

V. 54

Leon Roy

THE ARCHITECTURAL FORUM

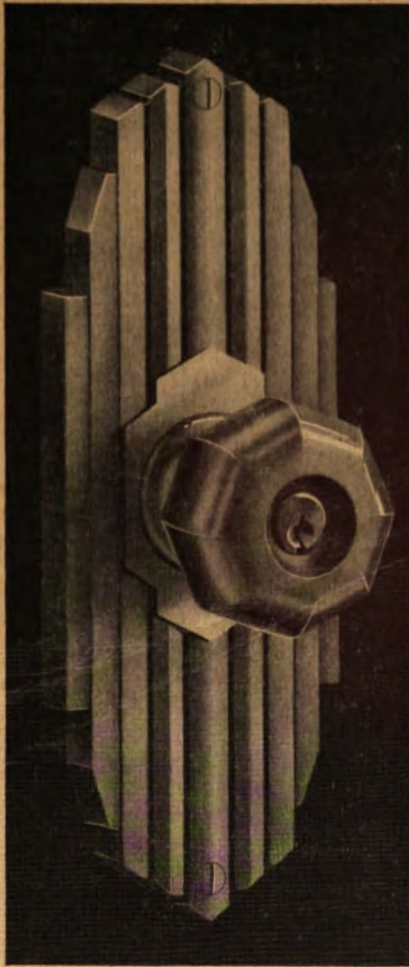


IN TWO PARTS PART ONE

ARCHITECTURAL DESIGN

APRIL 1931

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THE ARCHITECTURAL FORUM

VOL. LIV, No. 4

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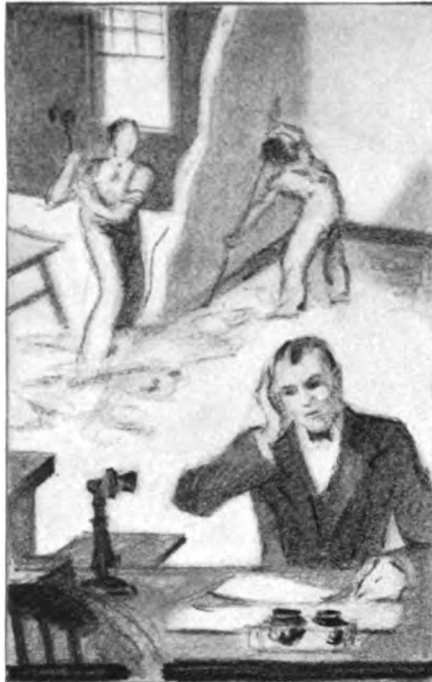
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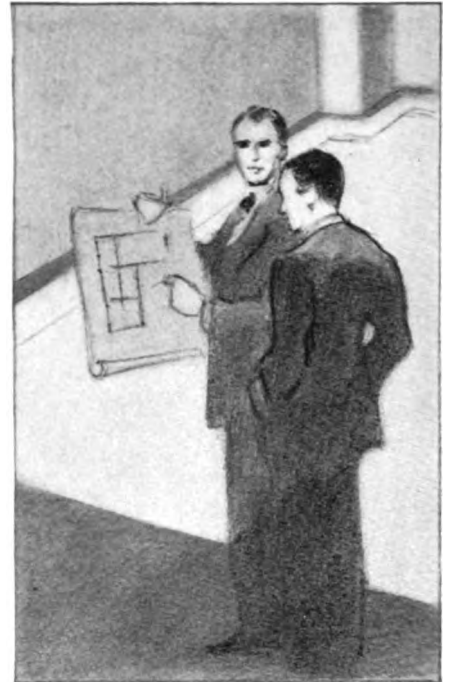
GOOD BYE, PLASTER WALLS



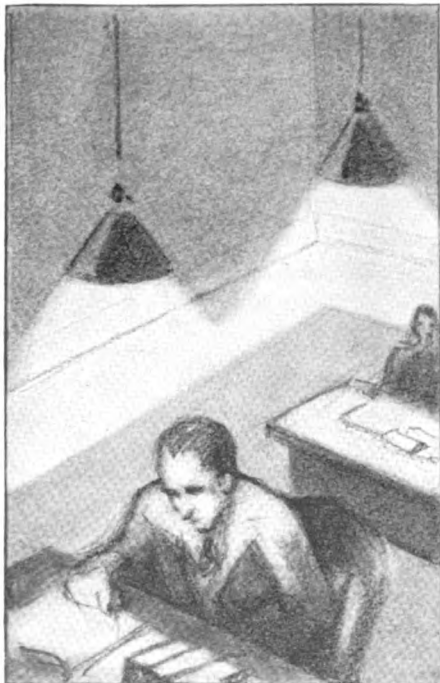
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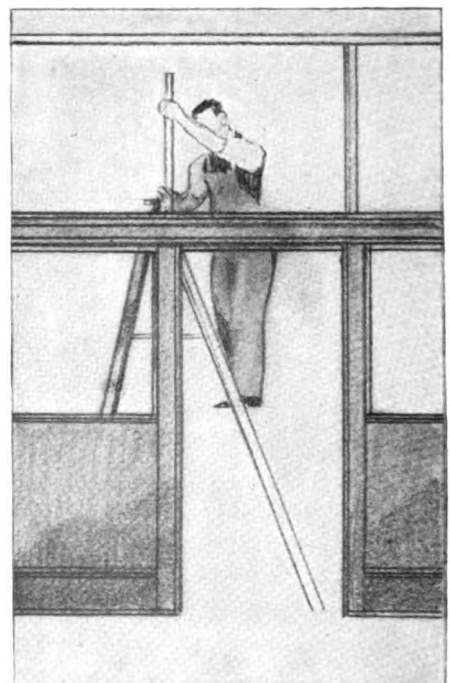
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SKYLINE 1930

FROM AN AQUATINT
BY KARL DEHMANN

The Architectural Forum

THE ARCHITECTURAL FORUM

VOLUME LIV

NUMBER FOUR

APRIL 1931

TRENDS IN ARCHITECTURAL THOUGHT

BY

PROF. FRITZ SCHUMACHER

IF today—more than a decade after the World War—inquiry is made as what influences of the war are brought to light in architecture during the intervening time, everything is not accounted for by the translation of splintering ruins and exploded grenades in terms of a zig-zag scheme of ornamentation. The noisy outburst was short, and its nature such that it was primarily displayed in places of amusement. Rather the proper effect of the war was to the contrary and of deeper nature. Everything harsh, keen-edged, steely, in the nature of things and men was loosed, together with mechanization and want, and showed itself not in frothy noisiness but in simplicity. Not simplicity in the form of naïveté but in a plainness characterized by hard-bitten conciseness.

Without question, these tendencies, as they came to light, were influenced by the rôle played by the common economic compulsion to save. Saving, however, was only a background. What appeared before it, as the living aspect, issued from the vague sources of a spiritual power.

What the war evoked could not be directly transformed into art. The external causes and inner reactions of an epoch attain a power which influences culture only when they are shaped as ideas, which, independent of external conditions, have inner vitality. This re-formation after the war is shown strikingly in architecture. The war shattered all continuity afforded by feeling; it was maintained only by force of intelligence. Therefore, it was natural that men reacted as they always have in periods of confused feelings about architecture,—they made the two intellectually comprehensible aspects of architecture, *function*

and *construction*, the center of aspiration.

What does Function or Construction mean as the pivot of architectural aspiration? Brought down to their finest points they lead to different results. In fact two currents are clearly distinguishable among the most radical, meaning the narrowest, attempts at *functional* building on the one hand and *constructive* building on the other.

There are recent building problems, especially those related to modern methods of production, in which function controls form in a consequential way. Such problems lead to solutions which are to us halting. Instead of permitting the peculiarities of the problem, as formerly, to disappear as much as possible in a neutralized expression, they are seized eagerly and their expression emphasized. Architectural success (in such a healthy struggle with a problem having definite and really new purposes to fulfill) often leads to needless attempts at similar methods of solution in cases where the function of the building is best satisfied by a formal and neutral shell. That this tendency as a universal pole-star for architectural endeavor must lead in certain cases to lack of fundamental soundness and contorted form is easy to perceive. However characteristic these solutions of present problems may be, however much new needs demand their own evolution of form, there is also an abundance of related problems, differentiated only in details of function, for which the building forms evolved must have a common relationship. It is worth while to be able to find the common denominator of these relationships. There is, therefore, a direction of development diametrically opposed to the demanded creation of *spe-*



cialized forms—the demand for *typical* forms which provide a vessel for constantly recurring related functions. This latter direction leads to a distinct æsthetic result. Above all, it gives an entirely different measure to the communal architectural demands which we relate in the conceptions of town planning. The cult of visible expression of each function of each building is opposed to a demand which we hold to be the final aim of architectural creation. The measure and high aims of great building are not in the solos of the particular parts but in the orchestration of the entire detailed harmony.

Such considerations raise a doubt as to whether an expression of function, important as it is in architectural creation, is as important as the power to bring out a consistent style expression of our time and to lead our architectural forms to a greater coherence.

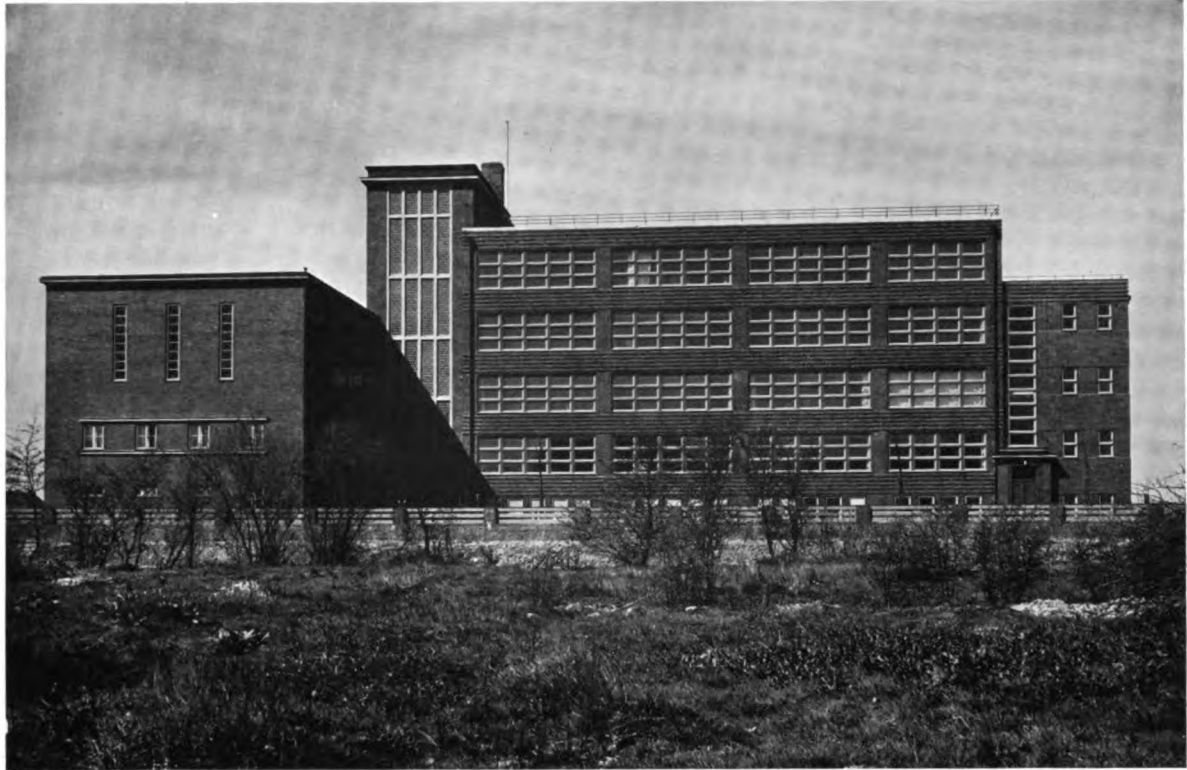
Along with the current which seeks in *function* the answer to the creative principle of the time, flows the second current which sees the answer in a cult of *construction*. Everything which has developed in external expression in architecture stands in relation to and is in many cases dependent upon the structural material. Our time stands in contrast to earlier epochs by decree of new building materials—concrete, steel, glass. Treated consistently, materials lead to new expressions.

Such new possibilities in structure show their fruitful influence especially in interiors where we

A housing development for which Professor Schumacher was architect. Typical of current work, it shows the influence of post-war days

span great lengths. The proportions of space enclosure have been changed. The expression of new spans on the interior affords on the exterior equal possibilities of new envelopes. Suspension is substituted for buttressing and the carrying of loads. The result of these considerations is that our feeling of stability, which we long respected as something absolute, because of the domination of certain building materials, has become unfettered and extended. Besides the corporeal manner of building plastic masses, we have the skeleton method of revealed supports. The light-membered nature of this skeleton frequently does not appear very distinctly in building because it is completely covered by materials which form surfaces, in order to create useful spaces. On this circumstance depends the great popularity of glass in post-war architecture. When this transparent material is associated with the skeleton as surfacing, the structure comes out in complete clarity. It is evident that if one aspires to it, the goal of a new expression of our own time lies in new possibilities for structure.

Can the legitimacy of this aim be doubted after all? In one respect certainly not. Every instance will be welcomed where the nature of a task,



Dransfeld

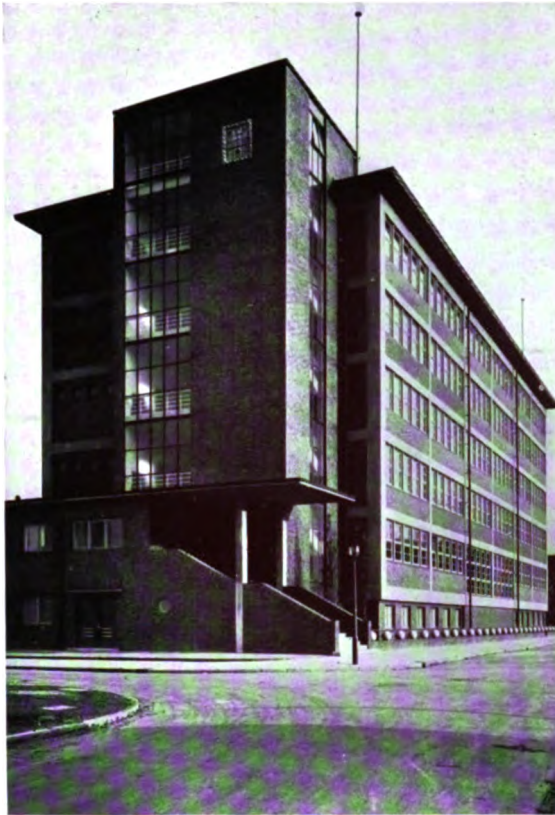
An elementary school by Professor Schumacher. A step toward the goal which, he thinks, "lies in new possibilities for structure"

which, by reason or necessity, demands the use of new materials, results in utilization of their constructive properties. From such uses will arise not only the possibility of new expressions but also the demand for them. What, however, is the case with numerous building problems which have no need of new materials? Where room dimensions, proportions and wall surfaces have not changed? There is no question that the satisfaction with the very characteristic new forms which concrete, glass and iron permit to develop together with the derivative tendency toward logic in construction, taken simply as the nucleus of a new artistic expression, brings with it the danger of spasmodic introduction of new methods of construction where they are entirely unnecessary. Indeed they may even be applied for their own sake where other kinds of construction are in reality demanded. This danger would perhaps not be present if the new materials were generally completely superior to the old. Their superiority should be investigated in relation to *all* their functions and properties.

We touch at this point a second important heading in the scope of the constructionists. With them it is not only a question of building daring

structures, but at the same time of doing it with the simplest and most economic materials with which the result can be obtained. Whether the prospect of victory for the new materials will come from the standpoint of rationality or from their general physical make-up is still not entirely clear. However, when in the course of time new materials take their reasonable place in every day building, any form other than the present neutral right-angle prism will arrive with difficulty. Whatever novelty architects give this fundamental form will arise not from construction but from some other source.

Good architecture is dependent on three forces, all of which make demands equally; first, the nature of the function which the work should perform; second, the nature of the materials with which the work is performed; and third, the nature of mankind, which uses materials to accomplish its purposes. If one speaks of the power which distinguishes the architecture of an epoch, one may not omit this third force. Nothing of worth in architecture can exist in which all three forces are not operative together. Herewith enters the element in architectural creation that is not mechanically demonstrable like fulfillment of function and influence of materials. Whatever is characteristic at a given period is inexplicable, rooted not in the comprehensible but in the spiritual. Each time has its own compulsion which becomes apparent in art, revealed in the crea-



Dransfeld Photos

“Everything which has developed in external expression in architecture stands in relation to... and is dependent on structural material”



tions of tone, of speech, of color, and form. Whoever perceives compulsions feels them to be the same in all their varied manifestations. It is that which charms him in contemporary performance as possessing life. It is the rhythm of a period.

Next to music perhaps architecture most clearly brings out the characteristics of this rhythm. If today we conform to the exciting vibrations which run through our time, perceive dynamic suspense in architecture to be more in harmony with ourselves than static, soothing qualities; if we are influenced accordingly to express ourselves more easily in counter-play of rectilinear masses; if we are inclined to emphasize whatever the subjugation of statics brings out; if we use color not to soothe, but to excite,—then there flows through the medium of creation into architecture something which has not evolved from function and construction but from the spiritual rhythms of the creator.

Everywhere, when a true artist is working, he is deceiving himself if he believes he is developing his work entirely out of function and materials. Whether consciously or unconsciously, it is the will to create form which is the spiritual source.

The materialistic sentiments to which a greatly respected part of our present-day architectural philosophy bears witness, can be only a transition. Historically this is completely comprehensible. What we call architectural development always demonstrates that one of the three important elements from which architecture derives, does not receive its due,—whether it be the function it serves, the materials in which it is realized, or the human wants it fulfills. When this occurs, the neglect of the element under consideration eventually becomes recognized and the fight shifts one-sidedly to restore the neglected factor to its proper value in the whole scheme. Epochs of contention arise through over-emphasis of one of the three elements, all of which properly should act as one. Therein lies the power of the three, and also the conditions of their absolute meaning. Equilibrium of the three inseparable elements is the real aim of the highest architectural art, and the goal directing our endeavors.

What we are battling over in our time is substantially nothing but a manner of speech—the speech in which our art attempts to explain everything that an exorbitantly pretentious and forward period demands of it. This pressure to express our time completely, which began at the turn of the century and after the war became an increasingly clear aim, belongs among the most fortunate impulses which the creative artist is given. Out of the darkness grows slowly the rose hour of dawn. Cheer to whomsoever shares in its experiences and is not found asleep.

TELEPHONE BUILDING DESIGN

BY
CHARLES G. LORING

BEAUTY costs more brains, not more money. Each of the operating companies of the Bell System has its own architect—in some cases more than one—and in addition is encouraged to use those of the headquarters company as consultants. The offices and operating plants are erected all across the continent, and like the post offices have a vital opportunity to influence national public taste. The architects of the twenty-four subsidiary companies associated with the American Telephone and Telegraph Company are in touch with the trends and traditions of their home sectors, and so avoid using one rubber-stamp design for all parts of the country. The system's principles of uniform engineering in telephone buildings, however, give an elastic continuity. The department architects become familiarized with the company's standard requirements; and the essential features of each type of building are evolved logically, with modifications according to the section of the country. A high official has said that personal contact with the customer has been difficult to maintain with service becoming fully mechanized, but that a fine building and a well chosen site afforded means of preserving friendly relations.

The telephone system has a titanic building program, a program demanding more outlay during the last few years than did that of the Federal government. The new building construction, aside from technical apparatus and equipment, cost over \$35,000,000 in 1929, and in 1930, \$53,000,000.

Although in these lean years this tide of building is stimulating, the mere number of buildings is less significant to the progress of architecture than is the policy directing this transcontinental expansion. The telephone authorities have enlisted the local and national interests of the architectural profession in no haphazard manner. From the administration buildings, occupying entire city blocks, down to the isolated toll-line repeater stations, the objective is to harmonize the design with the dominant native characteristics. A generation ago a public utility building was put up for utility and not for the public; now it is more often designed as an "outward and visible sign of the inward and spiritual grace" of service. This is common sense, not propaganda; for the better the local community, the better the business for all hands, from the neighborhood druggist to the telephone company that serves the community.



Moulis

The Coast Division Building of the Pacific Telephone and Telegraph Co., Miller & Pflueger and A. A. Cantin, Architects

With the largest central offices, broad acreage of floor space is needed for the apparatus, and additional stories with the maximum daylight are required for administrative offices. The "set-back" type with wide base and receding tower, the stepchild of New York's zoning laws, is essentially adjusted to the Bell requirements. The thirty-story Barclay-Vesey building in New York, and the twenty-story main offices in Cleveland are masterpieces of the structural expression of this day and generation, of these United States; and their brothers loom over Newark and over San Francisco. In contrast, the Montreal headquarters, although the same type of plan, has an exterior treatment consciously adapted to the sentiment of Canada, where classic forms have not been superseded, and where the elegance of traditional detail is inlaid over steel immensities. At Hamilton, Ontario, the telephone building is next a church and has been clothed in Gothic to harmonize with its important neighbor.



Gardner

The Cape Cod cottage of Scituate, Mass., and the Oriental Pagoda in San Francisco's Chinatown are two of the most extreme examples of designing the telephone exchange to correspond with its surroundings



The smallest buildings shelter an unattended dial switching equipment. They have their own special problems, such as the regulation which will give the best temperature for the apparatus and for the occasional inspection by the maintenance men. At the other end of the scale, is the headquarters of the New York Telephone Company with three-quarters of a million square feet of floor space, housing 6,000 people as well as the equipment which serves close to 100,000 telephones.

The program for 1929 included 200 new buildings and 80 major additions. The policy is to design their plans for an average of eight years' growth. The carrying charges and the problem of new inventions do not justify preparation for a longer span. On the other hand, building only for immediate needs would involve the risk of impairing the service and excessive alteration costs. Most of the telephone buildings, except the largest and the smallest, are constructed to permit the future expansion upward, foundations and framework are designed to carry the weight of additional stories when and if required.

The massiveness of many of the telephone buildings connotes the 20,000,000 interconnecting telephones, the 325,000 employees. It sings the national anthem of vast cooperation, but like so much of the business architecture of the Twenties, the soul of the individual is submerged in the power of organization. The blunted crenelations, the keep-alike qualities of these Towers of Babel do not visualize the magic of trans-Atlantic conversation, the friendly intimacy of the telephone bell in lonely farms, the filaments of copper spun



Above is illustrated the "unattended" central office at Piru, California; at the right the Manchester, Conn., central office, described on the following page. Below is the Pacific Telephone and Telegraph Company's central office at Ventura, California, suggestive of the southwest's mission architecture

Amenya

across deserts and through forests. This does not apply to the structure in Syracuse. There, although there is no tower to relieve the mass, the delicacy of the repeating vertical motifs, the etched stonework at the base and the more deeply cut intricacy at the top give an aerial refinement. The interior treatment of tenuous parallel lines on the vertical corners has a suggestive quality, appropriate but not pictorial. Another interior, that in the new Denver offices, will make vivid the company's tradition that lines of communication

must be kept open at all cost. The building is on the very site where once was the stockade of the pony-express station; and mural paintings by Allen J. True depict the frontier days of 75 years ago when messages were relayed on cow-ponies, even when the riders had to fight their way past Indians or through blizzards.

Following out its program in the smaller buildings, the telephone system frequently has introduced Colonial facades along the Atlantic, as at Chevy Chase, Md., where the design is derived





Amemya

The influence of the residential area in which this building at Silver Springs, Md., is located is reflected in its strictly Colonial exterior expression

from an old stone mill at the Park; as at Bristol, R. I., with its quaint gambrel roof; and as at Silver Springs, Md., where the guise of a dwelling is modified to house machine rooms on the ground floor and others above. The archaeologically inspired yet brand new and modernistic Neo-Grec structure at Manchester, Conn., is known as a "screen-building," for want of a better term; that is, it maintains a domestic scale in a residence district and at the same time masks a large plant at the rear. At Scituate, Mass., the office is a truly rural Cape Cod cottage with white chimneys, picket fence and everything.

On the Pacific coast the delightful offices at Ventura and at Torrance are adaptations of Mission architecture, while that at Burbank, also in California, with its more sophisticated Mediterranean touch, has a walled garden with variegated

shrubbery, a tribute to the great cross-breeder of plants. The garage at Los Angeles is a courageous attempt at Spanish. The tiny automatic relay stations of Piru and Arcadia are positively precious, but the office in Chinatown, San Francisco, is a veritable "whoopie" of local color.

Where use of the local pre-Revolutionary styles is not appropriate, the post-World War fashions are embodied, as in the ingeniously textured unit at Clearwater, O., or that for Houston, Tex., with its touch of 1928 neo-Mayan detail. The treatment at Longview, Wash., with its electrical detail on the parapet, and that at Pontiac, Mich., with its polarized piers, are steps toward forming the symbolism of dial distributors, pay-station receivers and all the sensitized gadgets which make distant talk so cheap, and which can transmit sound at the speed of light.

Zallee



The Hadley-Lehigh Central office of the Southwestern Bell Telephone Company at Houston, Tex., is of brick in five graduated tones with terra cotta ornament

FIVE TELEPHONE BUILDINGS



Shannon

BROOKLYN CENTRAL OFFICE
BROOKLYN, N. Y.
VOORHEES, GMELIN & WALKER, ARCHITECTS



Bailey Photos



The present building is the result of extensive alterations and additions to the original one. At the left is shown a general view of the project; above is a detail of the main entrance. The base is of polished black granite, and the walls, including the ornament and modelling, are of textured, buff terra cotta

EXECUTIVE BUILDING
LOS ANGELES, CALIFORNIA
JOHN & DONALD PARKINSON, ARCHITECTS

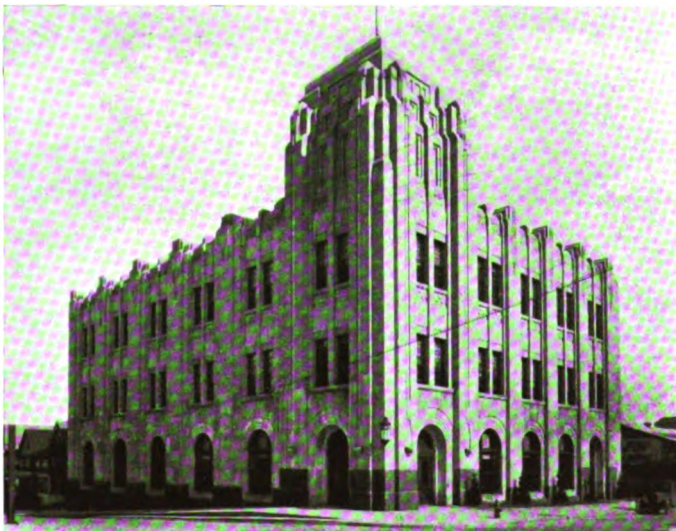


Norton

ADMINISTRATION BUILDING
CLEVELAND, OHIO
HUBBELL & BENES, ARCHITECTS



TWO TELEPHONE BUILDINGS



Above is the Central and Division Office at Syracuse, N. Y. The walls and all ornament are of buff, pre-cast stone. The sashes in the first story are bronze; the others are painted sage green

VOORHEES, GMELIN & WALKER,
ARCHITECTS

At the left is the Central Office at Pontiac, Mich. The walls are of light buff brick, with limestone trim, and the base course is of dark green granite. All sashes are pea green

SMITH, HINCHMAN & GRYLLS,
ARCHITECTS

A CITY APARTMENT HOUSE



Guld-Warnick

THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS

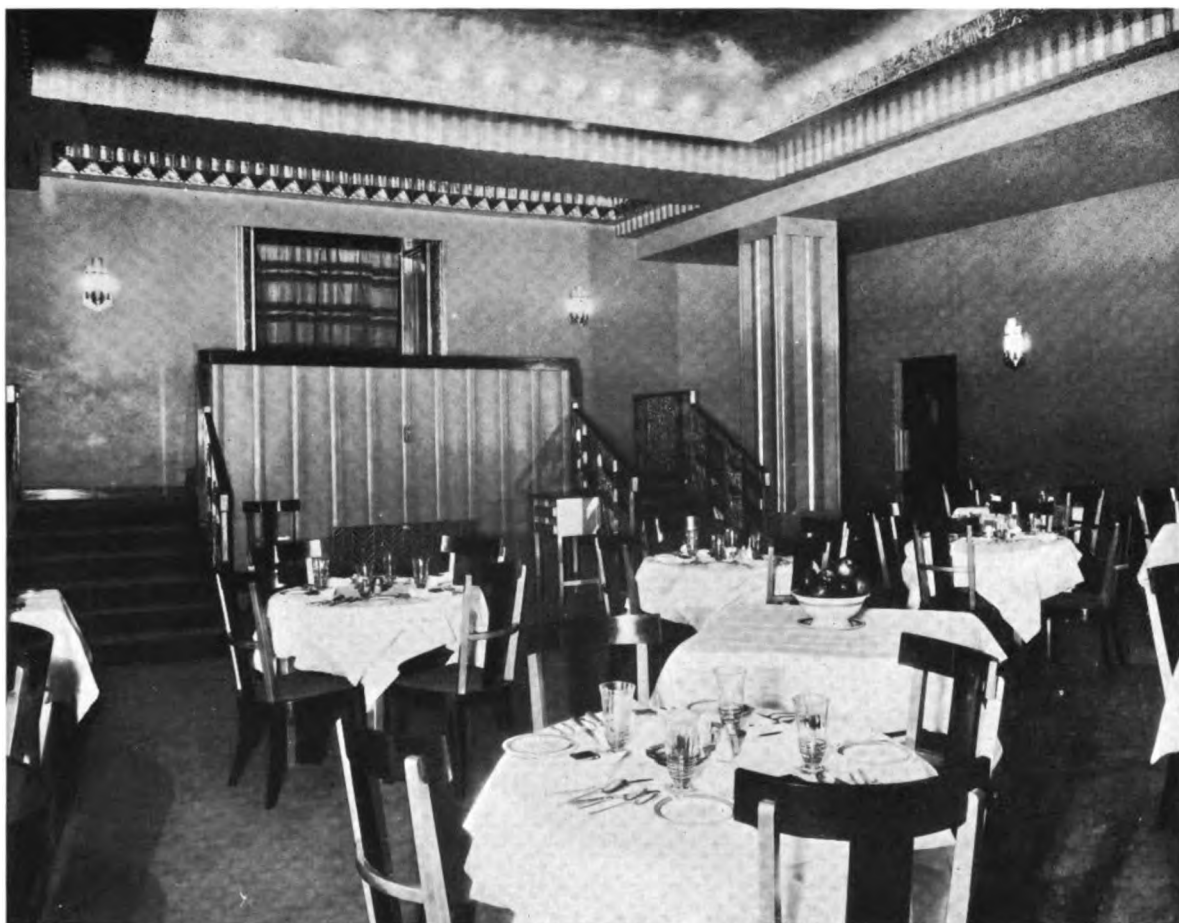


Guid-Warnick Photos



The base course and the trim around the doors is black, highly polished granite. The brick shades in color from a dark red near the street to a buff at the top of the building. It is laid with stretchers exposed, bonded with a header and stretcher row every five courses. The lamps and the trim of the entrance door are of brushed chrome plate, but the window grille, shown at the left, is of wrought iron, lacquered. All the detail on the lower stories is of molded brick

THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS

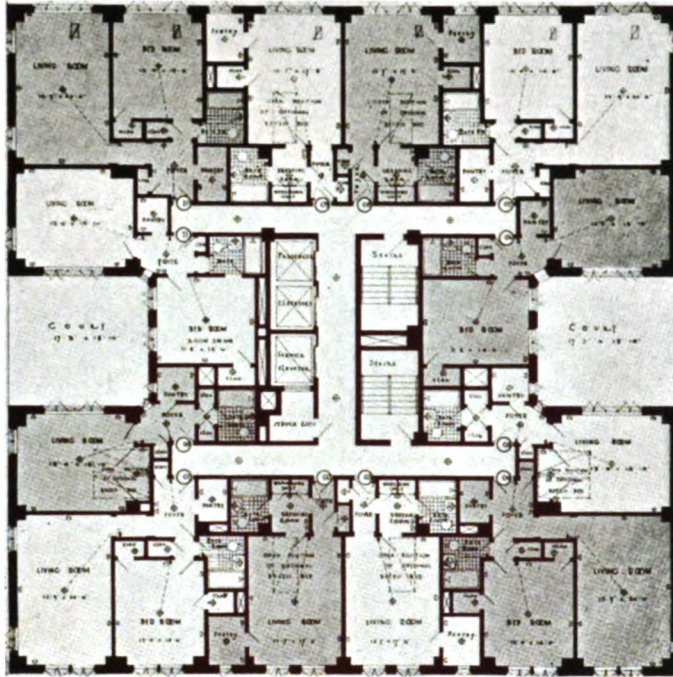


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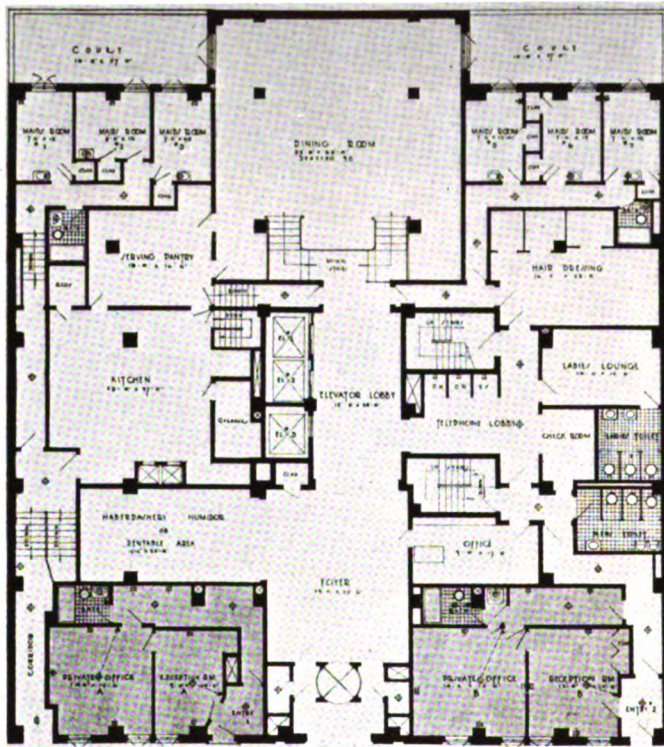
A view of the dining room, looking toward the entrance. The general color scheme is blue green and silver, the walls being painted and the ceiling panels silvered. The ornament in the cornice is modelled in plaster and portions of it accented in high color, overglazed. The wall opposite the entrance is faced with mirrors to increase the apparent size of the room. The stair railing, at the right, is of cast iron, painted silver. The handrail is aluminum



THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS



PLAN OF SECOND
THROUGH SIXTH FLOORS

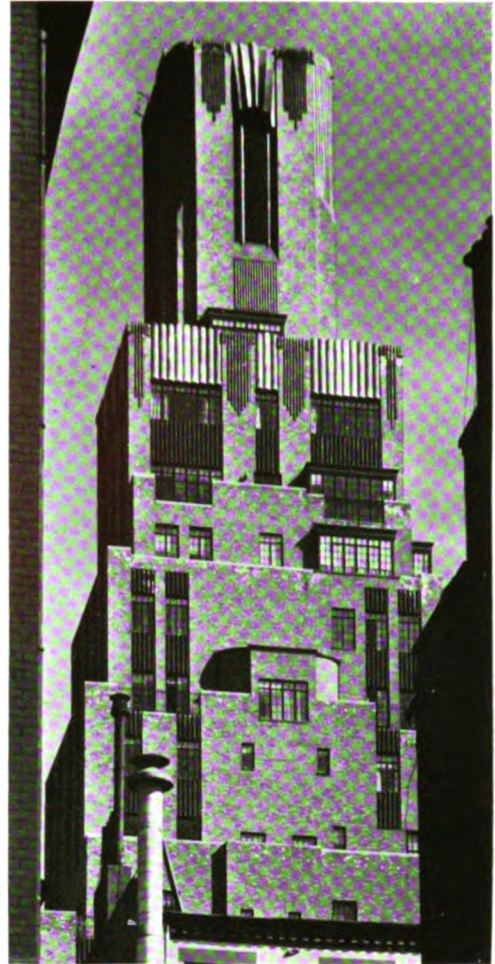


FIRST FLOOR PLAN

THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS

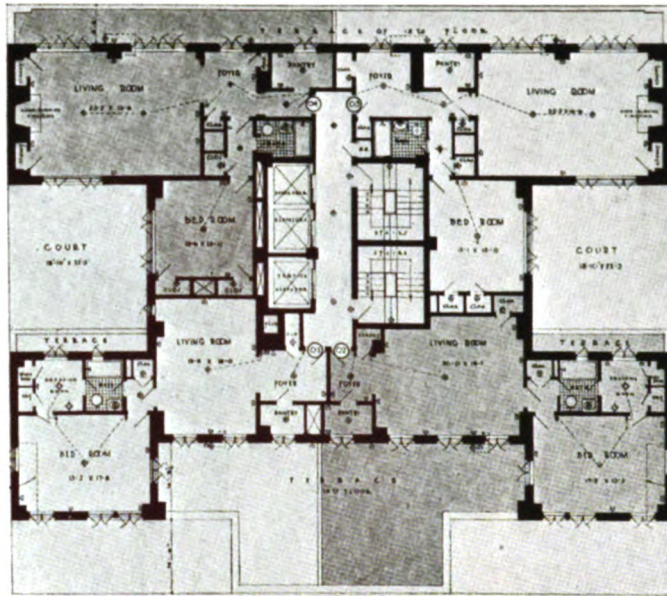


Guild-Warnick Photos

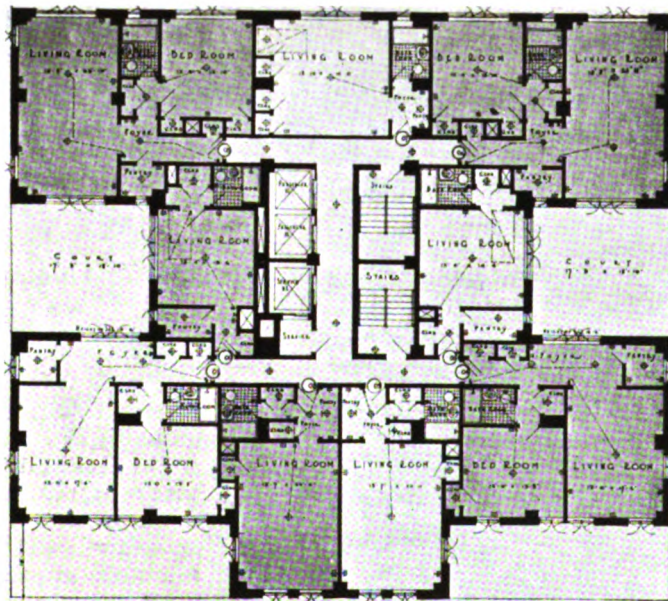


A general view of the building and a detail of the upper stories. The dark spandrels are of molded brick; the others are of terra cotta, matt glazed and colored cream and orange. The openings in the pent house are glazed with bricks of lavender and white glass, laid in cement mortar. They serve the double purpose of admitting light to machinery space, and being lighted from behind, of aiding the effectiveness of the floodlighting. The glass bricks are hollow and give satisfactory insulation against the weather

THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS

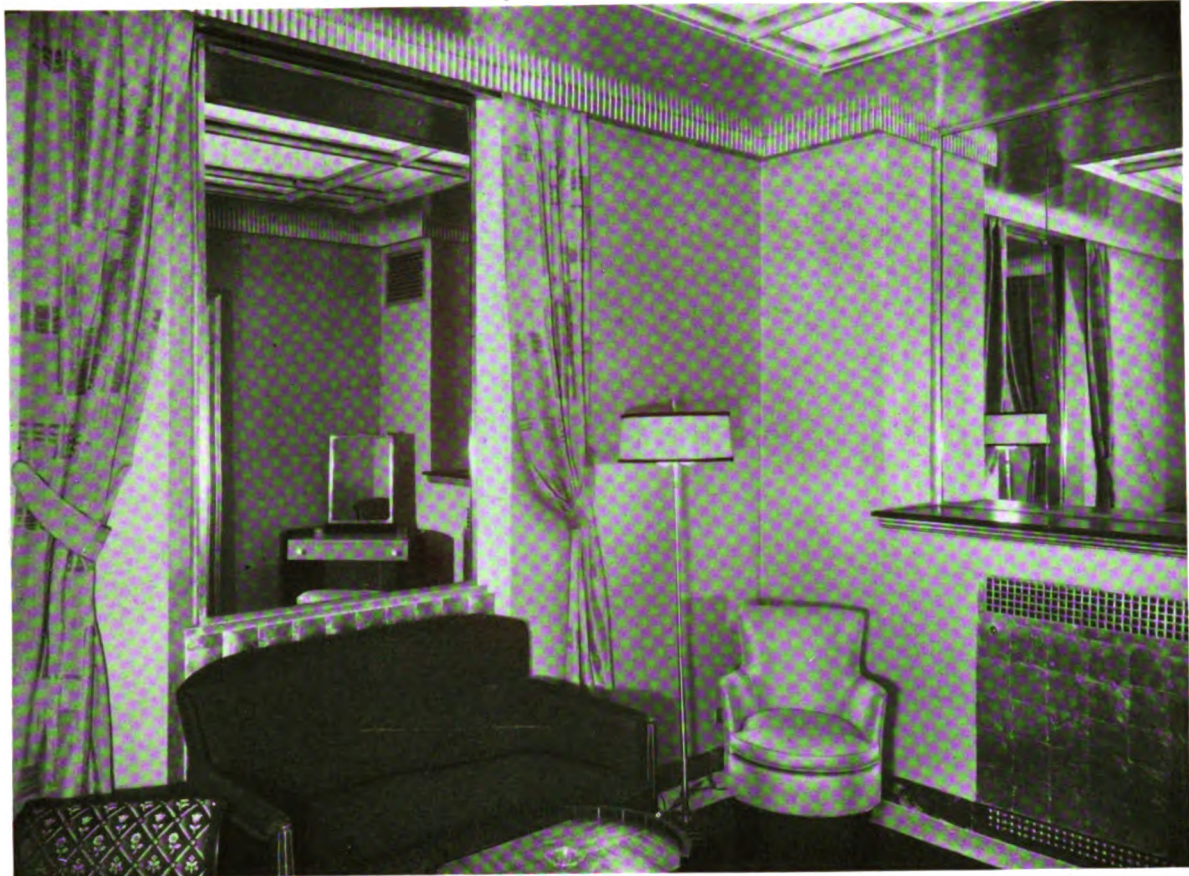


PLAN OF THIRTEENTH
AND FOURTEENTH FLOORS



PLAN OF ELEVENTH AND
TWELFTH FLOORS

THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS



Guild-Warnick Photos

The ladies' lounge, shown above, has a carpeted floor, and is decorated in a gold and tan color scheme. Lighting is concealed behind a ceiling grille of frosted glass

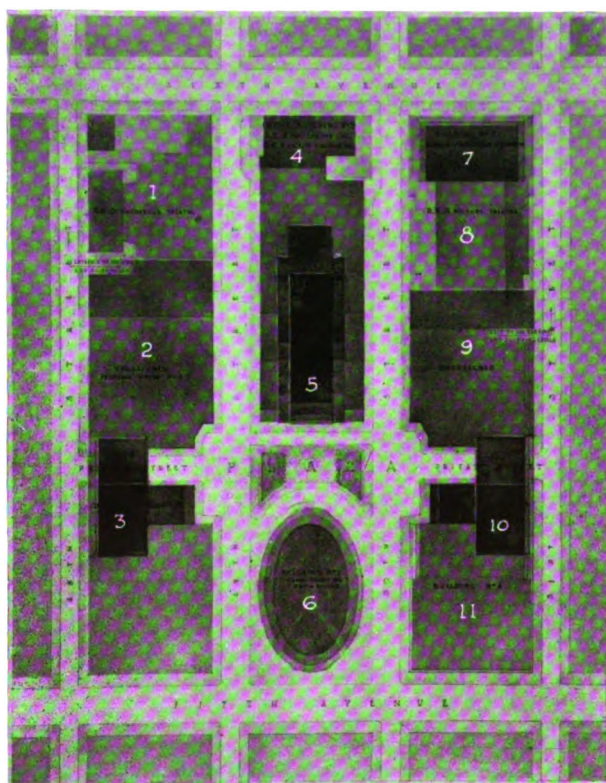
Each apartment contains a well considered wardrobe closet, lighted from within, and including spaces for hats, shoes, etc. Notice the arrangement of doors and mirrors



THE TOWN HOUSE
NEW YORK CITY, N. Y.
BOWDEN & RUSSELL, ARCHITECTS



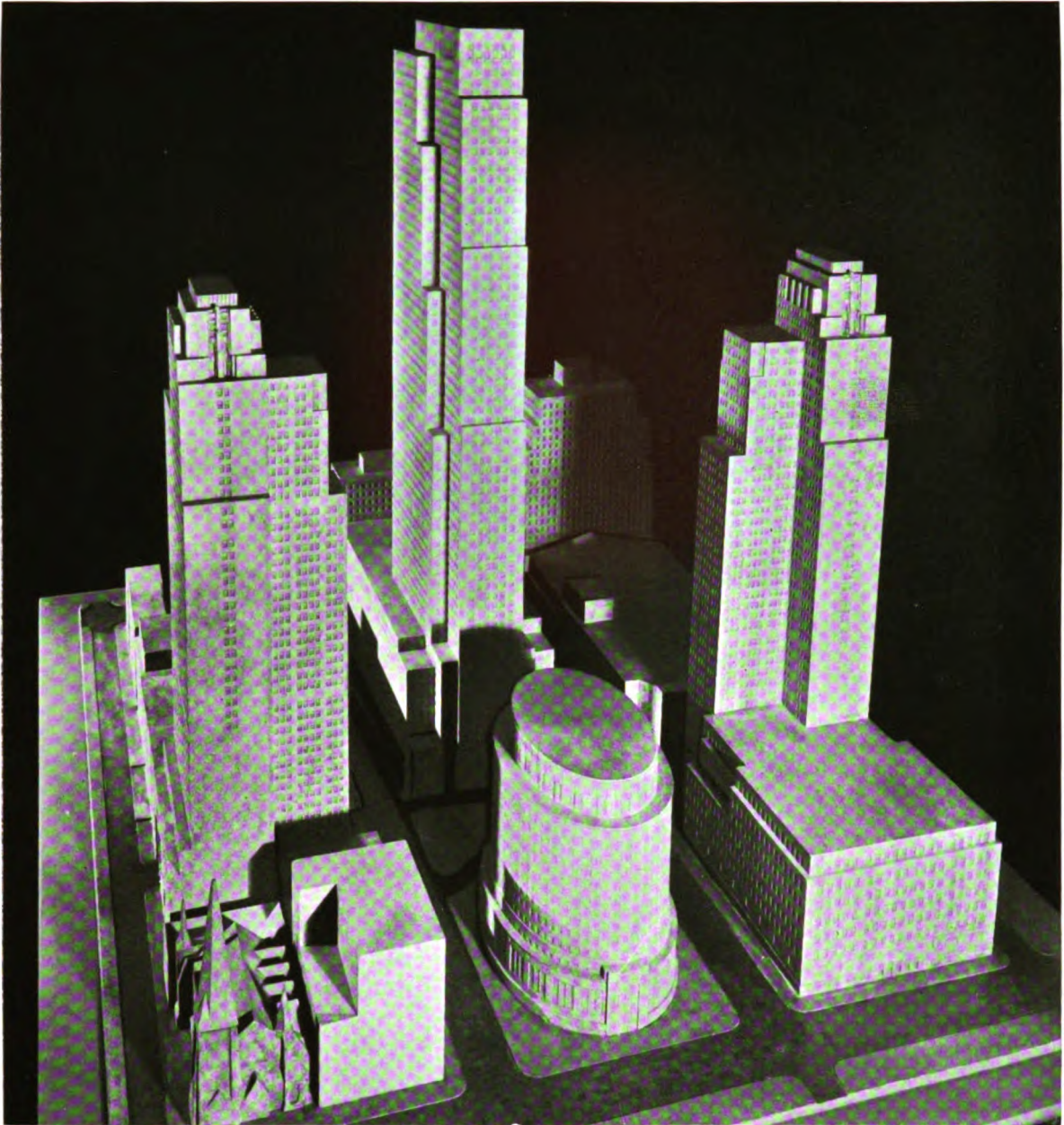
Bradley Photos



The imaginative drawing by Hugh Ferriss shows the possibilities of architectural treatment of the buildings and the private street adjoining the plaza. The numerals on the plan indicate the location of,—1. R. K. O. Vaudeville Theater. 2. Proposed Opera House Site. 3. Office Building. 4. Office Building for R. C. A. Companies. 5. Office Building partially for R. C. A. Executive Offices and N. B. C. Offices. 6. Bank, Shops and Show Rooms. 7. R. K. O. Building. 8. R. K. O. Picture Theater. 9. Unassigned. 10. Office Building. 11. "Building No. 4."

**PROPOSED RADIO CENTER
NEW YORK CITY, N. Y.**

**ARCHITECTS: REINHARD & HOFFMEISTER
HOOD, GODLEY & FOUILHOX
CORBETT, HARRISON & MACMURRAY**



Bradley

PROPOSED RADIO CENTER

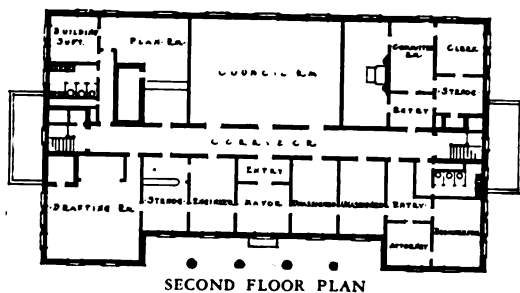
NEW YORK CITY, N. Y.

ARCHITECTS: REINHARD & HOFFMEISTER,
HOOD, GODLEY & FOUILHOUX
CORBETT, HARRISON & MACMURRAY

The unusual importance of the location and size of the plot assembled for this project seemed to offer unique architectural opportunities for a development that would be a model of unified planning and design and which would set a new standard in civic development. Those who were looking to this project for such an achievement may not have taken into account the fact that inevitably the controlling factor is the return on capital investment. The preliminary model shows, of course, only the general scheme which is now being subjected to further study as there was no intention of indicating the architectural treatment of the buildings in this early presentation. Undoubtedly the fact that portions of the blocks were not included in the assembled plottage, and that the streets must remain, contribute to the heterogeneous appearance of the buildings of various types and purposes. Whether or not it is now economically necessary or desirable in the progress of city development, the desire for an immense amount of floor area seems to have been the dominant consideration

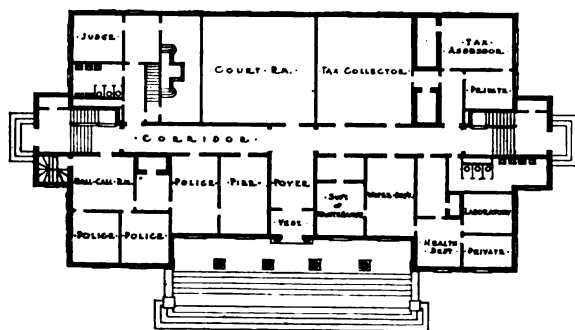


Wurts Bros.

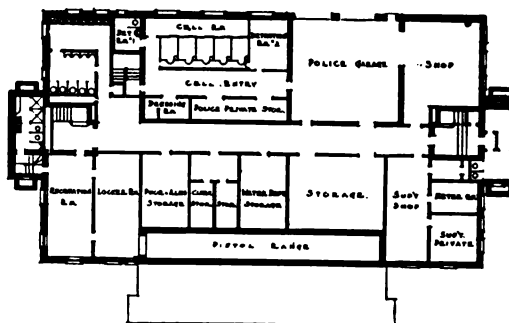


SECOND FLOOR PLAN

The building has been placed to form the center of a civic group to be developed in the future. It is of fireproof, skeleton steel construction. The exterior is face brick with limestone trim; the sash are steel and the roof is of slate. Indoors, the foyer and corridor have travertine marble walls, and travertine floors. All other floors are of linoleum. The Court Room has plaster walls and ceilings and oak trim; the Council Chamber has walls of imitation travertine



FIRST FLOOR PLAN



BASEMENT PLAN

THE MUNICIPAL BUILDING
BLOOMFIELD, N. J.
W. O. BARTLETT, ARCHITECT



Wurts Bros.

THE MUNICIPAL BUILDING
BLOOMFIELD, N. J.
W. O. BARTLETT, ARCHITECT



THE COUNCIL ROOM

Wurts Bros. Photos.



THE COURT ROOM

THE MUNICIPAL BUILDING
BLOOMFIELD, N. J.
W. O. BARTLETT, ARCHITECT

A COUNTRY HOUSE IN NEW JERSEY



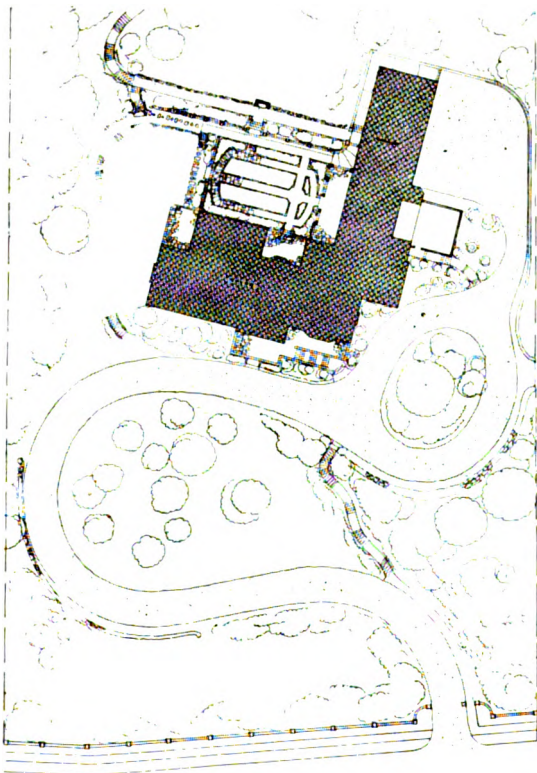
Drix Duryea

"STONE EAGLES"

HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



Drix Duryea



ENTRANCE GATES AND WALL: The entrance gates, as well as the house, were built of buff Doria stone in varying shades. The stone eagles at the gateway, from which the place takes its name, were carved from the architects' designs after models by Paul Wiehle

COLOR AND MATERIALS: Buff walls, steel casements with leaded comes, roof of shingle tile varying from deep wine color to purple with some dull green

THE GROUNDS: The various levels of the house conform to the finished contours of the ground. The natural bank at the rear is confined by a concrete wall, stuccoed to harmonize with the house

HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



Drix Duryea

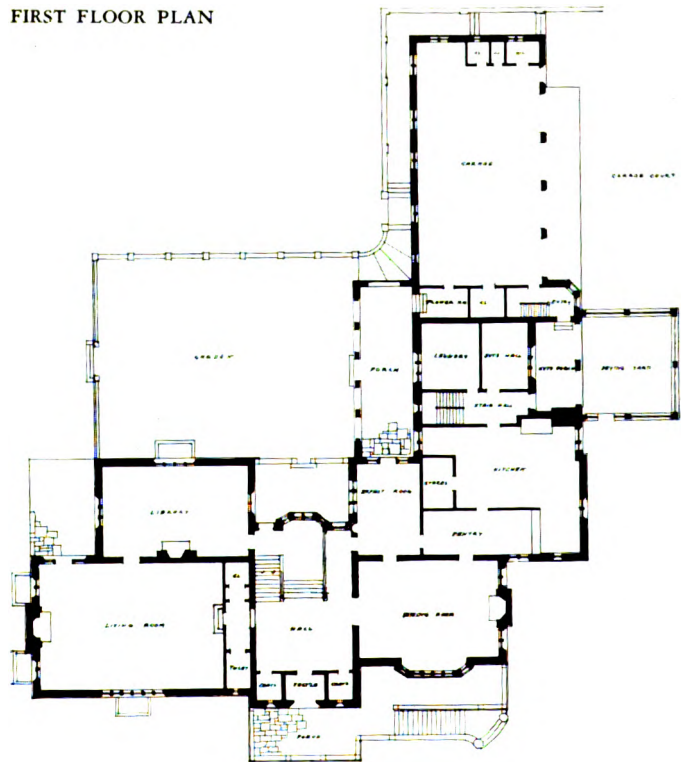
HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



Drix Duryea

GARDEN: Located at the southerly end of the house and laid out as a fall and spring garden. It is backed by a covered porch and has walks of gray, green and blue flagstones. The retaining walls are of Philadelphia ledge stone. The feature on the cross axis is a stone garden niche with an old blue pot and a leaden figure spout, introduced against a terraced background. The drying yard, shown in plan, is enclosed with an antique finished oak lattice and a cupola of lead terminates the garage gable. The driveway entrance is connected by a wide flight of stone stairs to the first floor level rooms

FIRST FLOOR PLAN



HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



Amemya

The library's paneled wall is of natural finished, waxed walnut. The applied mantel festoons are original Grinling Gibbons work. The marble facing is of levanto marble in which the colors red and purple predominate. The floor is of wide oak planks, stained a soft brown and waxed

HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



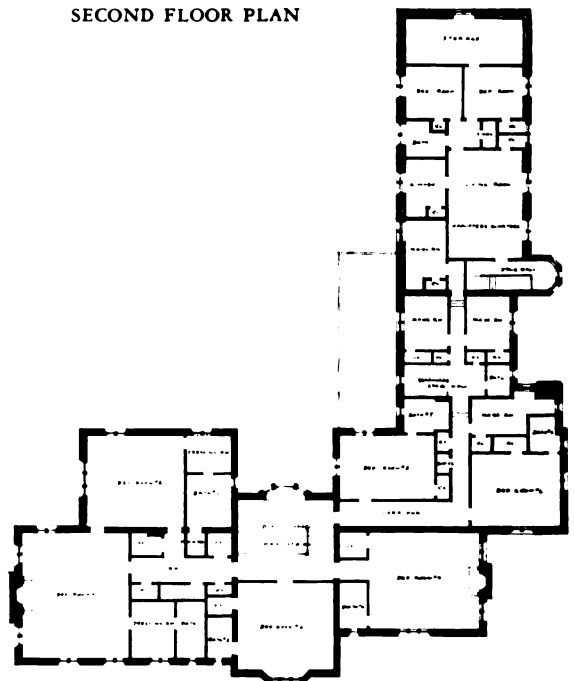
Drix Duryea

THE GROUNDS were laid out from designs by Olmstead Brothers of Brookline, Mass. New planting supplements the natural growth where required. The unusual slope of the property was overcome by the use of several breaks in level from front to rear. Several old English houses of this type were studied as precedents for both house and gardens

THE HOUSE is of entirely fireproof construction, utilizing brick and stone for the walls, and steel framing for the roof. It is heated by a direct and indirect hot water system with oil burners. Each room is equipped with a thermostat control. A mechanical ventilating system was installed for the basement rooms and kitchen

HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS

SECOND FLOOR PLAN





Amemya

Drix Duryea



THE BREAKFAST ROOM: The walls and the ceiling are of waxed, antiqued plaster finished in gray-yellow tones; the floor of wide oak planking, stained brown and waxed. The trim is of artificial stone and the furniture is of yew wood

THE TAP ROOM: Walls and ceiling are of antiqued wavy plaster and the ceiling beams are of molded artificial wood. The floor is of stone flagging laid random in blues, grays, and greens. The mantel trim is of stone

HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS



Amemya

The dining room walls are of antiqued English oak of a soft brown tone. The carved wood mantel surrounds a fireframe of carved Portland stone. The ornamental ceiling is of antiqued plaster, light gray-buff in color and the floor is of wide oak planks stained brown and waxed

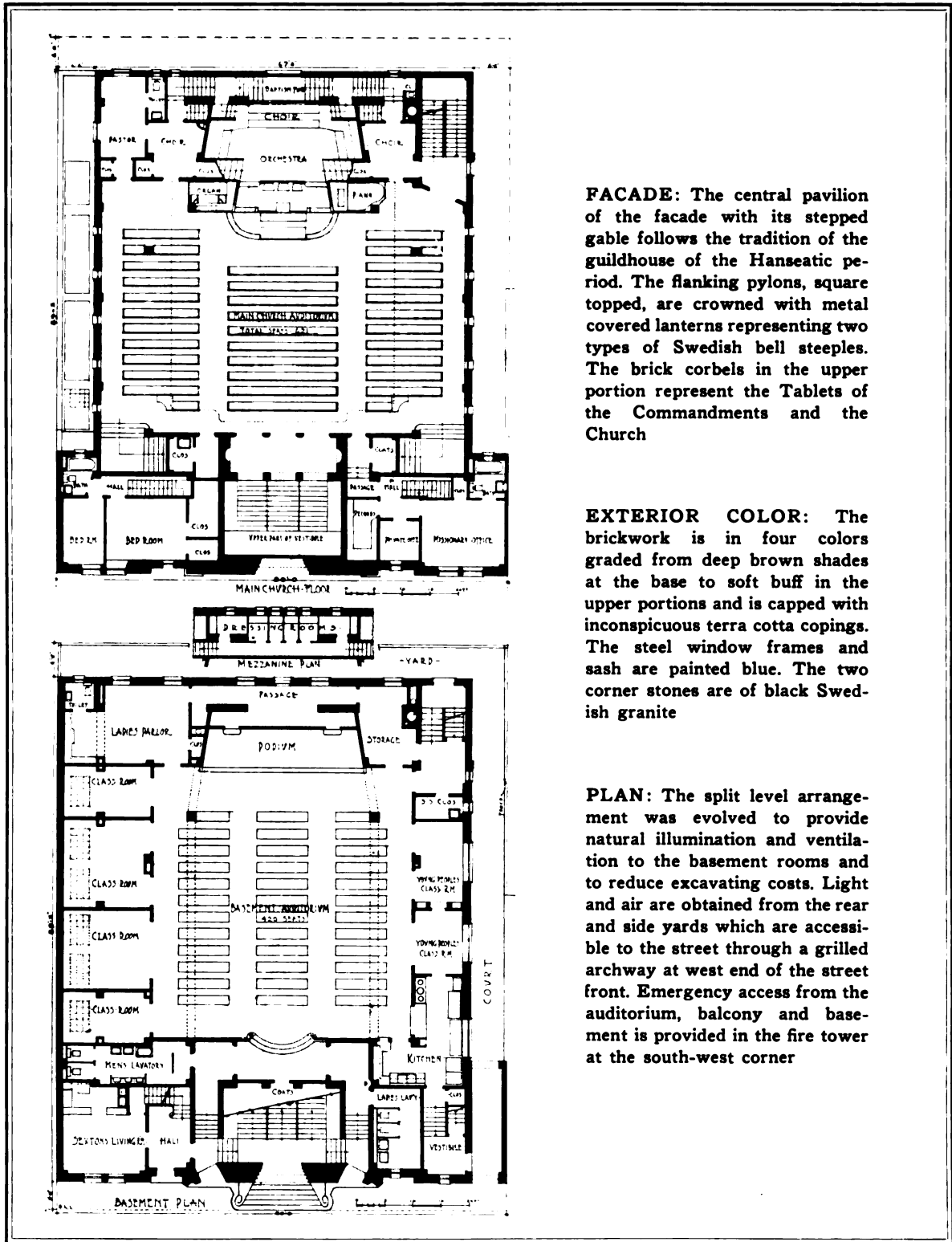
HOUSE OF MRS. W. H. ESHBAUGH
MONTCLAIR, N. J.
GOODWILLIE & MORAN, ARCHITECTS

FIRST SWEDISH BAPTIST CHURCH NEW YORK CITY



Danielson

MARTIN HEDMARK
ARCHITECT



FACADE: The central pavilion of the facade with its stepped gable follows the tradition of the guildhouse of the Hanseatic period. The flanking pylons, square topped, are crowned with metal covered lanterns representing two types of Swedish bell steeples. The brick corbels in the upper portion represent the Tablets of the Commandments and the Church

EXTERIOR COLOR: The brickwork is in four colors graded from deep brown shades at the base to soft buff in the upper portions and is capped with inconspicuous terra cotta copings. The steel window frames and sash are painted blue. The two corner stones are of black Swedish granite

