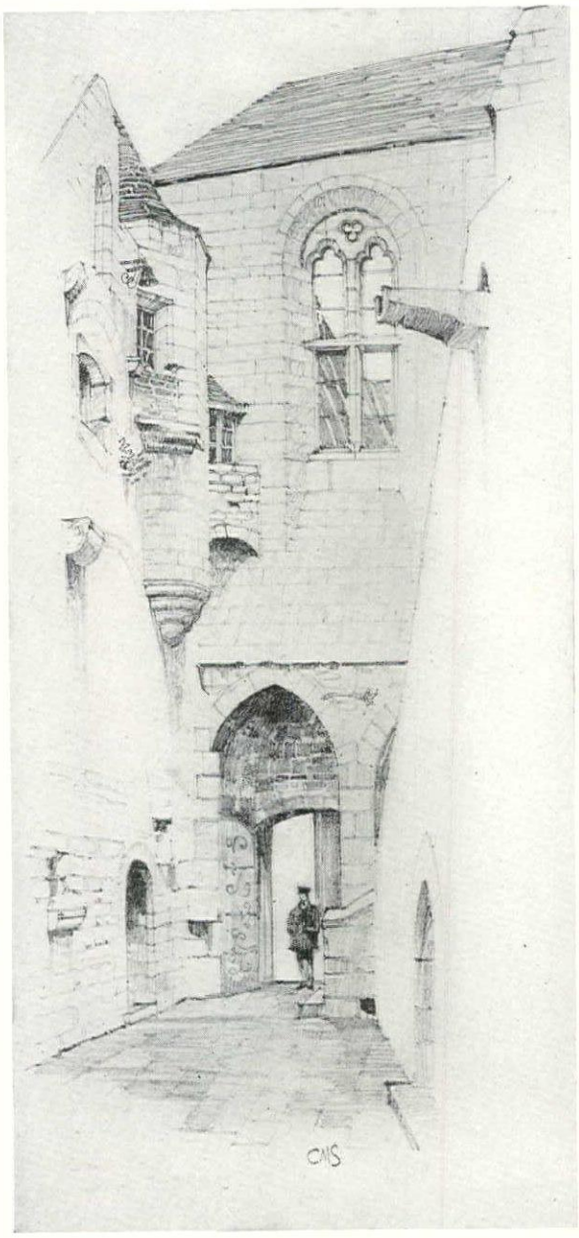
When we wish to be with Shakespeare we need only lift him from the shelf, but to be with Mont-Saint-Michel is another matter. Yet it is not an impossibility for anyone. Probably the greatest single difficulty is to shake off the dull hand of routine. From New York, as illustrated in the accompanying sketch, it is only a matter of a few days to Cherbourg, a few hours on the train to Pontorson, then a few minutes on the narrow gauge, and we are at the foot of the Mount, with much less effort and time than necessary for most of those pilgrims of old, for whom the journey to the island was a perilous and arduous experience.



Diagrammatic sketch (not to scale) showing location of Mont-Saint-Michel with respect to Cherbourg and Pontorson

After the first surprise at the sight of the distant profile from the train, long before made familiar to us by print and photograph, the closer approach to the island brings new and different impressions. When we alight from the train, the hundred or more houses spread over the side of the island facing the shore (that facing the sea being wild and precipitous) dominate the view, the only discordant note being the ugly modern establishment of Madame Poulard, who can only be forgiven on the strength of her remarkable omelettes. A fortified wall forms a great arc, following the shore line, about the town, rising as it turns to the right until it reaches the entrance to the buildings on the summit. A row of fine old stone buildings faces on the parapet walk which tops the ramparts. Among these there is one of outstanding interest,—*La Maison de Duguesclin.*

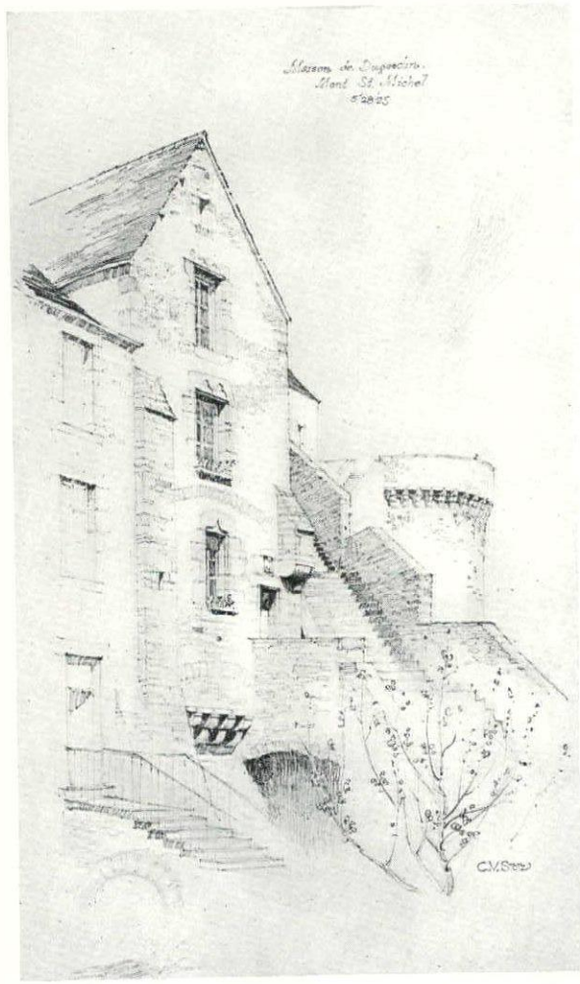
The only street, *La Grande Rue,* which starts just within the only entrance through the ramparts, hemmed in closely by old buildings, some of which are shown in the view towards Pontorson, winds and climbs its way, roughly parallel to the wall, past the old parish church, until it finally joins the walk on the ramparts, immediately below the final staircase, *Le Grand Degre,* which leads to the cavernous entrance



Inner Court

to the abbey on the summit. From this point of juncture of the two thoroughfares of the town there may be obtained one of the best views of the surrounding land and seascape, as well as of the town below and the buildings above. From here the sketch of La Merveille was made.

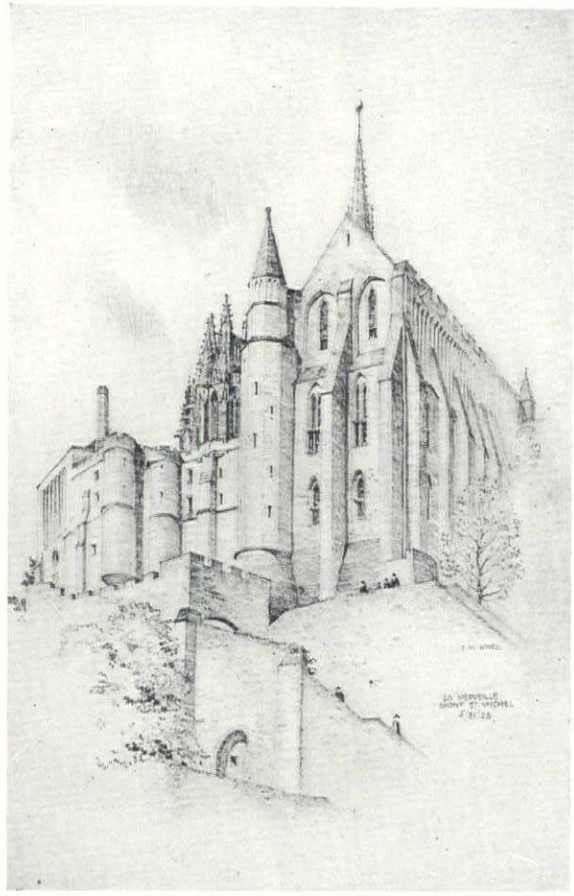
And it was from this vantage point, one day in May, that I gained my first close impression of the Mount, played on with all the moods of the capricious Norman spring weather. Alternating sunshine and shower further enhanced the spectacular character of the setting. High above, the towering mass of the buildings would stand out in dark shadow against a dazzling white cloud, and in another moment the great rugged walls would seem to be dripping sunshine. And as a climax to this show, a vast rainbow arched vividly against the deep velvet curtain of the storm clouds retreating over the Breton coast. And toward the open sea, the sands, saturated with the water of the ebbing tide, caught the glow of the sun. Turning in the opposite direction, I saw, toward the nearby Norman coast, the shadow of the church spire and buildings on the summit drawn in long, delicate lines on the flat sands. Then came twilight. The shades of those other days raised themselves in the imagination. Sentinels again walked their accustomed places on the ramparts. Pilgrims, chanting, wound their way up *La Grande Rue* to blessed rest for the night in Aumonerie. Distant sounds of feasting came from the Hall of the Cavaliers where William the Conqueror and his men often held forth, and where the Song of Roland was recounted many times. And then, again remembering that this edifice, rising in its simple majesty against the deepening night sky, was, after all, pitifully empty, I felt the sadness that comes from con-



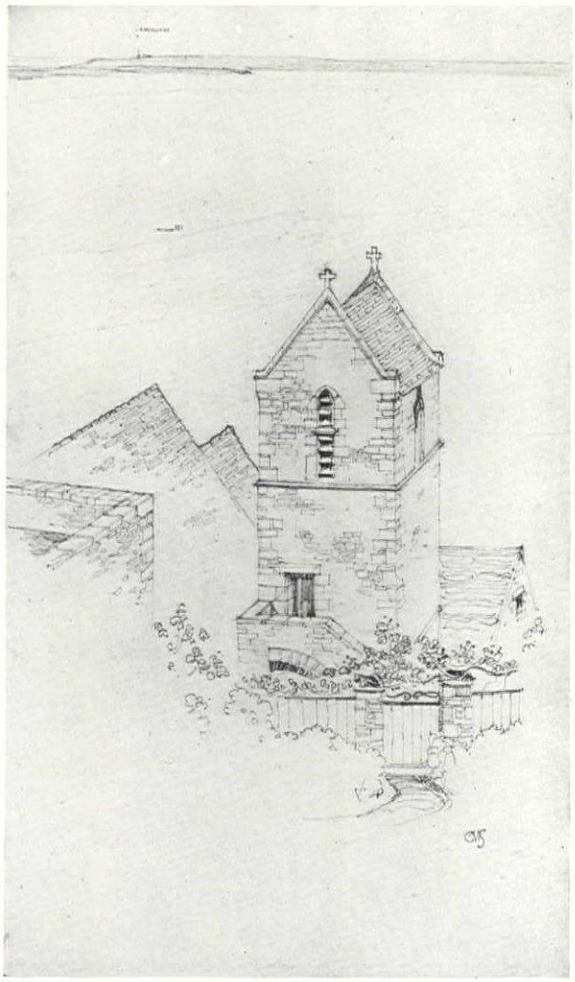
Maison de Duguesclin

templating the barrier of the centuries which isolate us from those colorful days. The night birds, with their melancholy screech, that beat against the turrets of *La Merveille* seemed the departed spirits of those who once knew this place in its flower and were vainly striving to enter again the beloved enclosure.

While walking the parapet, I made my first acquaintance with the social life among the inhabitants of today. It was before the main tourist season, and the island was practically my own. For that reason, I suppose, the proprietresses of the several cafes that open onto the walk engaged in lively competition for my patronage. It was disconcerting to have these women accost me in tense, pleading tones from the uncomfortably close doors of their shops, especially as I understood little they were saying and was interested rather in the sunset reflections over the sands toward Avranches. I gave in under the third barrage,—an impassioned description of the various delicacies of her cellar. With a gleam of triumph toward her neighbors and an effusive *"Bon soir M'sieu,"* she ushered me in to a table as though I were an old friend returned.



La Merveille



Parish Church

The buildings on the Mount can be seen only under the supervision of a guide unless one is prudent enough to get a permit first from the headquarters of the Historic Monuments Committee in Paris. This permit may also include the privilege of sketching within the buildings. I managed to make a sketch of the inner court before being told so. These guides are the best of their kind, well informed, anxious to explain and in thorough sympathy with their subject. One of them proudly showed me personal cards of Thomas Hastings and William A. Delano and other prominent American architects.

The first journey through the abbey and church is as bewildering as it is thrilling. It takes several visits before the scheme of things becomes apparent. I became very curious to know the relations of the different levels and rooms as well as the reasons which brought them about. The few days on the island were not sufficient, but I have spent many enjoyable hours since over the exhaustive and beautifully edited volumes produced by Paul Gout, Architect-in-Chief of Historic Monuments. *"LE MONT-SAINT-MICH-*

EL. Histoire de l'Abbaye et de la Ville. Etude archeologique et architecturale des Monuments." 2 *volumes.* 470 *illustrations in the text and* 38 *plates. Published in* 1910 *by Librairie Armand Colin, Rue de Mezieres,* 5, *Paris.* And probably very few need introduction to Henry Adams' "Mont-Saint-Michel and Chartres." Through his ardent and knowing eyes, we may see the Mount once more in all its glory. Those of us who have been filled with inexpressible thoughts which we lack the power to impart to others, pay a sort of secondary homage to one who is thus capable of telling us that which we felt but dared not mar by saying badly or inadequately. For those who wish a thorough description of the entire history and architectural development of the island, as well as the psychology and spirit of the times, no two books can equal these.

The more one sees and knows of these buildings, the more one admires the unexampled ingenuity with which the plan answers the widely diversified requirements, in spite of the natural obstacles and extremely limited space available. The outstanding feature is the three-storied building which flanks one side of the plateau, known quite properly as La Merveille. It contains one of the loveliest vaulted rooms in Gothic art, *"La Salle des Chevaliers."* Both within and without this structure leaves nothing to be desired. It carries one back to childhood days of brooding wide-eyed over the stories of mediæval knights and ladies. It is a dream come true, a dream built and embellished with all the unyielding actuality of hard granite and, in its day, a practically impregnable fortress.

Above all, it is most fortunate that this jewel should have a setting comparable only to itself. What a foil to this finely wrought masterpiece of Man is the grand simplicity of the Sea, the masterpiece of Nature. Here, too, is undeniable evidence that Man's life is not altogether futile, that he can exhibit some God-like traits, and that he can live lustily and joyfully while making his most serious work his greatest joy.

View towards Pontorson

THE ARCHITECTURAL FORUM

VOL. LIII, No. 1

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JULY, 1930

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

THE ARCHITECTURAL FORUM is published monthly by Building Division, National Trade Journals, Inc., 521 Fifth Avenue, New York. H. J. Redfield, Chairman of the Board and Treasurer; Howard Myers, President and General Manager; John Thomas Wilson, Vice-President; James A. Rice, Vice-President; C. Stanley Taylor, Vice-President; Henry J. Brown, Jr., Secretary.

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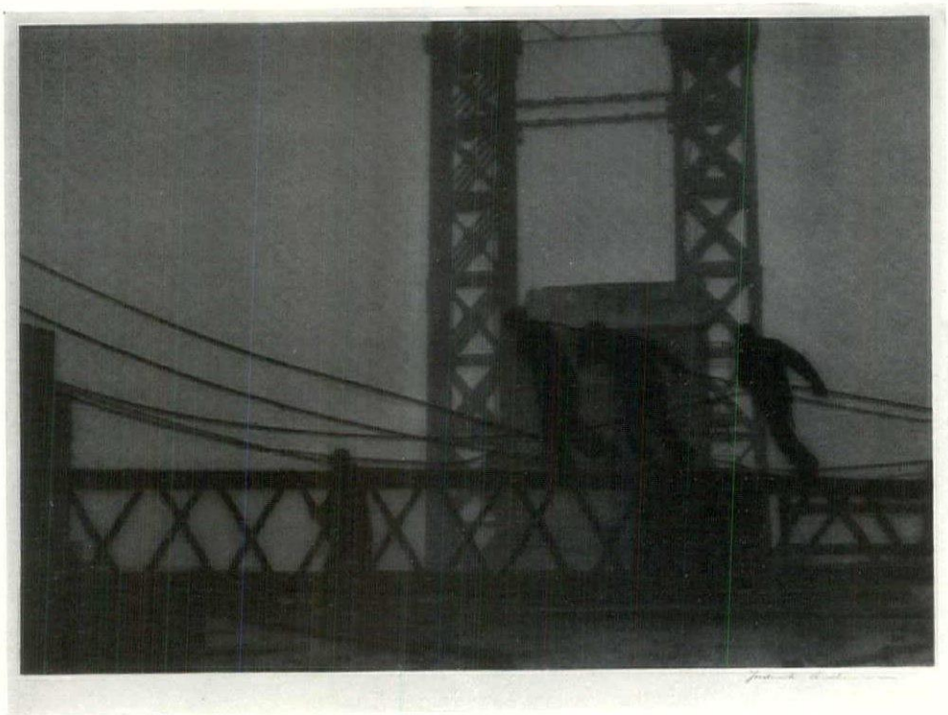
IN Part Two of this issue of THE ARCHITECTURAL FORUM we are fortunate in being able to present illustrations from a series of nine exceptional photographs of the new Hudson River Bridge made by the well known architect, Frederick L. Ackerman. Not only as an outstanding example of artistic photography, but also as record of the human element entering into every great architectural and engineering enterprise, these illustrations are noteworthy. We find here the romance of modern construction remarkably combined with a surprising expression of dramatic power. Such vigor and vitality of composition, such sense of tremendous strength and scale have seldom before been photographically obtained.

In the freezing temperature of February, Mr. Ackerman spent many hours in the dangerous quest, climbing over the great girders and up the curving cables. He waited for just the right angle of the shadows, the right grouping of the men, the right quality of light and atmosphere. Not only in the remarkable handling of the subject, but also in the superb etching-like quality of the prints he made, has Mr. Ackerman shown an artistic sense and a technical skill as yet unsurpassed in photography. A Whistler or a Brangwyn might well be proud of such attainments in the art of monochrome.

THE EDITORS



THE RIGGERS

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

THE
ARCHITECTURAL
FORUM

VOLUME LIII NUMBER ONE

JULY 1930

IS PUBLICITY ADVERTISING?

BY

KENNETH M. MURCHISON

AND if so, what is advertising? At the moment, there is no dictionary at hand, but it seems to me that advertising is the art of putting one's wares before the public in the most alluring way.

If it is unethical for architects to advertise, are they not losing an opportunity to acquaint the public with the advantage of purchasing their wares? The solons of the American Institute say they, the architects, must not advertise, so it is by publicity that they must become known.

But publicity is nothing more or less than advertising. It is done, however, in a more gentlemanly fashion, surreptitiously masking itself under the head of "news." But publicity, as news, is often paid for, although it might not be wrong to say that it is more often the publicity agent who receives the commission, not the periodical in which the news story may be found.

It seems to be unethical to put a paid advertisement in THE FORUM, for instance:

FARREN & FRETMORE
Architects
321 Fifth Avenue, New York,

while it is still within range of the book of etiquette to have a sign on an uncompleted building reading:

FARREN & FRETMORE
Architects

Nothing but the address is left off, but the drug store is handy,—and it has a telephone directory!

There are one or two architects in New York, big ones too, who will not allow any signs on their in-process buildings, not even that of the builder, or the plumber or the electrician. They undoubtedly have reasons, good reasons too, but I feel sure that the public, or an appreciable part of it at least, is interested in new construction work and wants to know what the building is going to be used for, who the architects and builders are, and, if it be a commercial structure, a brief description of it on the billboard in front.

Then how about the Sunday papers? The real estate sections carry plenty of fanfares describing new apartments to rent or to sell. And when a house is done by good builders and architects,—alas, would it were more often!—the owners and agents of said rookerie are only too glad to mention the names of the begetters of the building. All this seems to me legitimate and logical advertising in its best form. We have done something. We are not ashamed of it. If the public likes us, why hide our light? Particularly as we are, after all, in architecture to make a living, good or bad.

SWELL PUBLICITY

A recent issue of *Time*, a weekly built on the condensed milk principle, so that one does not have to wade through oceans of immaterialism, devoted several columns of its precious space lately to the Washington Convention of the American Institute of Architects. And they seemed to have the right idea too. A part of their saga ran: "Architects have one thing in common,—they are the least advertised professional men in the world. They do not sign their work. Advertising copy writers never get a McKim, Mead & White or a Warren & Wetmore account. Even in the pages of architectural journals you will look in vain for architects' advertisements. Everyone has heard of the Woolworth Building, the Lincoln Memorial and the palatial Pocantico Hills residence of John Davison Rockefeller, yet few laymen can name the designers (Cass Gilbert, Henry Bacon, Delano & Aldrich, respectively). The feats of great lawyers and even doctors are popularly associated with their names. But if you want an architect you have to go and get him, and the information you have as to his worth is usually conveyed by word of mouth."