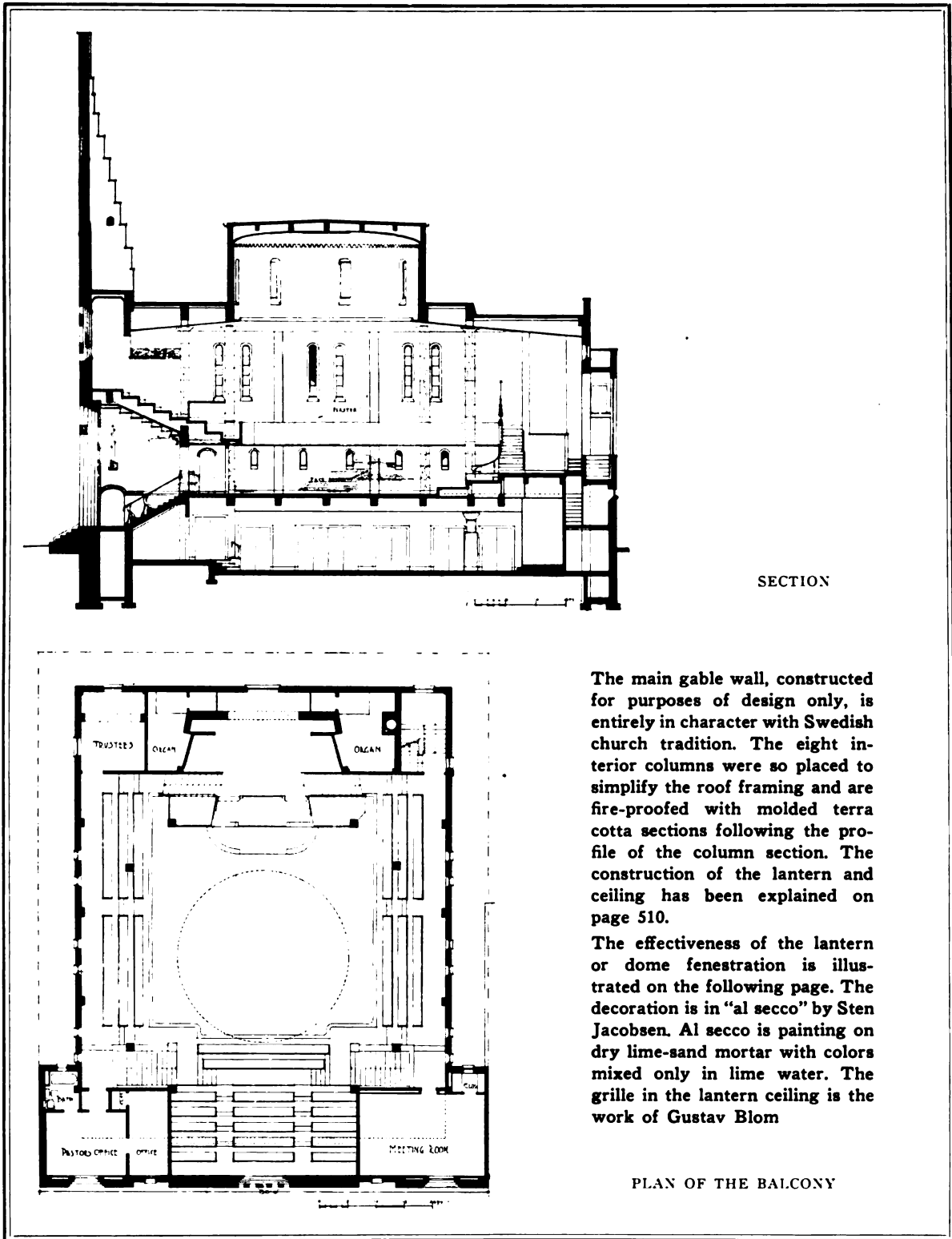
PLAN: The split level arrangement was evolved to provide natural illumination and ventilation to the basement rooms and to reduce excavating costs. Light and air are obtained from the rear and side yards which are accessible to the street through a grided archway at west end of the street front. Emergency access from the auditorium, balcony and basement is provided in the fire tower at the south-west corner

FIRST SWEDISH BAPTIST CHURCH
 NEW YORK CITY, N. Y.
 MARTIN HEDMARK, ARCHITECT



Danielson

FIRST SWEDISH BAPTIST CHURCH
NEW YORK CITY, N. Y.
MARTIN HEDMARK, ARCHITECT



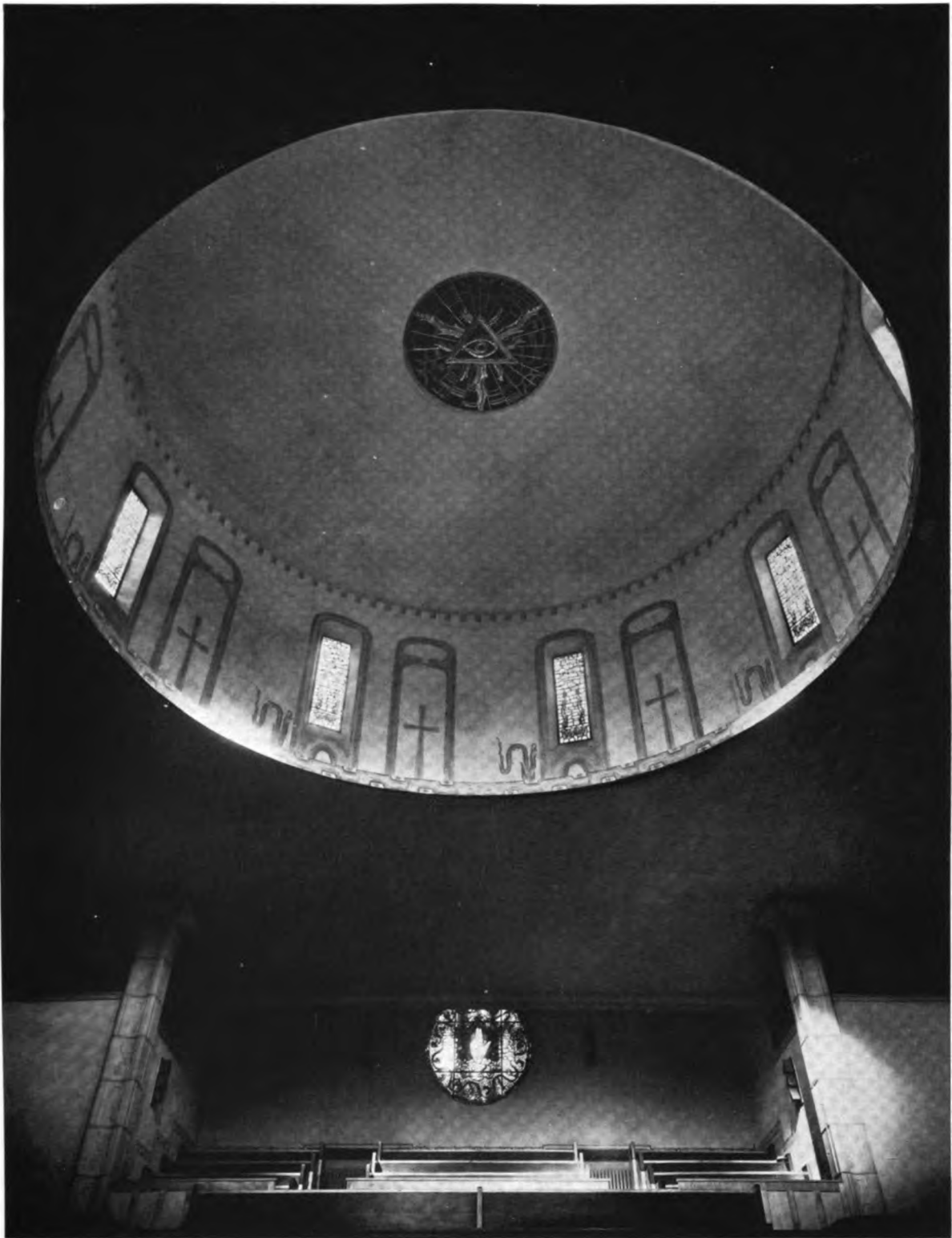
SECTION

The main gable wall, constructed for purposes of design only, is entirely in character with Swedish church tradition. The eight interior columns were so placed to simplify the roof framing and are fire-proofed with molded terra cotta sections following the profile of the column section. The construction of the lantern and ceiling has been explained on page 510.

The effectiveness of the lantern or dome fenestration is illustrated on the following page. The decoration is in "al secco" by Sten Jacobsen. Al secco is painting on dry lime-sand mortar with colors mixed only in lime water. The grille in the lantern ceiling is the work of Gustav Blom

PLAN OF THE BALCONY

FIRST SWEDISH BAPTIST CHURCH
 NEW YORK CITY, N. Y.
 MARTIN HEDMARK, ARCHITECT



Danielson

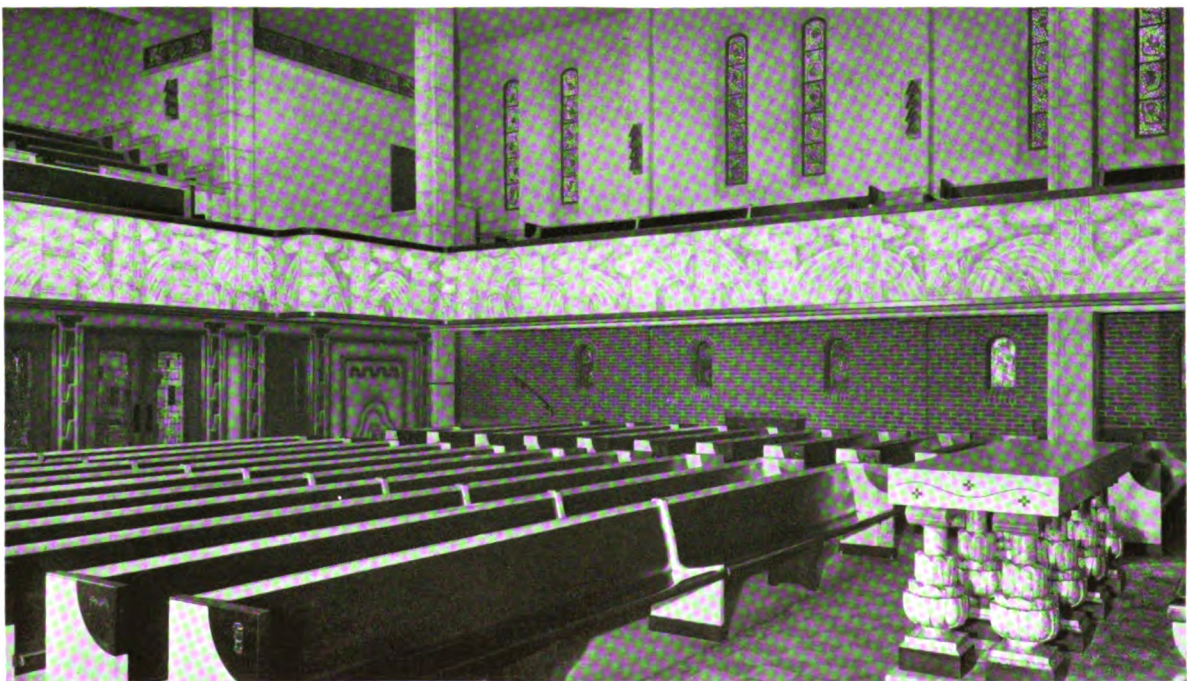
FIRST SWEDISH BAPTIST CHURCH
NEW YORK CITY, N. Y.
MARTIN HEDMARK, ARCHITECT



Sigurd Fischer

The general color scheme is buff and blue, first established in the block linoleum floor covering and lightened in the natural finish of the birch pews, the backs of which are ebonized birch. Organ screen and communion table are of natural birch with darker inlays. Doors, trim and newel posts are stained red-brown, antiqued, with polychrome treatment to carved and moulded portions. The ceiling and sidewalls have the color and texture of natural sand finished plaster. The side walls below the balcony are of brick

**Interior views of the
Main Church Auditorium**





Danielson

BASEMENT AUDITORIUM AND
DETAILS OF COLUMN CAPITOL

Sigurd Fischer

The decorative treatment and the material used in the Basement Auditorium are much the same as those noted for the Main Church Auditorium with the exception of the two columns toward the podium. The fresco painting in the narthex, the al secco decoration on the balcony fronts in the main auditorium, the wall painting in the prayer room, and the wall decoration in the lower auditorium were executed by Olle Nordmark. The al secco painting in the lantern of the main auditorium, and the frieze and beam decoration in the lower auditorium were painted by Sten Jacobsen from designs by the architect



FIRST SWEDISH BAPTIST CHURCH
NEW YORK CITY, N. Y.
MARTIN HEDMARK, ARCHITECT



Danielson

FIRST SWEDISH BAPTIST CHURCH
 NEW YORK CITY, N. Y.
 MARTIN HEDMARK, ARCHITECT

Sigurd Fischer



ABOVE: Fresco decoration on the main vestibule ceiling by Olle Nordmark. The central feature represents the towering main gable of the church. The lettering is in gold.

LEFT: Detail of small stained glass window under the balcony executed by Henderson Bros., of New York City from the architect's design.

BELOW: Wrought iron detail in main vestibule by Gustav Blom of Newport, R. I. The handrails are of heavy iron, ornamented with inlays of brass

Danielson





EDITORIAL

POLICY AND OPINION



THE FIRST STEP

THE organization of architects, dedicated to making "the profession of ever increasing service to society," meets in convention in San Antonio on April 14th, 15th and 16th.

The profession is part of an essential industry which is the most complex of any of our great industries, made up of many factors having interests conflicting not only among themselves, but often working counter to the public good.

Recognition of this complexity brings with it a realization of the need of leadership in the building industry,—an industry as yet unorganized as such and without effective coordination comparable to that of other industries.

All of the factors in building operate through the members of one profession,—architecture.

Of necessity, therefore, it would seem the prime function of the architect to coordinate the efforts of all the factors in the building industry to one common end,—the production of buildings that serve the various needs of society in being functionally efficient, economically sound and aesthetically satisfying.

The implications of this function of coordination demand most serious thought, especially when we consider the number of those involved in the production of a building,—the owner, architect, engineer, contractor, sub-contractor, manufacturer, craftsman, realtor, financier, lawmaker, economist, regional planner, and the legion of others. To bring about more effective coordination between all of these factors, or factions, is no small task, especially as the functions, responsibilities and prerogatives of each are not clearly defined as yet, or understood by all concerned. Mr. Kohn has already brought up this subject very definitely for discussion at the convention.

A DEFINITE move on the part of organized architects to study the component interests in the industry, the functions of each, and a method of correlating their efforts seems to be the first step necessary if the profession is to be "of ever increasing service to society."

Such a study, to which all the factors in the industry would contribute, would indicate more efficient methods of procedure, methods of eliminating waste and duplication of effort, and would indicate the advisability of founding a fact-finding research body for the industry. This research should include the study of supply and

demand regarding types of buildings, that planned development may ward off the depressions caused by speculative excessive production. In fact, the far-reaching effect of the act of leadership by architects in inaugurating a program of concerted effort cannot be predicted. Its need is recognized,—the industry awaits it.

Will architects take the first step to bring this about?

LEADERSHIP AND EDUCATION

THE unique position the architect should maintain in the building industry as the coordinator of effort calls for a man of deep social consciousness, great breadth of vision, extensive technical knowledge, executive ability and unquestioned integrity. The education of such men is the responsibility of the architectural school. The present system of education of architects was devised when the problems of architecture and building were less complex than at present, and the greatest need then seemed to have been aesthetic. The schools are still engaged largely in training designers or draftsmen rather than fitting men for leadership in the industry.

This larger function of the architect entails so much that fear will undoubtedly be expressed that the *art* of architecture will suffer if architects assume a larger rôle. Yet most of the troubles of the building industry may be traced to the lack of leadership. As long as architects are looked upon as the artists who are "hired to draw the plans," so long will architects continue to complain of low fees and the usurpation of work by others, with the resulting poor design. There appears to be an opportunity for the architectural schools to train architectural executives who will be better able to accept the responsibilities of leadership and the wider function which the present status of the industry demands. The schools can also continue to educate experts in plan and design, or others specializing in architectural engineering, both of which would be benefited by contact with the broader training and fuller understanding brought about by educational methods designed for the correlating executive-architect.

Kenneth K. Stowell

EDITOR

WHAT IS GOOD ARCHITECTURE?

BY

That much serious thought is being given to the fundamentals of architecture is evidenced by the comments received in reference to the editorials in our January issue. One, entitled "Our Objective," was concerned with the definition of Good Architecture; the other emphasized the business necessities of the present. These paragraphs are a few excerpts from many letters; others will be published later as space is available.

WILLIAM ORR LUDLOW
R. CLIPSTON STURGIS
GEORGE GOVE
FRANKLIN O. ADAMS
ALEXANDER TROWBRIDGE
H. B. WHEELOCK
HARVEY WILEY CORBETT
HAL F. HENTZ

"YOUR editorial is quite right about 'good architecture.' Anything to be really good must have balance.

"What the extremists are doing I would not call *good architecture*; it is *good experimenting*. It is unbalanced; it has placed most all of the weight on efficiency and economy. At least I am glad to have a lot of other fellows try out their notions on the public, because we don't know exactly what we need until someone sacrifices himself to the public good by making a lot of mistakes, but at the same time bringing to light some good things that will make for real progress.

"*Good architecture* must preserve balance by taking into account the emotional side of life, and who shall say that perhaps that is not after all the most important side.

"We pride ourselves on this being an age of reason; 'we have done with senseless ornament and mere copying of form suitable for the brick and mortar period.' But reason simply states the facts and draws conclusions from them. Emotion listens attentively and after the evidence is all in, takes what action it pleases. This is not an indictment of emotion; it is simply saying that as long as we are humans our emotions, and not rea-

son, are really the determining factor.

"Now the fine things of life,—yes, and the things that give us real joy,—are our emotions,—love, courage, faith, loyalty,—and perhaps it is fortunate that man will always be, in every finality, guided by these rather than by facts and logic. Facts and logic have their domain, but they are simply in a different world from emotions.

"We must conclude to let each have its own place and perform its own functions, just as we are pretty much agreed now that science and religion do not overlap,—they do not live in the same plane. And the place of the emotions is to determine what we shall do about it, when we have spread before us all that reason can collect.

"Emotions, then, besides being the joy-giving element of life, have and always will have the upper hand, and perhaps justly so, for as long as man is human,—meaning a creature with emotions and not merely a machine to make life from facts and logic,—just so long will the warm heart of love, courage, faith, loyalty, and not the chill hand of pure reason, control in *good architecture* as in all else."

WILLIAM ORR LUDLOW,
Ft. Lauderdale, Fla.

AN EXECUTIVE, NOT A PROMOTER

"In the main I agree with what you say editorially of the architect's work. He must be a good executive, a sound business man, he must design first to meet the needs of the case, and second to give it fine form. . . .

"To finance projects is an entirely separate profession, unrelated to the architect's work. No one man can do the work outlined above and the work of financing at the same time. If this work is properly to be done in an architect's office, he should have a man whose sole business it is to do

such work. Even then the architect is taking over another profession and I believe would be wiser if he went direct to a man trained professionally for that work and employed him for that service.

"I am then in agreement with your editorial except on the desirability of the architect becoming a promoter. There is the same objection to his being a promoter that there is to his being a contractor and builder."

R. CLIPSTON STURGIS,
Boston, Mass.

A BOMB AND A CHALLENGE

"Good Architecture? We are just licking our own fur like contented cats when we think or talk or write comfortably. Might it not be more practical for us to inquire: First, why our buildings are not good; second, if we can make them good; and third, how to go about creating Good Architecture?"

"Do we not yet realize that usually our building were poor because the financial and social system (or lack of system) under which they were built is economically unsound? How can there be much good architecture produced beneath the burden of exploitation all along the line? If the factor of exploitation could be removed from construction, would there not immediately develop a new Renaissance?"

"Cogitating the second question, will we not be led to face frankly and try to overcome our own stupidity and laziness and ignorance, and to consecrate ourselves daily to the service of humanity as expressed in good building?"

"And then the third poser,—'Aye there's the rub.' Is not the question rather a call to leadership than to retreat? Had the Dane boldly proclaimed himself Dictator and proceeded to rebuild the rotten state, might not his name have been remembered for success instead of for futility?"

"Whom else than its Architects has America today to look to for constructive thought? Have our military commanders, or our clergy, or our politicians, or our teachers, or our financiers, shown us who poisoned King Progress, once ruler of this most glorious State? Has one of them a

set of plans and specifications for a better organized commonwealth?"

"Are not Architects fitted by their nature as dreamers and their experience as executives to organize all the producers of whatever nature into a new party—not so much political as economic—the Constructive Party? Do they not constitute the only group that has ever visualized, even faintly, the possible development of our nation? Did they not study it in their school projects for ideal buildings and in their city planning schemes? Have they not proved their ability more convincingly than in these schemes by the fact that under heavy burdens they have nevertheless sometimes built fairly well? And are Architects not the only group fitted by practice to spend big money economically?—to visualize the recovery from our depression in a comprehensive way?"

"If the American Institute of Architects could or would call together master craftsmen of all kinds from the provinces of engineering, finance, labor, transportation, material manufacturing,—and after due consultation,—proceed with the interrupted building on a foundation as wide as our country, or even as the world,—and organize and carry on a program of road building, city reconstruction, farm house remodeling, power and light distribution, reclamation, education, penology, hospitalization, music and amusement, recreation and religious inspiration,—would not such a denouement demonstrate the power of constructive ideas? How could it be done, do you ask? How was the war waged, I counter. Leadership, enthusiasm, an ideal. . . . Or will we continue to fight in the grave of dead love as did the Melancholy Dane?"

GEORGE GOVE,
Tacoma, Wash.

ARCHITECTURAL JUDGMENT AND THE SCHOOLS

"I thoroughly agree with your description of Good Architecture and the necessity for stressing a more thorough understanding of the economic factors involved in the financing of the building. However, I believe that care should be exercised in attempting to emphasize any particular element of the requirements of Good Architecture because the degree of stress varies with each individual operation. It is true that perhaps economics requires more frequent emphasis and it is also true that it usually receives less in proportion than it should. Functionalism is a prerequisite in any attempt to produce worthy results.

"I am not sure but that we would be safer in establishing correct Architectural Judgment as the true foundation of Good Architectural work.

"Architectural Judgment must be schooled by

training and matured by experience. It must determine just what the problem is, its modifying factors, its objectives and its possibilities and then solve it with the nicety of balance required by Good Architecture. Lack of this judgment is at the bottom of every failure in results in any or all of the three departments of Architecture you have named,—arts, science and business.

"This judgment can be developed in any individual, affected, of course, by certain natural gifts. It is failure to do this that constitutes the greatest weakness of our architectural schools. They really do not train men to become architects but merely draftsmen and designers, leaving it to the chance of individual discovery as to the real essentials of true architectural preparation."

FRANKLIN O. ADAMS,
Tampa, Fla.

PLAN, THE FIRST ESSENTIAL

"I believe plan should come first. Any building with a bad plan is not good architecture no matter how good is its exterior. Why can we not start with the query (assuming most buildings to be well planned). 'What quality is possessed by some buildings which makes them immeasurably superior to other buildings having the same or a very similar plan?' It is clear that in such a situation one man will design a better building than another man, but how may we agree as to the qualities that make it better?"

"I believe better architecture is going to be evolved by the scheme of starting from scratch with no ornament. Without familiar cartouches, eggs and darts, beads and reels, garlands and swags, and all the rigamarole of ornamental forms we have used all our lives, what will be our first move? It will be to give to *proportion* an attention it has seldom heretofore enjoyed. The extreme simplicity of our first designs is going to make them seem crude and we will be tempted to apply ornament. But no amount of crude Mayan

FINANCE MEDDLING

"I agree that 'architectural prosperity is dependent on available funds,' but I do not agree with your idea that architects should be so connected with financial interests that they can obtain financial loans any better than anybody else.

"'Easier and more plentiful financing' means to me more disaster of the same kind that we are now trying to outlive. I believe there should be a basic principle established by the loan men that would limit the amount of loans on any type of building, and also limit the amount of commission to be paid so as to avoid favoritism and avoid greed on the part of the financial agent in attempting to get all there is in it for his own pocket.

"If the loaning agencies could agree to standardize their methods of establishing loans and conduct of paying out and supervising loans we would be in a much healthier condition than we are today."

H. B. WHEELOCK,
Chicago, Ill.

A DISASTROUS BUSINESS

"The temptation to run an architect's office as primarily a business can prove to be a disastrous idea to follow, if it pulls an architect's organization away from the fundamental principal that our profession is an art rather than a business.

detail or barbaric forms from darkest Africa are going to 'modernize' our work. There are many motives in use suggesting the sharp angles and points of a lightning flash. Some designers have a curious idea that these details are modernizing in their effect—whereas they are new to us merely because we have not in the past thought of them as material for decorative design. I believe modern architecture, and by that I mean 'Good Architecture,' will not be achieved through the clever use of decorative detail. Much that is being done today under the mistaken notion that it is modern is going to be scrapped inside of ten years and will be called old stuff. A few outstanding examples will survive, examples showing a fine sense of proportion, an unerring feeling for scale and a fine taste for the little detail that is used. Good work will be done by a few thoughtful men, who are going to refuse to be carried away by fads of the moment but, instead, will search for an honest expression of modern construction and for design that is not imitative."

ALEXANDER B. TROWBRIDGE,
Washington, D. C.

ARCHITECTS, NOT PROMOTERS

"I have read your editorials, in the January issue of THE ARCHITECTURAL FORUM and coincide with your views. They are clearly and concisely expressed and touch the fundamentals of the architect's problem.

"I could suggest only one criticism and that is where you say 'the architects who are equipped to aid clients to obtain money for building, both through financial knowledge and financial contacts, are in the strongest position to go ahead with their work,' suggests indirectly that architects engage in financing operations.

"This may not have been your idea but I feel very strongly that while an architect must have a general knowledge of economics and financial arrangements, it is most unfortunate if he personally becomes involved in any manner of financing of buildings. To render proper service to his client he must always remain totally disinterested in any particular phase of the building operation."

HARVEY WILEY CORBETT,
New York, N. Y.

"However, it is easily possible for one to maintain the highest ideals of the profession and still organize his office so that efficient and business-like service is rendered the client."

HAL F. HENTZ,
Atlanta, Ga.

THE ARCHITECTURE OF MERCHANDISING

Important points of design that stimulate sales and help advertising. Illustrations are of the Peck-& Peck Store in New York, John Matthews Hatton, architect.

BY

JOHN MATTHEWS HATTON



THE architectural setting for the display of merchandise is a phase of advertising too often neglected. It should serve to present the goods in the right dramatic manner in order to attract the attention of the casual passerby and focus his aimless attention on a definite object. The technique of this dramatic manner is commonly used by those who compose pictorial advertisements for newspapers and magazines. Sometimes it is good drama, and sometimes not. The high cost of front footage can pay its way only by good design in the right dramatic manner.

The first rule of good commercial design is the first rule of all design—simplicity. Irrelevant detail in the setting kills the interest in the detail of the merchandise displayed. How often one sees a window background which is so complicated that the merchandise is lost to view—a perfect example of camouflage. Window designs should be composed entirely of goods and accessories in sil-

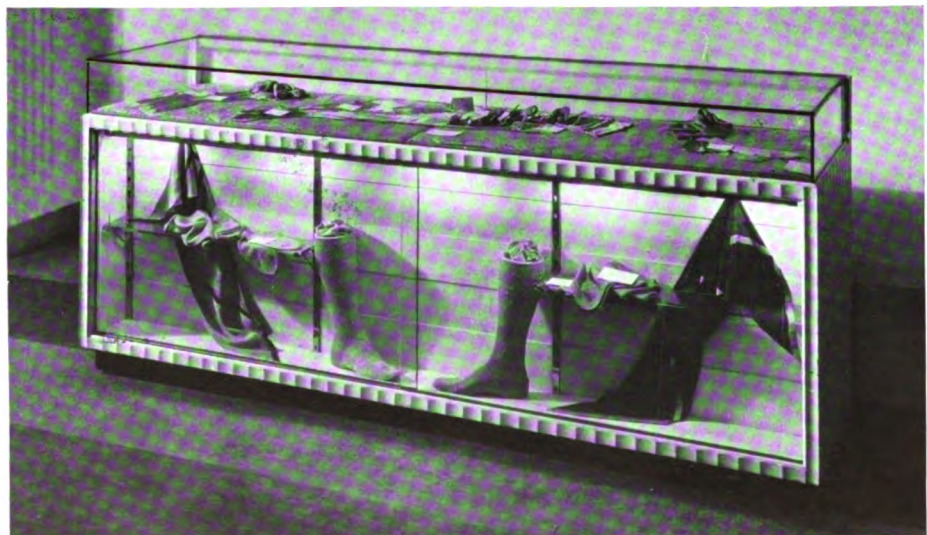
houette against a simple harmonious background.

The proportion of display windows in relation to the size of the articles shown is important. In many stores the windows are so high that the eye wanders to the valance line, or to some unnecessary ornament in the background, or to an exposed glaring light instead of immediately to the display. The architectural setting should have just enough richness in the ornament or in the decorative value of the materials used to insure the dignity of the facade and to focus the interest on the display. Carefully concealed illumination is paramount. The effect ought to be that of sunlight. It is also important to continue the display units from the windows up to the entrance door because window shoppers must be brought over the threshold. The vestibule should also contribute to an inviting entrance.

On entering the store the most important factor is lighting. Here again the effect should be that

Richard Averill Smith Photos

A simple, harmonious design is the best background for the display of merchandise. A show-case in the Peck & Peck store, New York





Richard Averill Smith

THE FIRST FLOOR DISPLAY ROOM

The floor is covered with alternate strips of light and dark cork, designed to carry the eye to the rear of the store. The walls are white; the trim and base, red. The round display frame is of chrome plate, and the show case is made of plate glass, aluminum, and black formica

Early American room in the Peck & Peck store. The floor is of teak plank; the wall panels, beams and pilasters are pine; scenic wallpaper panels flank the fireplace and Dutch oven. The three arches, hung with red curtains, lead to fitting rooms, are also papered with scenic designs



Richard Averill Smith

of sunlight achieved by indirect illumination. Direct exposed light is the strongest visual value in the store. It attracts the eye immediately, and distracts the attention from the level of the merchandise display. All light stronger than the general illumination should come from concealed sources. Architectural and decorative motifs must serve as focal points for merchandise display. The beautiful objects which are sold today make striking pictures. When displays are used in this manner, the atmosphere of the store becomes charged with interest and vitality. Concentrated interest in a brilliantly lighted display on the rear wall of the store opposite the entrance will intrigue the curiosity of the customer and impel him to explore and examine the merchandise beyond the center. It is also advisable to enrich the walls around the entrance to sustain the interest and leave a vivid impression on the visitor, who may even turn back for another purchase suggested by a display at this point.

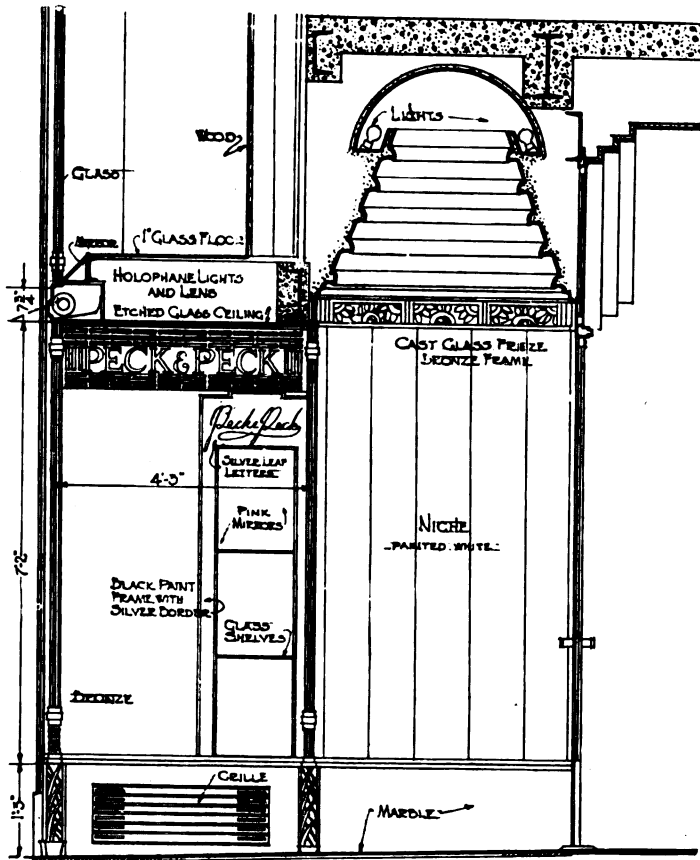
Color is a very strong contributing factor which affects the entire atmosphere of the interior. It also enhances the visual brilliancy of the merchandise and adds to its appeal. Modern colors

are full of light and they demand backgrounds of pure white or light tones, in harmony with the general tones of the merchandise. Drab interiors do not break down sales resistance.