They mention such luminaries as McKim, Mead & White, William Van Alen and Ralph Adams Cram and go into journalistic ecstasies over Delano & Aldrich, mentioning 20 or 30 of their buildings. The answer may be that the editor of *Time* lives in a "D. & A." (as the editor

calls it) house and everything works all right, including the hot water and the oil burner. Is this advertising? Perhaps yes, and perhaps no. But it is certain that D. & A. (sounds like a railroad, doesn't it?) didn't pay for it, so it's just publicity and good publicity at that. For let it be understood that THE ARCHITECTURAL FORUM has the highest and most sincere regard for Mr. Delano and Mr. Aldrich, and anybody who can get three columns in a space-saving newspaper is going some, in our opinion, and ought to be talked of for President of the United States.

THE OTHER SIDE OF THE PICTURE

Quite the opposite, and quite a mournful and ridiculous opposite, is shown in a letter received by a firm from an architect practicing in Brooklyn. He starts thusly:—

"Permit me to draw your attention to my first class architectural service, at very fair prices. This service is fully guaranteed by my 30 years of practical experience; by my former association with leading architects; and by my acknowledged skill in Beaux Arts architecture, architectural engineering, landscape architecture and decorating. The few small sample houses on this letter will give you a faint idea of my skill.

"Therefore, when you entrust me with your work, large or small, or when you recommend me to your many friends, you are absolutely guaranteed to get the cleverest plans, artistically designed. These plans are easy to build, yet the buildings look bigger, better, more valuable, commanding a much better price. You get expert specifications that will save you lots of money; you get Beaux Arts color sketches that will sell your buildings like the proverbial hot cake; expert economical large scale and full size details; interior and exterior decorations and valuable landscaping advice. In short, you get every known means of art and science, every humanly possible aid to make your projects the greatest possible success in every way." etc., etc.

The letterhead is adorned with five cuts of the most erudite and elementary looking buildings, with the cost price of each, while down at the bottom, in capital letters, he clinches his argument with this devastating promise:

"I WILL PROMPTLY PAY 20% OF MY FEE AS COMMISSION TO ANYONE RECOMMENDING ME OR DIRECTING BUSINESS TO ME."

OTHERS GET IT

Other professions get publicity in their own way. Take a tense criminal trial, for example. Do the attorneys for either the prosecution or the defense refuse the use of their names to the papers? Hardly. They do everything they can do to get a sketch of themselves on the front page while the going is good. And the big doctors just love to sign their names on bulletins concerning the health of prominent citizens. So after all, every man for himself, every profession for itself, and there's plenty of room for everybody in this world. What the architectural profession really does need in the way of publicity is a nationwide campaign on *the necessity of having an architect in every building operation.* If the public could be educated up to this viewpoint, then the profession would have accomplished a very definite step in its development.

Something of this sort was broached by a committee of architects a few years ago, and I believe it had the full coöperation and sympathy of the American Institute of Architects. Each subscriber to the publicity fund was to have put in each year a tithe of his earnings, on a sliding scale, depending on how much business he did.

This committee worked hard on it under the very able leadership of Harvey Wiley Corbett, but there was no big, definite response, no rush of architects to the standard bearers. No waving of checks, no shoulder-to-shoulder stuff at all.

WE HAVE NO DEAR PUBLIC

Why is it that the average public takes so little interest in exhibitions of architectural drawings? For it does, and there is no dodging this fact. Every other year the Architectural League gives an architectural exhibit in the Fine Arts Building in West Fifty-seventh Street. There is no wild stampede of patrons and amateurs to see this.

Then every odd year the League has an enormous exhibit in the Grand Central Palace, run by professionals in the art of display and publicity and supported by the brethren of the building trades and by the manufacturers.

Is the attendance meager for this sort of thing? I should say not! Last year a hundred and sixty thousand people visited the exhibition. They wandered all over the three-floored display; they went to the movies; they went through wood rooms from old English ale houses; they went to the "Best 100 American Pictures"; and they enjoyed the whole show mightily.

That was good publicity for the cause of architecture, and I have no patience with those who cavil against it. It was a big thing.

THE HANDWRITING ON THE WALL

As to the oft-mooted question of signing one's buildings, it is hard to see any objection to it from the architect's standpoint if there be none from the owner. Certainly they do it abroad everywhere, but here one sees rarely the timid inscription of the designer of the building, and in some cases, when you see it, you are sorry he did it.

Unfortunately for our profession, there are too many mistakes made by the members of it. And people always remember the mistakes much more poignantly than they do the nice, agreeable, pleasant features of the finished product.

TOO ARTISTIC BY HALF

The builders, for instance, have no burning desire to applaud the designer who shows a simple cornice at quarter scale when they full-size it into something entirely different and costing probably 50 per cent more. The real estate men are too often surprised and disappointed when they find that an architect's wonderful layout of apartments will not pass the regulations of the city's building department, after they've sold apartments.

And then, My God! the estimates! When are we ever right? As guessers, we'd never get a job on a weighing machine at Coney Island.

Of course, during the time when we're trying to land the job, we don't dare tell the client that his building is going to cost as much as it really ought to. Most of us stall around a bit and begin a lot of "Well, you see it all depends on so and so," rather than add 25 per cent to what we really think the cost is going to be.

But that's an old story,—and it's still popular, too. It comes out in the papers every few days on public work, and just lately our world-wise mayor went up in the air when he found out that certain city projects would cost about twice the sum that the architects told him they would amount to. Of course, there are always explainable changes and more expensive materials suggested by somebody, and higher ceilings and lots of other items, but nevertheless we have that reputation, deserved or not, and there you are!

THEY NEED US EVERY HOUR

Let the light of publicity so shine and let it shine in such a way that people will be glad to see us. The man who is building a small house should be just as sure that he needs an architect as is the president of a corporation which has the erection of an office building under consideration.

We who run the Beaux Arts Ball every year for the benefit of those thousands of students affiliated with the Beaux Arts Institute of Design have no possible trouble with the publicity end of the affair. In the first place, it is essentially social, and that means that the society editors of the daily press are always eager for copy which contains names familiar to the leaders of society and equally so to their chambermaids.

The society editors clamor for the photographs of stars of society and the stage, but the photographs of architects, either as themselves or as the characters they are to portray, are not so feverishly in demand. Mr. J. Monroe Hewlett did get in a couple of times, but he played the part of Michael Angelo, who was fairly well known in his home country and who has had quite a few notices ever since.

WE REALLY OUGHT TO HAVE HIS PICTURE

The publicity man of the Beaux Arts Ball is an architect of note,—Arthur Ware. He is skillful at it. He handles it as deftly as an old newspaper man. The editors eat it up. They don't put their re-write men on Arthur's stuff. It's there. Meat. No boloney. And it's what they want.

The American Institute of Architects has a press department, and every once in a while one sees articles by a member of the press committee or by the publicity representative of the Institute, but unless the occasion be a dinner or the opening of an exposition or a nice, well-rounded-out murder by, or of, an architect, then the story only goes into the real estate page and nobody reads it except citizens interested in our allied trades.

We want to be put where the average man in the street will see us. He ought to be shown what an architect really is. He should realize, at least if he is contemplating the erection of some building or other, that the architect furnishes him a great deal more than a set of sketches. People are generally surprised when they realize the scope of an architect's equipment. They recoil at the size of the specification. They are confused at the idea of an elevation where they can't see the wings jut out. They never know why the stairway takes up so much room and every dimension line seems to them to indicate a partition.

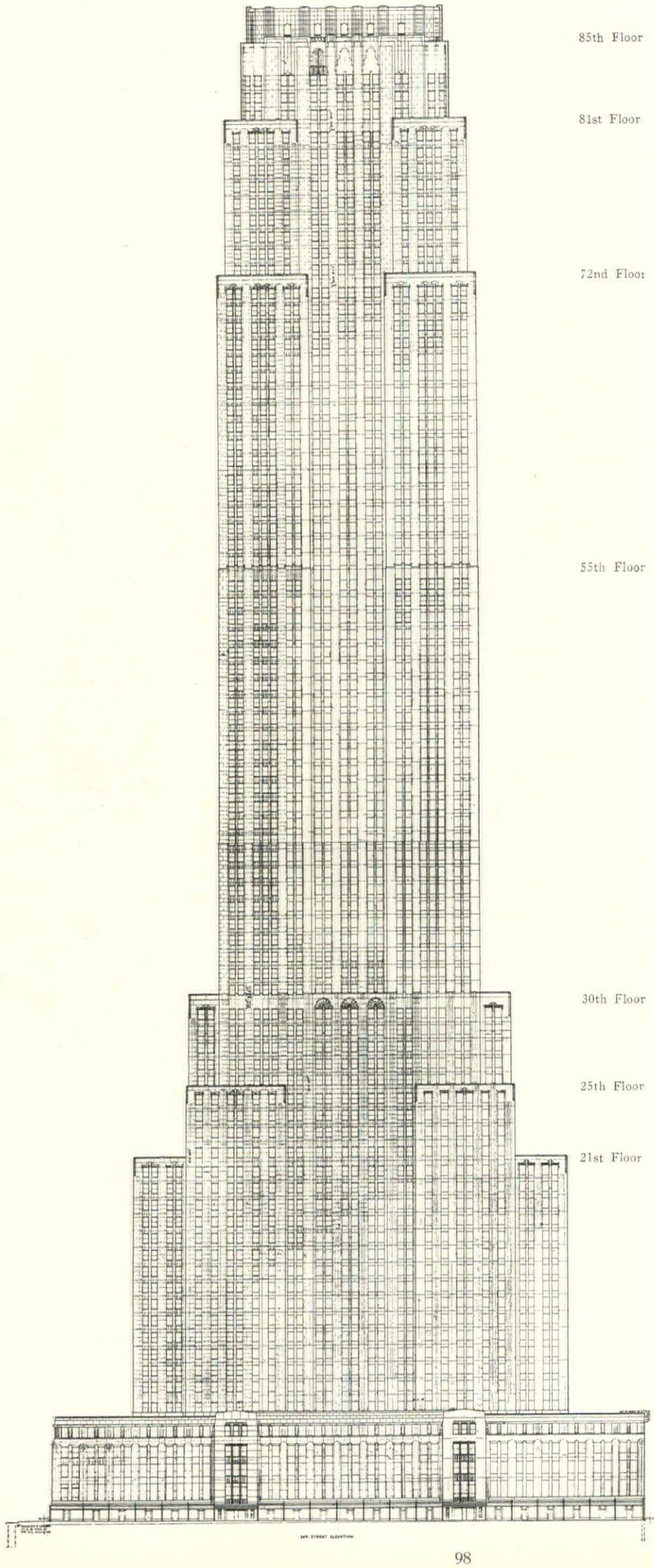
Of course, we cannot expect the man in the street to know the ins and outs of a set of blue prints. But he might be shown a few things by a competent publicity campaign. And, moreover, he might be a little bit interested too.

AMONG OTHER THINGS

The architects of the United States need a business manager. In the recent conferences in Washington called by the President, did anyone see the names of any prominent architects among the invited guests? Did any of our profession get up on his feet and point out the way to restore business confidence? Not that I know of, and I looked very thoroughly in the papers.

That's the trouble with us. We don't take our place in the fast-moving development of the present day. The engineers do. They even got one of themselves elected to the presidency! They are opportunists,—always on the job, or waiting with their ears to the rail to see what kind of a train is making that far-off rumble.

We need publicity. As a body, as a profession, we need it. Don't sidestep anything legitimate in that line. It'll never hurt you if it's aboveboard, and every little thing helps a big thing, and our profession is the biggest thing we know.



34TH STREET ELEVATION OF
THE EMPIRE STATE BUILDING

SHREVE, LAMB & HARMON
ARCHITECTS

THE EMPIRE STATE BUILDING

II. THE WINDOW-SPANDREL-WALL DETAIL AND ITS RELATION TO BUILDING PROGRESS

BY
R. H. SHREVE
SHREVE, LAMB & HARMON, ARCHITECTS

ON the west side of Fifth Avenue, New York, on the block between 33rd and 34th Streets, the Empire State Building is now taking form through the erection of the great cage of steel and the placing of the floor arches. About the perimeter of the building's bulk are being placed the elements of the exterior wall, materials and forms measurably familiar, but interrelated in a structural and decorative assemblage which has many points of novelty and, we believe, some features of merit and of interest to the architectural profession. For that reason these notes have been prepared with special reference to our study of the windows and spandrels and their relation to the exterior stonework and to those parts of the wall construction which are directly associated with the window openings. In considering these features of the building and their part in the structure as a whole it should be noted that to a great extent the form and proportions of the structure have influenced the development of this detail, which is the outcome of our approach to the problem first as one of design, and secondly as a development of logical construction.

The buttressing forms at the lower part of the building are set back from the street lines well within the limits of the zoning envelope, their supporting forms extending about 350 feet or 29 stories above the street level. Above them rises a tower of 55 stories, nearly 700 feet high above its base line, and 1050 feet above the sidewalk. The east and west faces of this shaft are about 185 feet long; to north and south they reach 135 feet, and for a considerable length of each of the four sides the sheer walls rise unbroken through a height of over 725 feet.

In all the building there are somewhat more than 6400 windows; over 4000 of them are in the tower walls. What treatment of these myriad openings in this vast expanse of wall would best retain and express solidity of mass, avoid giving the impression of a perforated shell, add dignity to utility, and through all escape the inherently monotonous gridiron of oft-repeated floors crossed by the slotted vertical bands of uniformly spaced windows?

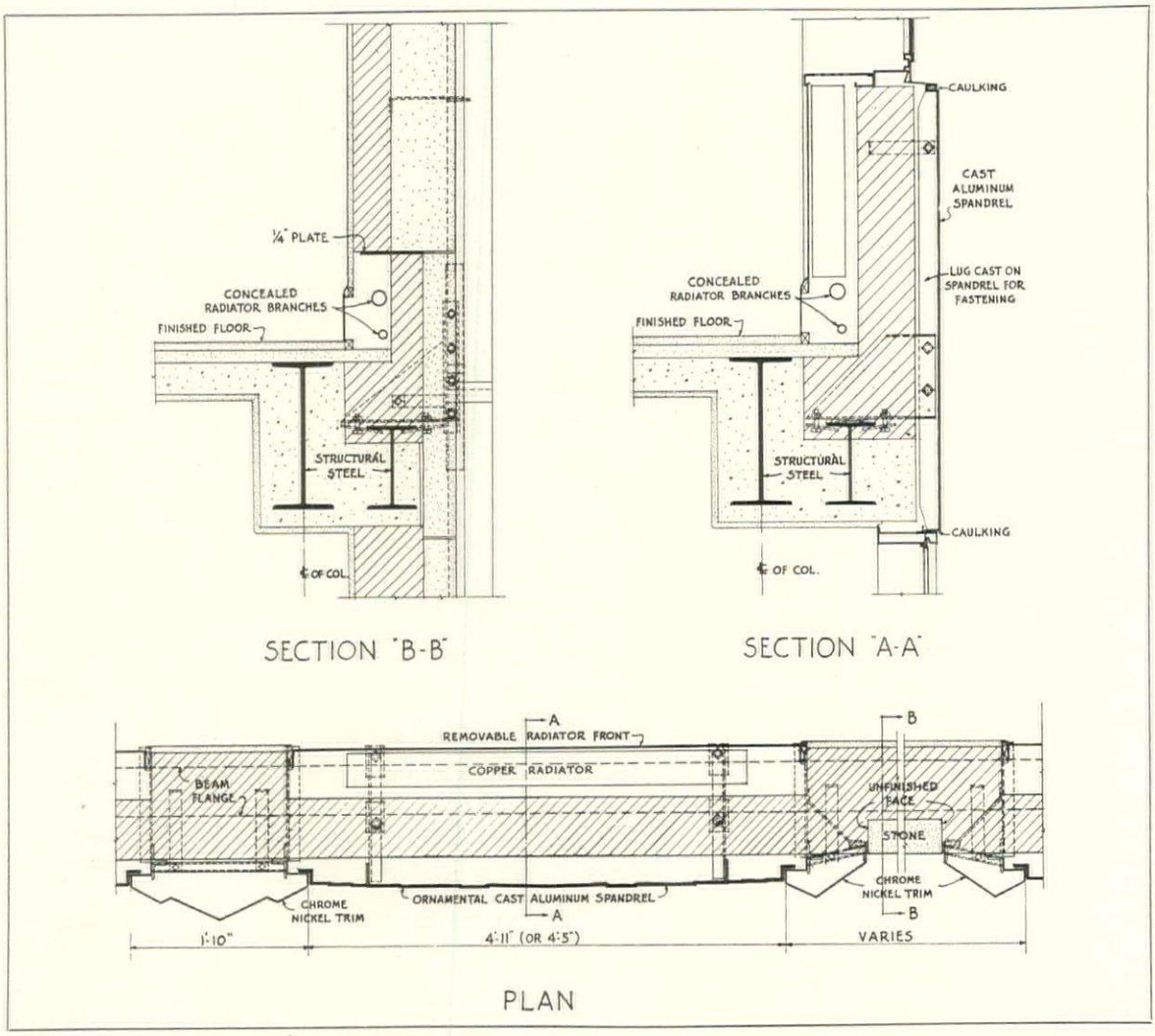
The answer to this question has many sides which will be discussed at another time as phases of the study of the mass and detailed design of the building. But as one step in the effort to solve this problem, a step which has involved many interesting developments to which particularly these notes are directed, it was decided to place the glass of the windows outside the face of the wall, and so to eliminate the customary reveals of soffits and jambs,—and their attendant assertive shadows.

It is true that tradition would lead us to believe that an expression of thickness of wall conveys an impression of strength of structure. But how convincing would be a reveal of 4 or even 8 inches in a masonry wall 1000 feet high and 200 feet wide? Would not the mass of the building seem a more sturdy form if its outer shell or covering, for such only it is, were recognized and treated as a wrapping and not as a load-bearing structural element? And would not their appearance be more satisfying if the protective coverings of the openings for light and air were placed over, or outside of, and not within the borders of these openings?

We may very well withhold judgment on the success of this arrangement viewed as the solution of a problem in design and await the test of execution, but it would seem possible to reach a conclusion at this time as to the merits of the construction from the point of view of good sense, usefulness and economy,—and above all, the opportunity for most rapid erection. The instant approval given it by the builders and by the engineers and subcontractors in the several trades involved has helped us in our decision to adopt it in the construction of the building and has seemed to warrant its discussion here.

The following paragraphs therefore present an analysis of the arrangement of the windows and spandrels, the effect on the stonework and steel occasioned by placing these windows and spandrels at the outer face of the wall, and the consequent increase in usable area resulting from the removal of the radiators and pipes from the office floor space. The accompanying drawings illustrate the details of the construction described.