For some types of merchandise, rooms that are residential in character offer excellent settings for display. The early American pine room shown in the illustration was designed as a salesroom for sports clothes. The quiet and restful atmosphere offers relaxation to the customer, concentrating his interest on the selection of clothes in surroundings conducive to ease and comfort.

Each type of store has its own problems in design and plan, but the same basic principles apply to all. There must be an exaggerated thought kept in mind concerning the dramatic display of merchandise, because the only object of the store is the largest possible sale of merchandise.

The architecture of merchandising is an engaging study and the field for development is rapidly expanding as competition steadily becomes more keen among merchants. The future will bring forth surprisingly interesting developments in store design that will greatly simplify merchandising and make shopping an exciting adventure.



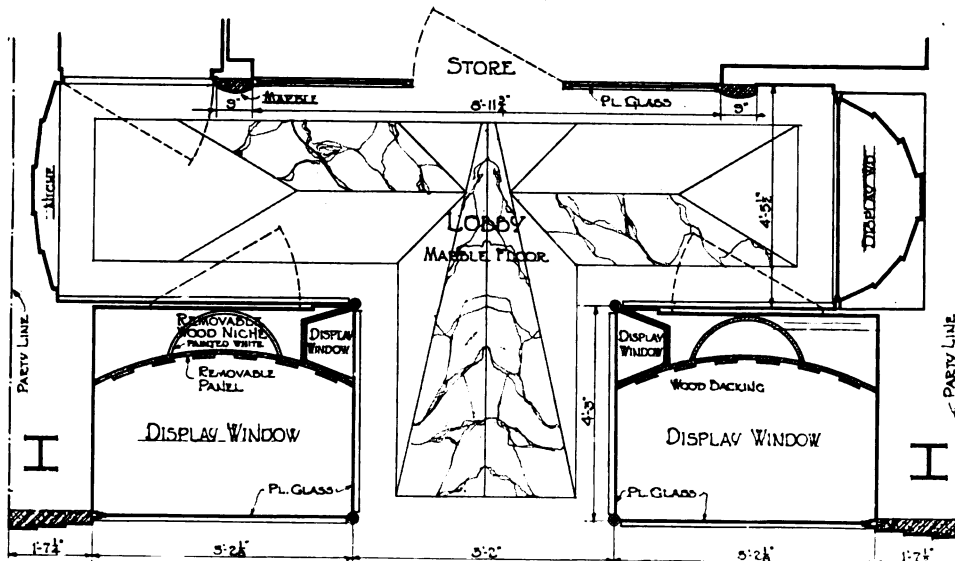
SECTION THROUGH
ENTRANCE

The base is Black marble. The grille, as well as all other bronze work is of a bluish green color. The firm name and a simple pattern is etched on the plate glass windows to form a valence. The niches are of painted Keene's cement and are lighted from above through carved glass panels in the ceiling. The floors of the display windows have been kept low to permit the best possible view of the merchandise in them

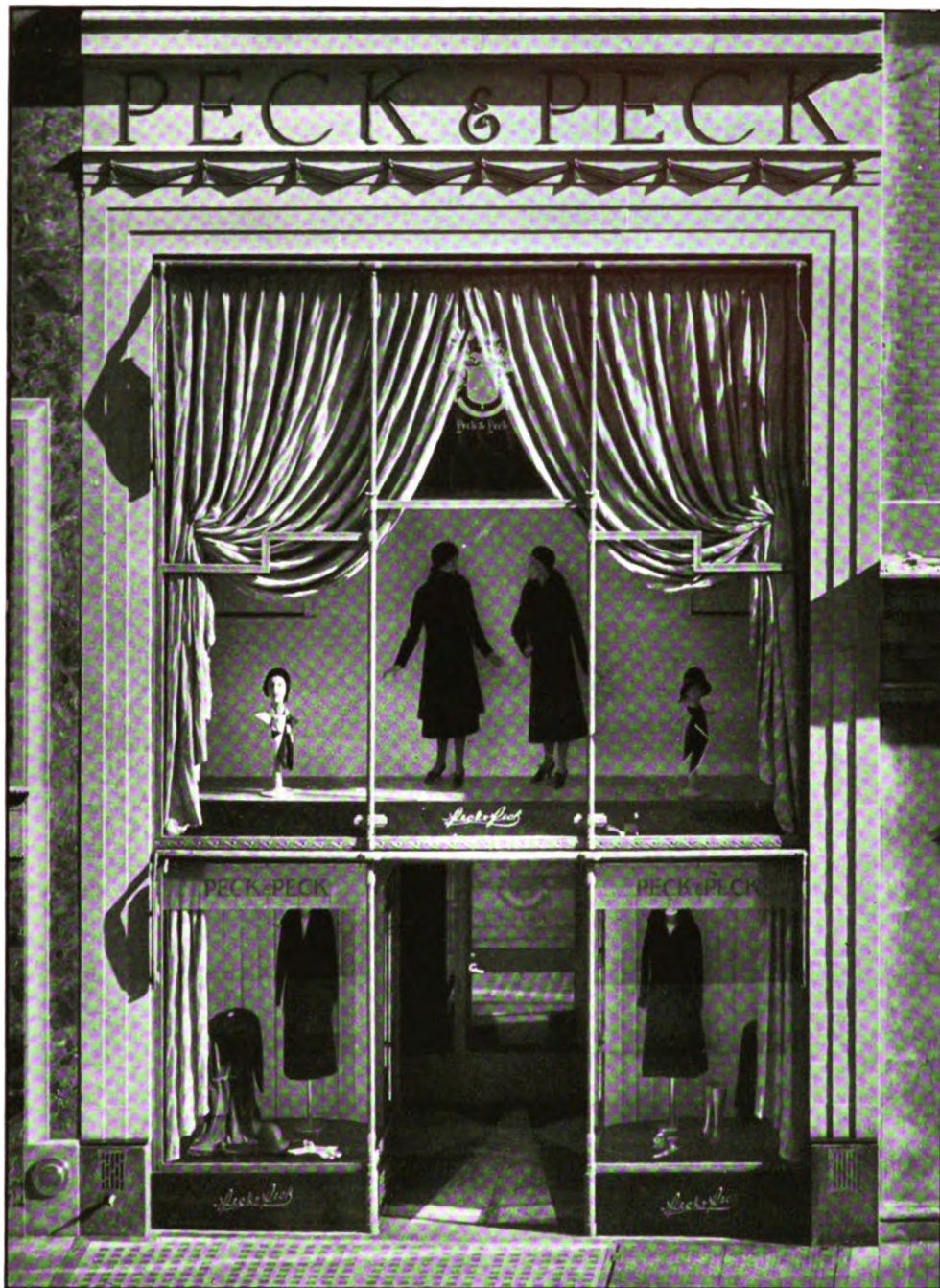
PLAN OF THE LOBBY

The floor is patterned in Belgian black and cream marble. The pilasters on either side of the store entrance are of Black marble, and the backs of the display windows are of wood, marbled. The windows themselves are fitted with removable wooden panels painted white. The floors are of black brushed formica

STORE FOR PECK & PECK
NEW YORK CITY, N. Y.
JOHN MATTHEWS HATTON, ARCHITECT



THREE SPECIALTY STORES



Richard Averill Smith

STORE FOR PECK & PECK
NEW YORK CITY, N. Y.
JOHN MATTHEWS HATTON, ARCHITECT



Richard Averill Smith

The elevator lobby on the third floor. The floor is of red and white inlaid linoleum. The pilasters are light red with black bases. The ceiling is white with curved recesses which conceal the lights. Mirrors are used as wall panels opposite the elevator doors. The arch leads to the fitting rooms, formed by an arrangement of fixed floor screens

STORE FOR PECK & PECK

NEW YORK CITY, N. Y.

JOHN MATTHEWS HATTON, ARCHITECT

THE EASTMAN KODAK SHOP

NEW YORK CITY

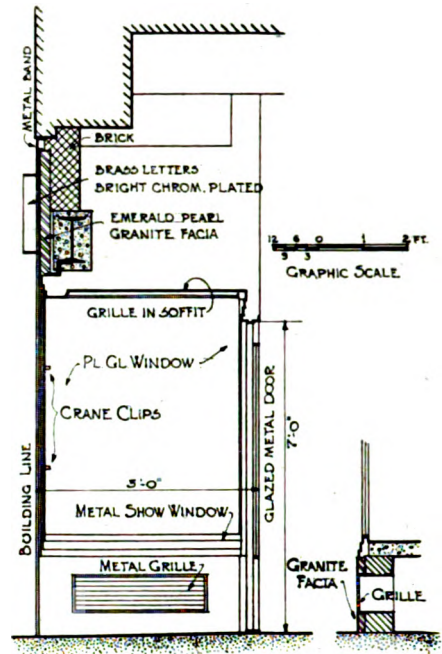


John Wallace Gillies

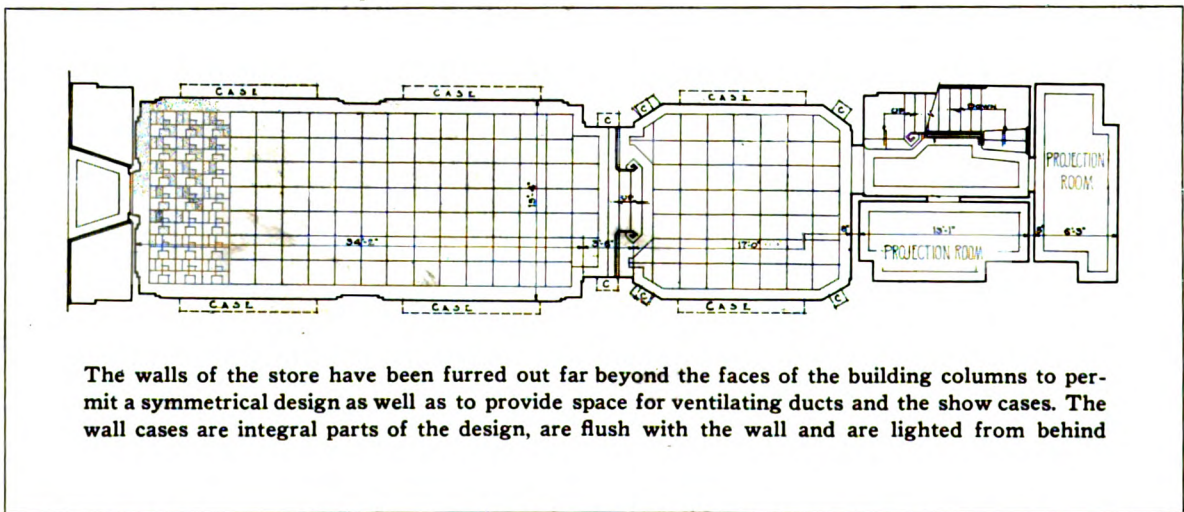
WALTER D. TEAGUE, DESIGNER
R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies



A DISPLAY WINDOW AND SECTION THROUGH ENTRANCE

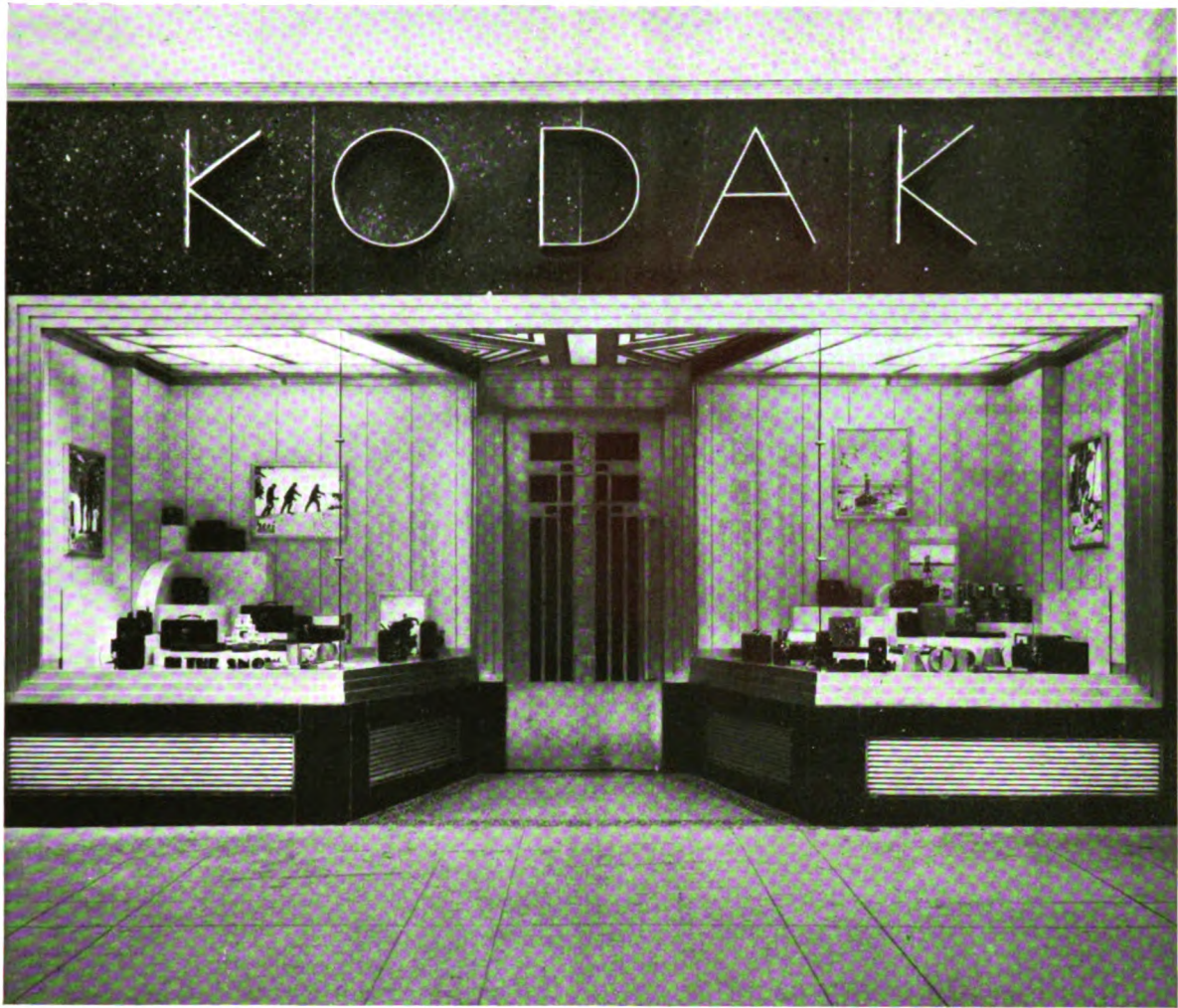


The walls of the store have been furred out far beyond the faces of the building columns to permit a symmetrical design as well as to provide space for ventilating ducts and the show cases. The wall cases are integral parts of the design, are flush with the wall and are lighted from behind

EASTMAN KODAK SHOP

NEW YORK CITY, N. Y.

WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies

COLOR: The entire design was conceived as providing a neutral setting for the display of the photographic enlargements and the various colorful objects of Eastman Kodak manufacture. It was executed, therefore, in varying tones of silver, gray, and black. The finish of the various materials was chosen with the same object in view. The display space draws the eye because it is of a light, dull finish in contrast to the dark, polished enframement.

MATERIALS: The facia and window bases are of emerald-pearl granite, but appear almost black in comparison with the other materials. The lettering, the muntins in the window soffits, and the pattern over the entrance are of polished chrome plate. The window frames and settings, the doors, and the grilles in the window bases are of benedict nickel. The walls of

the show windows are of wood, flush panelled and in-laid with vertical strips of polished chrome plate. They were lacquered white and then sprayed with a silver mist, giving a light, neutral gray background to the objects on display. The lighting is entirely from above, the soffits being units of frosted glass.

DESIGN: The display counters have been kept low, better to attract attention, and the objects are displayed on plain standards of a finish similar to that of the walls. The grilles in the window bases serve as air intakes for a system of conditioned ventilation, which furnishes cleaned, heated and humidified air to all parts of the store. Clips are used at the window corners as an aid to complete visibility instead of the usual frame, and ornament is confined to the entrance where it does not attract attention from the windows

E A S T M A N K O D A K S H O P

NEW YORK CITY, N. Y.

WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies

E A S T M A N K O D A K S H O P
NEW YORK CITY, N. Y.
WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies

E A S T M A N K O D A K S H O P
NEW YORK CITY, N. Y.
WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies

Looking from the entrance toward the rear of the store. A neutral setting for the display of merchandise has been developed here as well as on the exterior, the general color scheme being silver, silver gray, and black. The floor is composed of three tone gray and black terrazzo, laid in blocks to form an irregular pattern which is outlined by wide strips of benedict nickel. The walls are panelled in English harewood of a light, silver gray tone. The wood is laid in flush panels to take advantage of the variation in the grain. Black formica is used as a baseboard and as an outline of the wall cases. The pilaster caps, the cornice, and the moldings are of unpolished chrome plate

E A S T M A N K O D A K S H O P

NEW YORK CITY, N. Y.

WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies

Looking from the Cine-Kodak Room toward the entrance. The rug is rose—the only note of color in the shop—and the furniture is silver. The steps are black marble and the railing is chrome plate. The lighting throughout the store is indirect; the fixtures are executed in polished chrome, those in the ceiling being simple rectangular boxes with sides and bottoms of opal glass, and those on the walls being prisms of the same materials. At the rear of the shop, under the mezzanine, are two small projection rooms where amateur photographers can view their own moving pictures in privacy. Both rooms are treated in rose and silver, with silver furniture and lighting fixtures of chrome plate

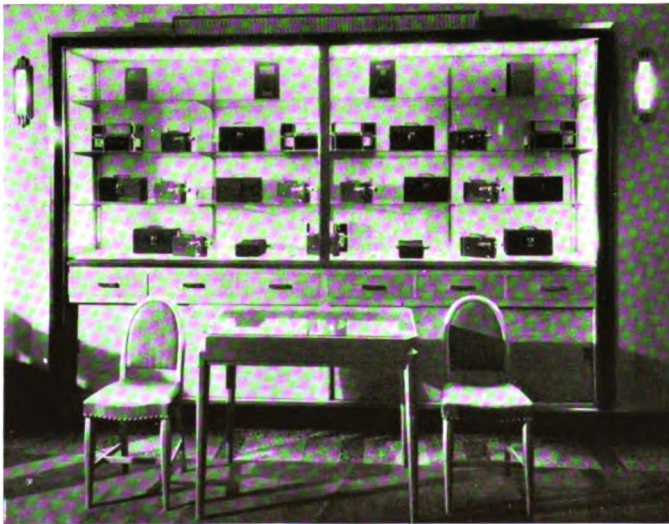
E A S T M A N K O D A K S H O P

NEW YORK CITY, N. Y.

WALTER D. TEAGUE, DESIGNER; R. B. SHERBOURNE, ASSOCIATE



John Wallace Gillies Photos



CINE-KODAK ROOM
DETAIL OF WALL CASE

EASTMAN KODAK SHOP
NEW YORK CITY, N. Y.
WALTER D. TEAGUE, DESIGNER
R. B. SHERBOURNE, ASSOCIATE

A COSMETIC DISPLAY STORE



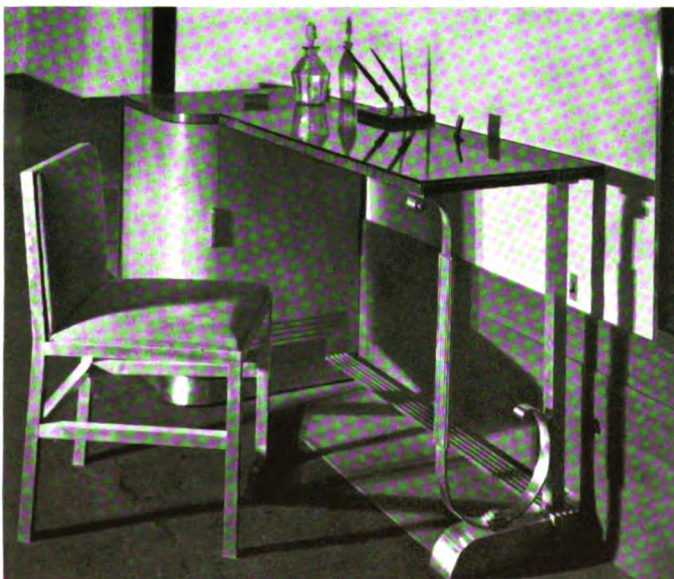
Tebbs & Knell

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS



Tebbs & Knell Photos

SHOP FOR BOURJOIS, INC.
 NEW YORK CITY, N. Y.
 THOMPSON & CHURCHILL, ARCHITECTS



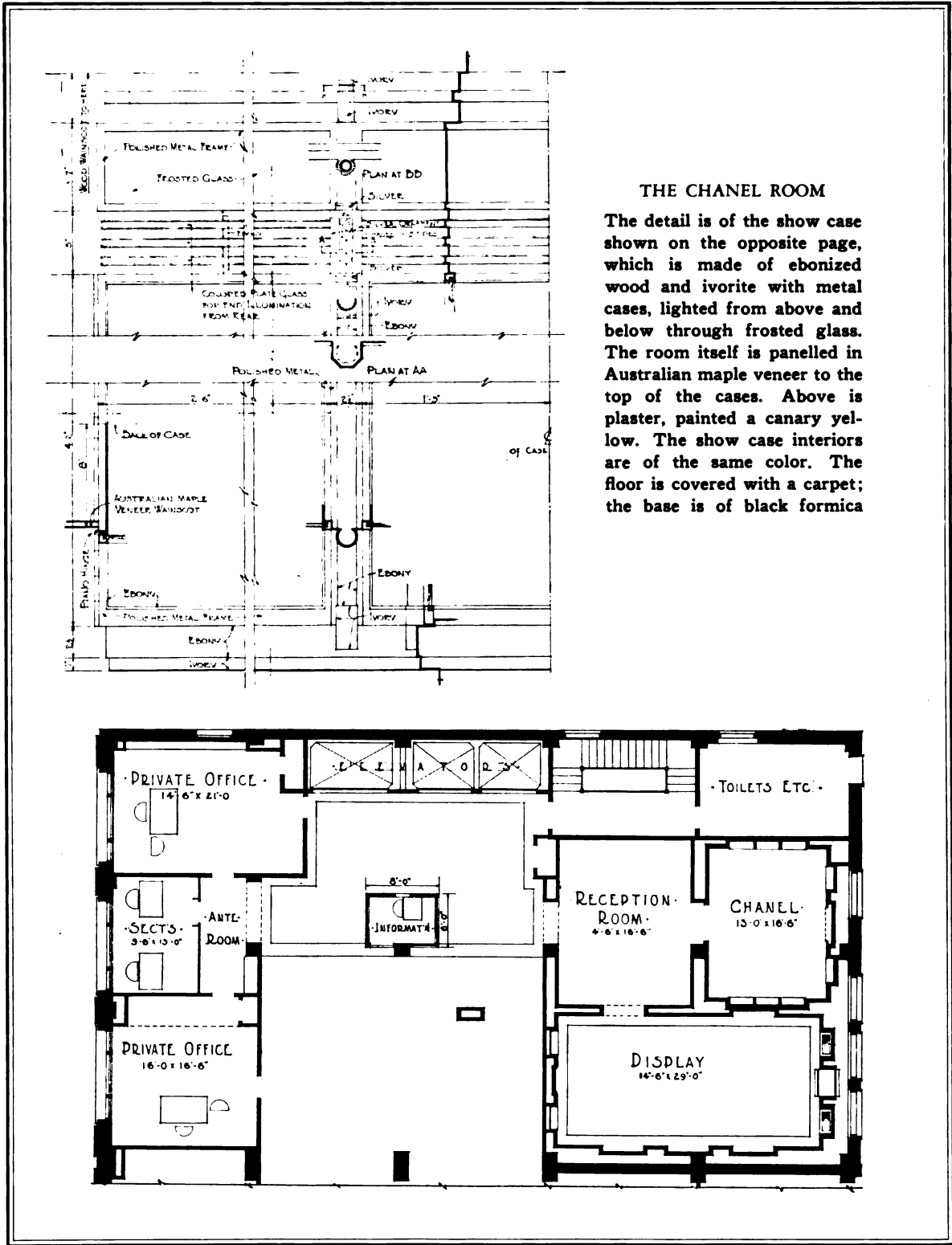
THE DISPLAY ROOM

The floor is entirely covered with a mulberry colored rug. The base and low wainscot are of natural finish mahogany. The walls are painted in three shades of very light gray, and the ceiling is a dull white. The trim of the painted metal show cases is of German silver, and the table in the center of the room is made of glass, chrome plate, and gunmetal, with a base of black formica. Gunmetal, trimmed with gold is used for the large mirror between the show cases. The upholstery of the chairs is light green



Tebbs & Knell

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS



THE CHANEL ROOM

The detail is of the show case shown on the opposite page, which is made of ebonized wood and ivorite with metal cases, lighted from above and below through frosted glass. The room itself is panelled in Australian maple veneer to the top of the cases. Above is plaster, painted a canary yellow. The show case interiors are of the same color. The floor is covered with a carpet; the base is of black formica

SHOP FOR BOURJOIS, INC.
 NEW YORK CITY, N. Y.
 THOMPSON & CHURCHILL, ARCHITECTS



Tebbs & Knell

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS



Tebbs & Knell

THE SHOP is essentially a place to show merchandise to the wholesale trade, and effort has been made to provide a setting that would arouse the interest of the buyers, create an atmosphere indicative of the type of products on display, and at the same time develop a background that would enhance their attractiveness.

THE RECEPTION ROOM: The room is shown on page 457. The carpet is of three tones of a neutral gray green, the ceiling is cream, and the wall panels are painted in three graduated tones of light blue green with a black formica base. The panel edges are silvered. The chairs are upholstered in a peach and

yellow pattern. The mirror is of polished gunmetal, and the wall cabinet is of sycamore, inlaid with wood and metal. The table is similar, in materials and construction, to that in the Display Room.

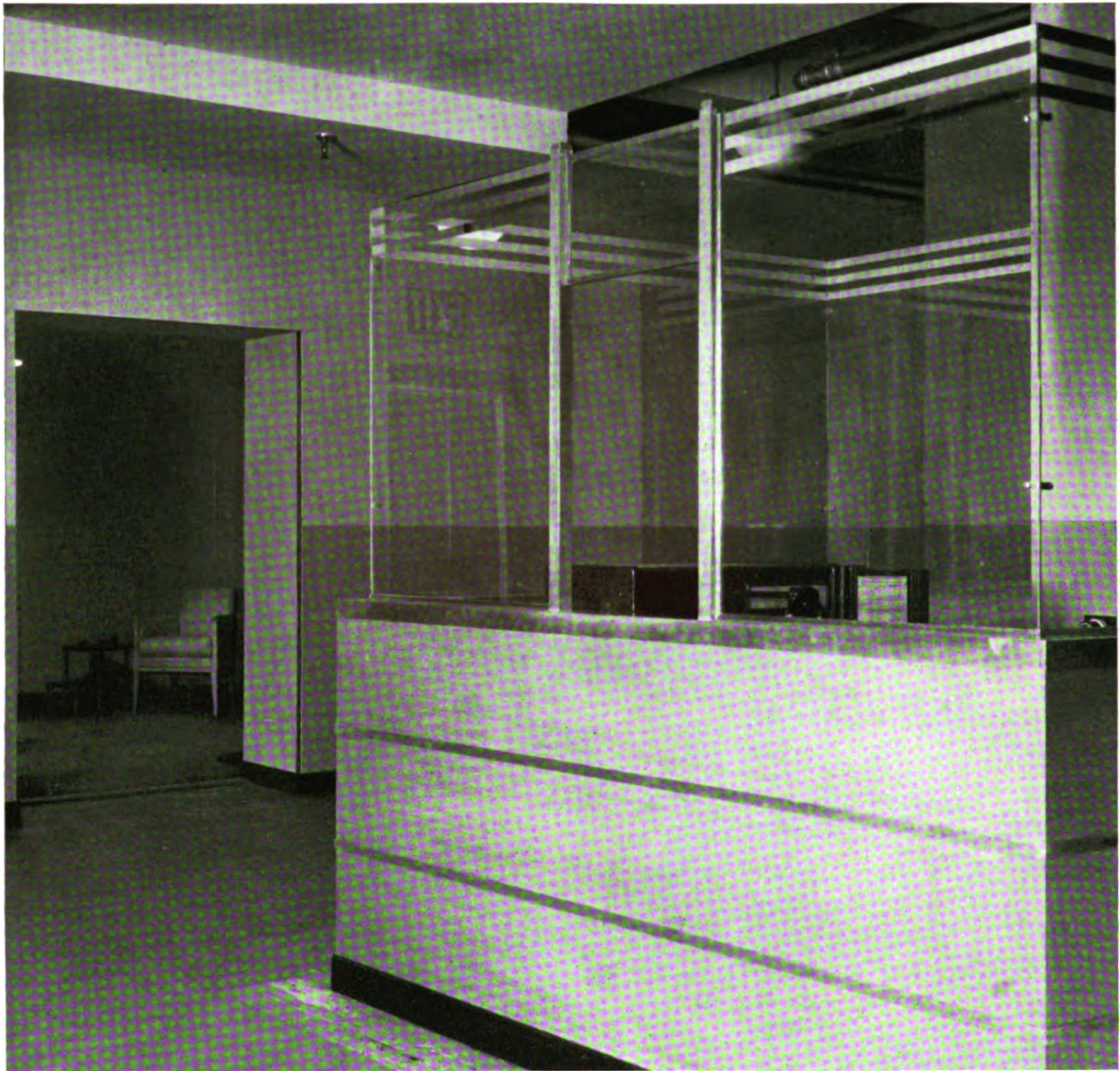
PRIVATE OFFICE: The room above is a corner of a private office and shows the sample cabinets. The floor is of waxed green linoleum with a base of formica. The wainscot is of waxed, natural color oak, set with slightly projecting strips of brushed aluminum. The walls above are plaster, painted light tan. Notice the simplicity of the door setting and the sliding doors of the cabinets. Door and shelves are natural oak, waxed

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS



Tebbs & Knell

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS

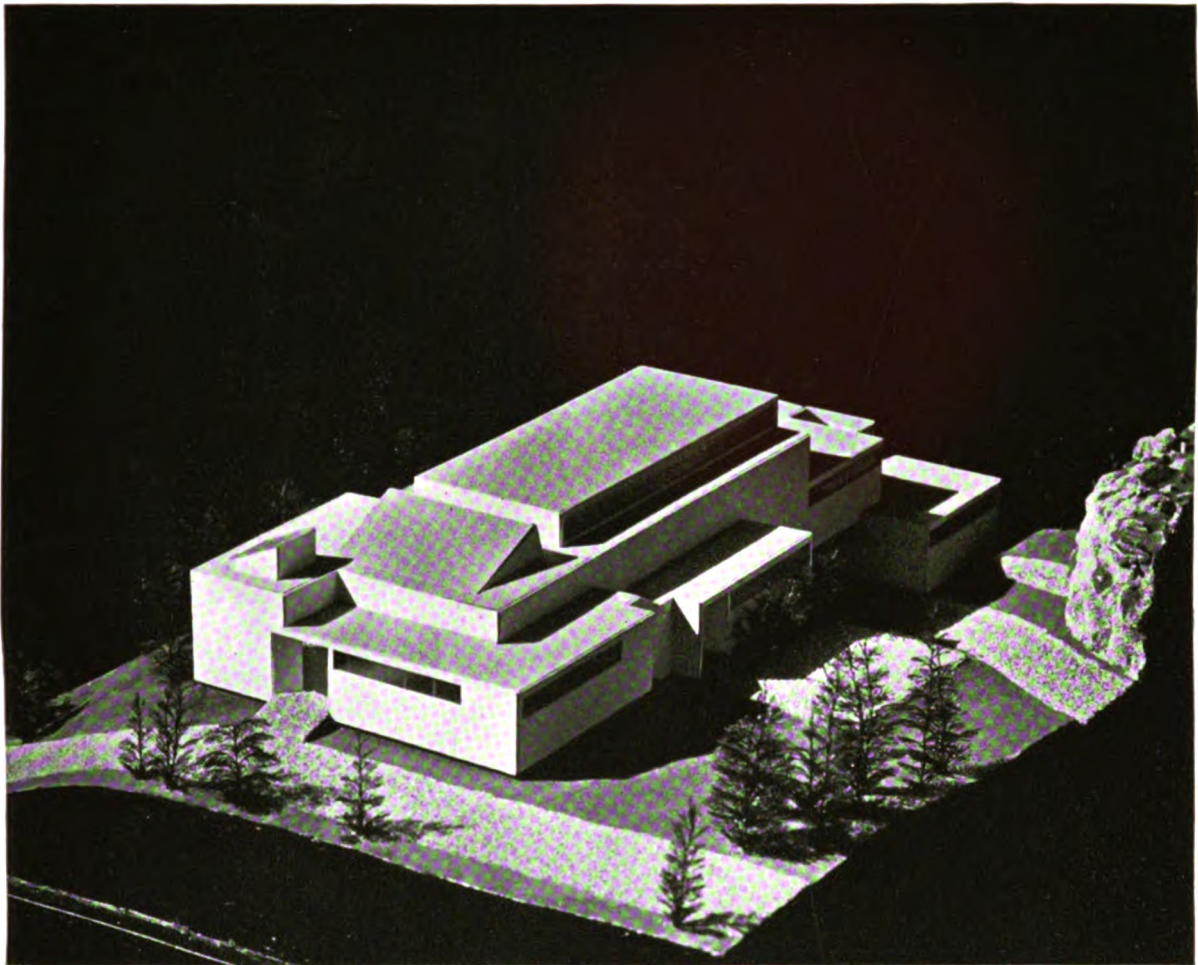


Tebbs & Knell

The information booth. The base is of natural oak, waxed, with slightly projecting strips of brushed aluminum. The base is of black formica; the floor is rubber tile. Notice the narrow aluminum mullions and corner bars of the cage

SHOP FOR BOURJOIS, INC.
NEW YORK CITY, N. Y.
THOMPSON & CHURCHILL, ARCHITECTS

A COMMUNITY ART CENTER



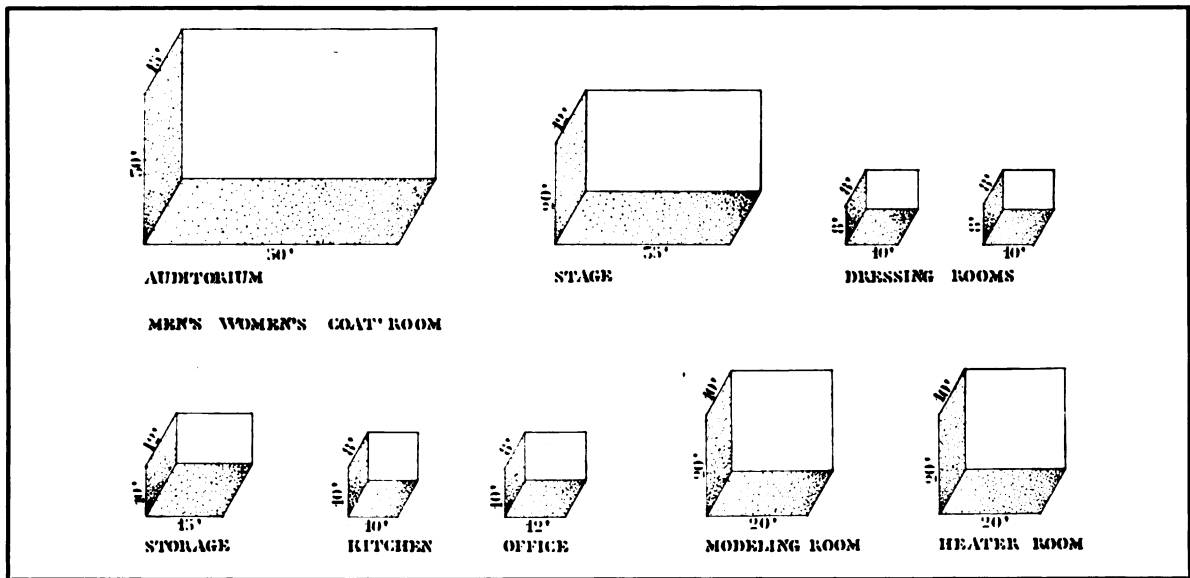
Shannon

AIRPLANE VIEW
OF THE MODEL
FROM THE REAR

REQUIREMENTS: An art club with interests in painting, sculpture, music, drama, and landscape gardening required a permanent building with provision for a combined exhibition hall and auditorium, studios, and other rooms, in sizes as indicated on the following page

SITE: A plot facing to the North on the Boston Post Road at Darien, Conn. The ground slopes abruptly to an upper level, 15 feet above the highway. An old roadbed near the eastern end of the plot is about eight feet lower than the plateau level chosen for the building site. There are several large trees scattered toward the front. A thickly wooded grove and outcropping of irregular rock form a picturesque background

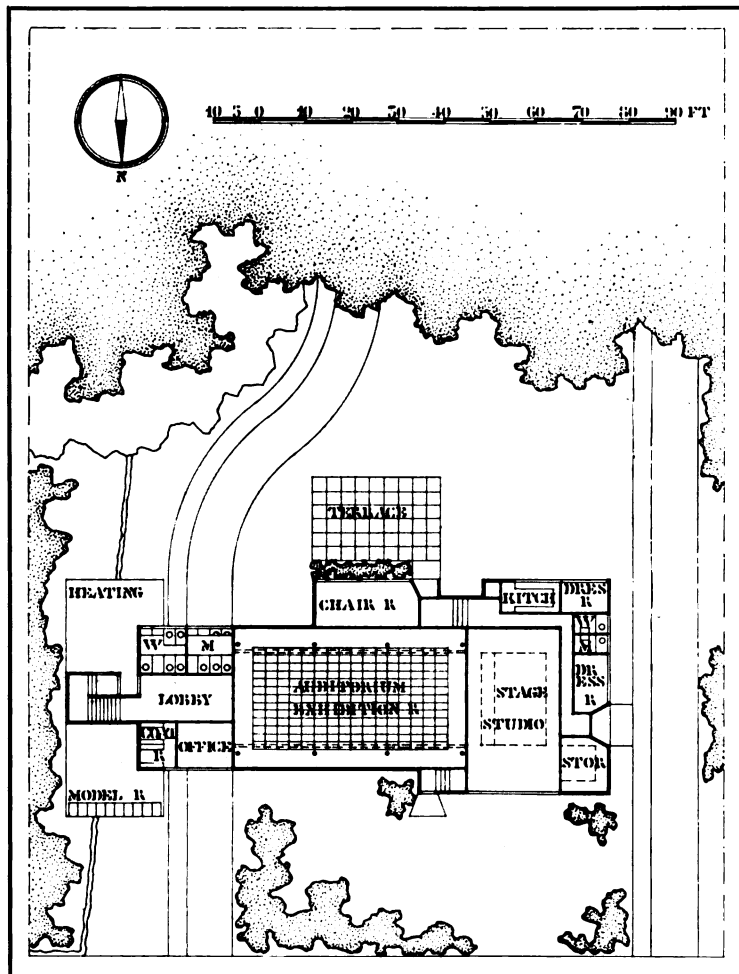
D A R I E N G U I L D H A L L
DARIEN, CONNECTICUT
A. LAWRENCE KOCHER & ALBERT FREY, ARCHITECTS



D A R I E N G U I L D H A L L
 D A R I E N , C O N N E C T I C U T
 A . L A W R E N C E K O C H E R & A L B E R T F R E Y , A R C H I T E C T S

ISOMETRIC OF
 REQUIRED ROOMS

The exact room volumes were the elements to be grouped, lighted, and adjusted to the site



PLAN OF THE HALL

The relation of the rooms is shown at the upper level. There is a parking space at the rear and an auto driveway encircles the building. The auditorium and exhibition hall are combined, and the large stage serves also as an art studio. The terrace faces a wood to the south, forming an attractive outdoor area which will be used for afternoon teas and garden parties



Shannon Photos

TWO VIEWS OF THE MODEL. BELOW
IS THE PASSAGE UNDER THE
BUILDING WITH THE MAIN ENTRANCE

The difference in level made it possible to eliminate ex-
cavation and permitted entrance to the building by a pas-
sageway. Each room has windows suited to its purpose



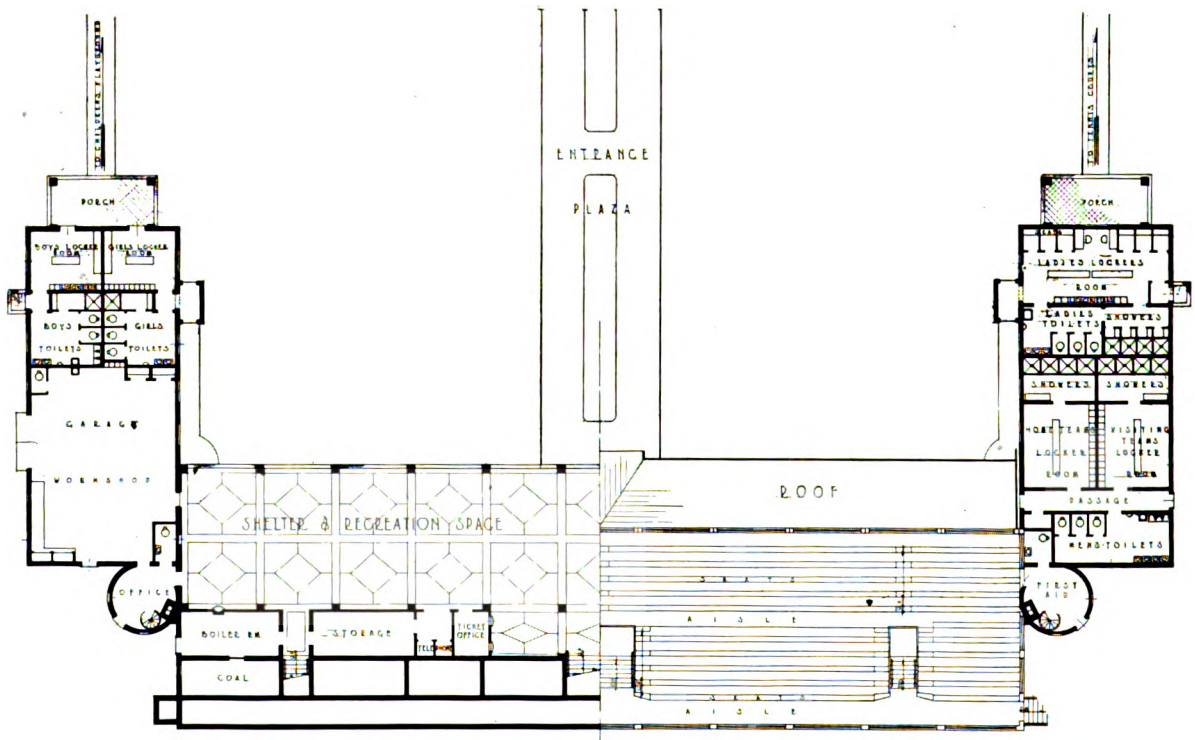
D A R I E N G U I L D H A L L

DARIEN, CONNECTICUT

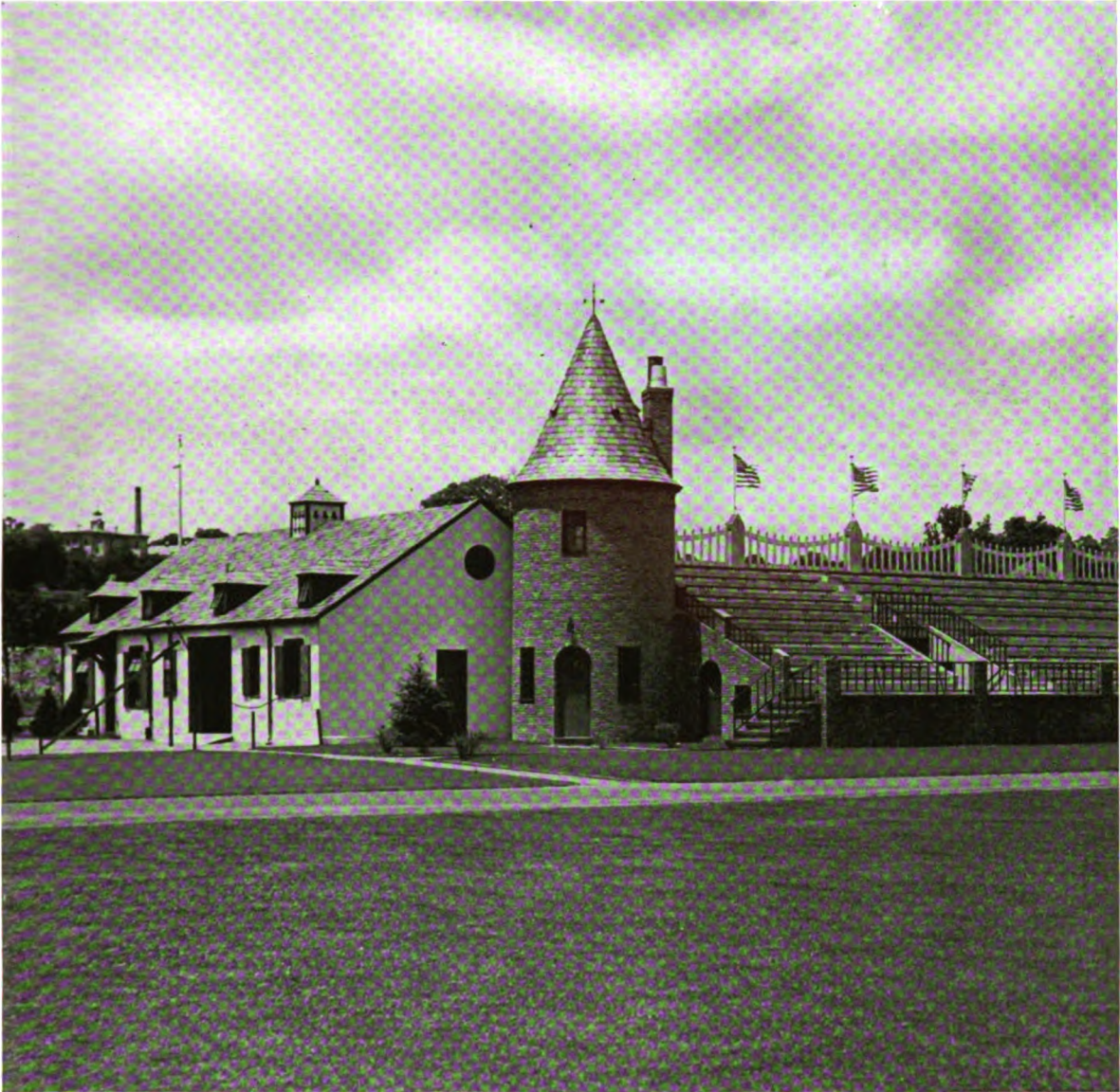
A. LAWRENCE KOCHER & ALBERT FREY, ARCHITECTS



Pack Bros.



RECREATION CENTER
 WHITE PLAINS, N. Y.
 THEODORE RICHARDS, ARCHITECT



Pack Bros.

The recreation center was built upon reclaimed ground. Concrete piles support stands and buildings. Walls, with exception of brick towers, are terra cotta tile and white stucco. Timbering is dark-stained chestnut, oak slab doors, steel casement windows; roof is of variegated red and purple slate. Shelter floor under stands is terrazzo (for roller skating, dancing, etc.). Stands are concrete with raised wooden seats. Shower, toilet, and locker room floors and walls are tile. Ventilation supplied through turrets. Total accommodations: in locker rooms, 200; in stands, 900. Total development cost, \$250,000; building cost, \$105,000

RECREATION CENTER
WHITE PLAINS, N. Y.
THEODORE RICHARDS, ARCHITECT



Pack Bros.

THE LOCKER ROOMS FROM
THE ENTRANCE PLAZA



RECREATION CENTER
WHITE PLAINS, N. Y.
THEODORE RICHARDS, ARCHITECT

MODERN AMERICAN MURALS



Juley & Son

CEILING OF 120 WALL STREET
D. PUTNAM BRINLEY, ARTIST

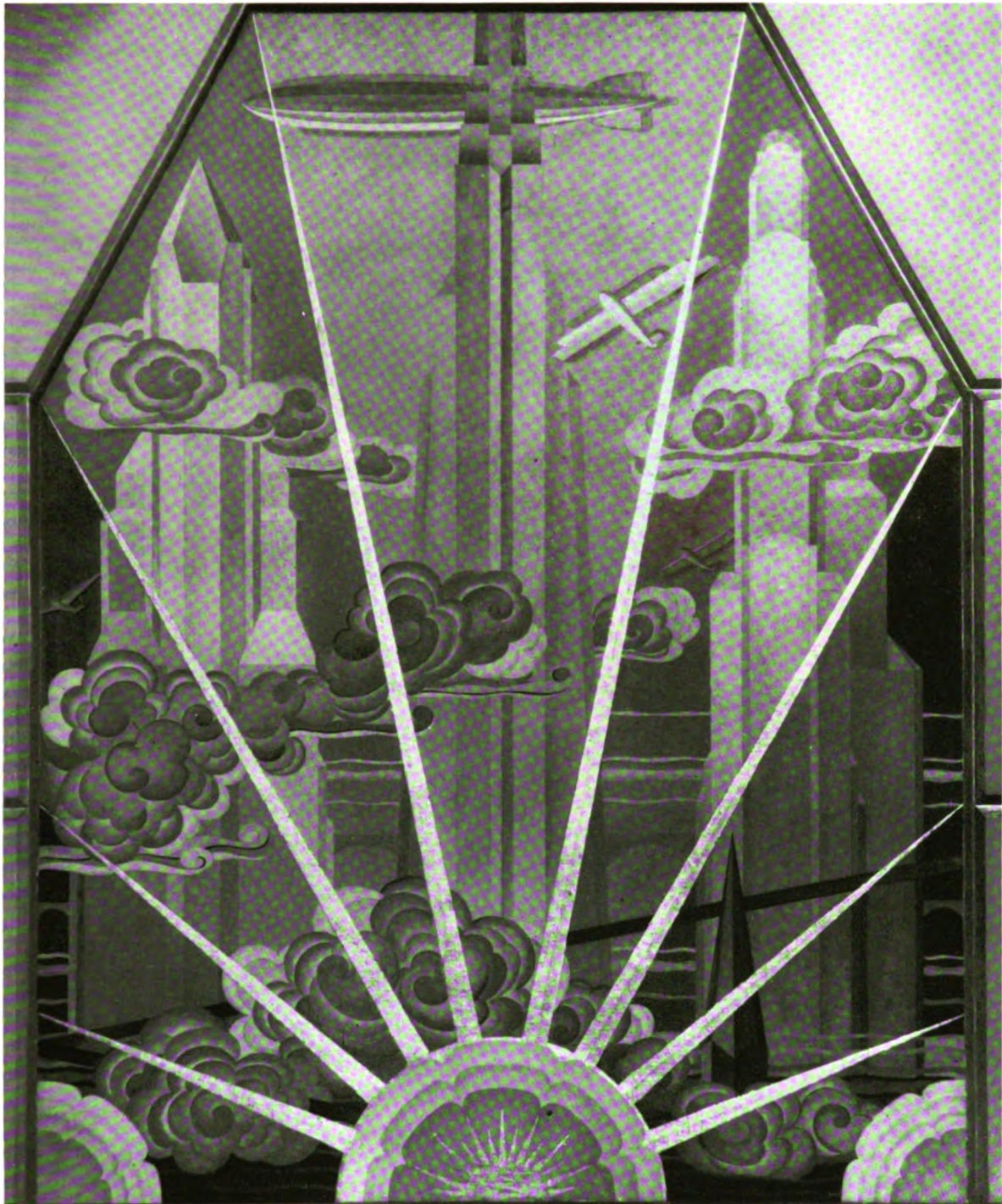
BEING A SERIES OF MURALS SHOWING THE TRENDS IN DESIGN
AND TECHNIQUE AS DESCRIBED IN THE ARTICLE BY ANNE LEE



Shannon

One of the mural paintings by Aldo Lazzarini in the main dining room of the Downtown Athletic Club, New York. Starrett & Van Vleck, Architects, Duncanhunter, Associate Architect

CONTEMPORARY
AMERICAN MURALS



Gass

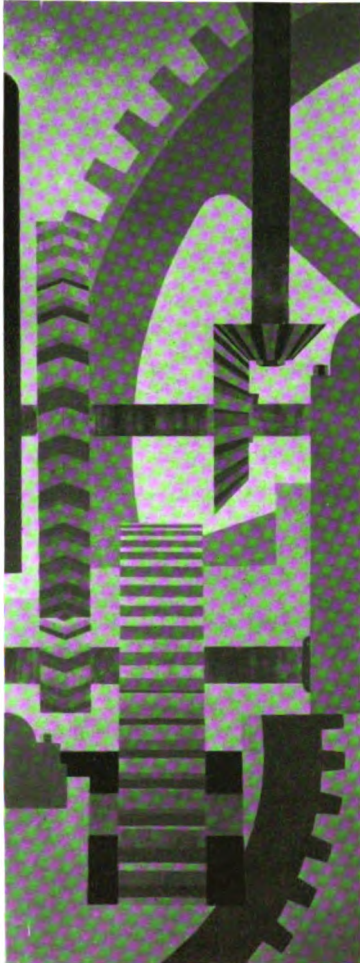
Over-fountain mural, "Tomorrow," by Alice Hendee Price in Childs Restaurant, New York. Pruitt & Brown, Architects

CONTEMPORARY
AMERICAN MURALS



Almonte

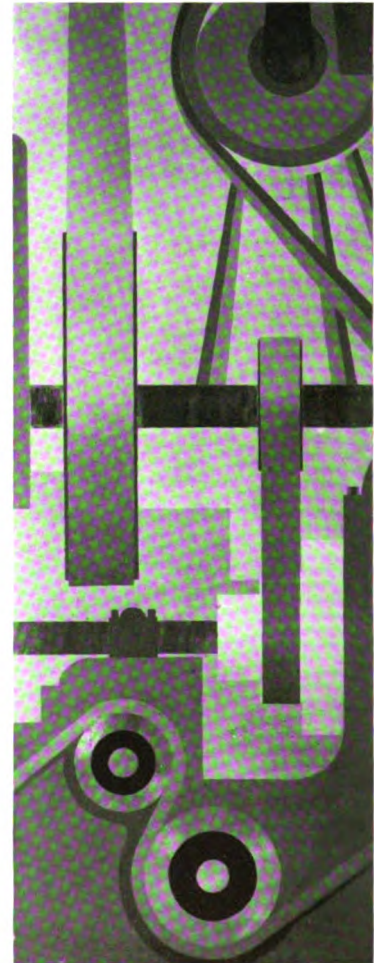
Gray



Above is a drawing by Boardman Robinson for one of his mural panels in the Kauffman Store, Pittsburg, for which he was awarded the Architectural League's 1930 Gold Medal for Painting.

The illustrations on either side are from studies by Henry Billings for designs based on machinery and power transmission

Gray



CONTEMPORARY
AMERICAN MURALS



Juley & Son Photos

"City Activities." Two mural panels of a series by Thomas Benton in the New York School for Social Research, New York. Joseph Urban, Architect

CONTEMPORARY
AMERICAN MURALS

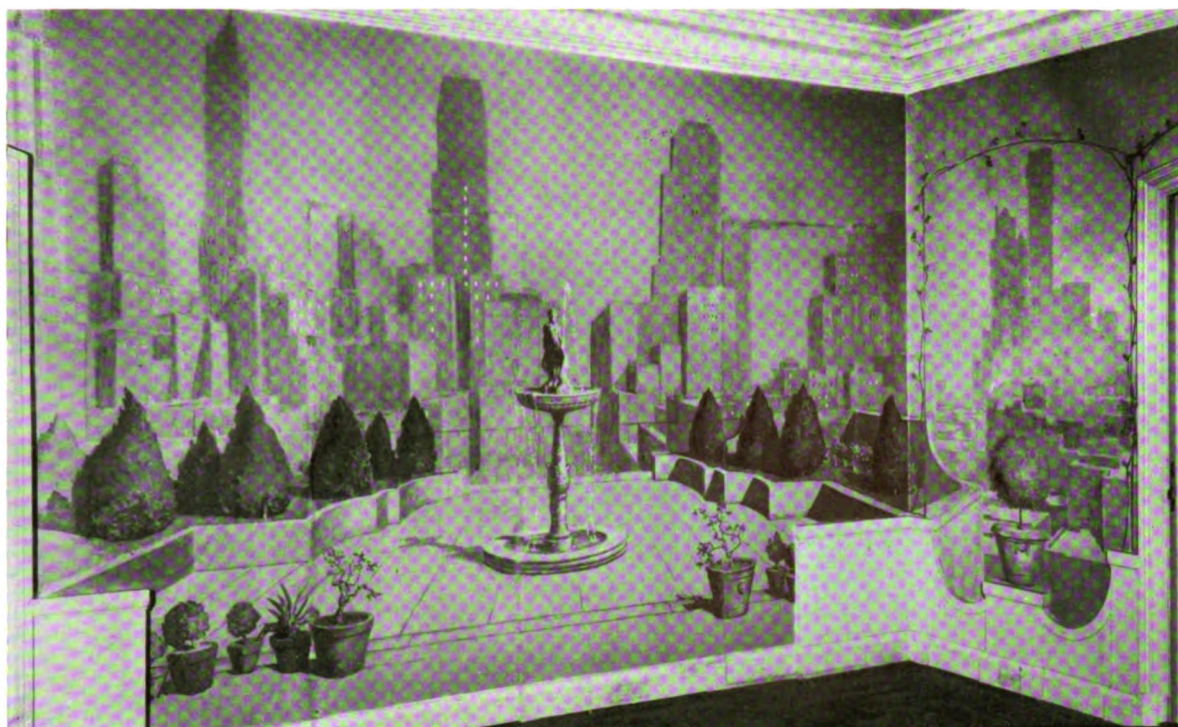




Copyright Elks Nat'l Memorial Headquarters Comm.

**A mural panel by Eugene
Savage for the Elks
Memorial Hall, Chicago**

CONTEMPORARY
AMERICAN MURALS



Juley & Son

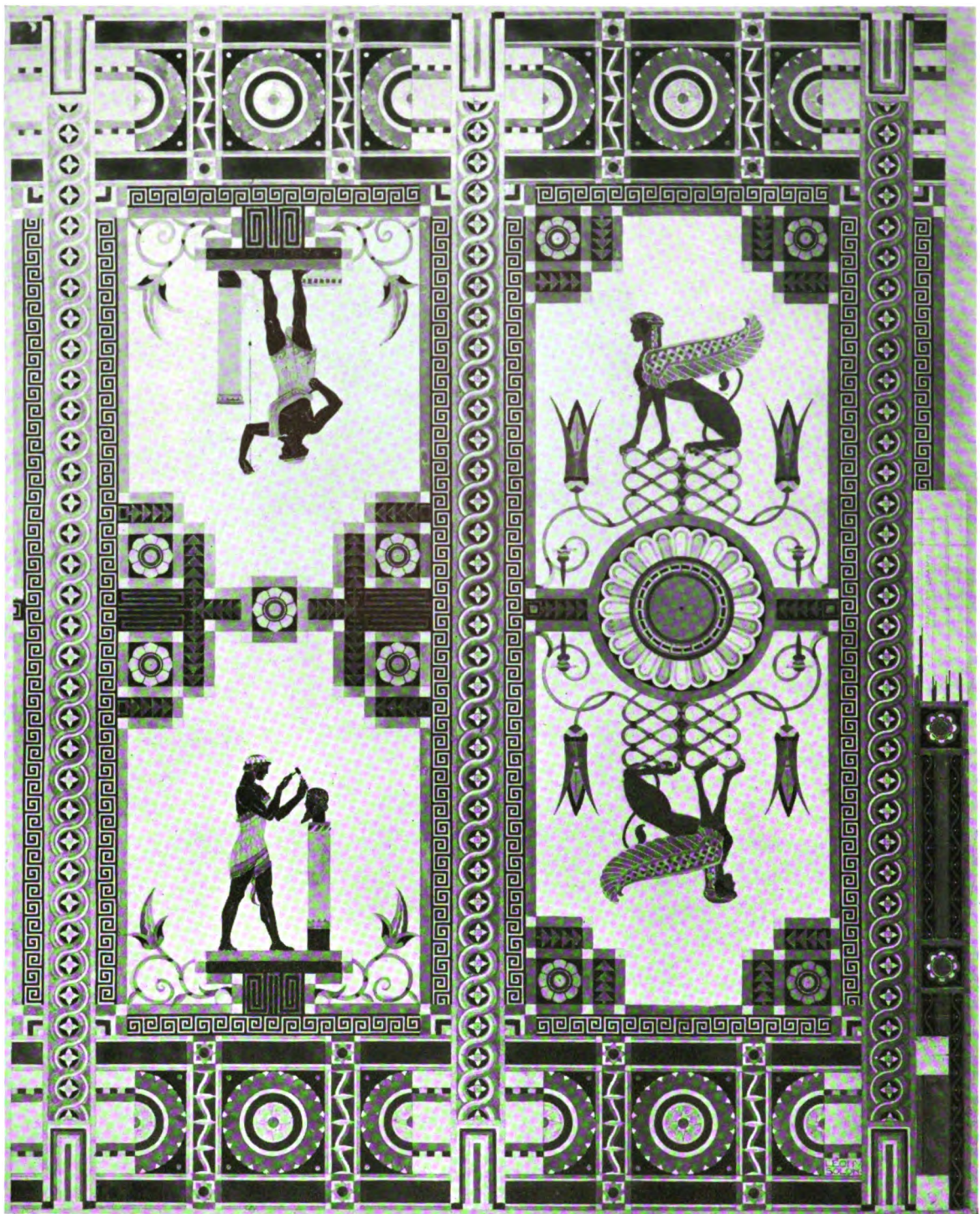
**Mural decoration by Ernest Peixotto
for the foyer of a New York apartment**

**Mural decoration by Stanley J. Rowland
for the foyer of a New York apartment**

CONTEMPORARY
AMERICAN MURALS

Gottscho





Study, by Leon V. Solon, for the ceiling decoration
in the Fairmount Park Museum, Philadelphia, Pa.

CONTEMPORARY
AMERICAN MURALS

CONTEMPORARY AMERICAN MURALS

BY

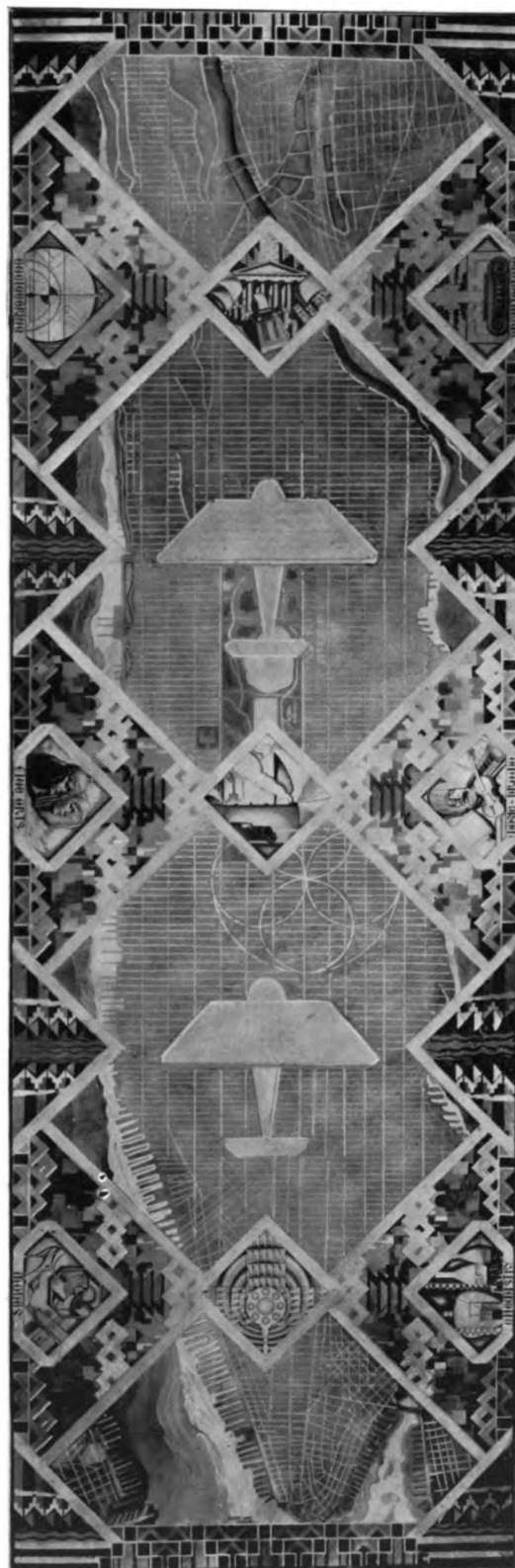
ANNE LEE

CONTEMPORARY architecture with its simplicity of line and expression, has created a demand for a new type of mural painting where such decoration is to be used at all. This, the artist is meeting by designing decorations wherein pattern strikes a dominant note. The tendency may be recognized in much recent work. Evidences of it are to be seen in many paintings included in the Architectural League's exhibition at the Architectural and Allied Arts Exposition being held from April 18 to 25 at Grand Central Palace, New York under the combined auspices of the League and the American Institute of Architects.