THE STONE WORK is at once simplified and its cost very much reduced. Setting the windows forward eliminates the finishing of stone jambs and heads and the arrises at their intersection with the face of the stone. Much of the stonework becomes largely of such a nature that it can be handled as ashlar. The stock is received from the quarries sawn to dimension one way (the thickness generally 4, 6 or 8 inches) and is

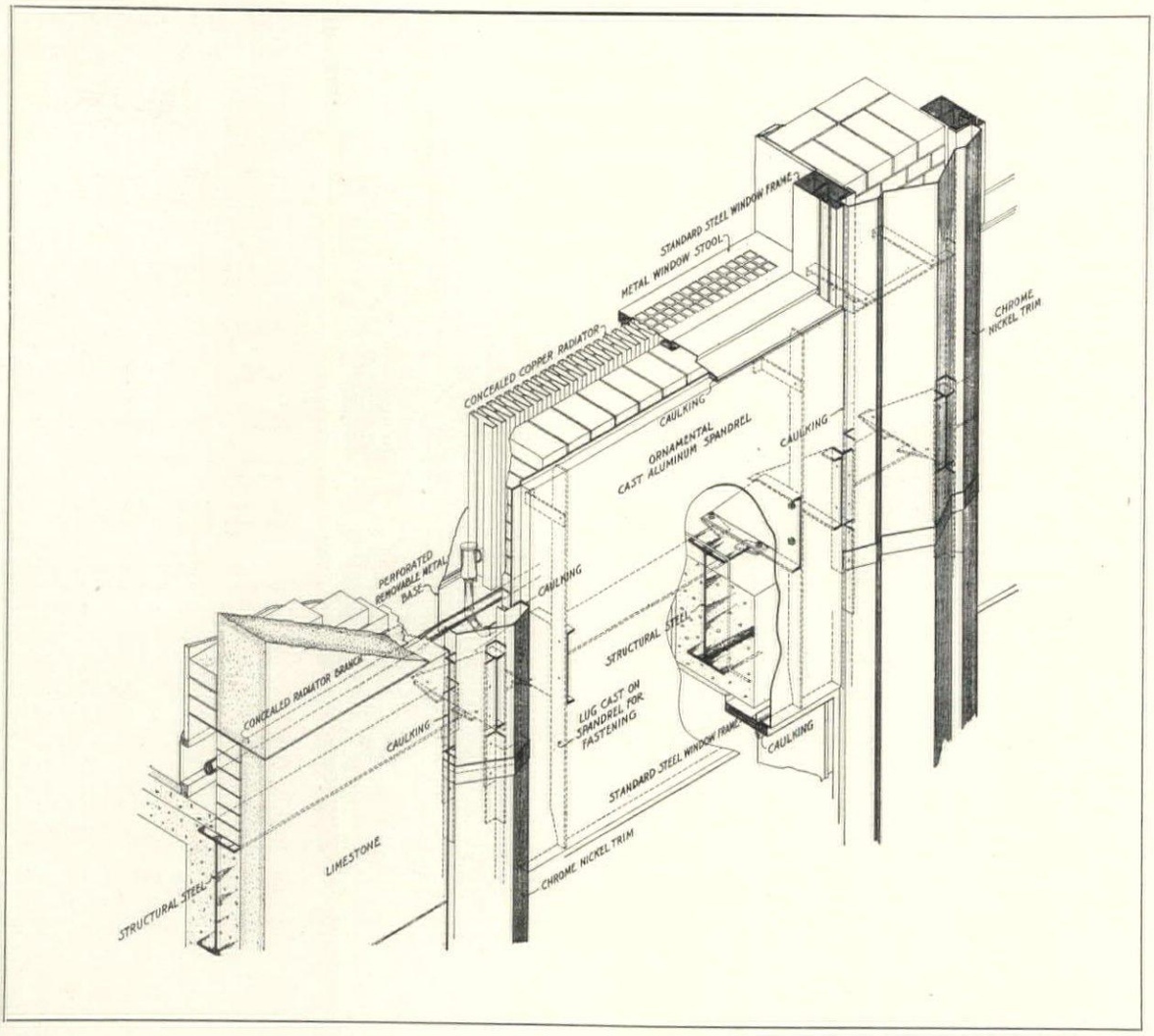


Sections and Plan Showing Windows, Trim and Spandrels Outside the Line of the Stone Facing; the Simplicity of All Parts and Their Relations; the Radiators and Steam Branches

then sawn to dimension for beds and joints and finished on the one exposed face. Because of the use of metal spandrels in the place of masonry spandrels the piers of face stone carry up vertically for great heights, 500 to 700 feet in the tower, without cross bonding with other masonry. There are therefore numerous pieces of stone quite alike and of simple form. These are easily and quickly fabricated, in fact production in the shops has moved so rapidly that one-third of the stone required for the building was finished in seven weeks and was ready for delivery before setting at the building was begun.

An additional feature of great importance in the progress schedule later referred to is that the stonework and its brick backing are designed in connection with the structural steel to be carried directly on the spandrel beams, without the shelf angles and brackets which commonly complicate and delay both the fabrication and the placing of these interrelated materials and parts. This point is referred to again in the notes on structural steel. Because of this simplicity of the stonework, the direct support given by the spandrel beams without shelf angles and brackets, and the fact that the stone piers are independent of one another and to a great extent free from troublesome intersections, it is anticipated that there will be a minimum of cutting and fitting stone at the site. The gain will be both in economy and in speed. It is true too that the manner in which the facades have been designed has freed the walls of the weight and cost of "through" stone cornices, belt courses and other architectural features whose bulky forms preserve their balance by virtue of having a greater weight of unfinished stock in the wall than of cut stone visible on the front.

These several advantageous conditions combined in the design of the stone and metal ex-



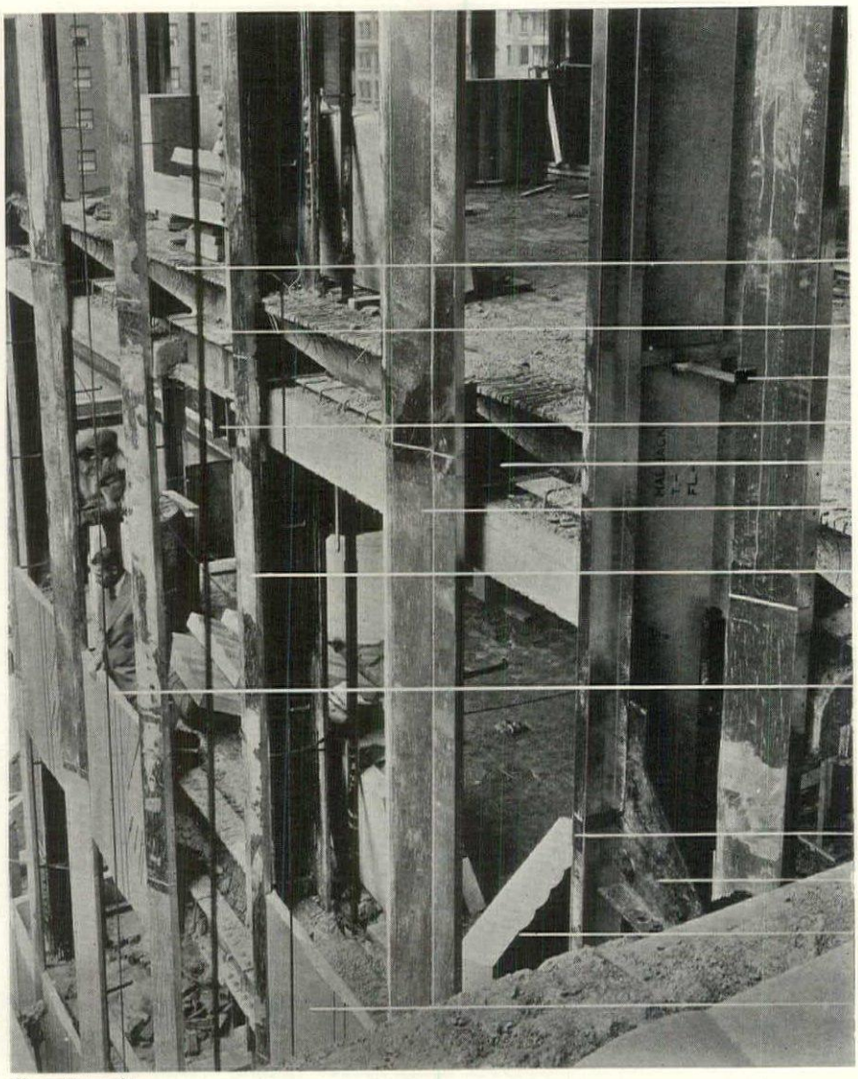
Isometric Drawing Showing in Detail the Assembly of the Window-Spandrel-Wall System Designed for the Empire State Building by Shreve, Lamb & Harmon, Architects

terior of the Empire State Building result in a very low ratio of stone volume to building volume. Other stone buildings designed for similar use have one cubic foot of stone to each 45 or 50 cubic feet of building, whereas Empire State will have but one cubic foot of stone to each 200 feet of building, and this single stone cube will have a lower cost than that amount of stock has shown in any other job of similar character in recent building history in this city. No doubt the modified window detail has largely aided in this economy as it has also in expediting the execution of the work.

THE METAL WINDOWS, of a standard type without special features of design, are set as usual on a masonry supporting wall, but are so placed that the glass of the upper sash is 1½ inches in front of or outside of the face of the stonework. The relation of the window frame to the metal spandrel meeting it at head and sill and to the exterior metal trim at the sides is shown in the accompanying illustrations and described in succeeding paragraphs.

In later developments of this construction arrangement it should be possible to support the window from the steel frame of the building and, if desired, to make the metal spandrel integral with the window and its supports; it may be possible later also to omit the apron wall (between the window sill and the fireproofing of the structural steel). But for the very rapid construction program of the Empire State Building it has seemed wiser to adopt the tried method of window support as one involving no experiments and no non-standard manufacture,—and affording the greatest assurance of rapidity and continuity of execution.

THE EXTERIOR METAL TRIM sounds a note in the design of the facades of the building which will be discussed at another time. Our present



THE EMPIRE STATE BUILDING, NEW YORK

SHREVE, LAMB & HARMON ARCHITECTS

Progress Photograph
June 16, 1930

Floor Construction and Wind-bracing steel

Spandrel Beam

Anchor

Spandrel Beam Bracket

Adjustable Bracket Supporting Trim

Chrome-nickel Steel Trim Between Pair of Windows

Chrome-nickel Steel Trim Between Windows and Stone

Cast Aluminum Spandrel

Overlap Connection Between Sections of Trim

Adjustable Bracket Supporting Trim

Limestone Ashlar (to be placed)

Cast Aluminum Spandrel

Photo Browning

consideration of this material has to do only with its use in the series of frames intended properly to relate the windows and spandrels to the other elements of the wall of the building.

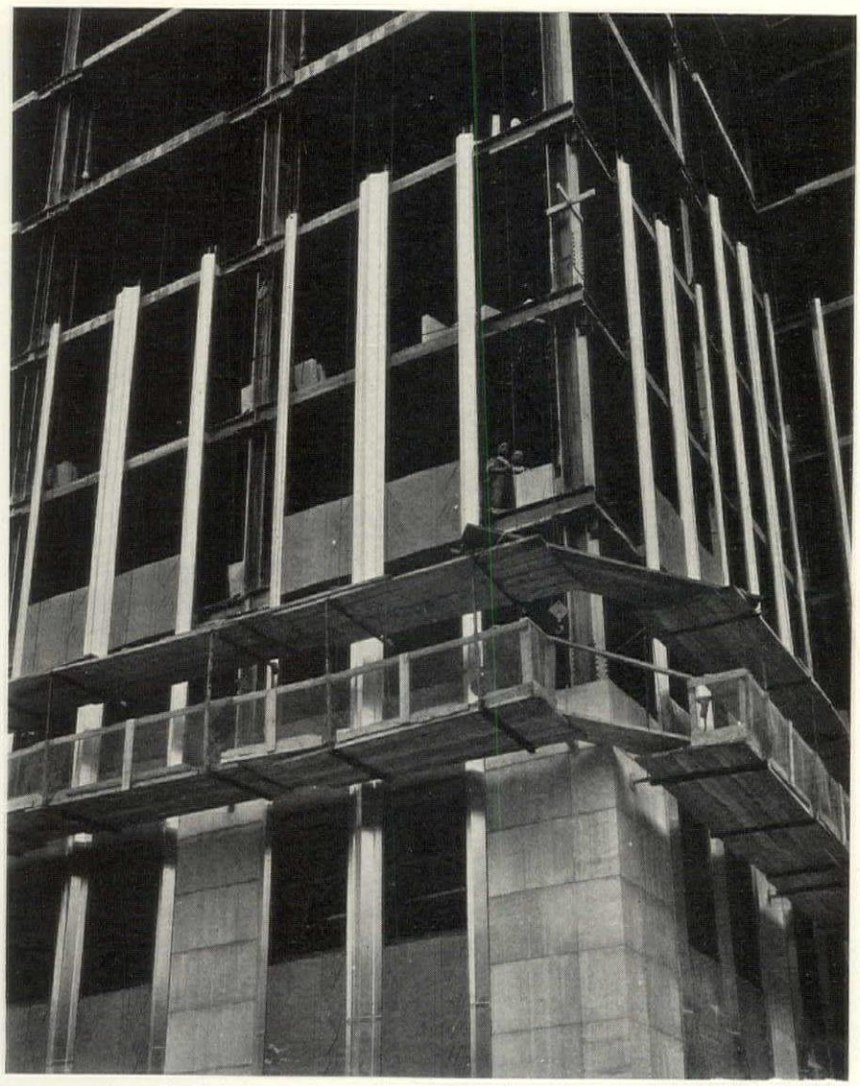
This trim is of chrome-nickel steel ("18-8") of Number 18 gauge (about 1/20 inch thick) rolled in sheets of dimensions established by the practical problems of fabrication. These sheets are formed to show 10 inches and 22 inches wide on the face of the building in lengths generally corresponding to the story heights. The fabricated forms are angle-braced and are attached by straps to the building structure as shown on the accompanying drawings. These details show also the overlap of the steel trims on the frames of the windows and the sides of the spandrels. The trims (or frames) are calked at their junctions with windows and spandrels as well as at their junctions with the stonework of the exterior wall. At joints between trim sections, where one length is superimposed on another already placed, a "shingle" lap is made by offsetting the lower end of the upper length, the faces of the two sections being kept in one plane, (or a series of planes) having a constant relation to the outer face of the building.

THE ALUMINUM SPANDRELS are generally 4 feet, 6 inches high and 5 feet wide, in one piece, and weigh only 130 pounds. The exterior face of the spandrel is sand-blasted to produce a dull gray surface counting in tone value with the windows above and below, but contrasting with the metal trim adjoining the sides of the spandrel. The upper edge of the spandrel is received under the sill of the window; the lower edge is set over the window frame head. The sides of the spandrel are received behind the exterior metal trim. At all of these points provision is made for a stop against which to receive the calking,—the space between the spandrel and the window sill being calked from the rear, while at window heads and sides, and at sides of spandrels, calk-

THE EMPIRE STATE BUILDING, NEW YORK

SHREVE, LAMB & HARMON ARCHITECTS

Progress Photograph
June 16, 1930



Showing the Trim, Windows and Spandrels Fastened in Place Independently of One Another; the Vertical Lines of the Chrome-nickel Steel Trim; the Cast Aluminum Spandrels and Stone in Place; and the Ease and Simplicity of Erection and Assembly

Photo Browning

ing will be done from the outside, the mechanics working from a hanging scaffold.

By means of integral ribs cast on the back of the spandrel and a uniform type of steel bracket and strap, the spandrel is rigidly supported from the steel frame of the building and can be placed in position independently of the other elements of the assemblage should this be desirable.

HEATING. The preceding notes have dealt chiefly with the effect of this modified window detail on the exterior materials and construction. A further very notable result appears in the interior through the gain in rentable area or the increased usefulness of floor space secured by taking all heating equipment off the floor and placing it within the thickness of the outer wall. In the case of the Empire State Building copper radiators will be used. They will be housed below the window sills and behind metal fronts which are placed ½ inch back of the finished plaster line and 6 inches from the inner face of the spandrel masonry panel wall. All pipes will be concealed behind the metal front or back of the plaster at the level of the finished base, but will be easily accessible. There will be no setting and removing temporary radiation, because there will be no plastering or painting to be done in the panel back of the radiator enclosure. The wall plastering will finish up to and return on the frame of the metal radiator enclosure.

THE PROGRAM FOR CONSTRUCTION of the building calls for very rapid execution of the work of placing a vast quantity of raw and fabricated material and of mechanical equipment, and, as a part of this unprecedented building operation, setting the metal trims, the spandrels, the metal windows and the limestone was scheduled to begin the latter part of May, 1930, and to be finished by December.

To insure the carrying out of this program without delay, the assemblage described in these notes was analyzed with the builders and the sub-

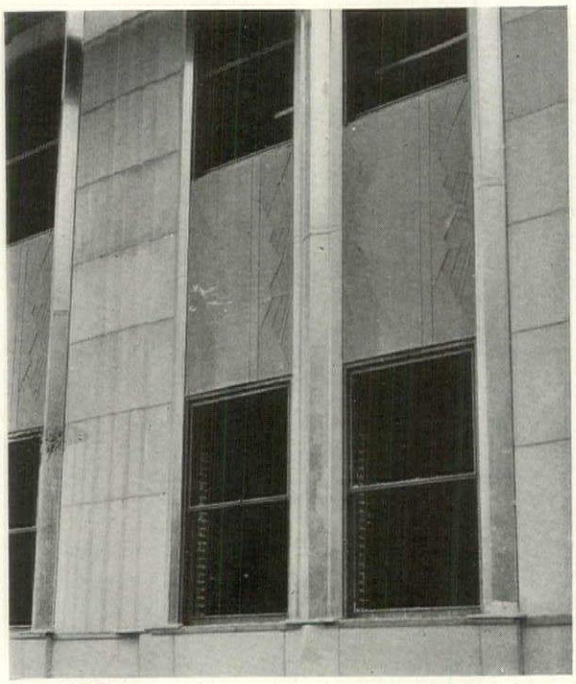


Photo Browning

The Window-Spandrel-Wall System of The Empire State Building, Complete Except for Glazing and Interior Finish

contractors especially concerned to determine what method and sequence of erection of the several elements would most expedite the execution of the work. Special study was given to eliminate as far as possible material interdependence, to provide in every way for entire independence of manufacture and erection, and, where the elements were necessarily interrelated, to arrange so that the placing of any one group, once started, might proceed freely without being held up by another. To make this freedom of procedure possible, and to avoid the need of any field cutting of the steel trims, the spandrels and the trims were designed to be fastened in place independently, without any structural connection between the two.

It was planned that the exterior metal trims should first be placed in position, spaced properly, plumbed and secured to the steel frame. Spandrels were then to be set between the metal trims and similarly fastened in place. It was evident that this sequence could quite as well be reversed, and in fact at the job as conditions made it desirable, spandrels were set first and metal trims later. The brick panel walls supporting the windows could be built along with the backing of stonework, and the windows then set, closing the openings already formed by the metal trims and the spandrels. The stonework could proceed at any time after the setting of the metal trims quite without regard to the windows and spandrels,—and several piers or fields of stonework and their brick backing could be carried up without regard to one another,—or to the state of progress of the window groups. While the normal advance of the work story by story will be maintained in order to facilitate systematic handling of material and men, there is no reason why, if necessity arose, any window and spandrel group or any stone section might not be temporarily left down to be carried up at such time as conditions permitted. It is very doubtful if without this freedom from the complication of interrelated forms and materials this great building could be constructed in the time in which it is scheduled to be completed.

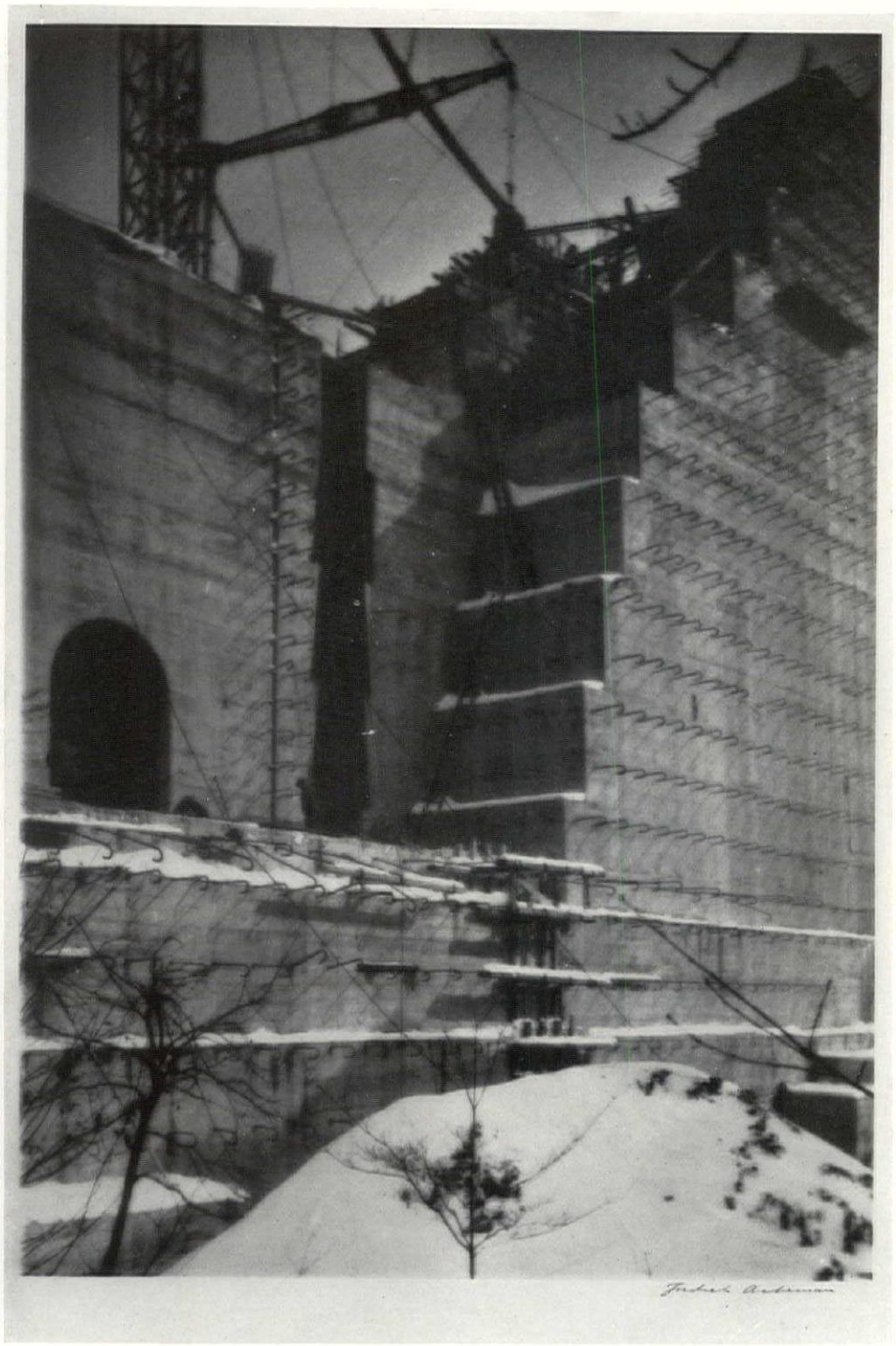
The effect of this window arrangement on the preparation of working drawings and on the design of the steel structure has been of the utmost importance in shortening the time usually required between the completion of preliminary sketches and the beginning of construction at the site. As soon as the decision had been made to carry all exterior wall masonry directly on the spandrel beams, omitting all shelf angles and brackets, the design of the steel could be completed, working drawings approved and fabrication started without waiting for complete working drawings giving precise window locations, but having only such approximate locations as would permit determination of wall loads. It was therefore possible to study the exterior of the building without delaying the time of manufacture and delivery of the steel which was thus advanced to a much earlier date than would otherwise have been possible. Actual placing of the grillage began on March 20 and the setting of columns on April 3, only five months being required for the preparation of information by the architects, and the design, rolling, fabrication and delivery of the steel. And after field erection started, the simplicity of the structure and its freedom from numerous small and relatively complicated members aided in making possible the most rapid delivery and erection of steel tonnage in the history of New York.