That painters are finding divers ways of meeting this demand for pattern is shown by such exhibits as D. Putnam Brinley's ceiling design for the No. 120 Wall Street Building. The pattern achieves added interest because of the use of symbolic designs pertinent to the historic site at Wall and Pine Streets, the old Dutch city and modern Manhattan, America's first railroad train and steamboat, as well as all modern means of transportation and communication.

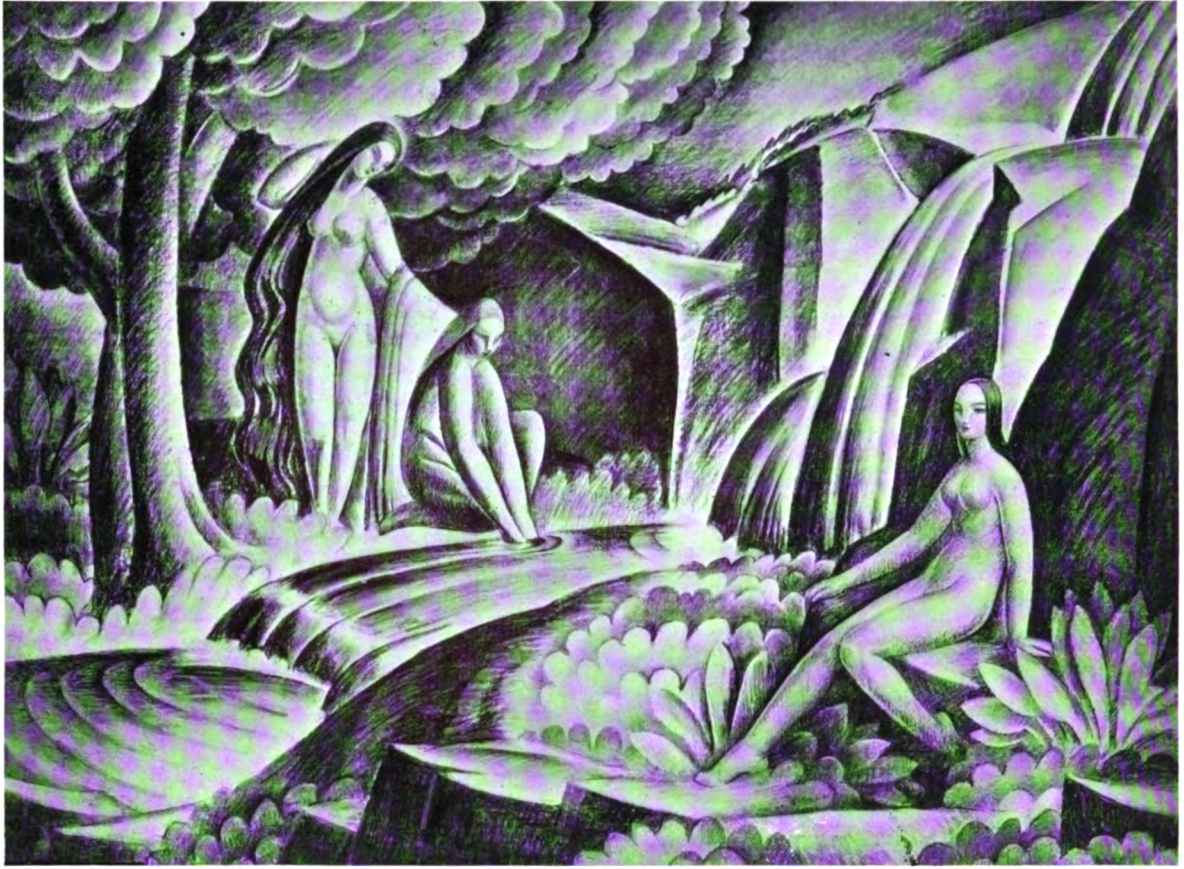
Some artists achieve the effect of pattern by injecting strong sweeping lines, as in the striking marine decoration painted by Aldo Lazzarini for the Downtown Athletic Club, and in the overfountain painting for Child's Restaurant, in which Alice Hendee Price makes use of solar rays to direct the eye through the full height of her decoration, entitled "Tomorrow" an impression of the future city, as well as to accentuate the note of pattern.

In Arthur S. Covey's ceiling decoration for the Squibb Building, pattern governs the design which shows interesting use of the map of Manhattan and pertinent symbols. Among the group of younger artists whose works indicate a strong regard for pattern is Suzanne Miller. She has

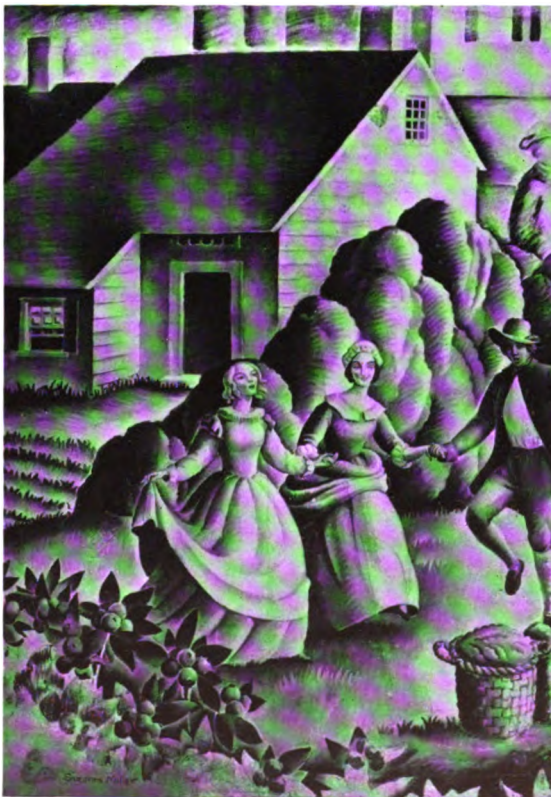


Juley & Son

A mural by Arthur Covey for a ceiling in the Squibb Building, New York, Ely Kahn, architect. A design based on a map of Manhattan Island and the activities of New York City



Gray Photos



Two murals by Suzanne Miller. That above, an overmantel panel, won honorable mention in the 1930 Architectural League Exhibition

achieved the decorative quality of abstract pattern in such interesting compositions as the overmantel for which she was awarded honorable mention at the League's last exhibition. In the current show, Miss Miller exhibits a panel, called "Huckleberry Frolic," a detail from one of three mural decorations depicting the early days of Long Island, now being executed for the reception corridor of the Jamaica, L. I. High School.

Another recent exhibition which emphasized the importance of pattern in modern decorations was Henry Billing's exhibit of mural paintings based on machinery. Finding new art forms in such things as the locomotive, the airplane motor, the crankshaft, gears and belting, this artist's work has opened up a new field of possibilities. For his mural paintings for the new Chicago Daily News Building, John Norton adopted the art forms found in presses, machines, and workers in the various stages of getting out a newspaper. His decoration was published in these pages some months ago.

In many contemporary mural paintings an ef-

fect of modeling is distinctly noticeable. On the other hand, some of our most successful painters strive for flat surfaces, and make every effort to avoid impressions of relief. Such decorations as those painted by Boardman Robinson for the Kauffman Store, Pittsburgh, and those just completed by Thomas Benton for the New School of Social Research, New York, acquire added interest and vitality because of the three-dimensional quality. Both artists use high-keyed colors and introduce sharp contrasts. In his series, called "America Today," Mr. Benton presents impressions of men and industry in various sections of the country.

Other paintings in the exposition, in conjunction with which the Architectural League is celebrating its fiftieth anniversary, include a number showing industrial subjects, maps, and some stimulating old pictorial wall papers. Among the residential works shown are Ernest Peixotto's Venetian decorations for a Florentine villa. The New York skyline recently provided this artist with an interesting theme for the decorative treatment of a Fifth Avenue apartment foyer. In the Life of Benvenuto Cellini, Stanley J. Rowland found a rich source of material for his stylized decorations for a New York apartment. The decorations designed by Leon V. Solon for the Fairmount Park Museum, Philadelphia, recall the keen interest aroused at the 1927 exposition by the model illustrating the use of primary colors in the exterior architecture and sculpture of the new museum, for which Mr. Solon was polychromist.

On the strength of that exhibit, the question of color in architecture aroused widespread public interest at that time. The significance of color was emphasized, too, in the exhibits of painting and the decorative arts. It is to the great general interest in color that many leading authorities in the arts have ascribed the revival of interest in mural painting during the past several years. Among those whose opinions were sought on this question were Kenneth M. Murchison, Raymond M. Hood, Arthur S. Covey, Cass Gilbert, J. Monroe Hewlett, Harvey Wiley Corbett, Ernest Peixotto, Hildreth Meiere, Joseph Urban, J. Scott Williams and D. Putnam Brinley. Their comments varied, but in substance they concur in the belief that the general interest in color was a fundamental factor in reviving mural painting.

Whereas Mr. Murchison's remarks were to the effect that the renewed interest in such decoration is certain to enjoy continued growth, and that he considers it part of the general cultural awakening which America is now experiencing, Mr. Gilbert's comments about America's strong and able group of painters included a plea for the importance of thorough collaboration between painter and architect to achieve the best results. Mr.



July & Son

A tropical design in high color by Don Blanding and Earl Challenger

Corbett expressed the opinion that the plain, sanitary surfaces of modern architecture are here to stay, and that we are more than ever dependent on paint for the effectiveness of our decorative schemes. "We are going to get back the feeling for form in our rooms without having the old dirt-catching projections," he said. "A room with perfectly plain walls may be made just as rich in effect by painting,—and it may be a mural decoration, a series of lines, or a plain color, depending on the circumstances,—as by any amount of money spent on modeling."

Mr. Hood admitted the importance of color in interiors, but suggested that an artist's function might concern itself with the planning of color-sequences through series of rooms, thereby making just as great a contribution to the effect, as a whole, as if his efforts were confined to the painting of decorative panels. Mr. Hood frequently uses artists' services in that way for both exterior and interior work. The exterior color treatment of the group of buildings he designed for the Chicago Centennial Exposition was the work of a well known mural painter.

Recently, for the Daily News Building, the architect had occasion to call upon a painter for quite

another type of decoration. D. Putnam Brinley was commissioned to paint the huge revolving globe which attracts thousands of visitors to the lobby of the News Building. Made of aluminum, measuring twelve feet in diameter and weighing 4,000 pounds, the globe presented many problems to the artist and his four co-workers who painted in shifts, day and night, for two months to complete the task. Painting on anything but a flat surface was a new experience to the artist, one of the many new and interesting demands being made upon painters by contemporary architectural design. An amusing anecdote related by Mr. Brinley in connection with that work is worthy of repetition. His research, it seems, divulged the information that two small islands in the Pacific's Galapagos group bore names of interest and significance when used together. Their inclusion was at once decided on, and an examination of the islands shown in the globe's Galapagos group reveals the name of one as "Indefatigable" and the other as "Hood." Had they been named in honor of the architect, the mural painters at work on the globe were convinced nothing more appropriate could have been chosen in the way of a qualifying adjective.

Artists and art circles everywhere have evinced great interest in recent developments, but there is, perhaps, no one who takes a keener delight in the present revival than does Edwin Howland Blashfield, who is sometimes referred to, affectionately, as the "Dean of Mural Painters in America." The career of this artist is so definitely interwoven with the history of mural painting in this country that it becomes difficult to separate them. He was one of the group of artists commissioned to paint decorations for the Chicago

World's Fair in 1893, where mural painting in America literally had its birth.

According to Ernest Peixotto, the present interest in mural painting, in so far as its use for homes is concerned, may be looked upon as a reaction against the plain putty-colored walls which followed the indiscriminate use of color and pictures. Architects, he explained, did not like small pictures, pictures generally out of proportion with the rest of the design, so they introduced the formal, panelled room without any pictures. When the need for color became apparent, they ordered mural paintings made to fit into certain of the panels, starting with the overmantel.

Arthur S. Covey believes the revival of mural painting has been gaining headway for some years; that it began soon after the war. He credits the general interest in color with having fostered its growth and popularity. Among the artist's own recent work decorations for industrial plants and for hospitals may be included to emphasize the general appeal of this art. He is enthusiastic about present tendencies because he feels that the new epoch is marked by individualism. He is interested in the tendency toward the use of pure color in masses. It is his contention that mural decorations should be representative of their own time. That this is beginning to be true of current work, he believes is largely due to the fact that we have become bolder and more independent in all manner of expression. In commenting that our architects are looking forward into the future of the country and introducing something of the essence of our own civilization into modern architectural design, Mr. Covey stated that mural painting and the decorative arts have already given strong evidences of following architecture's lead.



"Dianes." A colorful panel by Natacha Carlu for a modern store interior

THE LITTLE MASTER OF THE ARTS

PAUL PHILIPPE CRET
OF PHILADELPHIA, OF
PENNSYLVANIA, AND OF
THE WORLD AT LARGE

BY GEORGE N. ALLEN

PAUL PHILIPPE CRET—is the unassuming and diminutive little academician. Supreme ad libber and wisecracker, one part Thoreau and nine parts Ed Wynne.

He is an epigrammatist, the flip tosser of *bon mots* that become homing pigeons and return to him to roost. His pupils, who really worship him, think he is a Mephistopheles in the guise of a benign school-master.

He was born in Lyons, France, fifty-five years ago; likes to make sketches with a 3B pencil, then smudge them up with his thumb; is the recipient this year, of the ten thousand dollar Philadelphia Bok Award; and he eats a prodigious amount of potatoes.

Is an artist, teacher, architect, philosopher, wit, and writer—and of all things, broad sword champion of Pennsylvania.

His parents were not artists in any form, but he inherited his uncanny skill in logic from his father.

Was educated in Lyons. Heard Paris calling, so packed his bag and said goodbye to his family. Arriving there, he entered the École des Beaux Arts.

Wasn't satisfied until he brought home the Paris Prize, at the age of twenty, in his coat pocket.

Could be found, during this period in Paris, wandering around the crowded Faubourg Montmartre or Carrefour de Chateaudun with other logists; or perhaps, down in some cobwebbed cafe in the St. Germain-des-Pres Quarter, over a flagon of "vin noir" or, most likely, would be working hard in Pascal's atelier, slapping enormous amounts of India ink washes on a large sheet of Fabriano.

He was only twenty-five, when he won the Rougevin Prize, and the Grand Medal of Ecole des Beaux Arts—both in the same year. Two years later, won the Gold Medal at the Salon des Champs Elysees.



Dooner

DR. PAUL PHILIPPE CRET

"... contributed a service, calculated to advance the best and largest interests of the community of which Philadelphia is the center." (See *Notices and Events*, page 21.)

AMERICA beckoned to him that same year, and he came to the University of Pennsylvania, taking up his duties as Professor of Design.

Abhors cheeses in any form.

Likes loose, hand-rolled cigarettes made of strong French tobacco.

Smokes six a day.

Is intimately called, "Uncle Paul."

Favorite restaurant is "La Mere Fillouse" in Lyons.

Is an avid sketcher on tablecloths and uses black burnt matches as his medium.

Considers the Pan-American Union in Washington, the Detroit Institute of Arts and the Hartford County Building, his three most important works.

Is very short, only 5' 6" high. Weighs 160 pounds.

Likes dark, worsted suits, but lets himself go in a riot of color when it comes to wearing ties.

Has a unique collection of them—ranging from violet to indigo. His favorite one is a mustard.

Invariably wears blue or white shirts.

Hates anyone to slap him on the back.

For breakfast, his menu is eggs plus and the paper.

Considers jello an anathema. Especially if it is surmounted with "one leetle nut."

In the round trip which took him from the Gothic to the Classic—he met many names—but he is no hero worshipper.

Wears the Phi Beta Kappa key.

On Sunday mornings he looks forward to waffles heavily buttered and submerged in honey. They are his "piece de resistance."

Has no favorite newspaper. Considers them all equally bad.

Is, according to the occasion—quiet, blustering, cautious, retiring and emphatic.

Detests Pullman sleepers.

Regulates his ventilation logically, according to season, and detects the slightest change in atmospheric temperature by sneezing instantly.

Loves to hear Stokowski's Orchestra play its intricate instrumentations.

Is a Modernist—with a touch of the Classic.

And pre-Victorian, because he has no phone in his private office. Dislikes to hear them ring.

Does not believe in reform and prohibition.

Hardly reads any fiction. Last good book read was by Aldous Huxley.

Doesn't like to commute. Lives in the heart of Philadelphia.

Outdoor pastime is walking around and looking at buildings.

Loves the movies passionately, but is not over-enthused with the "talkies." Has a weakness for Gloria Swanson.

His vacations consist of doing his work with a change of scenery. Ofttimes, without the change of scenery.

Likes to fence. Is an expert with the blade.

Devotes a lot of time and hard work to the T-Square Club.

Goes home in the evenings, but instead of putting on his slippers for a night by the fireside, will return to the office and work far into the night.

Of his many committee duties the two outstanding are: Member of the Architectural Commission of the Chicago World's Fair, 1933 and Consulting Architect for the American Battle Monuments Commission.

He will jump on an innocent draftsman when a sketch looks better than he hoped it would.

Is probably responsible for developing more Paris Prize winners than any other man.

Has an "illicit" affection for pigs knuckles and sauerkraut.

During the feverish war days he managed to pull through with the Croix de Guerre, which lies home, among other gadgets, in a long forgotten drawer.

The vesting of such power, such authority, in so slight a man, so fastidious a wisp, with so soft a voice and so courtly a demeanor, is astonishing to a normally observant intelligence, unaware of this man's significance in architecture.

It may be that the classical-Modern expression in this country will wane with the passing of Cret, so amazingly does he personify its virile quality.

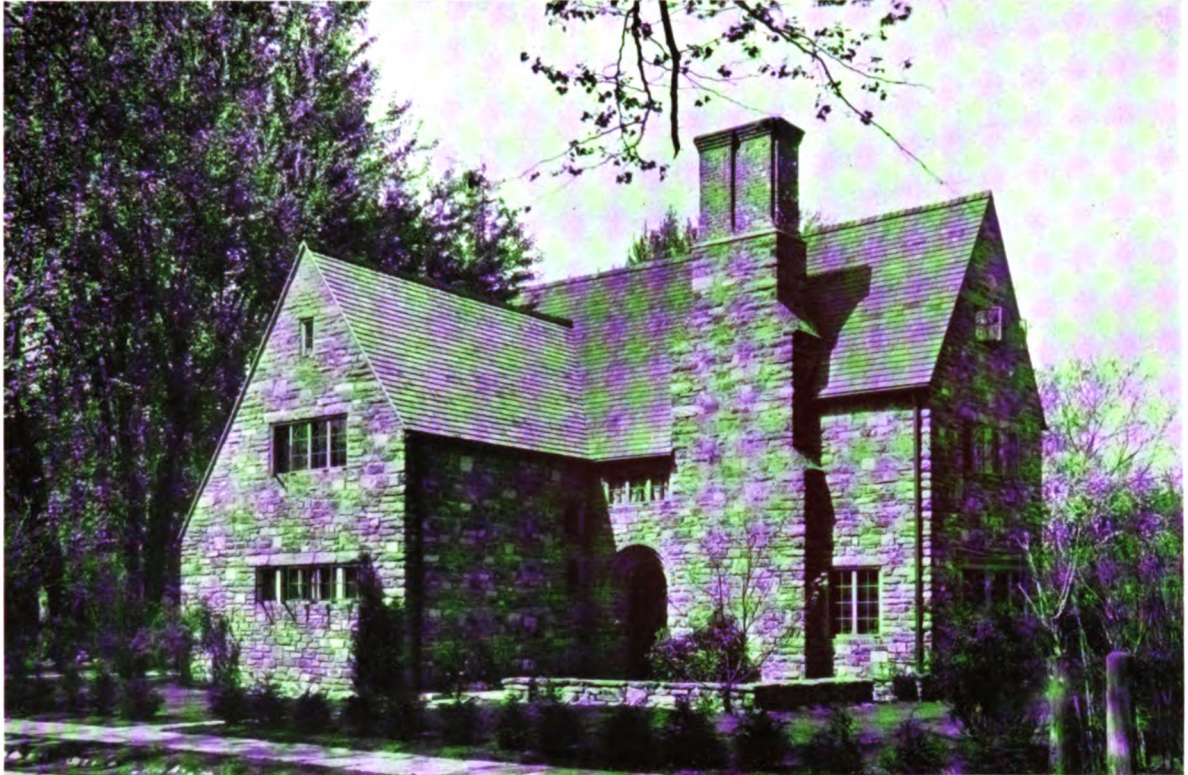
He is an aesthetic Cass Gilbert; a dynamic Ralph Walker; a Whitney Warren minus the Ascot tie. These men helped to exploit the profession. So does Cret. But oh, so gently. He rules the city he lives in like a Louis Quinze.

His edicts are whispered as though culling from the menu of Mme. Babrixon. He is aloof alike to political buccaneers and crack-pot insurgents. He stands alone.

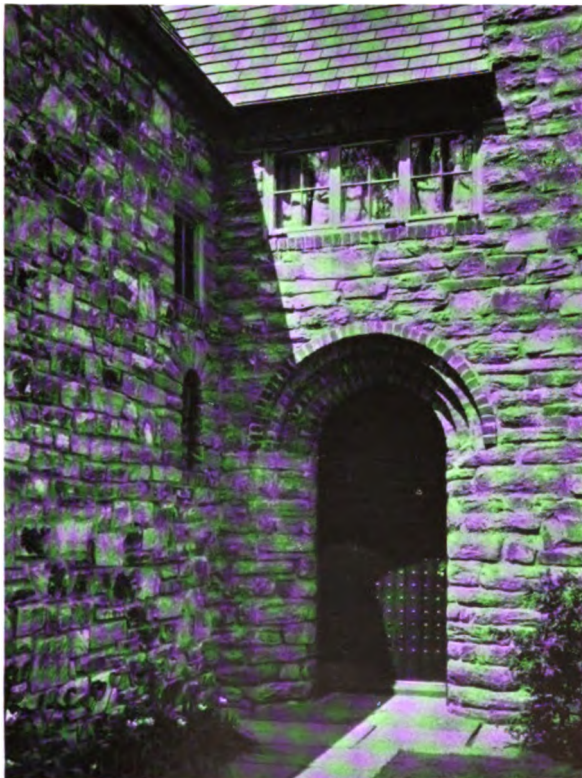
He would renounce his moral allegiance to the classic faith of his idols, the Letarouillys and the Vignolas, rather than forever be parted—from his glass of pilsner.

FROM "WHO'S WHO IN AMERICA"

Cret, Paul Philippe,—Paris prize, 1896, Rougevin prize, 1901, and grand medal of emulation, Ecole des Beaux Arts, Paris, 1901; gold medal, Salon des Champs Elysees, Paris, 1903. Architect (with Albert Kelsey) of Pan-American Union (Washington, D. C.); Valley Forge memorial arch, Rittenhouse Square, Phila., Indianapolis Pub. Library (with Zantinger, Borie and Medary); Detroit Inst. of Arts (with same); Pa. battlefield monuments. Mem. Art Jury, City of Phila. Mem. Societe architects diplomés, Soc. Beaux Arts Architects, T-Square Club, Phila., fellow A. I. A. Served in French Army with 1st Div., A. E. F., 1914-1919. Chevalier Legion of Honor (France). Mem. Archtl. Commn., Chicago World's Fair Centennial Celebration, 1933.



A SMALL HOUSE IN PHILADELPHIA



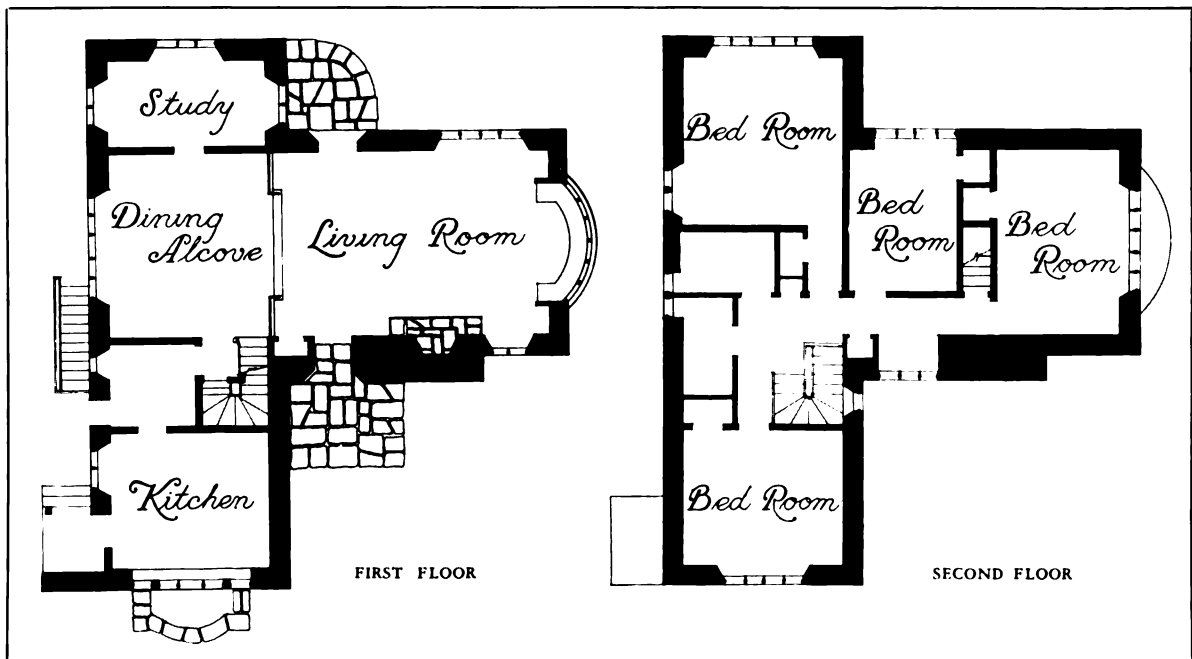
EXTERIOR: The walls are solid masonry, built of the variegated ledge rock common to the locality. The trim is of dark red brick and the roof is of stained shingles.

PLAN: An important requirement was convenience in maintenance; another was the arrangement of rooms to provide much open space with a great degree of adaptability in use. These have been accomplished by the absence of an entrance hall, the location of the stairs, and by the separation of the dining and living rooms only by a change in floor level, according to the tradition of an English manor house.

HOUSE OF E. M. FINLETTER
CHESTNUT HILL, PHILADELPHIA, PA.
DAVIS, DUNLAP & BARNEY, ARCHITECTS



HOUSE OF E. M. FINLETTER
 CHESTNUT HILL, PHILADELPHIA, PA.
 DAVIS, DUNLAP & BARNEY, ARCHITECTS



THE ARCHITECTURAL FORUM

VOL. LIV, No. 4

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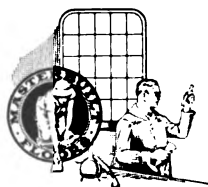
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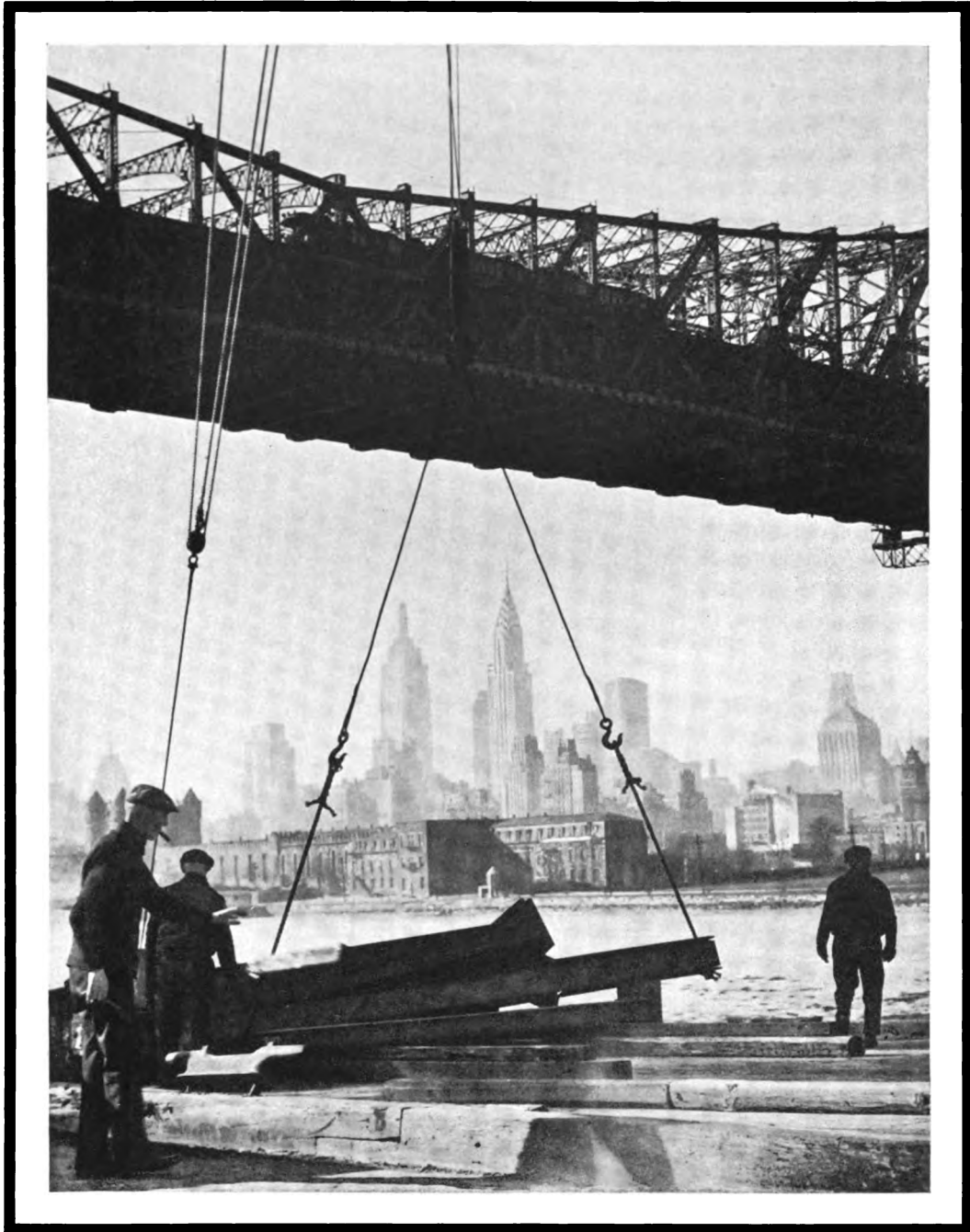
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SKYLINE 1931

Browning

The Architectural Forum

THE ARCHITECTURAL FORUM

VOLUME LIV

NUMBER FOUR

APRIL 1931

CONSTRUCTING A CLEARING HOUSE FOR CONVERSATION

BY

DANIEL B. CATHCART

THE intricacy of the machinery which a telephone building contains does not necessarily beget a complicated plan.

The nature of the equipment housed in a telephone office would lead the uninitiated architect to believe that planning such a building offers many difficulties. Fortunately, his supposition is not based upon fact. Planning departments, organized by the various telephone companies, have evolved typical study plans to meet almost any condition. These so-called "schematics" are necessary to maintain a fixed relationship between various groups of equipment, and to provide for future expansion. The telephone engineers, because of their background of experience, anticipate any contingency which may arise in a special case. The architect commissioned to plan a telephone office at last deals with a client who knows exactly what he needs.