The construction of the Empire State Building within the time set for its completion has been, like every other great task, dependent on the successful execution of many detail operations, failure in respect to any one of which would render impossible the carrying out of the full program in the allotted time. Well up among the conditions contributing to success in this case must be placed the working out and the use of this modified window-spandrel-wall construction.

STEEL

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

THE ARCHITECTURAL FORUM
PART II, JULY 1930



ANCHORAGE

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

THE ARCHITECTURAL FORUM
PART II, JULY 1930

THE ANCHORAGE SADDLE

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

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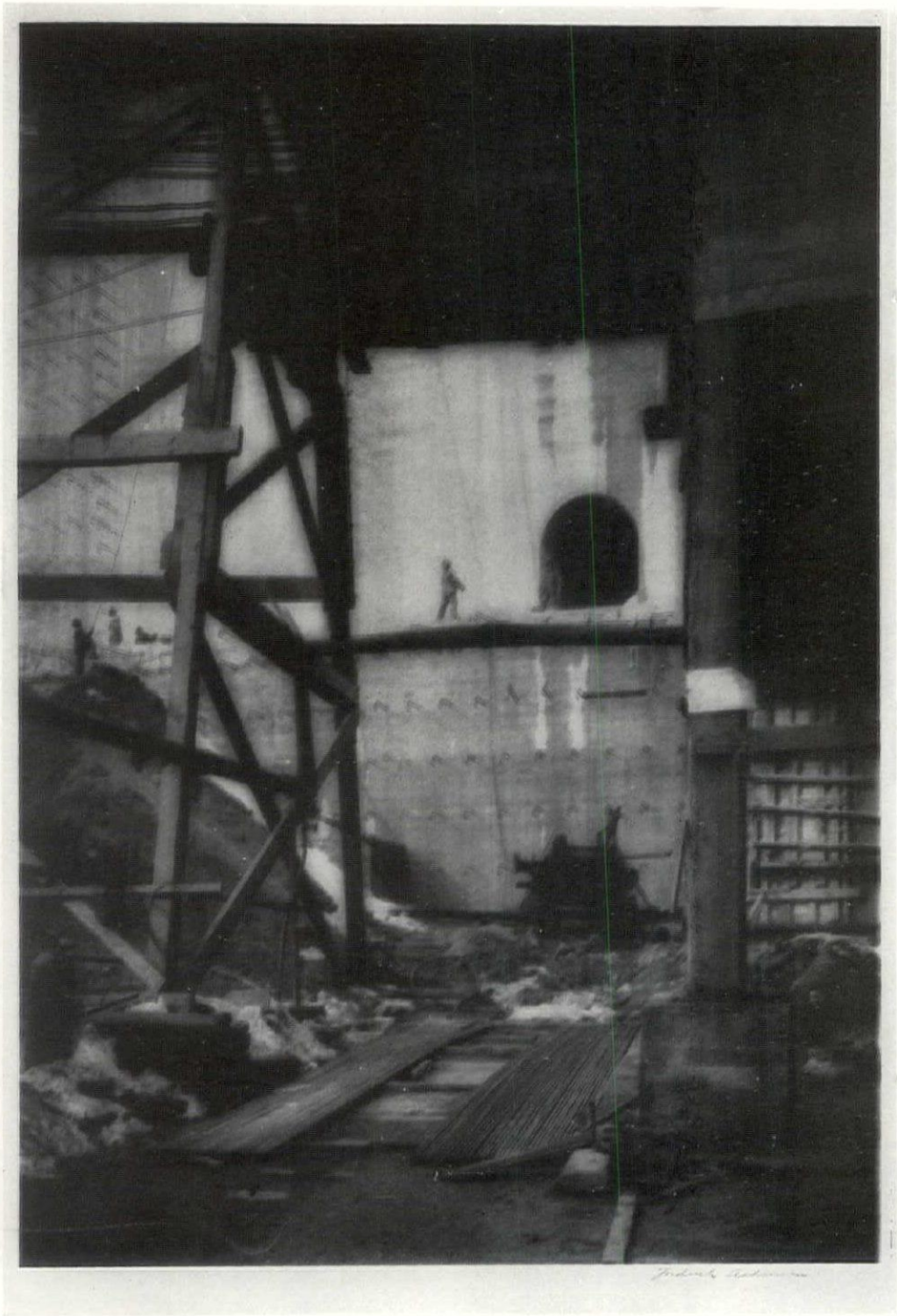

REMOVING THE FORMS

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

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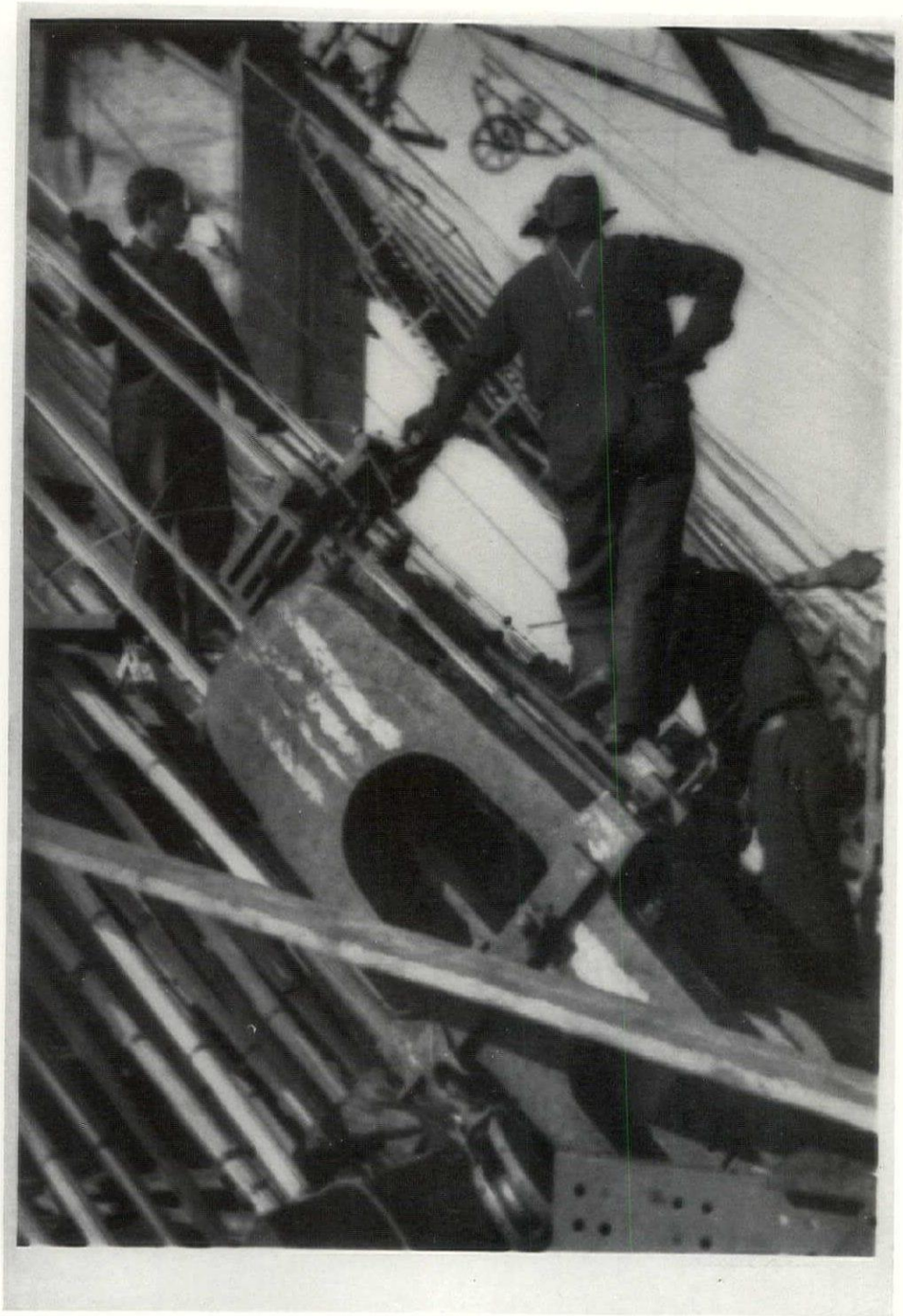

ADJUSTING WIRES

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THE REELS

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

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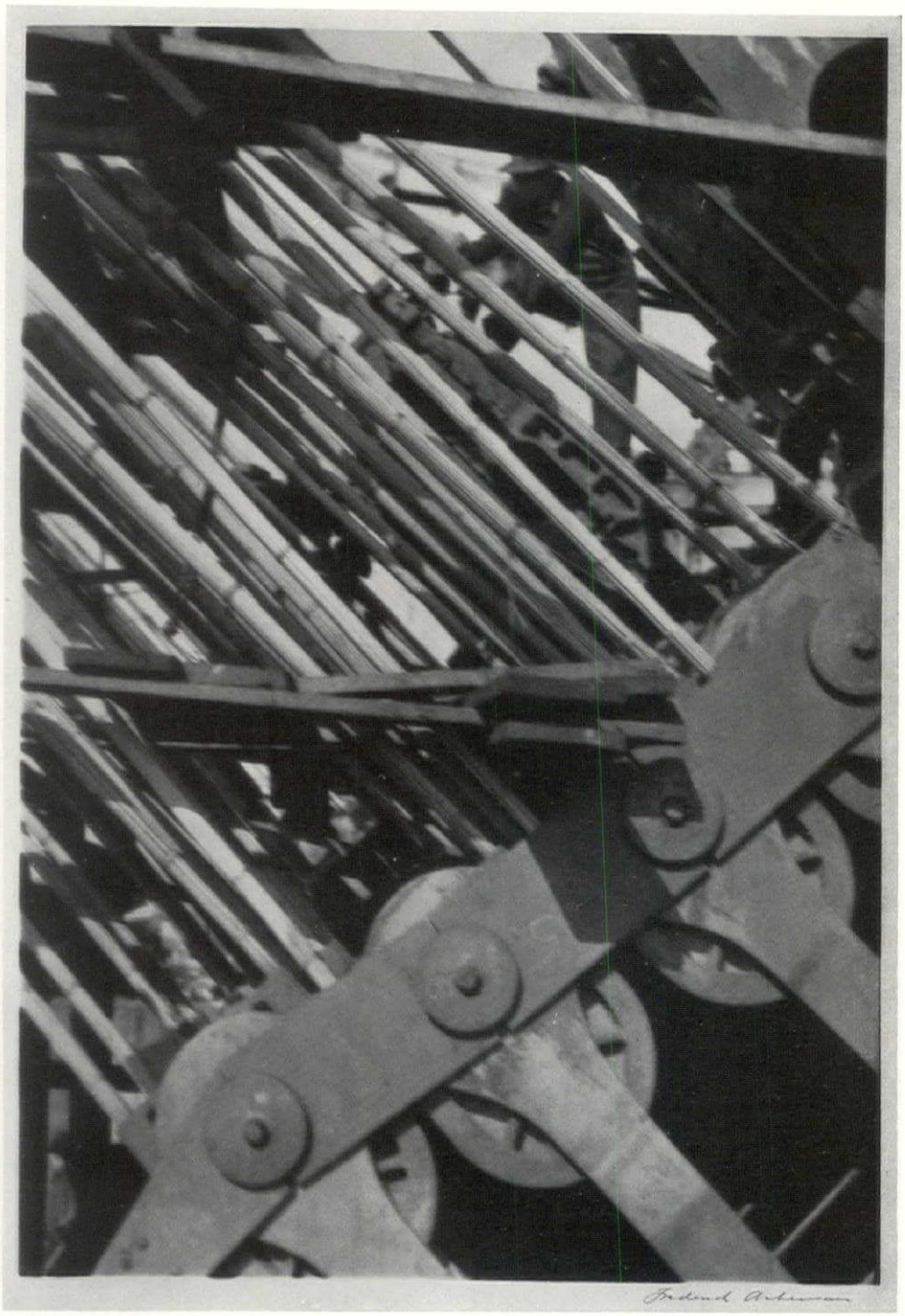


THE STRAND SHOES

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

THE ARCHITECTURAL FORUM
PART II, JULY 1930

TENSION

FROM A PHOTOGRAPH OF THE HUDSON RIVER BRIDGE, BY FREDERICK L. ACKERMAN.

THE ARCHITECTURAL FORUM
PART II, JULY 1930

POLICY AND OPINION

DESIGN, MATERIALS AND LOGIC

AT this time, when discussion of modern design is rife and so many ideas, theories and rationalizations are promulgated on every side, it is refreshing and stimulating to read clear, sane, forward-looking thoughts on contemporary design and the part which modern materials and methods may play in its development. We are fortunate in being able to present such an article by Professor Killam in this issue—"Modern Design as Influenced by Modern Materials."

He does not spare either present-day "Modernistic" nor "Traditionalist," but does indicate the many possibilities of a real modern architecture that will spur on every architectural designer who is sincerely striving to create with modern materials for modern needs and who is not content to merely substitute the geometric forms of Germany for the classic forms of yesterday. Professor Killam does more than "take stock" of the illogical architecture of the present; he shows definitely the direction which intelligent architectural design will take. K.K.S.

ARCHITECTS UPHELD

THE constitutionality of Section 300 of the Multiple Dwelling Law (New York) has been sustained by the Court of Appeals without dissent. It provides that all plans filed for multiple dwellings costing more than $10,000 shall be filed by the owner in person or by a registered architect who shall file a written statement signed by the owner designating him as his agent.

The appeal was made from the decision of Justice George V. Mullan of the Supreme Court, New York County, who held that the Section was not discriminatory and did not deprive the petitioner (a Licensed Professional Engineer) of his livelihood without due process of law. The State was defended in this litigation by Harold Riegelman, Special Assistant Attorney General, who was counsel for the State Commission on Revision of the Tenement House Law and drafted the Multiple Dwelling Law. In defense, Riegelman contended that the restriction was a proper and reasonable exercise of police power and tended effectively to promote public safety and dispatch of public business.

Engineers contended that, in effect, the license to practice one profession, for which they are presumably qualified, entitles them to practice an entirely different profession, such as architecture, for which they may or may not be qualified. Among the 27 different kinds of engineers are the industrial, chemical, marine, mining and irrigation engineers and others who probably know less about constructing multiple dwellings than many plumbers, masons and general contractors. If Section 300 was discriminatory against engineers as a class, it would be equally discriminatory against these other groups.

Formerly, the filing of plans for multiple dwellings, by persons who were not competent to understand intelligently the requirements for proper buildings, was common practice. For personal economy, they successfully depended upon the departmental plan examiners to correct the defects in their plans, which consumed valuable time at the expense of the public. Frequently some rooms were noted on the plans as to be used for legal purposes in order to secure the building permit, and later were equipped and used for other and illegal purposes. The new law affidavit makes such falsification an act of perjury. It also insures the submission of competent plans, saving time in plan examination.

This decision, along with the refusal of the last legislature to pass any of the engineers' bills mentioned in THE ARCHITECTURAL FORUM, page 615, April, 1930, definitely establishes the professional status and responsibility of registered architects in the State of New York.

No one man can be technically competent to design all of the complicated details embraced in a modern building, and architects must associate competent specialists with themselves. The essential character of the various phases of engineering germane to building construction is recognized. The architect is, however, justified in demanding that engineers be so registered as to identify their special technical training, knowledge and competency, which will automatically place all of the building industry professionals on a higher professional plane comparable to that set up by the architects' registration law. A.T.N.

ARCHITECTS' CONTRACTS

NO service should be rendered without a legal contract. It is bad business to drift through a professional engagement without a contract. A contractor can recover the cost of material, labor, overhead and a percentage as legitimate profit. On a professional basis, the contractor is not usually recompensed for experience or "know how." The architect can undoubtedly recover the cost of labor, material and

overhead plus a legitimate profit. What constitutes profit for an architect is not as clearly defined as for a contractor.

The architect who proceeds with his professional services without a contract invites disaster. Reasons for such a practice may be attributed to an inferiority complex, lack of business acumen, dependence on a favorable fortuitous circumstance or a concealed motive. No one of these is a valid reason. If the owner refuses to agree to a suitable contract, the service should cease at once. Dependence on recovering the nebulous six per cent involves a risk, as it is obvious that it may be inequitable either for the owner or the architect. Remuneration cannot be evaluated on a percentage-of-cost basis with justice to both the owner and the architect. The elements of building cost and the actual value of professional service are variable, and the basis of remuneration must also be variable,—but should be definitely fixed by contract for each architectural commission. A. T. N.

THE SURVIVAL OF THE FITTEST

IT is generally believed that only the fit survive—including buildings. The only causes for the survival of buildings are social and economic. Social causes include those of an educational, cultural and human welfare nature. The fitness to survive must be established by impartial investigation and the weighing of evidence. It is somewhat fashionable for some to deplore the disappearance of old buildings—victims of "architectural cannibalism"—especially those of a certain period or owned by the financially prominent in the good old days of commercial brigandage.

Notwithstanding the halos that some architects have acquired, their works must be subjected to the most critical analysis and a sound social or economic reason found for their preservation. The abandonment of old residences by their owners is evidence that they possess neither social nor economic value as such. Preservation of buildings is a function of ownership, and ownership alone should preserve supposedly artistic architectural monuments. Numberless seats of dead civilizations still exist and find an economic value in ancient buildings and ruins which attract the curious, money spending and "culture" seeking tourists; the art is exploited for profit. What American city, which has a reason to exist, desires to be reduced to living on its departed glories?

Let us be honest. Are these old buildings, lamented by those of their own generation, really fine,—or are the lamentations caused by an obsession to venerate the old, just so it is old? Veneration is a desirable and often saving characteristic in men. Reasonable men venerate only those persons, material objects and beliefs that possess the attributes of distinguished quality.

In past generations we have had architects of distinction. Their influence and eclectic taste have enriched our architecture. The architects of the present owe a debt of gratitude to these men who chose from the past the design best adapted to the civilization of their day.

A belief in compensatory equivalents is most comforting. We lose the old, obsolete building. Who presumes to think that contemporary architects are incapable of creating better and more beautiful buildings? If so, it would evidence a complete breakdown of contemporary architecture. American architects are now better qualified to create a worthy and glorious architecture than in any period of the world's history. A. T. N.

HANDICAPPING POSTERITY

WHEN Cass Gilbert recently announced his new United States Supreme Court building at Washington, he stated that it would require three years to construct it as it was designed to last for all time. The *New York Times* comments that "to raise buildings for all time is to impose ourselves on the future. It denies our posterity the right to express themselves in their own buildings in their own way. It fails to take cognizance of the speed of modern civilization."

Progress and change are evidences of civilization, and architecture must change if we are civilized. In view of this, is it not rather presumptuous to attempt to anticipate the future architecturally in building for all time? In the light of our own experience, can permanent buildings be expected to function efficiently with changing needs? Does not the servile copying of the architecture of a long dead civilization indicate that we cannot progress and develop architecturally and are therefore barbarians? Have we no consideration for posterity, no pride in creative accomplishment today nor hope for a greater architecture of tomorrow? A. T. N.