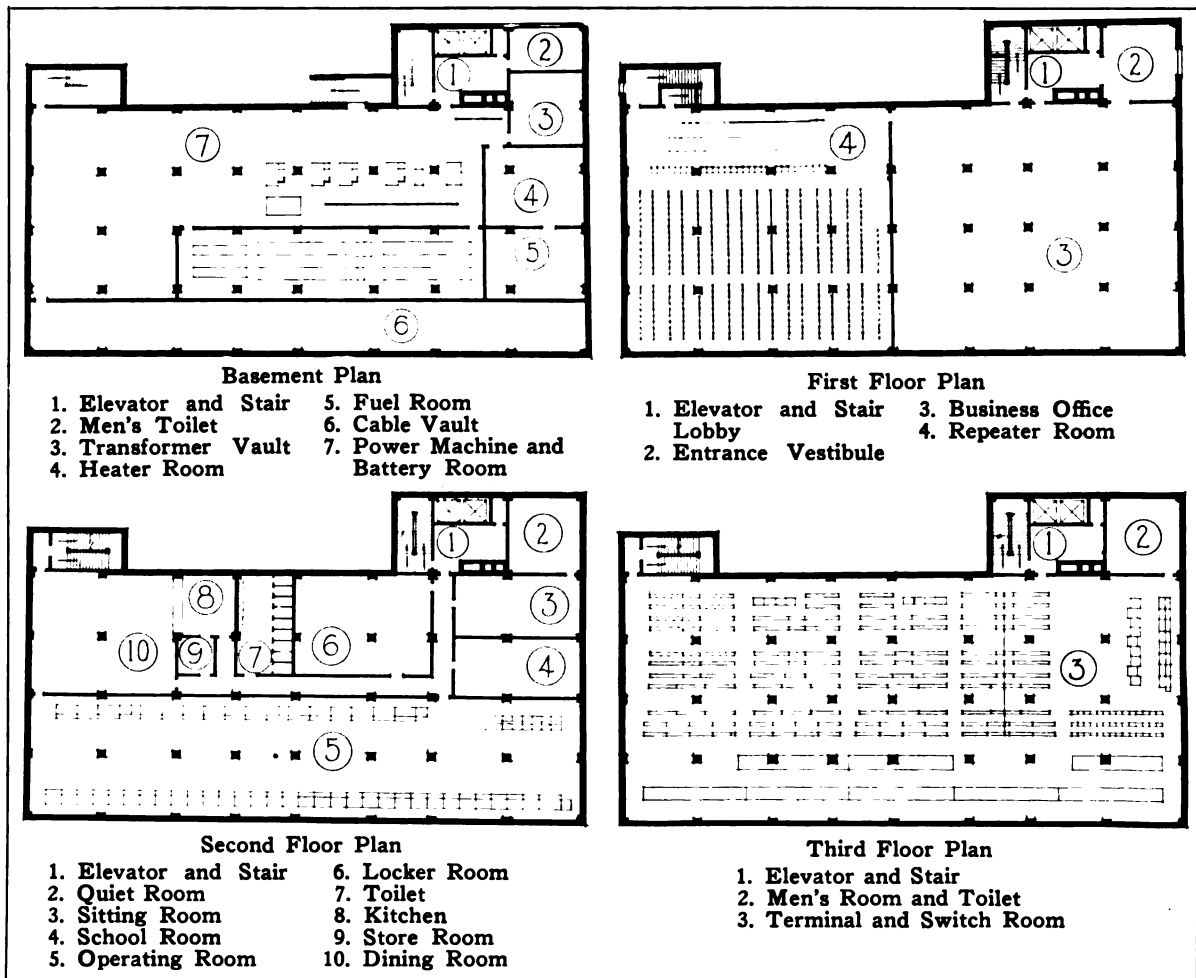
A quotation from the annual report of the American Telephone and Telegraph Company for the year 1930 will convey some idea of the volume of construction necessary to keep pace with the needs of this fast growing industry.

"Three hundred new buildings and major additions ranging from small one-story structures to modern, large combination administration and equipment buildings involving expenditures of \$60,000,000 were completed during the year. Modern in conception, these buildings reflect in their substantial character and careful planning something of the System's stability and its regard for the comfort and convenience of its customers and its employees. They also contribute toward the achievement of the ideals of the communities in which they are located."

THE SITE

Building sites are usually chosen as a matter of taste or for monetary considerations. The telephone office, however, presents one governing requisite which is unique. The exchange must be located near a "wire-center." This is a point about which a minimum amount of wire is necessary to connect with the telephones served. Regional surveys, made by the company indicate these "centers" in every community. The wire center may be likened to the center of population of our country. When an area to one side becomes more densely inhabited than the surrounding districts, the center moves closer to it. The same condition will occur with the telephone wire center in the area to be served. Owing to an expansion program of several hundred thousands new subscribers each year, the ultimate "wire-center" must be estimated. With this point determined, several plots in its vicinity are investigated to ascertain whether or not they meet additional requirements. The architect will be asked to advise as to whether or not the building can be erected economically on the site selected. Adaptability of the plot to expression in design is another point which is left to his judgment.

The lot selected must be large enough to provide for future additions to the first unit erected. This first building is planned to provide space for equipment which will probably be installed in about eight years. It is extended laterally, when necessary, until property limits prevent further expansion; then additional stories are constructed. This order of expansion is sometimes reversed, as each new office is a problem in itself. Each building's estimated growth, unit after unit, is prede-



Schematics developed by the American Telephone and Telegraph Company for a typical "step-by-step" dial office

terminated to a reasonable extent and allowances for that growth are made accordingly in its construction.

An inside or a corner lot may be chosen. Proper light and air conditions for employes and public, percentage of area which may be eventually covered by the building, and the purchase price will also tend to influence the choice of a site.

Convenient access to the building for public and employes is another requirement. The telephone company strives to make its relations with its patrons as pleasant as possible and to protect those of its employes who are forced to leave the building at late hours. Therefore the building should be located near some transportation line.

THE PLAN

The telephone building is, fundamentally, merely a shell to protect the equipment it contains from the elements. In addition, proper provision must be made for services necessary to the employes, and for the transaction of business when the public has access to the building.

The functioning of the entire office is dependent upon the wires brought into it from the telephones it serves. The manner in which they enter the building, are segregated and attached to the proper equipment, largely determines the orientation of the various rooms.

The buildings fall into three different classes. They are: the purely administrative type, which offers no problems other than those of an office building; the central office type, which houses the equipment and functions directly associated with furnishing telephone service; and the combination administrative and central office type, which includes the features of both of the others. Only the two latter types will be considered in this article.

In addition to the familiar manual switchboard type, there are now two systems of dial equipment in use known as the panel system and the step-by-step system. Generally the panel system is used in the larger metropolitan areas, and the step-by-step in the smaller. The building requirements for the two systems are very similar. A discussion

of a typical step-by-step building will, therefore, give a fair picture of the problems encountered in planning a dial system office.

BASEMENT:

THE CABLE VAULT. This is usually a basement room. Here the cables enter the building through the "cable entrance" and are placed on racks, identified, and often subdivided. From this room the wires are directed upward to other rooms on upper levels.

TRANSFORMER VAULT. In this room are located transformers through which power, purchased from a local company, passes to motor generator sets, which in turn, provide power to ring subscribers bells and charge the batteries necessary to operate the telephonic mechanisms.

BATTERY ROOM. Banks of batteries of several types and purposes are contained here. The gases which are generated by the batteries necessitate special acid proof paint for the walls and floor, vapor proof lamp housings, and some means of ventilation.

POWER MACHINE ROOM. Motor-generator sets used for charging batteries, and also "ringing" generators for operating subscribers bells are installed in this room. When two independent sources of power are not available, an engine and generator are sometimes installed in this or a special room to protect the service against possible failure. Though the batteries hold enough reserve power to operate the equipment for many hours, no chance is taken on an extended interruption of the purchased current. Emergency equipment is not installed in very small offices, as the company maintains portable power plants which may be quickly moved by truck to any desired location.

HEATER ROOM AND FUEL ROOM. The heater room contains the plant necessary to heat the building. Where coal is used, provision must be made for fuel storage.

WESTERN ELECTRIC COMPANY ROOM. When changes or replacements in equipment are made, the new parts sometimes arrive weeks in advance. They are stored here until needed. This procedure eliminates the confusion that would ensue if the material were left scattered about the office for any length of time. This room is sometimes omitted.

Other rooms on the basement floor are the men's toilet, and in some cases a repairer's and installer's room.

FIRST FLOOR:

BUSINESS OFFICE. If a business office is to be included in the building it will be located on this floor, giving convenient access to the public. The area required for this room will vary with its needs.

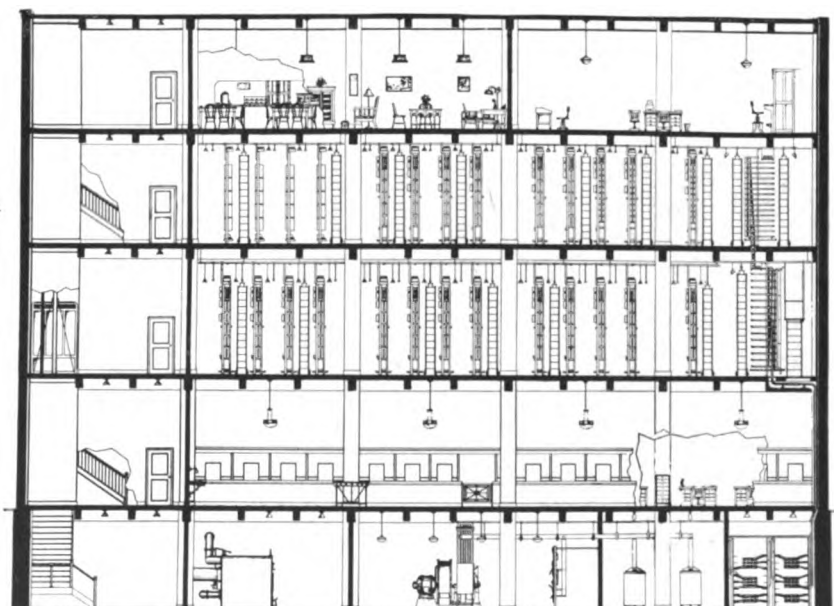
TELEPHONE AND TELEGRAPH REPEATER ROOM. The repeater room includes terminating and testing apparatus for toll lines. Vacuum tube repeaters are also located here. They are used to amplify the voice currents over the long distance circuits. Any adverse condition on the toll lines is located from the test boards, and the people operating them direct the elimination of such "non-standard" conditions.

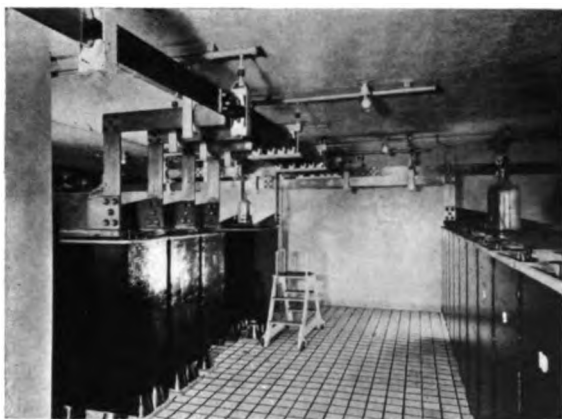
SECOND FLOOR:

OPERATING ROOM. Switchboards required to complete long-distance, toll, information and miscellaneous calls are located in this room.

LOCKER AND TOILET ROOMS. Adjacent to the operating room are the women's lockers and toilets.

A sectional view of a "Panel Dial" system building. The telephone cables enter the Cable Vault (lower right), are directed upward through the duct wall to the Cable Pit and then are connected to the Main Frame. Directly above the main frame on the top floor in this case is the operating room with its switchboard and other apparatus. Though the arrangement of equipment sometimes varies to suit special conditions, a general idea of the orientation of the various rooms is offered by this illustration





A Battery Room.

OPERATOR'S SITTING ROOM. The operators, when off duty, use this room as a lounge.

QUIET ROOM. A small room, necessary in case of illness of an operator or in an emergency, is required on this floor.

SCHOOL ROOM. This is a small room in which operators are instructed.

KITCHEN AND DINING ROOM. Each office which employs a number of operators incorporates in its plan a suitable dining room and kitchen. The dining rooms or cafeterias vary in seating capacity from ten or twenty in the small offices to as high as four or five hundred in the largest buildings.

The locker rooms, kitchens, dining rooms, etc., vary with the type of office. In the manual type of exchange more services of this kind will be needed than in an office using dial equipment exclusively. The schematics shown will afford an idea of the proportionate area required for equipment and services for employees.

Note the position of the stairs and elevators. They are so located that at no time will they interfere with the growth of the building and the consequent installation of new equipment.



Power Machine Room.

THIRD FLOOR:

TERMINAL AND SWITCH ROOM. This room is so named because it is the termination of the wires attached to the telephone instruments, and because it includes the switchers for establishing connections between subscribers. Here is located the main distributing frame, on which the cable conductors terminate and whose machinery makes possible the segregation and numbering of myriads of wires which, after being spread fanwise over the surrounding territory, are brought to the wire center. In addition to this frame and the switching equipment, there is included local repair service and test bureaus, which are responsible for maintaining the local plant.

CONSTRUCTION DATA

GENERAL. Telephone equipment is built in standardized units of fixed dimensions. The greater part of it is carried on steel frames laid out in parallel lines. These lines point in the direction of future expansion. The width of these frames and the necessary working space between them determine column spacing in both directions. The columns are spaced in multiples of four feet in each direction, normally sixteen and twenty feet from column center to column center. The equipment is designed to make efficient use of the floor area with the columns spaced in this manner. The telephone company's engineers require these column spacings because of the flexibility of plan and equipment layout thereby obtained. The repeater room, where equipment is laid out perpendicular to the direction of growth, is one instance of the desirability of the arrangement.

Ceiling heights of rooms are also governed by the size of the equipment contained in them. For all but the smallest buildings, they are:

Basement: 10'-6" clear to the underside of girders.

Terminal and equipment rooms: 14'-6" to 15'-0" where they contain a main distributing frame, otherwise 12'-6" clear to the under side of girders.

Operating Room and Quarters: 12'-6" clear to the underside of girders.

Methods of construction and materials used in the erection of a telephone office are much the same as those required by the local building code. The particular building illustrated is of "fire resistive" construction. To protect the employees and the costly equipment, and to prevent interruption of service, the telephone company invariably takes extra precaution against fire. Exits, walls around stairs, elevators and their lobbies are specially designed to safeguard the occupants of the building. Openings into these "safety areas" are furnished with underwriters labeled fire doors. When other buildings are close enough to the office to present a fire hazard, all windows facing

them are equipped with self-closing steel shutters.

The buildings are also equipped with the latest and best fire fighting apparatus. This is not necessary because of frequent fires, but is considered the best kind of "insurance" against service interruptions. Newly developed carbon dioxide hand extinguishers and "bombs" are gradually replacing the acid and water types of fire fighting apparatus. Sprinkler systems are not used because the damage done to the equipment by them usually exceeds the fire loss. Standardized though the equipment may be, it cannot be replaced at a moment's notice. Neither can the thousands of wires be connected to new terminals over night, and woe be unto the telephone company if the public is prevented from conversing with "the butcher, the baker, or the candle-stick maker" at any moment of the day.

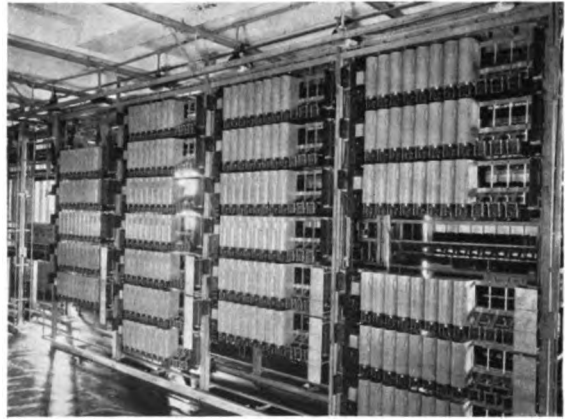
SPECIAL CONDITIONS

THE CABLE ENTRANCE. At one or both ends of the cable vault there is an opening in the exterior wall, below the grade, through which the cables are brought into the building. Underground cables are housed in terra cotta ducts, and groups of these ducts extend through the wall to its inner face.

CABLE PULLING HOLES AND RINGS. After cables are brought to the building, they must be pulled far enough into the cable vault for splicing. To facilitate this operation, some form of anchor is attached to the floor or wall at the end of the vault opposite the cable entrance, to which can be fastened a pulley arrangement. A rope or steel cable, attached to the cable to be pulled, is passed through the pulley and returned to the cable pulling hole. Through this it is taken outside the building and attached to a winch, or to a truck which, by the application of power, draws the cable into the vault to the required distance.

The cable pulling opening is located between the basement ceiling and the grade outside whenever conditions permit. Should the exterior level prevent the adaptation of this method, a diagonal tube with its outside opening flush with the sidewalk or grade is sometimes used. The exterior opening is fitted with a suitable waterproof trap door of bronze or a like metal.

THE DUCT WALL. The wall of the building adjacent to, and parallel with, the cable vault is usually designed to house vertical ducts. These contain the outside cables which are attached to the main frame when, as in this case, it is located on an upper floor. Where the main distributing frame is located on the first floor the cables are carried through slots in the ceiling of the cable vault direct to the distributing frame. The ducts in the wall occur on either side of a column, and as many as can be contained between the window



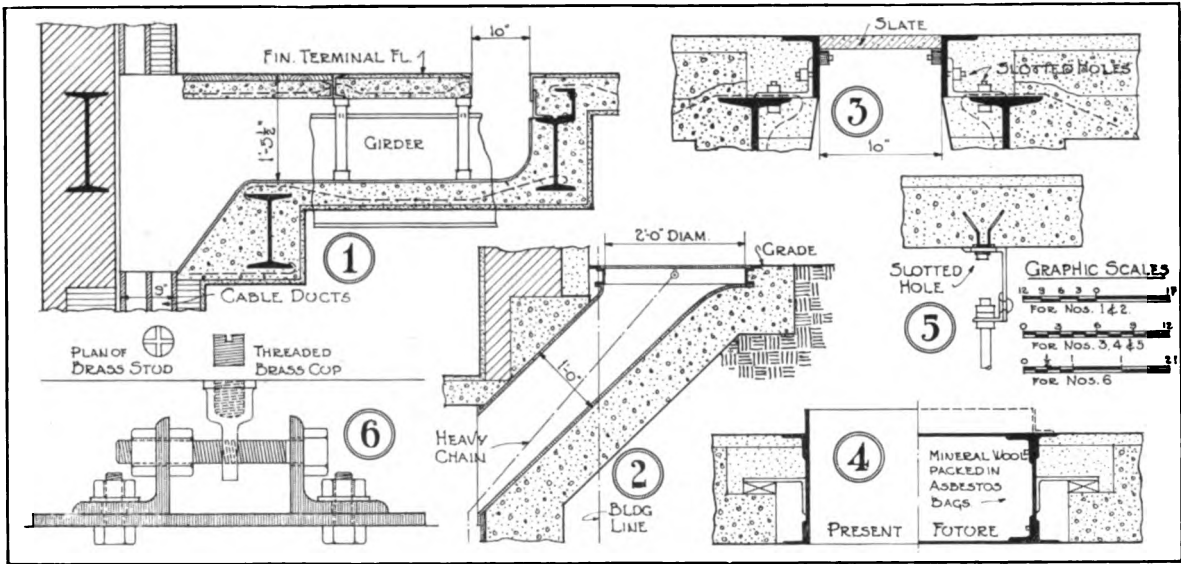
Switchroom. Step-by-Step system.

openings may be installed. The rows of ducts are in some cases two or three deep, depending on the number required and the wall space available. The ducts are protected by terra cotta furring or by similar means. Care must be taken in placing these ducts and their furring to preserve the proper clearance between column faces. If ducts and furring extend beyond the column face, the column spacing must be increased accordingly.

CABLE PITS. After the cables in the duct wall have been brought to location of the equipment on the upper floor, some provision must be made to bring them to a point directly under the "main frame." They must not interfere with equipment on the ceiling below, nor may they become stumbling blocks on their own level. The problem is solved by the "cable pit." The floor slab is here lowered enough to allow the cable to pass between it and another slab. This upper slab is held in place by metal supports fixed to the floor slab, and maintains the same level as the finished floor surrounding it. Trap doors of wood or metal are needed to give access to that part of the cable pit used as a splicing chamber.



Operating Room



Construction details as developed by Voorhees, Gmelin & Walker, architects

- | | |
|---|---|
| <p>(1) Cable Pit, showing the Duct Wall, Splicing Chamber and floor opening.</p> <p>(2) The Cable Pulling Hole.</p> <p>(3) Cable Slot with temporary slate cover.</p> | <p>(4) The Cable Hole; a method of fireproofing.</p> <p>(5) Ceiling Insert and rod hanger.</p> <p>(6) Floor Monument. Construction allows adjustment of marker before slab is poured.</p> |
|---|---|

CABLE SLOTS AND HOLES. Cable slots will be provided in the floor under the main frame at frequent intervals. They are sometimes round and sometimes rectangular in form. Their construction must be such that when not in use they can be closed. This is done by means of a steel or slate cover plate, or by filling them with concrete.

The floor slab between the terminal room and the operating room contains several "cable holes." These openings are usually about two to three feet square and are suitably fireproofed.

Cable pits, slots and holes are provided for future equipment where their locations can be clearly anticipated. This is also the case with steam pipes when vertical expansion is contemplated. They are carried through the roof slab and capped; and a protecting masonry wall is temporarily built around them. Several details applicable to these conditions have been evolved both by the company engineers and by architects connected with the work. The floor construction used, however, is such that holes can be cut where and when needed.

INSERTS IN CEILINGS FOR EQUIPMENT HANGERS. Much of the equipment is supported at the ceilings, including cable racks and mezzanine platforms. The inserts illustrated are spaced 2'-6" on center in the battery and power machine rooms and 4'-0" to 6'-0" on center for all other equipment rooms. Five-eighths inch rods are used for hangers. When not in use the hole is closed with a plug, flush with the ceiling.

REFERENCE LINES AND MONUMENTS. Contrary

to the usual custom of taking measurements from the face of a wall or column, the telephone company places monuments in the walls and floors of the building during the course of its construction. They are made of bronze and are finished flush with the floor or wall.

HEATING

The telephone building's heating problem presents but one unusual condition. The amount of heat generated by the motor-generator sets, switching equipment, etc., has been tabulated by the engineers and is considered in the heating plant design. For all equipment rooms a temperature of 65° is maintained; and in the operating room, operator's quarters, and public rooms the usual 68° is required.

VENTILATION

The battery room is usually vented. A vitrified tile flue will in most cases suffice. In some cases, mechanical ventilation becomes necessary; if so, acid resisting metal must be used for the ventilating equipment.

Air circulation is usually maintained in the terminal and operating rooms by means of electric fans, and only in isolated cases is forced ventilation desirable. Particular care is taken in planning the building and in laying out the equipment to provide the maximum of natural light and air for all rooms.

LIGHTING

Careful attention is given, in planning the building and laying out the equipment, to provide the maximum of natural light and air to all rooms.

Where artificial lighting is required, the minimum number of types of reflectors and lamp sizes consistent with securing a satisfactory result is used. The telephone company engineers have prepared several bulletins covering every phase of their lighting problem. The architect commissioned by the company will have access to and be guided by these bulletins. In general, the equipment used is much the same as that required for a clerical office.

EXTERIOR DESIGN

Fifty-seven per cent of the world's telephones are in use in the United States. It follows then, that the American architect's opportunities in this field are proportionately great.

Telephone buildings are designed to reflect the policies of the Bell System. Cost is kept down to a reasonable figure, resulting in edifices whose treatment is simple and in good taste. They are meant to contribute toward the achievement of the ideals of the communities which they serve, and architectural style and materials are varied to suit the particular localities in which they are erected. In a community whose builders are more familiar with one type of construction or a particular style of design than they are with another, the building is generally made to conform to the style which is better known. A structure in har-

mony with its surroundings, erected more substantially, and at less expense than would otherwise be the case is thereby obtained. On the whole, the work done by the architects responsible for the 2,700 telephone company buildings is a credit to the profession. The Bell System has given evidence of its wisdom in retaining architects throughout the nation to execute the work, instead of organizing an architectural department of its own.

It would be interesting to observe the changes in architectural expression which might result if the public at large could be made to realize what a tremendous service the telephone exchange renders to any city or town. These buildings and the equipment contained in them are fully as important to our present day civilization as the banking house or the public library. Why then, should they not have design characteristics as distinctive?

Uncle Sam's children have a capacity for trying to camouflage or ignore anything they do not understand; and, unfortunate though it may seem to the modernist, this idea is often crystallized in our country's architecture. Might not some rebellion against this state of affairs be excused on the ground that after all there is a great deal of beauty in truth?



The telephone company's newest business offices are the result of an endeavor to do away with counters and wickets wherever possible in favor of desks and comfortable chairs in order to make the customer's relations with the company as pleasant as possible



Browning

THE DERRICK GANG

THE EMPIRE STATE BUILDING
SHREVE, LAMB & HARMON, ARCHITECTS

THE EMPIRE STATE BUILDING

SHREVE, LAMB & HARMON, ARCHITECTS

X. FIELD ORGANIZATION AND METHODS

The need of speed and order in the field is common to all building projects, but the size of the Empire State Building demanded an unusual degree of organization. The methods discussed here—by a man intimately concerned with every phase of the building work—might well be applied to the field operations of almost any project.

BY JOHN P. CARMODY

OF STARRETT BROS. & EKEN, INC.

THE formidable task of supervising construction of a building that is at once the largest and the tallest building in the world, a building that had to be finished within the space of one year from start of setting the steel, would have been utterly impossible without a highly trained organization. We who live in the industry sometimes forget that each new building requires a new organization, formed of the owners, architects, builders, and sub-contractors. In most instances, they have never worked together before; their methods are often strange, and natural difficulties arise which only better acquaintance can straighten out. In no other industry, with the possible exception of war, are groups of men thrown together so hurriedly to do a job whose success depends chiefly upon cooperation. And war has no time schedule. General Grant said, "I intend to fight it out on this line if it takes all summer"; but on the building line, the challenge cry is, "Ready for occupancy by May 1st."

To the builders of the Empire State fell the task of coordinating the various branches of work being done by themselves as well as the work of approximately forty sub-contractors. On page 497 is a diagram showing the organization of the actual force of the builders in the field. The relations are definite; responsibility is specifically designated; and the reasons for success or failure are at once obvious.

JOB ORGANIZATION DIVISIONS.

Directly in charge of all the work is the job superintendent who must have, in addition to a

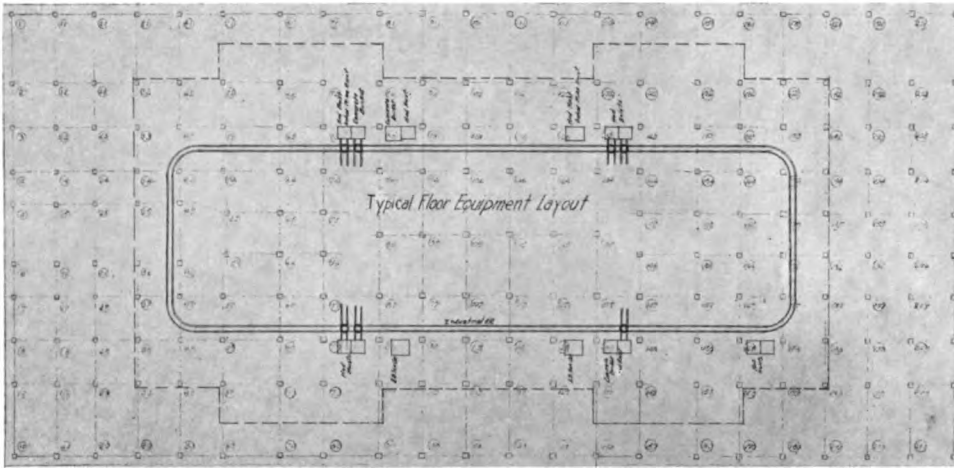
thorough knowledge of building construction, an aggressive personality, tempered by infinite tact and patience. Under him are the various departments, the most important of which are as follows:

JOB RUNNER'S DEPARTMENT. The Job Runner is the Assistant Superintendent in charge of the office work and under his guidance, a liaison is established between owners, architects, job organization and sub-contractors. This involves the receiving, filing and distribution of all plans and shop drawings; the interpretation of plans for job organization and sub-contractors; the preparation of contracts and change orders; estimating for tenant changes and variations from original plans; expediting material; and mill and shop inspection.

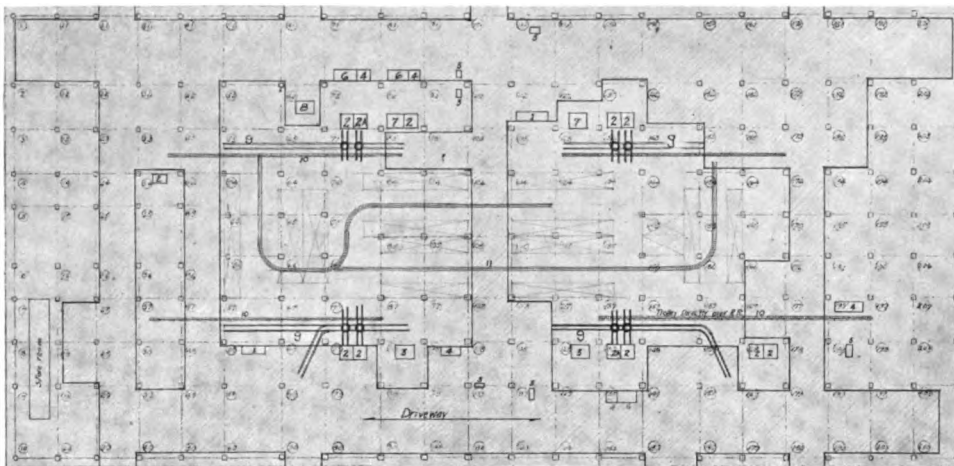
CONSTRUCTION DEPARTMENT. This branch, as well as being in charge of all construction work done by the job organization, has direct supervision over all the work installed by sub-contractors. The civil and mechanical engineering departments, the various units having direct inspection control of the mechanical and architectural construction work, the watchmen and the fire patrol forces are also part of this department.

ACCOUNTING DIVISION. Under this division are the auditing, bookkeeping, timekeeping, payroll, and material receiving departments. Although the purchasing agent is included in this division, he is directly responsible to the superintendent, through whom all requisitions have to be cleared.

One of the important functions of the accounting department is the compilation of a daily labor



Typical floor equipment layout, showing the position of the industrial railway in relation to the hoists. There were eight temporary shaftways



Construction equipment on first floor. Legend: 1, brick hopper; 2, hod hoist; 3, elevator; 4, sand hopper; 5, cement slide; 6, cinder hopper; 7, hod hoist; 8, rubbish chute; 9, Industrial R. R.; 10, overhead trolley

unit cost, which is determined by checking the amount of work done each day by the various trades against the value of the labor expended against these respective subdivisions. This work is done in conjunction with the Construction Department and the Production and Cost Department. It results in a barometer which enables the superintendent to ascertain if the work of each class is being done at a loss or gain as compared with the unit allowed in the preliminary cost estimate. It is of supreme importance in assisting him to keep his labor forces under economical control.

The method used by the builders in hiring, laying off, and checking the men is substantially the same system used by the various sub-contractors. The hiring of men for the different trades is done by the respective trade foremen.

All hiring is done before 8 a. m. on the main floor in the direct vicinity of the timekeeper's office. Each man is given a hiring ticket upon which is written his name, class, rate of pay, and time hired. He presents this ticket to the timekeeper's office, where a personnel card is filled in with his name, age, home address, and a notation if he is married or single, and number of children. A record of his earnings is kept upon this card for income tax purposes.

At the timekeeper's office he is assigned a number and given a small brass disc bearing the same number. This check is given to him each morning when he reports for work, and he presents it at the time office when he finishes work each day. During the day, field time checkers visit all the men on the building, once in the morning and once in the afternoon, and ask them to

show their brass checks. This gives the office four reports on each man every day, twice at the time office and twice in the field. On Friday morning (payday) each man receives an aluminum check bearing his number in addition to his regular brass check. This he presents to the paymaster when he receives his pay.

The information showing the actual number of hours each individual worked each day is forwarded to the payroll division and posted on the roll. After the weekly payroll has been audited, a check for the total amount is drawn; and this check, together with a change list and the required number of empty pay envelopes, each bearing the name and number of a workman as well as the amount he is to receive, is turned over to an armored service company. The envelopes are filled at the bank and the men are paid in the field upon surrender of their aluminum checks.

COST AND PRODUCTION DEPARTMENT. Entirely independent of the field time checking force is a field labor cost distribution organization, which checks each man in the field in relation to the kind of work he is doing. A summary is made for each trade or class on the foremen's daily reports, which show on one side the number of men and the total hours each man worked for the day and on the other side, the distribution of activities under the different accounting sub-division symbols. This insures, as far as possible, an accurate

record of the work performed by each man every day. A digest of the activities is incorporated in the daily job diary, which gives a complete record of the day's activities.

In addition, a survey is made each day of the various quantities put in place on all those accounts upon which a daily cost unit is worked out. Once each week, a physical inventory is taken of the different kinds of material on hand, which serves as a check against quantities surveyed in place in the structure. The division of the various quantities placed, by the cost of labor, results in the daily cost unit mentioned before.