INDUSTRIAL BUILDINGS

BY

ROBERT D. KOHN, ARCHITECT

An Address for the Department of Architecture, New York University

IT is obvious that in every new form of need that is to be met, in buildings, or anything else, the new form follows the old that existed before, and is simply a modification at the beginning. The easiest example is that of the automobile. When the first gasolene car came out, it was just a four-wheeled carriage with an engine stuck on. Little by little a distinctive form for the automobile was developed. It looks like nothing else now. It looks nothing like a carriage, a horse carriage.

The industrial building, the factory, started very much in the same way. Without going into the long history of the development of industry in America, it appears that the earliest factories, really distinctive factories, showed up some time right after the war of 1812, in New England, and they were then housed in buildings that were exaggerated private houses. If you go to New England, particularly north of Boston, along the coast, you will find,—I was going to say, Colonial factories. The industrial building, when it first came out, was housed in an exaggerated private house. They made it larger and heavier. Then in the early part of the nineteenth century, along about 1830, they built them a little differently.

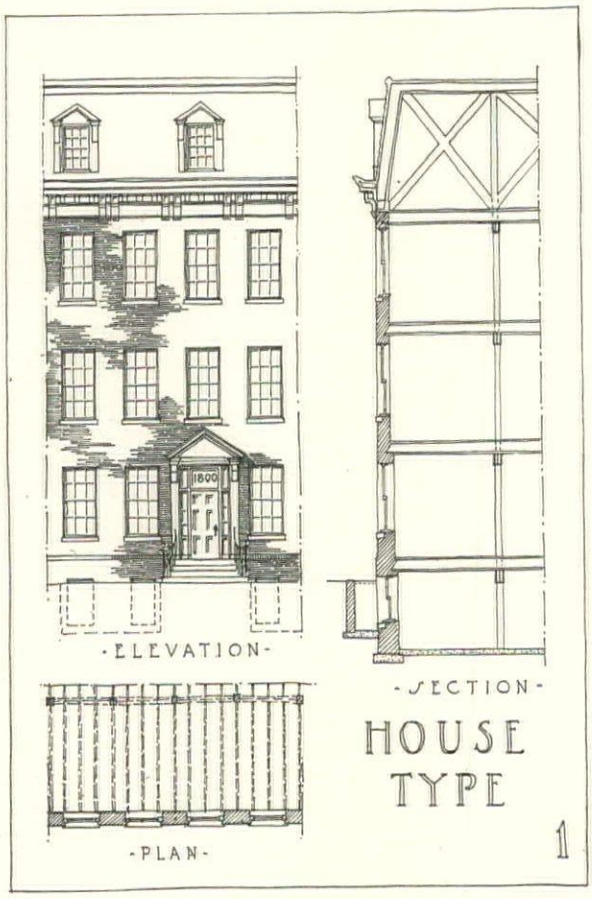
Fig. 1 shows one of those early factories of more or less Colonial construction, with a joisted roof and a mansard, rather a later thing, toward the Civil War period. Then something happened just after the Civil War. There were a lot of fires, and it was really the fire hazard that caused them to change all of that. There was a man by the name of Edward Atkinson in Boston who, —I don't say he invented what was called mill construction,—discovered that the ordinary little joist 16 inches on centers, with a light floor laid on top, the old type of house construction, was very hazardous. He discovered the idea that if you put beams 6 feet on centers, heavy beams, and then put a heavy planked floor on top of that, anywhere from 4 to 6 inches thick, you could expand from beam to beam, make a more or less cantilever form of support, and get a very stiff floor with this thick flooring which was either tongue-and-grooved, or later on "splined" with a little piece of wood in a groove on both sides. He was the promoter of what they called "mill construction," which ran wild through the whole country in the period starting about 1780 up to 1890, when reinforced concrete came in. It really developed in a very interesting way. It was wall-bearing, just as the old joist house construction was wall-bearing. The windows were small, and the light was poor. Nevertheless, it was a great step forward.

A little while later somebody discovered the happy idea that he might make these piers very small if he put a wooden post in the wall itself; in other words, carry his girders 12 feet apart, and he actually carried wooden girders 12 feet apart, planked with wood as much as 8 inches thick, and the stiffness obtained was surprising.

Then came the next step,—reinforced concrete. I have not, in the diagrams, gone into all of the steps in that process of the development of industrial buildings in reinforced concrete construction. It was at first a series of beams of concrete, much as these are of steel, with flat slabs in between, and the loads were concentrated as in skeleton construction. They had the big window. For the first time they got full daylight, and they were able to put the windows up to the ceiling, practically, because this girder carried nothing but the little spandrel under the window. It was not beautiful. In fact in those early buildings they made no attempt at beauty. I think most industrial concerns in the country decided that they would get rid of the architects.

Then industry woke up. I think it was about 1895 that one of my friends in Cleveland came to me and said, "We are just about to build a great factory, and I am sick of the stuff that is being built all around Cleveland by the engineers. You may say that industry is pure business, and that art has nothing to do with it, but it is not only my men, the thousand men that work for me, that have to spend most of the day in this thing; I have to work in it, and I have to see it every day, and I am not going to have a place where I cannot go in the front door without shame." His was not the only case. There were many men feeling the same way, and I think at about that period,—about 1895,—the architect came back into the industrial building field and began to do things that were worth while.

At the same time there were being developed other types of reinforced concrete construction. Fig. 5 shows the first of what were called "mushroom" buildings. Instead of a beam and girder

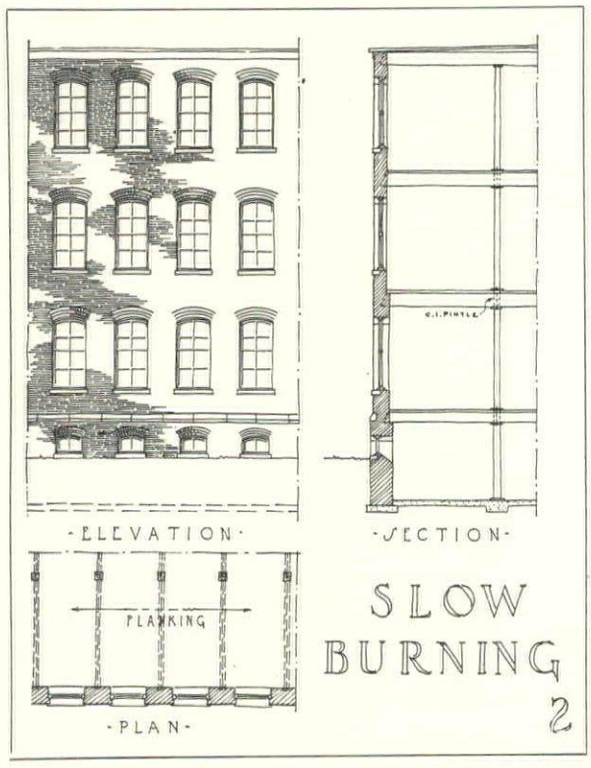


system, the columns were kept on practically equal panels, that is, 20 by 20, or 22 by 22 feet. The spacing was rectangular, and the loads were carried onto the columns by what are called "mushrooms," that is, the reinforcement went from the slab down into the column, and there were no beams at all. That developed the possibility of carrying glass right up flat to the ceiling. There was no head to the thing at all. It came right out, and an entirely new form of design was evolved from it.

Beyond that, one more thing came when they found that this type of construction developed negative stresses in the outside columns. Somebody had the happy idea of moving the column in from the wall about 8 feet, where it would be out of the way of a bench. The slab was carried over so that the column would get an equal load on all sides around; then they carried the window ledge at the edge, so that there were no piers in the outside wall. There are buildings of this type 200 feet long in New England and some in Ohio, where there are no visible means of support; it is all inside. There is a maximum of glass in that case.

I am rather proud of the fact that 15 years ago, in a talk in Detroit about modern architecture, I claimed,—and I think I was right,—that this industrial design, this comparatively stupid rectangular stuff that the architects, improving upon the engineers, were beginning to develop in the early nineteen hundreds, was going to affect our high building design very directly. I said, in part, at that time: "To my mind the really important thing we have done is the start we have made with our industrial buildings. We are really beginning to understand our industrial life. We have not solved its problems, but at least we have in part realized them, and we are working at the subject in a human way. . . .

"Now that the architect has faced his problem he is producing really beautiful buildings. In our office buildings and in our mercantile structures the essential needs are still ignored in certain quarters. Architects are still leading their clients toward classic types of buildings with broad wall surfaces, as if for bearing walls, unrelated to the steel skeletons." Here is a dangerous point I hardly dare to repeat. "The mediæval cathedral had a structure in which all the loads were centered on a few thin piers with buttresses placed at right angles to the wall. Indeed there was practically no wall. In order to get the maximum of light, the weights of vault and floor were centered on these piers. All the rest was glass. Now as I see it that is exactly the problem we must meet in our American skeleton-frame buildings. The weights are carried in these by a series of steel uprights, but this does not mean that the steel is to show, because these steel uprights and the horizontal floor beams must be covered for

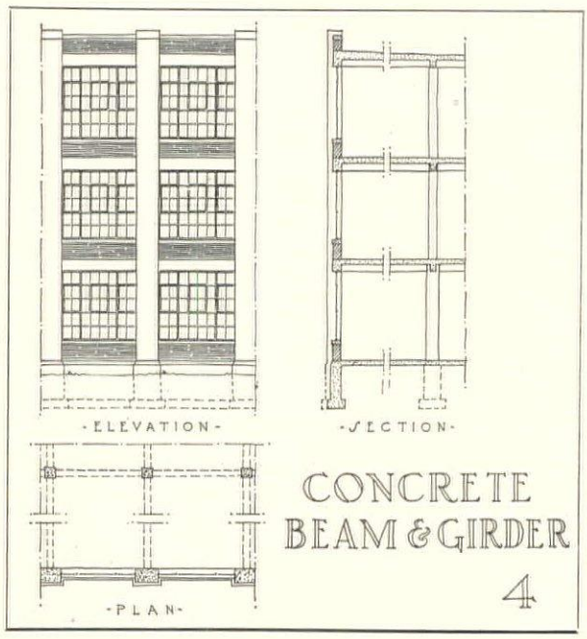


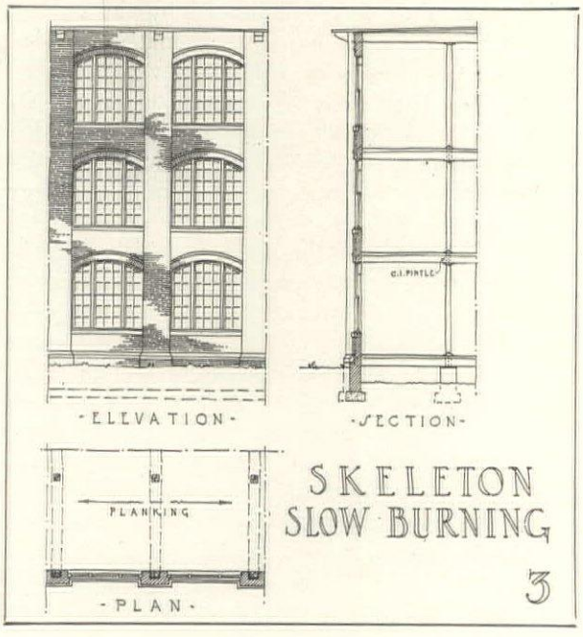
protection by some material which can resist heat and the disintegrating effects of the weather. The piers ought to show that the support is within them, and everything else ought to seem to be suspended therefrom. I have learned from Reims, Chartres and in places like Laon the effect of vertical lines and concentrated loads. Concentrated loads are as essential now as then for the reasons just stated. To me vertical lines alone are interesting in our narrow streets."

It is interesting that, whereas the whole tendency of modern design in industrial buildings has been toward getting daylight in the buildings, the problem is today much less a daylight problem than it was 20 years ago.

About 1890 there developed the idea that, for many industries where horizontal transport of the manufactured product was reasonable and possible, it was much better on cheap land to spread out over enormous areas of buildings in which the daylight would come in through skylights or what was called "sawtooth construction." The first sawtooth mill was built like that by Evarts Tracy, the architect, in Summit, N. J., and I think I built the second, near Mystic, Conn., in 1898.

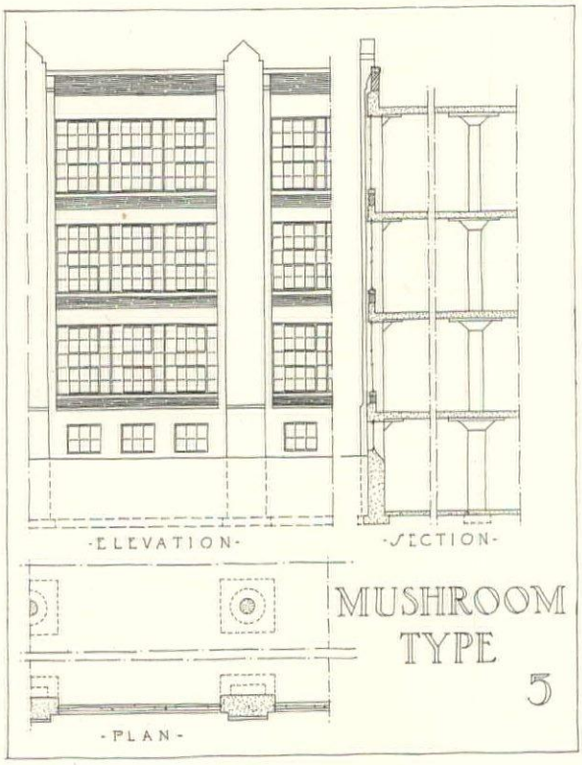
It was not adaptable to the needs of *every* industry. It went too far. Where materials can be handled by gravity, that is to say, through a series of processes, brought down vertically, high buildings are desirable for industrial processes. In milling or oil processes or anything where a great quantity of light material can be shot down chutes or brought down through tubes or anything of that kind, it is unquestioned that the one-story type of building lighted from above is not at all suitable. It is suitable only for weaving and for heavy manufacturing, such as machine shops, automobile construction and so forth. The American department store is something entirely different. They don't want daylight. Only about 10 per cent of the things sold in a department store should be shown by daylight.





Rudolph Miller, talking before the American Institute of Steel Construction, in Pinehurst, two years ago, made the prediction that the time would come when city buildings would be erected without windows. He said that the dirt and the noise of the city were becoming unbearable, and that with our modern lighting systems and our modern ventilating systems, it was perfectly feasible to do just that thing. It seemed like a humorous suggestion, but within the last six months I have received an order to build a whole series of offices, administrative offices, in one of the important buildings in New York, in the interior of the building, away from the windows, completely isolated from outdoors by solid walls, soundproofed, and artificially lighted and ventilated. And this plan arises because of the noise of the city and the dirt that come in through windows in the firm's present quarters.

There has been a decided change in the plan of modern business buildings, shops and stores and structures of that kind. When the elevator first came in, architects and owners thought that because the staircase used to be close to the front door elevators ought to be close to the entrance of a building. Now, in modern design, particularly in department stores, shops and so forth, the elevators are placed just as far from the front door as possible. There are two reasons for that. The one is that they want people, in arriving from



the street, to walk through and see as much of the shop as possible before they get to an elevator. The other is that as they go to the upper floors, the store wants them to look out over the floors as much as possible. And the staircase has become purely a utility and is not used except in case of emergency. From being an important feature of design, the staircase (except in monumental buildings) is now unimportant and is put back out of the way and necessarily enclosed.

In a great measure, much of our modern design of high buildings comes out of factory building. This type of factory, the all-glass front machine shop (Fig. 6) that New England started to build about 1910, was very interesting because when you saw the whole building from a distance it was just a series of stripes of floors,—all the rest of the building was sash with no structural vertical column element visible. I am convinced that one of the modernist architects of Germany, when he built that Press Building in Berlin about 10 years ago, had seen such American shops. He designed a six- or eight-story building in which there is no visible means of support for the fascias below the windows and above the windows. And now certain American architects have copied back from the German architect what I think he copied from the American machine shop!

We have had an important development in another direction,—in steel cantilever construction. The old type design of a building, either in steel or concrete, was to place columns at 20-foot spacings throughout the buildings so as to get

fairly equal panels. If it happened to be concrete with mushroom construction, it worked on a square panel. About 10 years ago, another scheme was thought out by the engineers which has considerably affected design. It came about first, probably, in Detroit, where they wanted very wide center panels on industrial buildings for automobile manufacture. The scheme was, in a building 80 to 100 feet wide, to put columns about 25 feet from the outside walls, and to run girders over these columns, cantilevered out about 25 feet on either side of the column. Then the space between the two girders is filled with a smaller beam which fills in the middle section. This obviated the necessity of a second row of columns, as they were eliminated by the cantilevering effect of the floors. This made possible large areas without any columns, even in high buildings. I have done a building of 19 or 20 stories in which the middle panel is 60 feet wide without columns, and the steel is not increased by this process of omitting interior columns, because of the cantilever form of construction. That is, perhaps, the latest of the changes which should really be credited to the engineers and not to the architects. It has, however, affected interior design very beneficially. More and more, commercial builders and manufacturers realize that every column omitted by so much increases the flexibility of arrangement possible for the machinery or fixtures and consequently the simplification of any process or business.

This has been an attempt to show very hastily the development in American design from house to industrial construction in concrete and steel, and what I believe to be the effect of both of these on modern design.

CALCULATING THE GLASS AREAS OF WINDOW OPENINGS

BY
ELMER GYLLECK
Architect

THE four tables here published were compiled for the purpose of saving time in the drafting rooms of architects who build hotels, office buildings, apartment buildings and public buildings, especially in the larger cities where the ordinances must be closely followed in regard to the ratio of glass area to floor space. When one becomes acquainted with the use of these tables a great deal of time can be saved in calculating. as the glass sizes, glass areas and the masonry openings can be found at a glance.

Table "A" is self-explantory and gives the size of one pane of glass in inches and the corresponding area in square feet.

Tables "B" and "C" and "D" are for standard double-hung windows, either wood or metal. Table "B" is for single double-hung windows. Table "C" is for a double set of double-hung windows, and Table "D" is for a triple set of double-hung windows. The brief explanation on Tables "B," "C" and "D" gives the simple directions for the general use of these tables.

Perhaps the best way to show the real uses of these tables is to give a few examples:

Example 1—In a brick opening of 5′-6″ wide and 5′-6″ high find size of glass and total areas of glass. Consulting the corresponding columns of dimensions in Table "C" shows a glass size of 24″ x 28″ (4 lights—24″ x 28″) and the total glass area to be 18.7 square feet.

Example 2—A triple set of double-hung windows with a glass size of 28″ x 28″ is to be used; find the size of the masonry opening. On Table "D" find the glass size 28″ x 28″; this shows a masonry opening 9′-4″ wide and 5′-6″ high, and also a total glass area of 32.7 square feet.

Example 3—A room requires a glass area of at least 32 square feet, and the standard masonry heights are 5′-6″ in this building; find the windows that would be best for this room. On Table "C," in a 5′-6″ masonry opening height we find that we can use a double set of windows 42″ x 28″ (4 lights—42″ x 28″) with a masonry width of 8′-6″ and a total glass area of 32.7 square feet,—or in Table "D" we find we can use a triple set of windows 28″ x 28″ (6 lights—28″ x 28″) with a masonry width of 9′-4″ and a total glass area of 32.7 square feet.

GLASS AREA TABLE IN SQUARE FEET

HEIGHT OF GLASS	WIDTH OF GLASS																				
	10″	12″	14″	16″	18″	20″	22″	24″	26″	28″	30″	32″	34″	36″	38″	40″	42″	44″	46″	48″	50″	52″
12″	.83	1.00	1.18	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00	3.14	3.33	3.49	3.67	3.83	4.00	4.17	4.33
14″	.97	1.17	1.36	1.56	1.75	1.94	2.14	2.33	2.53	2.72	2.92	3.11	3.31	3.50	3.69	3.89	4.08	4.28	4.47	4.67	4.86	5.06
16″	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33	3.56	3.78	4.00	4.22	4.44	4.67	4.89	5.11	5.33	5.56	5.78
18″	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50
20″	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17	4.44	4.72	5.00	5.28	5.56	5.83	6.11	6.39	6.67	6.84	7.22
22″	1.53	1.83	2.14	2.44	2.75	3.06	3.36	3.67	3.97	4.28	4.58	4.89	5.13	5.50	5.81	6.11	6.42	6.72	7.03	7.33	7.64	7.94
24″	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33	6.67	7.00	7.33	7.67	8.00	8.33	8.67
26″	1.81	2.17	2.53	2.89	3.25	3.61	3.97	4.33	4.69	5.06	5.42	5.78	6.14	6.50	6.86	7.22	7.60	7.94	8.31	8.67	9.03	9.39
28″	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83	6.22	6.61	7.00	7.39	7.67	8.17	8.56	8.94	9.33	9.72	10.11
30″	2.08	2.50	2.91	3.33	3.75	4.17	4.58	5.00	5.42	5.83	6.25	6.67	7.08	7.50	7.92	8.32	8.75	9.17	9.58	10.00	10.42	10.84
32″	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67	7.11	7.56	8.00	8.44	8.89	9.33	9.78	10.22	10.67	11.11	11.56
34″	2.36	2.83	3.31	3.78	4.25	4.72	5.13	5.67	6.14	6.61	7.08	7.56	8.03	8.50	8.97	9.44	9.92	10.25	10.86	11.33	11.81	12.28
36″	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00
38″	2.64	3.14	3.69	4.22	4.75	5.28	5.81	6.33	6.87	7.39	7.92	8.44	8.97	9.50	10.03	10.56	11.08	11.61	12.14	12.67	13.20	13.72
40″	2.78	3.33	3.89	4.44	5.00	5.56	6.11	6.67	7.22	7.67	8.33	8.89	9.44	10.00	10.56	11.11	11.67	12.22	12.78	13.33	13.89	1444
42″	2.92	3.49	4.08	4.67	5.25	5.83	6.42	7.00	7.60	8.17	8.75	9.33	9.92	10.50	11.08	11.67	12.25	12.83	13.42	14.00	1456	15.19
44″	3.06	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.56	9.17	9.78	1039	11.00	11.61	12.22	12.83	13.44	14.04	14.67	15.28	15.89

TABLE A

GLASS AREA FOR SINGLE WINDOWS IN BRICK OPENINGS

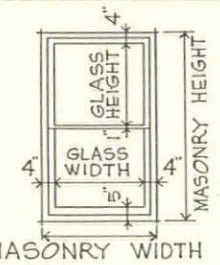


TABLE B

This table is used to calculate glass areas, glass sizes and masonry openings for single, standard, double-hung windows of wood or metal. The window diagram at the left shows the allowances for frame and sash used in this table, which are considered standard practice. The glass sizes shown here are for one sash only. The areas are for the total square feet in the two sash included in the masonry opening. For example:—in a masonry opening 3'-2" wide, 5'-10" high, the table shows a glass size of 30" x 30" in each sash, or two lights—30" x 30" in the entire masonry opening, with a total glass area of 12.5 square feet.—Compiled by Elmer Gylleck.

HEIGHT OF MASONRY OPENING	WIDTH OF MASONRY OPENING																				
	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	3'-0"	3'-2"	3'-4"	3'-6"	3'-8"	3'-10"	4'-0"	4'-2"	4'-4"	4'-6"	4'-8"	4'-10"	5'-0"
2'-10"	10x12 1.7□'	12x12 2.0□'	14x12 2.3□'	16x12 2.7□'	18x12 3.0□	20x12 3.3□'	22x12 3.6□'	24x12 4.0□'	26x12 4.3□'	28x12 4.7□'	30x12 5.0□'	32x12 5.3□'	34x12 5.7□'	36x12 6.0□'	38x12 6.3□'	40x12 6.7□'	42x12 7.0□'	44x12 7.3□'	46x12 7.7□'	48x12 8.0□'	50x12 8.3□'	52x12 8.7□'
3'-2"	10x14 1.9□'	12x16 2.3□'	14x14 2.7□'	16x14 3.1□'	18x14 3.5□'	20x14 3.9□'	22x14 4.3□'	24x14 4.7□'	26x14 5.1□'	28x14 5.4□'	30x14 5.8□'	32x14 6.2□'	34x14 6.6□'	36x14 7.0□'	38x14 7.4□'	40x14 7.7□'	42x14 8.2□'	44x14 8.6□'	46x14 8.9□'	48x14 9.3□'	50x14 9.7□'	52x14 10.1□'
3'-6"	10x16 2.2□'	12x16 2.7□'	14x16 3.1□'	16x16 3.6□'	18x16 4.0□'	20x16 4.4□'	22x16 4.9□'	24x16 5.3□'	26x16 5.8□'	28x16 6.2□'	30x16 6.7□'	32x16 7.1□'	34x16 7.6□'	36x16 8.0□'	38x16 8.4□'	40x16 8.9□'	42x16 9.3□'	44x16 9.8□'	46x16 10.2□'	48x16 10.7□'	50x16 11.1□'	52x16 11.6□'
3'-10"	10x18 2.5□'	12x18 3.0□'	14x18 3.5□'	16x18 4.0□'	18x18 4.5□'	20x18 5.0□'	22x18 5.5□'	24x18 6.0□'	26x18 6.5□'	28x18 7.0□'	30x18 7.5□'	32x18 8.0□'	34x18 8.5□'	36x18 9.0□'	38x18 9.5□'	40x18 10.0□'	42x18 10.5□'	44x18 11.0□'	46x18 11.5□'	48x18 12.0□'	50x18 12.5□'	52x18 13.0□'
4'-2"	10x20 2.8□'	12x20 3.3□'	14x20 3.9□'	16x20 4.4□'	18x20 5.0□'	20x20 5.6□'	22x20 6.1□'	24x20 6.7□'	26x20 7.2□'	28x20 7.8	30x20 8.7□'	32x20 8.9□'	34x20 9.4□'	36x20 10.0□'	38x20 10.5□'	40x20 11.1□'	42x20 11.7□'	44x20 12.2□'	46x20 12.8□'	48x20 13.3□'	50x20 13.7□'	52x20 14.4□'
4'-6"	10x22 3.1□'	12x22 3.7□'	14x22 4.3□'	16x22 4.9□'	18x22 5.5□'	20x22 6.1□'	22x22 6.7□'	24x22 7.3□'	26x22 7.9□'	28x22 8.6□'	30x22 9.2□'	32x22 9.8□'	34x22 10.3□'	36x22 11.0□'	38x22 11.6□'	40x22 12.2□'	42x22 12.8□'	44x22 13.4□'	46x22 14.0□'	48x22 14.7□'	50x22 15.3□'	52x22 15.9□'
4'-10"	10x24 3.3□'	12x24 4.0□'	14x24 4.7□'	16x24 5.3□'	18x24 6.0□'	20x24 6.7□'	22x24 7.3□'	24x24 8.0□'	26x24 8.7□'	28x24 9.3□'	30x24 10.0□'	32x24 10.7□'	34x24 11.3□'	36x24 12.0□'	38x24 12.7□'	40x24 13.3□'	42x24 14.0□'	44x24 14.7□'	46x24 15.3□'	48x24 16.0□'	50x24 16.7□'	52x24 17.3□'
5'-2"	10x26 3.6□'	12x26 4.3□'	14x26 5.1□'	16x26 5.8□'	18x26 6.5□'	20x26 7.2□'	22x26 7.9□'	24x26 8.7□'	26x26 9.4□'	28x26 10.1□'	30x26 10.8□'	32x26 11.6□'	34x26 12.3□'	36x26 13.0□'	38x26 13.7□'	40x26 14.4□'	42x26 15.2□'	44x26 15.9□'	46x26 16.6□'	48x26 17.3□'	50x26 18.1□'	52x26 18.8□'
5'-6"	10x28 3.9□'	12x28 4.7□'	14x28 5.4□'	16x28 6.2□'	18x28 7.0□'	20x28 7.8□'	22x28 8.6□'	24x28 9.3□'	26x28 10.1□'	28x28 10.9□'	30x28 11.7□'	32x28 12.4□'	34x28 13.2□'	36x28 14.0□'	38x28 14.8□'	40x28 15.6□'	42x28 16.3□'	44x28 17.1□'	46x28 17.9□'	48x28 18.7□'	50x28 19.4□'	52x28 20.2□'
5'-10"	10x30 4.2□'	12x30 5.0□'	14x30 5.8□'	16x30 6.7□'	18x30 7.5□'	20x30 8.3□'	22x30 9.2□'	24x30 10.0□'	26x30 10.8□'	28x30 11.7□'	30x30 12.5□'	32x30 13.3□'	34x30 14.2□'	36x30 15.0□'	38x30 15.8□'	40x30 16.7□'	42x30 17.5□'	44x30 18.3□'	46x30 19.2□'	48x30 20.0□'	50x30 20.8□'	52x30 21.7□'
6'-2"	10x32 4.4□'	12x32 5.3□'	14x32 6.2□'	16x32 7.1□'	18x32 8.0□'	20x32 8.9□'	22x32 9.8□'	24x32 10.7□'	26x32 11.6□'	28x32 12.4□'	30x32 13.3□'	32x32 14.2□'	34x32 15.1□'	36x32 16.0□'	38x32 16.9□'	40x32 17.8□'	42x32 18.7□'	44x32 19.6□'	46x32 20.4□'	48x32 21.3□'	50x32 22.2□'	52x32 23.1□'
6'-6"	10x34 4.7□'	12x34 5.7□'	14x34 6.6□'	16x34 7.4□'	18x34 8.5□'	20x34 9.4□'	22x34 10.3□'	24x34 11.3□'	26x34 12.3□'	28x34 13.2□'	30x34 14.2□'	32x34 15.1□'	34x34 16.1□'	36x34 17.0□'	38x34 17.9□'	40x34 18.9□'	42x34 19.8□'	44x34 20.8□'	46x34 21.7□'	48x34 22.7□'	50x34 23.6□'	52x34 24.6□'
6'-10"	10x36 5.0□'	12x36 6.0□'	14x36 7.0□'	16x36 8.0□'	18x36 9.0□'	20x36 10.0□'	22x36 11.0□'	24x36 12.0□'	26x36 13.0□'	28x36 14.0□'	30x36 15.0□'	32x36 16.0□'	34x36 17.0□'	36x36 18.0□'	38x36 19.0□'	40x36 20.0□'	42x36 21.0□'	44x36 22.0□'	46x36 23.0□'	48x36 24.0□	50x36 25.0□'	52x36 26.0□'
7'-2"	10x38 5.3□'	12x38 6.3□'	14x38 7.4□'	16x38 8.4□'	18x38 9.5□'	20x38 10.6□'	22x38 11.6□'	24x38 12.7□'	26x38 13.7□'	28x38 14.7□'	30x38 13.7□'	32x38 14.7□'	34x38 17.9□'	36x38 19.0□'	38x38 20.1□'	40x38 21.1□'	42x38 22.2□'	44x38 23.2□'	46x38 24.3□'	48x38 25.3□'	50x38 26.4□'	52x38 27.4□'
7'-6"	10x40 5.6□'	12x40 6.7□'	14x40 7.8□'	16x40 8.9□'	18x40 10.0□'	20x40 11.1□'	22x40 12.2□'	24x40 13.3□'	26x40 14.4□'	28x40 15.6□'	30x40 16.7□'	32x40 17.8□'	34x40 18.9□'	36x40 20.0□'	38x40 21.1□'	40x40 22.2□'	42x40 23.3□'	44x40 24.4□'	46x40 25.6□'	48x40 26.7□'	50x40 27.8□'	52x40 28.9□'
7'-10"	10x42 5.8□'	12x42 7.0□'	14x42 8.2□'	16x42 9.3□'	18x42 10.5□'	20x42 11.7□'	22x42 12.8□'	24x42 14.0□'	26x42 15.2□'	28x42 16.3□'	30x42 17.5□'	32x42 18.7□'	34x42 19.8□'	36x42 21.0□'	38x42 22.2□'	40x42 23.3□'	42x42 24.5□'	44x42 25.7□'	46x42 26.8□'	48x42 28.0□'	50x42 29.2□'	52x42 30.3□'
8'-2"	10x44 6.1□'	12x44 7.3□'	14x44 8.6□'	16x44 9.8□'	18x44 11.0□'	20x44 12.2□'	22x44 13.4□'	24x44 14.7□'	26x44 15.9□'	28x44 17.1□'	30x44 18.3□'	32x44 19.6□'	34x44 20.8□'	36x44 22.0□'	38x44 23.2□'	40x44 24.4□'	42x44 25.7□'	44x44 26.9□'	46x44 28.1□'	48x44 29.3□'	50x44 30.6□'	52x44 31.8□'

GLASS AREA FOR DOUBLE WINDOWS IN BRICK OPENINGS

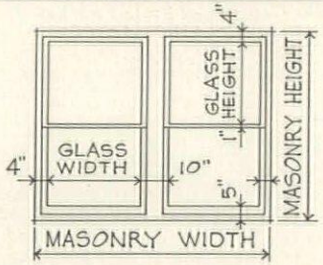


TABLE C

This table is used to calculate glass areas, glass sizes and masonry openings for a pair of standard double-hung windows, of wood or metal. The window diagram at the left shows the allowances for frame and sash used in this table, which are considered standard practice. The glass sizes shown here are for one sash only. The areas are for the total square feet in the four sash included in the masonry opening. For example:—in a masonry opening 6'-6" wide, 5'-6" high, the table shows a glass size of 30" x 28" in each sash, or 4 lights—30" x 28" in the entire masonry opening, with a total glass area of 23.3 square feet.—Compiled by Elmer Gylleck.

HEIGHT OF MASONRY OPENING	WIDTH OF MASONRY OPENING																				
	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"	6'-6"	6'-10"	7'-2"	7'-6"	7'-10"	8'-2"	8'-6"	8'-10"	9'-2"	9'-6"	9'-10"	10'-2"
2'-10"	10x12 3.3□'	12x12 4.0□'	14x12 4.7□'	16x12 5.3□'	18x12 6.0□'	20x12 6.7□'	22x12 7.3□	24x12 8.0□'	26x12 8.7□	28x12 9.3□'	30x12 10.0□'	32x12 10.7□'	34x12 11.3□'	36x12 12.0□'	38x12 12.7□'	40x12 13.3□'	42x12 14.0□'	44x12 14.7□'	46x12 15.3□'	48x12 16.0□'	50x12 16.7□'	52x12 17.3□'
3'-2"	10x14 3.9□'	12x14 4.7□'	14x14 5.4□'	16x14 6.2□'	18x14 7.0□'	20x14 7.8□'	22x14 8.6□'	24x14 9.3□'	26x14 10.1□'	28x14 10.9□'	30x14 11.7□'	32x14 12.4□'	34x14 13.2□	36x14 14.0□'	38x14 14.8□'	40x14 15.6□'	42x14 16.3□'	44x14 17.1□'	46x14 18.9□'	48x14 19.7□'	50x14 20.4□'	52x14 21.2□'
3'-6"	10x16 4.4□'	12x16 5.3□'	14x16 6.2□'	16x16 7.1□'	18x16 8.0□'	20x16 8.9□'	22x16 9.8□'	24x16 10.7□'	26x16 11.6□'	28x16 12.4□'	30x16 13.3□'	32x16 14.2□'	34x16 15.1□'	36x16 16.0□'	38x16 17.9□'	40x16 18.8□'	42x16 19.7□'	44x16 20.6□'	46x16 21.4□'	48x16 22.3□'	50x16 21.2□'	52x16 22.1□'
3'-10"	10x18 5.0□'	12x18 6.0□'	14x18 7.0□'	16x18 8.0□'	18x18 9.0□'	20x18 10.0□'	22x18 11.0□'	24x18 12.0□'	26x18 13.0□'	28x18 14.0□'	30x18 15.0□'	32x18 16.0□'	34x18 17.0□'	36x18 18.0□'	38x18 19.0□'	40x18 20.0□'	42x18 21.0□'	44x18 22.0□'	46x18 23.0□'	48x18 24.0□'	50x18 25.0□'	52x18 26.0□'
4'-2"	10x20 5.6□'	12x20 6.7□'	14x20 7.8□'	16x20 8.9□'	18x20 10.0□'	20x20 11.1□'	22x20 12.2□'	24x20 13.3□'	26x20 14.4□'	28x20 16.6□'	30x20 16.7□'	32x20 17.8□'	34x20 18.9□'	36x20 20.0□'	38x20 21.1□'	40x20 22.2□'	42x20 23.3	44x20 24.4□'	46x20 25.6□'	48x20 26.7□'	50x20 27.8□'	52x20 28.9□'
4'-6"	10x22 6.1□'	12x22 7.3□'	14x22 8.6□'	16x22 9.8□'	18x22 11.0□'	20x22 12.2□'	22x22 13.4□'	24x22 14.7□'	26x22 15.9□'	28x22 17.1□'	30x22 18.3□'	32x22 19.6□'	34x22 20.8□'	36x22 22.0□'	38x22 23.2□'	40x22 24.4□'	42x22 25.7□'	44x22 26.9□'	46x22 28.1□'	48x22 29.3□'	50x22 30.6□'	52x22 31.8□'
4'-10"	10x24 6.7□'	12x24 8.0□'	14x24 9.3□'	16x24 10.7□'	18x24 12.0□'	20x24 13.3□'	22x24 14.7□'	24x24 16.0□'	26x24 17.3□'	28x24 18.7□'	30x24 20.0□'	32x24 21.3□'	34x24 22.7□'	36x24 24.0□'	38x24 25.3	40x24 26.7□'	42x24 28.0□'	44x24 29.3□'	46x24 30.7□'	48x24 32.0□'	50x24 33.3□'	52x24 34.7
5'-2"	10x26 7.2□'	12x26 8.7□'	14x26 10.1□'	16x26 11.6□'	18x26 12.0□'	20x26 14.4□'	22x26 15.9□'	24x26 17.3□'	26x26 18.8□'	28x26 20.2□'	30x26 21.7□'	32x26 23.1□'	34x26 24.6□'	36x26 26.0□'	38x26 27.4□'	40x26 28.9□'	42x26 30.7□'	44x26 31.8□'	46x26 33.2□'	48x26 34.7□'	50x26 36.1□'	52x26 37.6□'
5'-6"	10x28 7.8□'	12x28 9.3□'	14x28 10.9□'	16x28 12.4□'	18x28 14.0□'	20x28 15.6□'	22x28 17.1□'	24x28 18.7□'	26x28 20.2□'	28x28 21.8□'	30x28 23.3□'	32x28 24.9□'	34x28 26.4□'	36x28 28.0□'	38x28 29.6□'	40x28 31.1□'	42x28 32.7□'	44x28 34.2□'	46x28 25.8□'	48x28 37.3□'	50x28 38.9□'	52x28 40.4□'
5'-10	10x30 8.3□'	12x30 10.0□'	14x30 11.7□'	16x30 13.3□'	18x30 15.0□'	20x30 16.7□'	22x30 18.3□'	24x30 20.0□'	26x30 21.7□'	28x30 23.3□'	30x30 25.0□'	32x30 26.7□'	34x30 28.3□'	36x30 30.0□'	38x30 31.7□'	40x30 33.3□'	42x30 35.0□'	44x30 36.7□'	46x30 38.3□'	48x30 40.0□'	50x30 41.7□'	52x30 43.3□'
6'-2	10x32 8.9□'	12x32 10.7□'	14x32 12.4□'	16x32 14.2□'	18x32 16.0□'	20x32 17.8□'	22x32 19.6□'	24x32 21.3□'	26x32 22.1□'	28x32 24.9□'	30x32 26.7□'	32x32 28.4□'	34x32 30.2□'	36x32 32.0□'	38x32 33.8□'	40x32 35.6□'	42x32 37.3□'	44x32 39.1□'	46x32 40.9□'	48x32 42.7□'	50x32 44.4□'	52x32 46.2□'
6'-6	10x34 9.4□'	12x34 11.3□'	14x34 13.2□'	16x34 15.1□'	18x34 17.0□'	20x34 18.9□'	22x34 20.8□'	24x34 22.7□'	26x34 24.6□'	28x34 26.4□'	30x34 28.3□'	32x34 30.2□'	34x34 32.1□'	36x34 34.0□'	38x34 35.9□'	40x34 37.8□'	42x34 39.7□'	44x34 41.6□'	46x34 43.4□'	48x34 45.3□'	50x34 47.2□'	52x34 49.1□'
6-10	10x36 10.0□'	12x36 12.0□'	14x36 14.0□'	16x36 16.0□'	18x36 18.0□'	20x36 20.0□'	22x36 22.0□'	24x36 24.0□'	26x36 26.0□'	28x36 28.0□'	30x36 30.0□'	32x36 32.0□'	34x36 34.0□'	36x36 36.0□'	38x36 38.0□'	40x36 40.0□'	42x36 42.0□'	44x36 44.0□'	46x36 46.0□'	48x36 48.0□'	50x36 50.0□'	52x36 52.0□'
7'-2"	10x38 10.6□'	12x38 12.7□'	14x38 14.8□'	16x38 17.9□'	18x38 19.0□'	20x38 21.1□'	22x38 23.2□'	24x38 25.3□'	26x38 27.4□'	28x38 29.6□'	30x38 31.7□'	32x38 33.8□'	34x38 35.9□'	36x38 38.0□'	38x38 40.1□'	40x38 42.2□'	42x38 44.3□'	44x38 46.4□'	46x38 48.6□'	48x38 50.7□'	50x38 52.8□'	52x38 54.9□'
7'-6"	10x40 11.1□'	12x40 13.3□'	14x40 15.6□'	16x48 18.8□'	18x40 20.0□'	20x40 22.2□'	22x40 24.4□'	24x40 26.7□'	26x40 28.9□'	28x40 31.1□'	30x40 33.3□'	32x40 35.6□'	34x40 37.8□'	36x40 40.0□'	38x40 42.2□'	40x40 44.4□'	42x40 46.7□'	44x40 48.9□'	46x40 51.1□'	48x40 53.3□'	50x40 55.6□'	52x40 57.8□'
7'-10"	10x42 11.7□'	12x42 14.0□'	14x42 16.3□'	16x42 19.7□'	18x42 21.0□'	20x42 23.3□'	22x42 25.7□'	24x42 28.0□'	26x42 30.7□'	28x42 32.7□'	30x42 35.0□'	32x42 37.3□'	34x42 39.7□'	36x42 42.0□'	38x42 44.3□'	40x42 46.7□'	42x42 49.0□'	44x42 51.3□'	46x42 53.7□'	48x42 56.0□'	50x42 58.3□'	52x42 60.7□'
8'-2"	10x44 12.2□'	12x44 14.7□'	14x44 17.1□'	16x44 20.6□'	18x44 22.0□'	20x44 24.4□'	22x44 26.9□'	24x44 29.3□'	26x44 31.8□'	28x44 34.2□'	30x44 36.7□'	32x44 39.1□'	34x44 41.6□'	36x44 44.0□'	38x44 46.4□'	40x44 48.9□'	42x44 51.3□'	44x44 53.8□'	46x44 56.2□'	48x44 58.7□'	50x44 61.1□'	52x44 63.6□'

GLASS AREA FOR TRIPLE WINDOWS IN BRICK OPENINGS

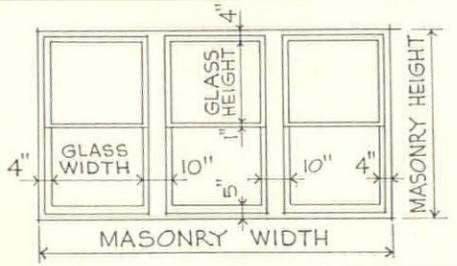


TABLE D

The table below is to calculate glass areas, glass sizes and masonry openings for a triple set of standard double-hung windows of wood or metal. The window diagram at the left shows the allowances for frame and sash used in this table, which are considered standard practice. The glass sizes shown here are for one sash only. The areas are for the total square feet in the six sash included in the masonry opening. For example:—in a masonry opening 10'-10" wide, 5'-6" high, the table shows a glass size of 34" x 28" in each sash, or 6 lights—34" x 28" in the entire masonry opening, with a total glass area of 39.7 square feet. Compiled by Elmer Gylleck.

HEIGHT OF MASONRY OPENING	WIDTH OF MASONRY OPENING																					
	4'-10"	5'-4"	5'-10"	6'-1"	6'-10"	7'-4"	7'-10"	8'-4"	8'-10"	9'-4"	9'-10"	10'-4"	10'-10"	11'-4"	11'-10"	12'-4"	12'-10"	13'-4"	13'-10"	14'-4"	14'-10"	15'-4"
2'-10	10x12 50□'	12x12 60□'	14x12 70□'	16x12 80□'	18x12 90□'	20x12 100□'	22x12 110□'	24x12 120□'	26x12 130□'	28x12 140□'	30x12 150□'	32x12 160□'	34x12 170□'	36x12 180□'	38x12 190□'	40x12 200□'	42x12 210□'	44x12 220□'	46x12 230□'	48x12 240□'	50x12 250□'	52x12 260□'
3'-2"	10x14 58□'	12x14 70□'	14x14 82□'	16x14 93□'	18x14 105□'	20x14 117□'	22x14 128□'	24x14 140□'	26x14 152□'	28x14 163□'	30x14 175□'	32x14 187□'	34x14 198□'	36x14 210□'	38x14 222□'	40x14 233□'	42x14 245□'	44x14 257□'	46x14 268□'	48x14 280□'	50x14 292□'	52x14 303□'
3'-6	10x16 67□'	12x16 80□'	14x16 93□'	16x16 107□'	18x16 120□'	20x16 133□'	22x16 147□'	24x16 160□'	26x16 173□'	28x16 187□'	30x16 200□'	32x16 213□'	34x16 227□'	36x16 240□'	38x16 253□'	40x16 267□'	42x16 280□'	44x16 293□'	46x16 307□'	48x16 320□'	50x16 333□'	52x16 347□'
3'-10"	10x18 75□'	12x18 90□'	14x18 105□'	16x18 120□'	18x18 135□'	20x18 150□'	22x18 165□'	24x18 180□'	26x18 195□'	28x18 210□'	30x18 225□'	32x18 240□'	34x18 255□'	36x18 270□'	38x18 285□'	40x18 300□'	42x18 315□'	44x18 330□'	46x18 345□'	48x18 360□'	50x18 375□'	52x18 390□'
4'-2"	10x20 83□'	12x20 100□'	14x20 117□'	16x20 133□'	18x20 150□'	20x20 167□'	22x20 183□'	24x20 200□'	26x20 217□'	28x20 233□'	30x20 250□'	32x20 267□'	34x20 283□'	36x20 300□'	38x20 316□'	40x20 333□'	42x20 350□'	44x20 367□'	46x20 383□'	48x20 400□'	50x20 417□'	52x20 433□'
4'-6"	10x22 92□'	12x22 110□'	14x22 128□'	16x22 147□'	18x22 165□'	20x22 183□'	22x22 202□'	24x22 220□'	26x22 238□'	28x22 257□'	30x22 275□'	32x22 293□'	34x22 308□'	36x22 330□'	38x22 348□'	40x22 367□'	42x22 385□'	44x22 403□'	46x22 421□'	48x22 440□'	50x22 458□'	52x22 477□'
4'-10"	10x24 100□'	12x24 120□'	14x24 140□'	16x24 160□'	18x24 180□'	20x24 200□'	22x24 220□'	24x24 240□'	26x24 260□'	28x24 280□'	30x24 300□'	32x24 320□'	34x24 340□'	36x24 360□'	38x24 380□'	40x24 400□'	42x24 420□'	44x24 440□'	46x24 460□'	48x24 480□'	50x24 500□'	52x24 520□'
5'-2"	10x26 108□'	12x26 130□'	14x26 152□'	16x26 173□'	18x26 195□'	20x26 217□'	22x26 238□'	24x26 260□'	26x26 282□'	28x26 303□'	30x26 325□'	32x26 347□'	34x26 368□'	36x26 390□'	38x26 412□'	40x26 433□'	42x26 456□'	44x26 477□'	46x26 498□'	48x26 520□'	50x26 542□'	52x26 563□'
5'-6"	10x28 117□'	12x28 140□'	14x28 163□'	16x28 187□'	18x28 210□'	20x28 233□'	22x28 257□'	24x28 280□'	26x28 303□'	28x28 327□'	30x28 350□'	32x28 373□'	34x28 397□'	36x28 420□'	38x28 443□'	40x28 467□'	42x28 490□'	44x28 513□'	46x28 537□'	48x28 560□'	50x28 583□'	52x28 607□'
5'-10"	10x30 125□'	12x30 150□'	14x30 175□'	16x30 200□'	18x30 225□'	20x30 250□'	22x30 275□'	24x30 300□'	26x30 325□'	28x30 350□'	30x30 375□'	32x30 400□'	34x30 425□'	36x30 450□'	38x30 475□'	40x30 500□'	42x30 525□'	44x30 550□'	46x30 575□'	48x30 600□'	50x30 625□'	52x30 650□'
6'-2"	10x32 133□'	12x32 160□'	14x32 187□'	16x32 213□'	18x32 240□'	20x32 267□'	22x32 293□'	24x32 320□'	26x32 347□'	28x32 373□'	30x32 400□'	32x32 427□'	34x32 453□'	36x32 480□'	38x32 507□'	40x32 533□'	42x32 560□'	44x32 587□'	46x32 613□'	48x32 640□'	50x32 667□'	52x32 693□'
6'-6"	10x34 142□'	12x34 170□'	14x34 198□'	16x34 227□'	18x34 255□'	20x34 283□'	22x34 308□'	24x34 340□'	26x34 368□'	28x34 400□'	30x34 425□'	32x34 453□'	34x34 482□'	36x34 510□'	38x34 538□'	40x34 567□'	42x34 595□'	44x34 623□'	46x34 652□'	48x34 680□'	50x34 698□'	52x34 737□'
6'-10"	10x36 150□'	12x36 180□'	14x36 210□'	16x36 240□'	18x36 270□'	20x36 300□'	22x36 330□'	24x36 360□'	26x36 390□'	28x36 420□'	30x36 450□'	32x36 480□'	34x36 510□'	36x36 540□'	38x36 570□'	40x36 600□'	42x36 630□'	44x36 660□'	46x36 690□'	48x36 720□'	50x36 750□'	52x36 780□'
7'-2"	10x38 158□'	12x38 190□'	14x38 222□'	16x38 253□'	18x38 285□'	20x38 316□'	22x38 348□'	24x38 380□'	26x38 412□'	28x38 443□'	30x38 475□'	32x38 507□'	34x38 538□'	36x38 570□'	38x38 60.2	40x38 633□'	42x38 665□'	44x38 697□'	46x38 728□'	48x38 760□'	50x38 792□'	52x38 823□'
7'-6"	10x40 167□'	12x40 200□'	14x40 233□'	16x40 267□'	18x40 300□'	20x40 333□'	22x40 367□'	24x40 400□'	26x40 433□'	28x40 467□'	30x40 500□'	32x40 533□'	34x40 567□'	36x40 600□'	38x40 633□'	40x40 667□'	42x40 700□'	44x40 733□'	46x40 767□'	48x40 800□'	50x40 833□'	52x40 867□'
7'-10"	10x42 175□'	12x42 210□'	14x42 244□'	16x42 280□'	18x42 315□'	20x42 350□'	22x42 385□'	24x42 420□'	26x42 456□'	28x42 490□'	30x42 525□'	32x42 560□'	34x42 595□'	36x42 630□'	38x42 665	40x42 700□'	42x42 735□'	44x42 770□'	46x42 795□'	48x42 840□'	50x42 875□'	52x42 910□'
8'-2"	10x44 183□'	12x44 220□'	14x44 257□'	16x44 293□'	18x44 330□'	20x44 367□'	22x44 403□'	24x44 440□'	26x44 477□'	28x44 515□'	30x44 550□'	32x44 587□'	34x44 623□'	36x44 660□'	38x44 697□'	40x44 733□'	42x44 770□'	44x44 807□'	46x44 843□'	48x44 880□'	50x44 917□'	52x44 953□'

LOW COST SPRINKLER SYSTEMS NOW PERMITTED FOR LIGHT HAZARDS

BY

TYLER STEWART ROGERS

A DRASTIC and highly significant revision of sprinkler equipment standards was approved by the National Fire Protection Association at its annual meeting at Atlantic City, May 12 to 15, 1930. The revision creates "Class B Systems" of automatic sprinkler equipment which are applicable to buildings having "light hazard" occupancies, such as apartment houses, hotels, office buildings, schools, and hospitals. The principal distinction between Class A and Class B systems is the former requires an average spacing of sprinkler heads not exceeding 10 feet apart—more often less—while the Class B system permits spacing not exceeding 14 feet apart.

The real significance of this new regulation lies in the substantial reduction of installation cost without a corresponding reduction in the insurance savings effected by the installation of sprinkler equipment. Savings, ranging from 20 to 30 per cent, will result from the use of Class B installations in place of the standard system (Class A) heretofore required for these light-hazard occupancies. "The development of the Class B system will undoubtedly reduce very materially the cost of installing sprinklers in the buildings for which it is intended," said John B. Coleman, chief engineer of Grinnell Company, in a recent statement. "As an illustration of this, I have carefully checked over a large number of actual buildings and have laid them out, both in accordance with the old standard and with the new Class B standard. A section of floor plans of one of these buildings is illustrated in the accompanying diagrams. It will be immediately noted that the Class B standard provides for a very much stretched spacing on this work and reduces the number of sprinklers required for the building from 126 heads to 78 heads.

"The material cost per sprinkler increases slightly as far as the sprinkler work itself is concerned, and decreases slightly for the auxiliary work, such as alarm valves, etc., so that the material cost per sprinkler on the Class B system will be about the same as the material cost per sprinkler on the former standard system. A careful estimate of this particular project indicates a saving in cost (and, of course, in selling price) of approximately 30 per cent. This is primarily the result of eliminating a large number of sprinklers under the Class B ruling. The labor on Class B installations will be slightly more than the labor on the standard system, but the difference will be very small. In the case in point, there was a city connection as the water supply. If, however, there had to be a separate water supply, this too would have cost a great deal less than for a standard system. It is reasonable to assume, therefore, that a saving of from 20 to 30 per cent to the owner over the standard system may be effected in many cases."

E. P. Boone, manager of New York Fire Insurance Exchange, was Chairman of the Committee on Automatic Sprinklers of the N. F. P. A. which drafted the new schedule. He gives this definition of the occupancies which this new regulation affects: "Class B standard systems shall be permitted only in buildings housing one or more of these or similar 'light hazard' occupancies:

Apartment Houses	Hospitals
Asylums	Hotels
Club Houses	Libraries
Colleges	Museums
Churches	Office Buildings
Dormitories	Schools
Dwellings	Tenements

Small stores in first floors or basements of the occupancies listed, when not over 3,000 square feet, are occupied by any one store. Approval of the use of Class B standard systems must be secured in advance from the inspection department having jurisdiction, since this type of system may not furnish adequate protection for all buildings (or all portions of buildings) housing the listed occupancies."

Of course, it is important that Class B standard systems shall not be installed in any building the occupancy of which is likely to be changed subsequently to a classification demanding a Class A standard installation. There should be no necessity to argue for the value of sprinklers in these classes of risks, whether or not the insurance saving would pay for the equipment. The value of Class B standard system as a means of fire protection in such structures is not affected by the stretching of the sprinklers or by the permitted reduction in pipe sizes, and it is presumed that when the insurance authorities approve a Class B system, it will be accorded the same rating and consequently the same reduction in insurance costs as would be granted for a Class A installation.

Under the new regulations, sprinklers may be spaced not exceeding 14 feet apart in any bay not exceeding 14 feet wide in mill construction, under wood joisted ceilings which are sheathed or plastered, and in fire-resistive construction.

Semi-mill construction requires a spacing not exceeding 12x14 feet apart, and under sheathed ceilings where the sheathing is combustible, the spacing may not exceed 12 x 12 feet, except that in basements with the latter ceiling, no modification of spacing is permitted. The Class B system is not applicable to open joist construction.

Another feature of the new regulation is the reduction in pipe sizes, the maximum size required for any number of heads being 2½ inches, with main supply pipes not less than 4 inches in diameter. It is required, however, that the risers shall be of sufficient size to maintain 20-pound residual pressure at the top of the riser, with 250 gallons per minute flowing at this point.

This reduction in pipe sizes as compared to Class A systems is of distinct advantage in many of the permitted types of occupancies, because the new system would have no large pipes showing any exposed portions, and it will lend itself very easily to concealment of the pipes wherever appearance is a vital matter.

The use of 135-degree (quartz bulb) sprinkler heads now approved by the Underwriters' Laboratories should overcome any objection which might be voiced to the stretched spacing of Class B installations. The quick-acting, low-temperature heads materially increase the sensitiveness of the system as compared to the standard 160-degree solder type heads. While the latter are permitted in Class B installations, the 135-degree heads afford sufficient extra protection to recommend their exclusive use.

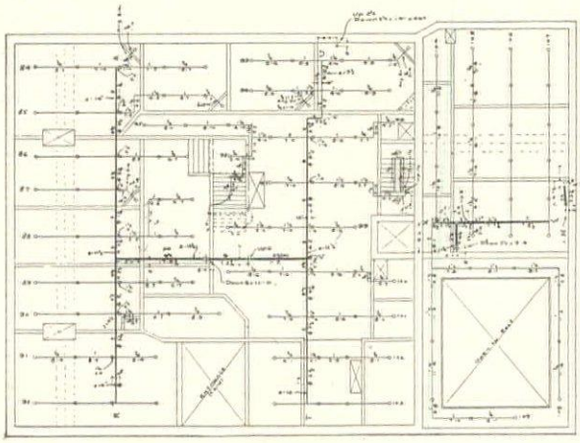
The new regulations covering Class B automatic sprinkler installations can now be obtained through the National Fire Protection Association. They open up new fields for the economic use of sprinkler equipment. The types of buildings in which Class B installations are permitted represent more than 90 per cent of the work undertaken by the average architectural office. Architects are quick to appreciate the importance of minimizing fire hazards in hotels and apartment houses, in school buildings and hospitals, in office buildings and small stores. Very often they have been unable to secure their clients' approval of sprinkler installations in such buildings because of the excessive cost of Class A installations in comparison to the apparent fire hazards. From the economic standpoint, residences, which form one of the classes where this system is permitted, may not be largely equipped. From a fire protection standpoint, however, particularly with reference to safeguarding human life, these cheaper systems should be installed in basements, kitchens, laundries, etc. The small additional cost for such protection is amply justified, particularly since such partial equipments safeguard fully 75 per cent of the hazard in any dwelling.

HOW THE SIZES OF ROOMS AFFECT NUMBER OF SPRINKLER HEADS

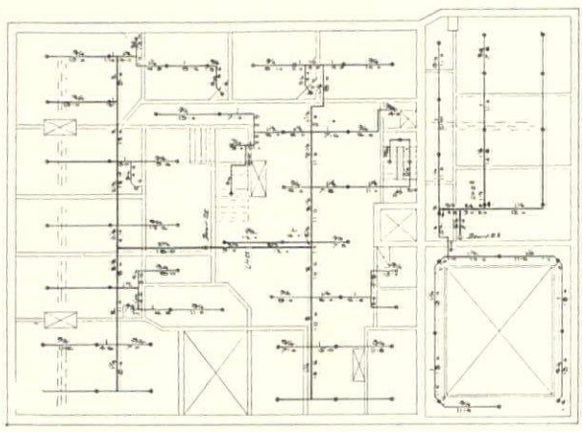
CLASS A versus CLASS B SYSTEMS

SIZE OF ROOM		NO. OF HEADS REQUIRED		SAVING	
Width	Length	Class A System	Class B System	No.	Per Cent
Under 10′	Between 10 & 14′	2	1	1	50
Between 10 & 14′	Between 14 & 20′	4	2	2	50
Between 14 & 20′	Between 20 & 28′	6	4	2	33
Between 20 & 28′	Between 28 & 30′	9	6	3	33
Between 28 & 30′	Between 30 & 40′	12	9	3	25
Between 30 & 40′	Between 40 & 42′	20	9	11	55
Between 40 & 42′	Between 42 & 50′	25	12	13	52
Between 42 & 50′	Between 50 & 56′	30	16	14	46
Between 50 & 56′	Between 56 & 60′	36	20	16	44
				Average Saving	43.11

Note. There are certain combinations of dimensions and certain room sizes which permit of no reduction in the number of sprinkler heads under Class B regulations, and these reduce the average saving to from 20 to 30 per cent. For example, bathrooms, closets and all other areas less than 10 feet square require one head under either system. Also dimensions over 14 feet and under 20 feet, over 28 feet and under 30 feet, would require the same number of heads within the span indicated.



Standard sprinkler system in a hospital.
126 sprinkler heads required



Class "B" sprinkler system for same building.
78 sprinkler heads required

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 17, STRUCTURAL STEEL (*Continued*)

DELIVERED at the site, steel should at once be measured and compared with shop drawings. Aside from correctness of rivets and holes, all characteristics are readily observable. Causes for rejection of steel, though of unusual occurrence, must, nevertheless, be looked for with due diligence. The most familiar of these are:

(1) Bent members, especially small angles and rods. The latter may be straightened, but the angles should be rejected, as they cannot be properly corrected at the building site.

(2) Substituted sizes. Many architects and some engineers guard against this, especially on minor work, by making use of the lightest sections of each size. This has the added advantage of confining one's design to sections of sizes and weights most commonly carried in stock in all beam yards. Intended substitutions should always be made manifest on shop drawings, and not be subjects for later consideration.

(3) Shop errors; rare but always possible.

(4) Insufficient cleaning of scale etc. under shop coat of paint. If surfaces appear unduly rough, the contractor should remove the paint for better inspection. The amount of permissible rust is a matter to be determined by experienced judgment. Incipient rust is not harmful but, where it amounts to much loose scale, the member should be rejected. If not serious enough to warrant rejection, it should be scraped and brushed with wire brushes. Steel intended to be encased in concrete is properly specified to be left unpainted, the same as reinforcing members.

(5) Use of second hand material. Except in most unimportant work or where extreme economy is a factor, second hand steel is always ruled out. Although it may be as serviceable as new, its inspection is a much more onerous task. One cannot trace such members back to original sources, nor can each be analyzed as to chemical components or mode of manufacture. If steel is permitted to be painted before inspection, it may be quite difficult to detect second hand members, except by the presence of unnecessary holes. It would appear that some fabricators assume that orders calling for delivery, painted, without shop inspection, imply admissibility of using second hand stock, even though the specifications distinctly decree otherwise. It is often surprising to learn how many subcontracts are awarded to bidders who have not looked at the specifications.

(6) Improper finish of bearing surfaces. These must be perfect in cases of end bearings of members carrying heavy loads. These are ordinarily specified to be planed or machined, and oiled or greased for rust preventive, rather than painted.

In the setting of steel, one of the most important factors is the perfection of column bearings, since any slight deviation from a solid horizontal bearing will be reflected by a lack of plumbness in the member, and may introduce undue stresses in both base plate and column. One must, therefore, make sure that the bedding is of the composition demanded (usually 1:1 or 1:2 Portland cement mortar); that it is fresh and stiff, so that it will finish at correct level, not compress too much under the dead load of the column; that it is so distributed on the footing as to be slightly crowned toward the center, so there will be no resulting air pockets under the plate; and that the column does not tip in the setting, so as to deform the mortar bed. Such beds should not be more than 1 inch thick, merely enough to compensate for minor inequalities in the surface of the footing. For large base plates with heavy loadings, greater precautions must be taken. The footing should be kept down at least 2 inches below the bottom of the base plate, and left rough to receive the mortar bed. This latter should be finished with spirit level and straight edge, and allowed to set before the column footing is placed. Whether this be of cast iron or of steel attached to the column, it should be provided with inspection holes through which air can escape, and the inspector can see if the thin grout, sheet lead or other compression medium is functioning throughout the entire area of the plate.

If anchor bolts are specified for base plates, the bolts should be provided with sleeves to be set in the concrete footings, accurately, according to templates; then the bolts be set to fit the holes in the templates, just previous to final bedding. The practice of setting bolts and plates simultaneously, and of slicing in grout under the plate, is not considered good procedure. Plates under girder bearings, and end bearings of beams and lintels, whether or not provided with plates, must also be inspected for good beddings and bearings, at proper levels. Variations of ¼ inch or so are frequently ignored in such matters, but it is, nevertheless, essential that the bearing members be well forced down, so that the bedding mortar

is known to be firmly compacted. Setters who are likely to cease compressing when such member is at correct level, regardless of whether or not the mortar is compact, may later find that the loading has caused further compression. To avoid this, the bed should first be built up, either by new material or by forcing in pieces of slate until the necessary density is indicated.

The basement columns in the school building were stay-braced during setting by means of wood members attached to either side near the top, and extending to posts driven into the ground. The superintendent saw that this work was properly done and that the bolted connections of columns and girders were as they should be. Such bolts are put in and the nuts tightened hurriedly at time of setting; then gone over after the work is aligned, additional bolts inserted, and all nuts turned to ultimate resistance. The inspector should review these again just before concealment, in order to see that all that may have been neglected or that have worked loose may be made tight. In large work, all such connections are riveted or welded, but good bolting, well supervised, serves as adequate substitute on remote minor construction, where the presence of a riveting or welding gang would not be warranted. In the case of our school, riveting was demanded only for the roof members, where the stresses and strains (due to wind and other variable loads) would be more constantly active, and bolt nuts would be ever inclined to work loose.

The roof trusses were shipped in sections, as indicated on shop drawings, and inspected, measured and assembled before erection. There is a certain awkwardness in such assembling (though it saves much scaffolding), and the superintendent was not surprised to find the workmen disposed to violate the prohibitions against undue drifting and mauling. Either of these induces improper shear on the rivets, and hence less violent exertion should be employed in matching rivet holes. The required accuracy for such matching in standard practice is thus defined in the code of the American Institute of Steel Construction: "The accuracy of the punching shall be such that for any group of holes when assembled,—all holes which will not admit a rod ⅛ inch smaller than the nominal diameter of the cold rivet (at right angles to the plane of the connection) shall be reamed." Shop riveting was inspected on the ground, visually and by means of hammer tapping; and the field riveting in the same manner, after the trusses and purlins were in place. No fault was found in the shop work, but it was discovered that an entire afternoon's stint of the field gang had been done while the men were under the influence of liquor; and hence fully 50 per cent of that particular work had to be condemned. The improper rivets had to be cut out and replaced. Although 99 per cent of all riveting may be well done, there is no alibi for the inspector if the other 1 per cent is not detected.

Although welding has been in practice on minor shop work for several years, its use on structural steel connections, either in shop or field, is much more recent. Specifications for such work have been evolved by those interested in promoting the industry, and attempts are being made to have the practice of welding so standardized as to warrant its incorporation in municipal building codes. Meanwhile, superintendents may expect to see its use rapidly increasing. Whether such work is done in the shop or in the field, they will be assumed to know (a) that the weld is applied to surfaces in proper condition to receive it, (b) that the weld bead is of correct diameter and length, (c) that it is of material of the chemical composition called for, (d) that it is applied by the equipment stipulated, and (e) that the work is done by mechanics skilled in such performance, individually approved by the architect. Of these five major requisites, it would appear that the last named is of prime importance. Architects and engineers will no doubt be skeptical about awarding work of such a nature to concerns that cannot convincingly demonstrate the fitness of their operatives.

In minor work of a non-fireproof nature, steel pipe columns are frequently used. These may be open or filled with a compressed concrete mixture. Filled columns are patented and generally specified by the name of the maker. Pipe columns may be either "standard" or "extra-strong" and, unless otherwise stipulated, are designated by their nominal inside diameter ("I.D."), as is customary with users of pipe. The makers of filled columns, however, make use of the nominal outside diameter ("O.D."), and hence engineering designers are accustomed to do likewise; so it is important to know definitely just which is intended. Published tables give weights and shell thicknesses of pipe columns, filled and unfilled, and therefore these are easily verified by the inspector. He should also pay close attention to all characteristics of base plates and caps. These may be of steel, attached to the shaft, and of standard design; or they may be of cast iron, especially for hollow columns. Cast iron plates are treated of in the next chapter, under "Miscellaneous Metal Work."

CHAPTER 18
MISCELLANEOUS METAL WORK

UNDER the subject of "Miscellaneous Metal Work" there are several sections which, on larger or more monumental work, are often segregated into separate contracts or subcontracts. Among these are "Ornamental Iron Work" (often made to include bronze and brass work), "Steel Stair Work," "Fire Escapes," "Pipe Railings," "Woven Wire Work," etc.

In a locality such as that in which this school which we are discussing was being built, we are assuming that first class ornamental iron shops can handle the stair and pipe railings. If such a shop does not turn out woven wire work, it can be sublet separately by the general contractor without inconvenience. We have here but little bronze or brass work, aside from hardware, and hence these are not given separate headings. Bronze and cast iron thresholds and certain ornamental bronze grilles are in this division. Other grilles are classed as register faces, included with "Sheet Metal Work." Woven wire guards in basement and gymnasium windows, and enclosing the switchboard, are classed with "Miscellaneous Metal Work." Kick plates and push bars are included with "Finish Hardware."

There is more possibility of uncertainty as to what is and what is not included under the heading of Miscellaneous Metal Work (sometimes called "Ornamental Iron Work") than under any other in an entire building specification; hence the necessity for very explicit lines of limitation on the part of the specification writer. One who is lax in this particular should be cautioned by the architect or field man, and advised of each discrepancy and ambiguity. Such coöperation between the superintendent and the man who prepares the specifications is of much value to both, and hence to their employer and to the owner.

Under the "Code of Standard Practice," published in the Handbook of the American Institute

MISCELLANEOUS IRON WORK (A.I.S.C. Classification)

Class "B," Ornamental Steel and Iron.

- All bronze and brass work, except hardware fittings.
- Balconies.
- Cast iron cornices.
- Curtain guides.
- Elevator fronts and enclosures.
- Grilles and gratings.
- Iron store fronts.
- Lamp standards and brackets.
- Marquise (steel or iron, except frame, see "Structural Steel").
- Ornamental brackets, steel or iron.
- Ornamental inside stairs, steel or iron.
- Ornamental outside steel or iron stairs, including fire escapes.
- Safety treads.
- Railings (gas pipe, ornamental or brass).
- Sills and thresholds (brass, steel or iron).
- Wire work, ornamental steel or iron.

Class "C", Steel Floor Joists.

- Steel joists which are not a part of the structural steel frame for the building and which are devised to carry the floor and roof panels.
- Bracing and bridging for floor joists.
- Clips for fastening floor joists.
- Stirrups and hangers for floor joists.
- Ties for floor joists.

Class "D", Miscellaneous Steel and Iron.

- Area gratings.
- Cast iron covers and frames.
- Cast iron rainwater receivers.
- Cast iron downspout shoes.
- Cleanouts.
- Coal chutes.
- Column guards.
- Door frames and bucks.
- Foot scrapers.
- Furnace or fireplace dampers.
- Flag pole.
- Ladders.
- Pin rails.
- Sidewalk doors.
- Sills and curb angles, and anchors for both.
- Special bolts and anchors, where distinctly shown on the plans.
- Stairs made of plain structural steel,—not including treads of other materials.
- Stacks.
- Steel and cast iron platforms.
- Steel or cast iron chimney caps.
- Thimbles.
- Wall plate anchors.
- Wheel guards.
- Window guards.
- Wire screens for partitions, door and window guards (not including fly screens).

Materials not classed under these headings:

- Ash hoists.
- Awning boxes.
- Boilers.
- Elevators or accessories.
- Elevator guides or sheave beams.
- Expanded metal.
- Furring.
- Glass for any purpose whatever.
- Hollow metal doors or frames.
- Hoppers.
- Mail chutes.
- Metal lockers.
- Miscellaneous carpenter or masonry bolts for connecting wood to wood, steel to wood, or wood to stone, etc.
- Name plates.
- Patented devices.
- Pilot and driving nuts.
- Reinforcing steel.
- Rolling doors.
- Sheet metal work or corrugated sidings and roofing.
- Steel sash and steel sash partitions.
- Spiral slides.
- Suspended ceiling, except as specifically called for.
- Tanks and pans.
- Toilet partitions.
- Treads, except steel or iron.
- Vault doors.
- Ventilating brick.
- Wall, ceiling and floor registers.
- Wood hand rails and brackets.
- All other material not mentioned.

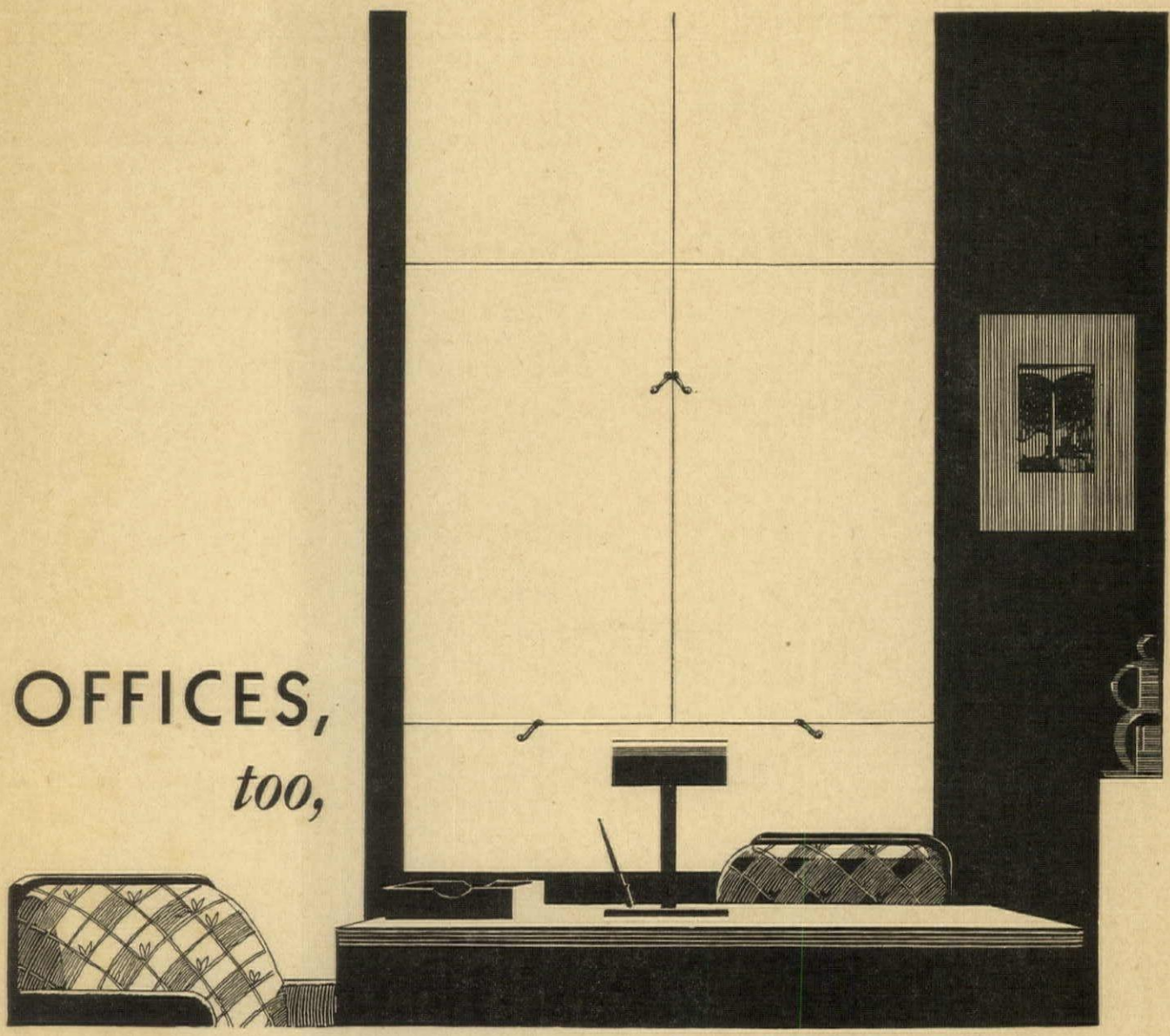
of Steel Construction, there are given three classifications of items constituting Miscellaneous Metal Work. Inasmuch as the Institute's publication of these lists gives them a certain authoritative status, the list should be consulted.

From all of which, it will be quite apparent to the young superintendent that both the contractors and himself must be thoroughly familiar with specification requirements as applied to these divisions, since otherwise something of importance may escape them. In addition to the classifications just given, the Handbook also lists as "Class 'A', Structural Steel and Iron," to which subject we have devoted the preceding chapter. Under this classification is included "Lintels as shown or enumerated." Loose lintels (not attached to the structural frame) are the poor orphans on many a project, too likely to be overlooked in both the Structural Steel and the Miscellaneous Metal specifications; or, perhaps unfortunately, included in both. The latter contingency, occurring in connection with this or any other building item, must always be a cause of embarrassment to the architect. Each contractor or subcontractor who discovers such duplication is likely to insist that he knew the item was included in the other fellow's specification, and hence omitted it from his own and made his price accordingly. He may go to extremes to avoid supplying it, or to avoid making allowance for its omission. Possibly, both contractors will take the same stand. The only course for the architect is to hold each of them to his contract, and then decide who is to supply the thing in controversy and deduct the cost of it from the other's contract price. Otherwise, he may safely assume that the owner is paying twice on account of the specification writer's error. Actually, there is no reason to suppose that either contractor has been abused by being compelled to supply the item, nor by having a deduction forced for its omission. He either bid in accordance with the specifications governing his work, or he contemplated using sharp practice to "out-smart" his competitors and the architect.

It is to be noted that there are several other items, in addition to loose lintels, which must be definitely allocated in one or the other of the metal specifications in order to avoid confusion. Among these are various kinds of guards, grilles and gratings, anchors and ties for all purposes, etc. The superintendent must familiarize himself with everything included for his particular building; its derivation, materials, composition, fabrication, finish, delivery, storage, handling, placement and its relation to adjoining construction. In this relation are included all matters of cutting, fitting, anchoring, bracing (temporary shoring, if needed) and the building in, in final condition. As to cutting and fitting, he must determine whose is the duty and see that it receives prompt attention. Frequently a little care and foresight on the part of those mechanics whose work is installed ahead of unchangeable metal corrections are unavoidable; the specifications should be, and generally are, most explicit in saying whose is the duty. It is usual and best practice for the contractor in each craft to do all cutting of his materials for others. Exceptions are made of minor cutting of structural materials, such as channeling masonry, boring wood members for electric tubing and conduit, cutting holes for anchorage, etc. These are done, within definite limitations, by those making the installations. Exception is also to be noted of cases undoing the placing of items not contemplated in the original contract, or of those demanding placement against the material of some subcontractor who has otherwise completed his work and removed his men. In such events, the cutting, fitting and patching are either included as part of the cost of the installation or are handled by the general contractor and charged against the responsible party,—to the owner, direct, if so determined by the architect.

The limits of this treatise do not permit entering into a minute description of each of the items included in this division of the work. The superintendent, however, must not only know the architect's demand on each, but must, in the cases of several, familiarize himself also with the details and descriptions of manufacturers' proprietary articles, such as elevators, hoists, rolling doors, vault doors, sidewalk lights and various patented devices. Particularly does this apply to the details and specifications for metal joists systems, either "junior" beams, or pressed steel, expanded metal or trussed steel joists. He must see to their placing, bearings, verticality, anchoring, bridging and temporary bracing, as well as to the proper kind and condition of all members in this division of the building operations.

EDITORS' NOTE—Chapter 18 will be continued in the August issue of THE ARCHITECTURAL FORUM.



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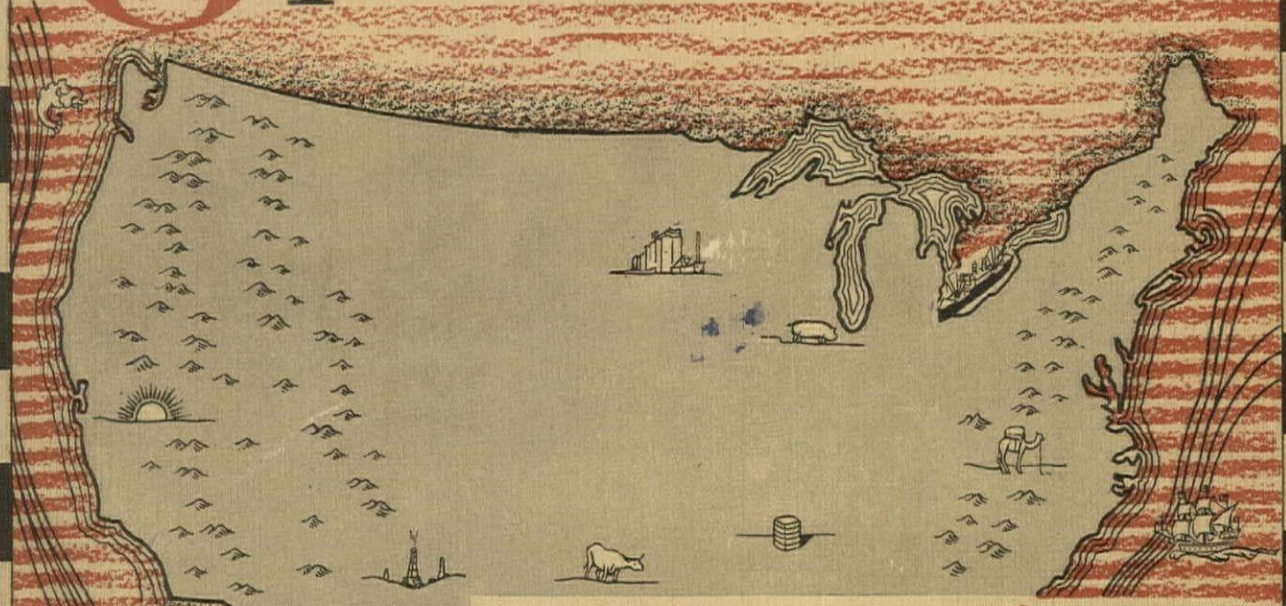

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