COMMISSARY. The feeding problem was handled in a customary and yet a different manner. Instead of renting out the concession to the highest bidder, the builders designated a restaurant owner in the neighborhood to operate five stands throughout the building, these stands to be erected as the conditions required. In return, the restaurateur paid the builders a nominal sum (enough for light, power and the cost of stand construction). They served food from stands on the 3rd, 9th, 24th, 47th and 64th floors at a cost to the workmen less than they would have had to pay outside the building. Despite the fact that construction commissaries are almost invariably protested against as "robbers" by the workmen, not one complaint about the food or the prices was made during the entire operation.

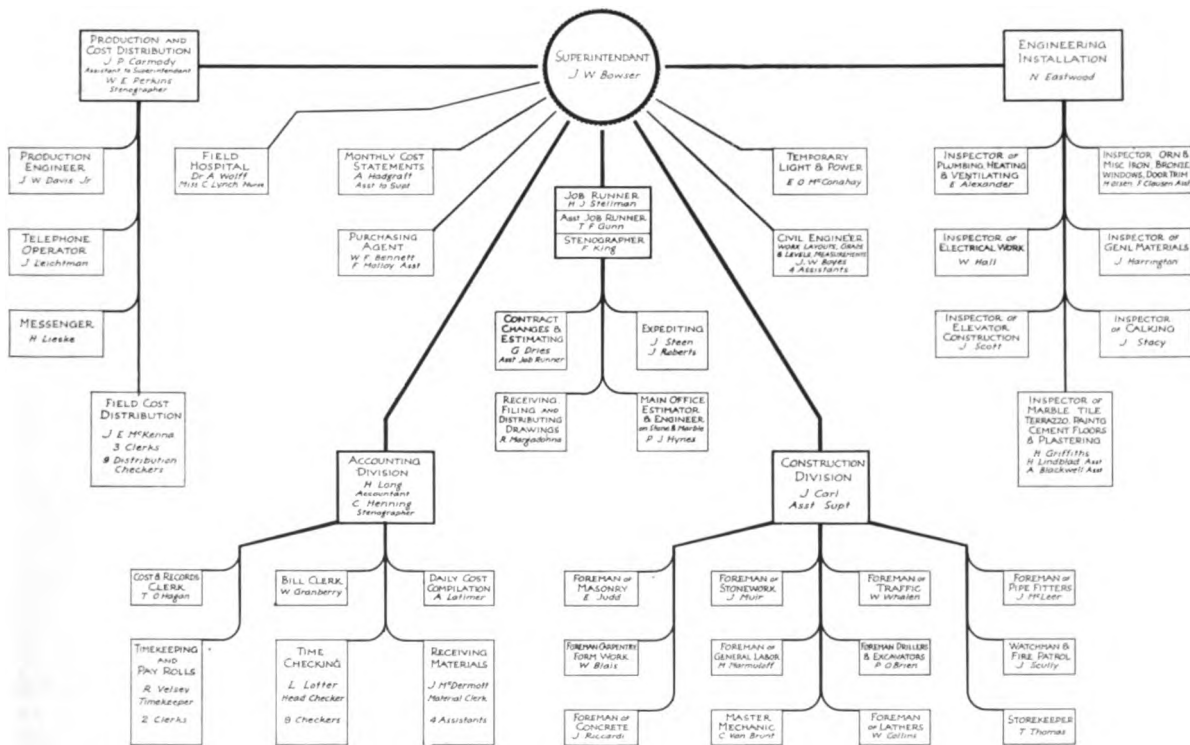
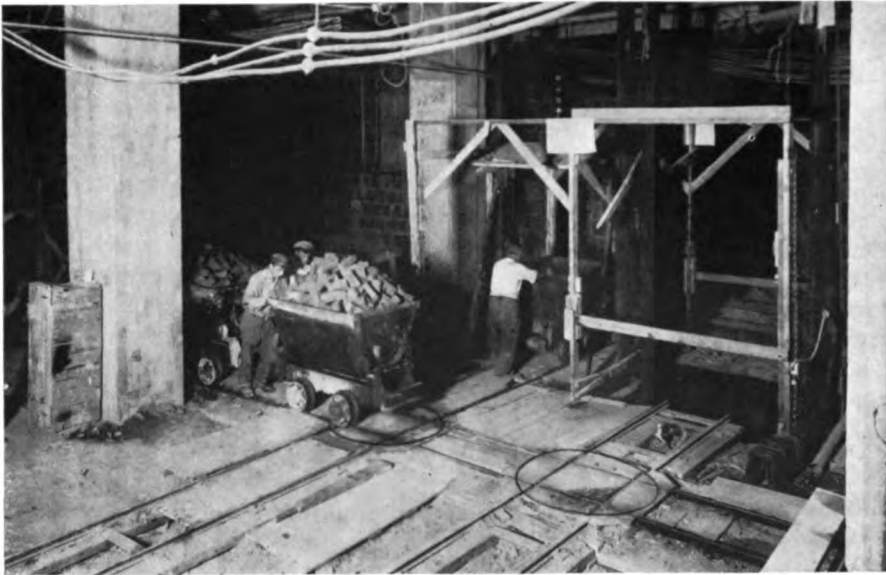
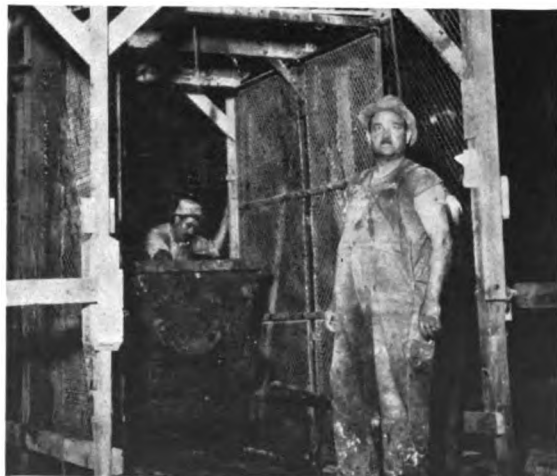


Chart showing the organization of the various departments of the contractor's force in the field



Empty car being pushed off hoist, and car loaded with brick being pushed on turntable. Note the guard rail and the placard warning employees not to ride on the hoist



Rocker dump car being rolled on hoist in first basement; and (above) industrial railway on the 85th floor with a load of limestone in the background

Highly important in construction work of great magnitude is the selection of proper equipment, its intelligent distribution to serve all branches of the work, and a logical plant layout. Naturally, on a building as large as the Empire State it was necessary to introduce new methods of handling and distributing materials. On page 496, there are reproduced two floor equipment layouts, the first floor and a typical floor. They were as carefully planned as a factory layout, based on the facile movement of materials.

INDUSTRIAL RAILWAY. For the first time on any office building construction project, an industrial railway system was used to increase speed in distribution of material. A permanent track was installed on the first basement and first floor, and auxiliary tracks were laid on the upper floors as they were needed. Turntables were located at the entrances to the hoists, the platforms of which had tracks so that the cars could be rolled right on them. Twenty-four double side rocker dump cars and twenty-four platform cars served the building.

OVERHEAD TROLLEY SYSTEM. For the purpose of unloading stone from trucks within the building, four sections of overhead monorail were installed at convenient points. Operated with them were electric hoists, equipped with 5 h.p. motors, with a working load of 8,000 pounds. Heavy pieces were lifted from the trucks by the hoists, swung along the monorail, and deposited on the platform cars of the railway, ready for distribution to other floors.

INSIDE MATERIAL HOISTS. The choice of an inside hoisting system was made largely on account of the ample floor areas within the building. The lower floors from sub-basement to the

5th floor are each approximately 425 ft. by 197 ft. This size is reduced gradually by setbacks until the main tower shaft is reached at the 30th floor; and from that point up to the 86th floor, the area of each floor is approximately 185 ft. by 134 ft. This condition made bays accessible within the building that could be used for temporary shaft openings without undue interference with mechanical construction work.

A study of comparative costs was made between the inside method, and the outside method of all steel hoist shaft construction; and it was proved satisfactorily that by using the inside method of bracketing the guide rails of the hoist shafts to the steel structure, and building wire screen protection enclosures around each floor opening, a substantial saving would be effected. This method, of course, had to include the expense of returning to patch the concrete floor arches, finish cement floors, plastering, electrical and duct work, after the hoisting system had been discontinued. Practically everything except the structural steel and a few large pieces of machinery was raised on the inside hoists.

Starting with six hoisting units (four platform and two bucket), the number was increased until there were seventeen units at the time of maximum operation. The six original hoists had a capacity of 8,000 pounds, operated at a speed of 600 feet per minute by 200 h. p. motors with full magnetic control. They were equipped with hand brakes of the air-cooled type, supplemented by automatic motor brakes mounted on the motor shafts. The other units were smaller, being served with engines of from 60 to 100 h. p.



Mine shaft car used for temporary service. Note heavy gauge wire which encloses the shaft, and the safety gate which prevents car motion if open

The heavy duty hoists were provided with dial indicators geared to the single drum shaft. The positions of the various floors had been marked on the dial to indicate the approximate position of the car, and final leveling was gauged by the customary marks on the cable. The platforms themselves were provided with landing lugs, two on each open side. The car was hoisted a few feet above the floor level; the signalman on the floor operated a hand lever on the car platform to project the lugs beyond the shaft opening; and the hoist was lowered until the lugs rested on the floor. Locking dogs held the wheels of the cars until released by the signalmen.

ELECTRIC SIGNAL SYSTEM. The method in general use whereby gong signals are given to the engineer by means of pulling a rope was superseded by a system devised by one of the electricians working on the building. The signalman presses a button which rings a gong attached to the hoisting engine in a panel box in front of the engineer. At the same time, a light flashes, thereby giving simultaneous sight and sound signals. A portable telephone between engineer and signalman is also used.

This system is safe because only the signalman can transmit the required signals to the engineer from a control unit directly in his possession. It is faster than the usual rope system because it works effectively in good and bad weather. A safety feature consisting of a trouble buzzer, operates through a relay in case of cable trouble.

TEMPORARY ELEVATOR SERVICE. A very costly item on buildings of this character results from turning over, for temporary operation, permanent



Mortar-filled rocker dump car ready for ascent. Note that signalman has all controls on his person, and that safety dog had not yet locked wheels



Workman dumping load of refuse down steel chute, the latter an innovation on building construction



Truck loaded with refuse received from chute that led into a heavily reinforced bin on second floor

elevator cars before the work on the various units has been completed. This practice necessarily results in overtime work by the elevator construction organization, because the cars are in use during the day. In order to avoid payment of excessive time, and also to allow the elevator constructors unobstructed use of all the permanent shafts, it was decided to install an absolutely independent system to take care of passenger service during the construction period.

To meet the initial requirements, two mine cage lifts were installed, one to the tenth and one to the twentieth, as soon as erection of the steel frame permitted. These cages were built for a load of 3,500 pounds, of the regular mine type with safety dogs. They were operated by an engineer on the second floor, to whom start and stop signals were transmitted by a signalman riding the hoist. A safety switch was installed on the door, preventing motion while the door was open. The hoisting engines were equipped with all the types of safety brakes that are part of a standard elevator installation.

The mine cage units were used because they were the most flexible for quick installation to take care of the daily increasing number of men employed on the building. The same type of shaft, and the same method of construction were employed in connection with the lifts as were used in the regular material hoists. The guide rails were extended to a point above the overhead cable sheaves, so that operation of the cars below that point was carried on while the work of installing the rails to higher levels proceeded. Whenever extension of travel was necessary on the hoists, the work was done overnight without interruption of service the following morning. Even though the completion of one shaft would permit the car in that particular shaft to run to a higher level, both cars were kept running to the same height to prevent overcrowding of the car running to the highest story.

About five years before the Waldorf-Astoria Hotel was demolished, an installation of four new elevator units had been made. These units were salvaged and placed in operation for temporary service. Two ran from the ground floor to the 30th, and the other two, in the same shaft opening, ran from the 34th floor to the 64th. The mine cage cars were raised to different levels as conditions required, and finally served from the 64th to the 78th floors. When the pits of the mine cage units were raised, the lower sections of both shafts became available for use of material hoist units. Obviously, the mine unit engines were raised also, first to the 40th floor and later to the 63rd floor.

Due to union rules, the majority of the men employed by the sub-contractors did not leave

their lockers until 8 a. m. To avoid too much congestion at that time, the builders employed a stagger system starting certain trades at 7 a. m. and others at 7.30.

DIRT CHUTE. Instead of the usual wooden debris chute, a steel chute was extended, as progress warranted, from the second to the 85th floor. This innovation was adopted because wood chutes require larger floor openings, are in constant need of repair and allow considerable dust to escape. On the second floor, a large dust-proof bin was constructed of heavy timbers to receive the refuse. This bin fed through a floor opening into rubbish trucks on the main floor. The chute itself was made of $\frac{1}{4}$ " steel plate from the 2nd to the 11th floor and $\frac{3}{16}$ " plate from the 11th upward. It was to be salvaged at the end of the operation to be re-used on other construction work.

UNLOADING AND DISTRIBUTING MATERIALS.

All material, except structural steel, was received and unloaded on the main floor of the building. As soon as the main street floor concrete arch had set properly, a six-inch decking of fir timber was laid for protection over areas to be used for driveways and material storage around the hoists. Four entrances on 34th Street and three entrances on 33rd Street afforded ample exits and entrances to avoid congestion of trucks at any time within the building. Driveways, extending around the four sides of the floor, were about 25 feet wide, thereby permitting two lanes of traffic. Contiguous to all the material hoists were spaces for unloading and temporary storage of materials. A check taken on an active day, when the work had reached its peak, recorded a total of nearly 500 loads of materials, machinery and equipment in an eight-hour period deposited without confusion or delay.

COMMON BRICK. The method of handling brick was a distinct innovation on buildings of this type. Considering the height of the building and the enormous quantity of brick required (approx. 10,000,000), the organization had to be equipped to raise the brick fast enough to keep pace with the stone setters, who were working on a schedule of one story a day.

Two brick hoppers, each with a capacity of 20,000 bricks were constructed in the first basement. Near entrances on the main floor, openings leading into the hoppers were located so that trucks could conveniently dump their loads and move out. Each hopper fed into a slot opening into double side rocker dump cars, each having a capacity of about 400 bricks. The loaded cars were pushed along the industrial railways, swung on turntables and on to the material hoists. After



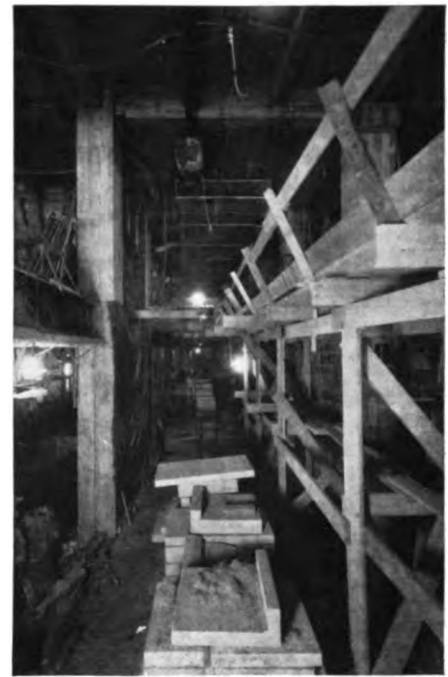
Concrete batcher in second basement. Materials were fed into it from bins in the first basement



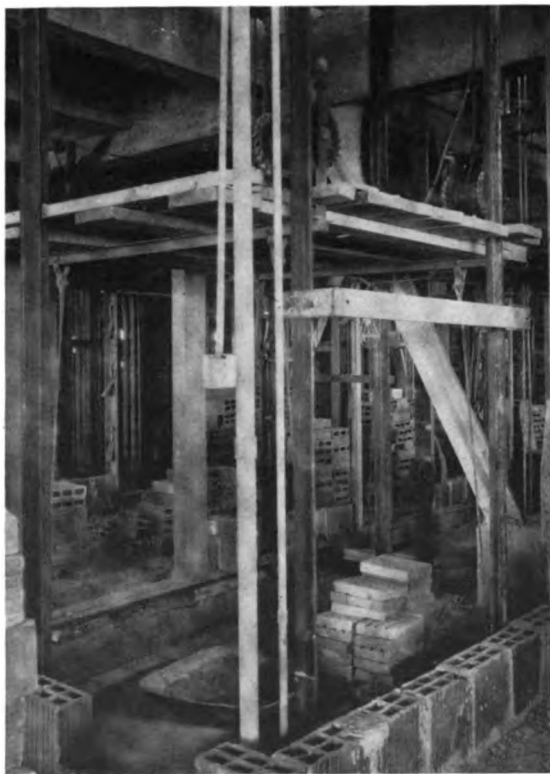
Carload of brick being pushed away on industrial tracks from large brick hopper in first basement



Tandem cars being loaded from hoppers. Note the water spray wetting down the brick on the right



Overhead trolley hoist for transporting stone from flat-cars to workers



Patent scaffold used in building up shaft walls. A novel feature is the location of hoisting machinery overhead instead of upon the working platform, which allows more space and reduces minor injuries

being raised to the proper floors, they were pushed off the hoists and sent along the railway to points where the bricklayers were working. It is no exaggeration to say that the bricks were "untouched by human hands" from the time they left the yard until the bricklayers picked them up to set in place.

It was estimated that, in addition to saving the space that would have had to be devoted to two more hoists to maintain the schedule, a saving of 38 men per eight hour day was effected by this new method of handling common brick.

CONCRETE MATERIALS. The two main mixing plants were located in the second basement. The material was fed into these plants from two combination bins erected in the first basement. These bins were divided into two sections, and were constructed to receive approximately 12 yards of sand in one compartment and about 30 yards of cinders or crushed stone (according to the aggregate) in the other. Openings were made in the main floor to receive the materials, dumped by trucks, into their respective bins. Cement in bags was dumped down chutes on the main floor to a space near the mixing plants, where the bags were stacked ready for use. Lakewood bucket hoists received the mix for the floor arches from the two main units. These bucket hoists raised the concrete to the proper floor heights and were automatically dumped into floor hoppers from where the concrete was wheeled in buggies and deposited in the floor arch forms. Independent



Rope net catch-all for light objects, located beneath the one on the right



Section of catch-all. Note solid planking, the high guard of planks and wire, and fire extinguishers

mortar mixing units deposited the mortar into dump cars, which, after receiving the mix from the machines, were pushed along the industrial rails, and carried aloft to the masonrymen. Reinforcing materials were raised on the material hoists, but the floor arch lumber was raised (generally a load at a time) from trucks in the street by steel derricks. Small whip hoists were subsequently used to raise this lumber, as well as reused forms, from floor to floor.

TERRA COTTA AND FACE BRICK. Terra cotta tile and face brick were unloaded from the trucks and stacked along railway spurs ready for upward transportation on the platform cars. An idea of the time and expense saved by use of the railway in handling this material may be gathered from comparing the 175 pieces of 2" tile which the cars hold, and the 12 pieces of tile which the old wheel barrows hold.

EXTERIOR LIMESTONE. All limestone from the sixth floor setback to the 85th floor was of a size that could readily be loaded on flatcars and raised on the material hoists. The stone was unloaded from trucks inside the building by the overhead monorail trolley system, placed on flatcars and pushed to the hoists. The limestone for the first five stories was raised by stiff leg derricks placed on the 6th floor setback.

FORECAST OF QUANTITIES. A schedule was made showing the estimated quantities of tile, common brick, face brick and limestone required on each floor. By following this schedule it was

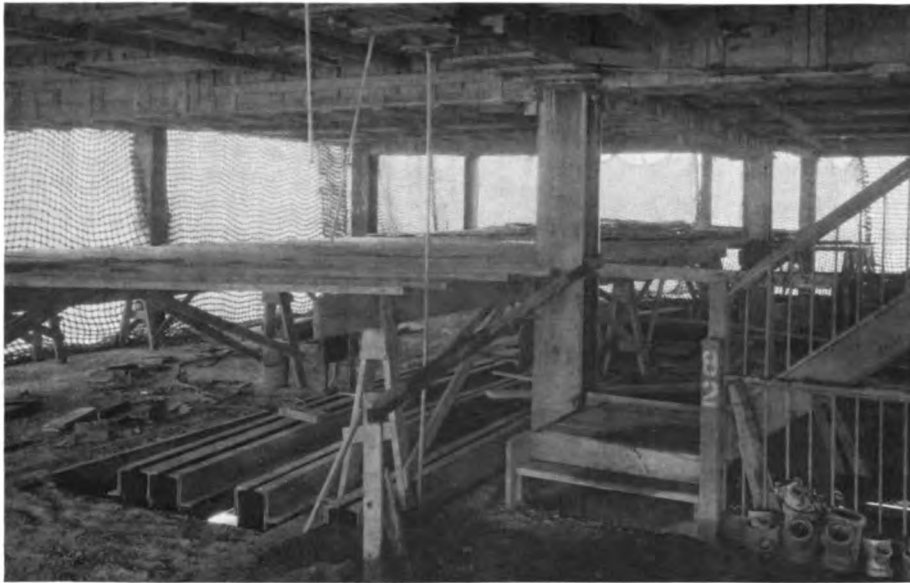
possible to have the allotted quantities stacked three floors ahead at all times. This reduced the necessity of rehandling materials to a minimum.

QUANTITIES INVOLVED. An idea of the masonry quantities raised on these material hoists may be gained from the following figures:

Common brick	10,000,000 pieces
Face brick	800,000
6" Terra Cotta	900,000
2" Terra Cotta	500,000
4" Terra Cotta	210,000
3" Terra Cotta	200,000
8" Terra Cotta	10,000
Limestone	198,328 cu. ft.
Wire mesh	2,900,000 sq. ft.
Beam clips	700,000 lin. ft.

The concrete raised for floor arches, not including fill and finish, amounted to 62,000 cubic yards.

MATERIALS FOR SUB-CONTRACTORS. An almost infinite variety of materials was received and raised for some forty sub-contractors, which, obviously, required strict regulation. Certain sub-contractors, such as the plasterers and the floor fill and finish men, had material hoists definitely assigned to them. The other firms were required to report their needs to the forman in charge of the main floor at least two days in advance. They had to designate the hoist required by its number, and the day and hours it would have to be used by them. The sub-contractors instructed their truck drivers when delivery could be made, and at which hoist the material had to be unloaded.



Rope net protection around an exposed floor. Permits more light and offers less resistance to wind pressure than customary tarpaulin



Scaffold used by stone-setters, with heavy plank overhead protection and firm platform. Note heavy gauge wire guard 3 feet high on the left

If a driver did not have such information he was not allowed inside the building.

The elevator company erected a monorail system for unloading its machinery on the first floor; and with the aid of traveling cranes the machinery was carried to the proper shaft. It was then hoisted up through the shaftways by means of temporary hoisting engines placed at the shaft heads on different levels. This was done until the permanent machines were installed and placed in operation.

THE FOUR PACEMAKERS. In considering the factor of speed, it is interesting to study the progress of those four divisions of construction work which had to take the lead and set the pace for

the trades that followed. Those four leaders, with their schedules are:

Trade	Schedule Date	Actual Date	Time Saved
Structural steel	Oct. 4	Sept. 22	12 days
Floor arches	Oct. 10	Oct. 6	4 days
Exterior Metal	Dec. 1	Oct. 17	35 days
Exterior stone and backup	Dec. 1	Nov. 13	17 days

SAFETY MEASURES.

The malicious propaganda which almost invariably circulates about large construction enterprises reached unusual proportions about the Empire State Building. The impression was created by rumors and subtle press articles, that adequate protection was entirely disregarded in

the feverish anxiety of all concerned to establish a record for speed in construction of the building. It is needless, perhaps, to reply to such absurd charges; but the efforts of the builders to maintain safe conditions on the job were so thorough that it may be of help to outline some of the precautions taken.

PERSONNEL. To supervise and co-ordinate all safety agencies on the building, an assistant superintendent was appointed. Under him were two foremen in charge of building temporary protection. At one stage of the work, more than 50 men were employed in these two gangs, doing nothing but that type of work. These men, together with all other foremen on the job, were given to understand that they constituted a permanent safety committee; they were told to correct immediately any dangerous condition brought to their attention, thereby eliminating the red tape of reporting the condition and then being assigned to correct it.

In addition, three agencies, the city building department, the state labor department, and the insurance company had safety engineers and inspectors in constant attendance. Besides these, the steel erectors, the elevator constructors and other sub-contractors had their own safety men.

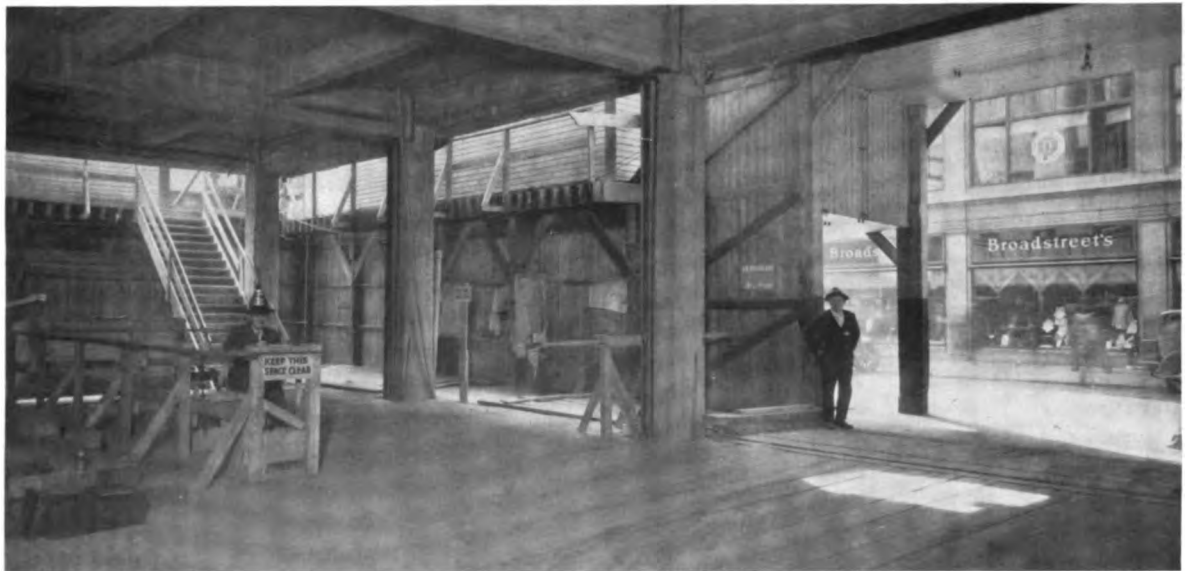
EQUIPMENT. Supplementing the safer methods of handling materials already described, additional precautions were taken by the builders. Around the material hoist shaftways, wire mesh panels were constructed, with pivotal bars, two feet from the edge, across the openings. Temporary stairs were avoided as far as possible, and those that were necessary (leading to the base-

ment and the sidewalk bridge) were substantially constructed with mid-rails and hand-rails. These, as well as all floor areas, were kept as clean from debris as possible. The use of ladders was discouraged except when needed by sub-trades; they were secured firmly at the bottom and extended well above the level which they were to serve.

The suspended type of scaffold (shown on page 504) was used for exterior work. They were well equipped with guard rails, wire mesh between rail and platform, and a solidly planked overhead protection. Interior scaffolds were of the type now extensively used in tall building construction, with the exception that the hoisting machinery was located on the overhead platform instead of on the working platform. (See page 502.)

Two catch-alls, extending completely around the building were located about fifteen stories apart. The upper one, under the stone setters (see page 503), was solidly planked over, and had a wood and metal guard extending upward about three feet. The lower one was of rope and wire net, serving to catch lighter objects falling from the floors between it and the catch-all above. Rope nets were used to enclose stories where floor arch forms were being stripped; and tarpaulins were used on floors below to enclose floors where concrete was being poured, thus preventing drip from being blown into the streets.

FIRE PROTECTION. As the building progressed, a fire alarm box was installed on every floor from the second basement to the 5th floor, and on every other floor from the 6th to the top. As required by the district telegraph service, four sta-



One of the truck entrances on the first floor. At the left is a space kept clear for an ambulance. Notice the cleanliness and freedom from debris of the floor



One of the five lunchstands set up for the convenience of workmen. Prices were low enough to keep most of the men in the building at lunchtime



A corner of the field hospital, in which a trained nurse was always in attendance, and to which a physician made regular calls during the day

tions were installed on every floor, two in each basement, four on each floor, up to the 6th, and two on each from there up. Half hourly tours were made from 5 p. m. to 7 p. m., and hourly tours from 8 p. m. to 6 a. m. Each watchman was equipped with a small portable fire extinguisher; and large extinguishers were distributed on various floors, especially where there were sub-contractors' shanties, and on floors where form work and decking were in progress.

Two temporary wooden tanks, each with a capacity of 4,000 gallons, were installed, and six standpipe connections were made with the street siamese. To take care of any fire which might have occurred, a 24-hour service was maintained whereby a pumpman was always on hand to supply water, an electrician to supply light and power, and a hoisting engineer to operate an emergency hoist or elevator for transporting firemen.

SYMBOL OF THE AGE.

A quotation from Ruskin which has often been used as an inspirational thought runs like this :

"Therefore, when we build, let us think that we build forever. Let it not be for present delight, nor for present use alone; let it be such a work as our descendants will thank us for, and let us think, as we lay stone on stone, that a time is to come when these stones will be held sacred because our hands have touched them; and that men will say as they look upon the labor and the wrought substance of them. 'See, this our fathers did for us'."

This massive building now stands as a majestic symbol of the enterprise and efficiency of our age, offering mute tribute to promoter, financier, architect, engineer, builder, artisan, and everyone, down to the humblest laborer who toiled to make it a reality. Not only is it a tribute to them individually, but coöperatively as well. Without the coöperative element, the organization which has been described in this article would not have been able to function with the same efficiency.

Photographs accompanying this article are by courtesy of the Building Trades Employers' Association, and of Frank Molloy, Assistant Purchasing Agent for the contractors.

INTEGRATING AN INDUSTRY

BY

JOHN C. HEGEMAN

PRESIDENT, THE HEGEMAN-HARRIS COMPANY

COOPERATION among all the elements of the building industry, including financial and professional, has received marked impetus in many directions during the past few months. This cooperation is not merely a defensive gesture prompted by the pressing need of the hour, but rather, the inception of a great constructive movement looking to the reforming of our common attitudes one toward another with a view to bringing about conditions that will permanently make for progress and better times for all.

Some months ago I ventured to suggest to the architectural profession that really the interests of the architect, the builder, and even the manufacturer, are identical inasmuch as we all serve the owner who pays the bill and, therefore, it would seem the part of sound judgment for all of us, especially the architect and builder, to develop closer relations for the common good of all. I said this with some trepidation because I have spent all my business life in the contracting business, and have been thoroughly trained in the tradition or illusion that the architect, an artist and a superior being, was too deeply concerned with problems of design and detail to worry about such mundane things as costs and finance. I still retain the great respect for the creative function of the architect, and of late have observed with satisfaction that the architects themselves are taking the lead in this movement toward cooperation of all the elements of the industry.

Mr. Robert D. Kohn has expressed this in saying that what appears to him to be even more certain is that within the building industry of this country there are elements which are moving towards a realization of their responsibilities to the public, and towards a definition and perfection of their functional relations to the industry as a whole. Our artistic progress can move along with certainty only when it stands on a solid basis of right relationship between the many essential elements that go into the process of designing and constructing a building.

Similar movements are discernible in other groups, some contractors and a large number of trade organizations, many of which maintain ex-

tensive bureaus and institutes designed to carry on research and development work into new fields of material and new methods of working.

COSTS

In all that is being done by the various groups through organized effort or individual leadership, it seems to me that the first fundamental upon which all should endeavor to reach a clear and comprehensive agreement is the ever present question of costs. Unfortunately, there is no common measure in our industry by which all the elements arrive at an understanding of the meaning and significance of costs as the basic factor in any construction enterprise. The first question the owner will ask of an architect is, "How much will the building cost?" The average owner calls upon an architect not only to design a building for him but also to estimate its cost.

ARCHITECTS AND COSTS

The architect is expected to possess some kind of second sight, some magic he can call to his aid, whereby offhand he can tell an owner the cost of a building for which he has not even yet had time to make a sketch or even give thought to what the proposed building should be like.

Every architect knows, sometimes from bitter experience, that a client has almost a childlike faith in his guesses; but he also knows that the client will assail him bitterly if this guess proves to be wrong later on. Many a noble design has been lost to the world because an architect has been forced, unfairly and unjustly, to place a valuation upon his creation based on few, if any, reliable cost data.

This perfectly human desire of the investor to know what a building is going to cost him is not a question that the architect can put aside or, as a rule, even defer; because the owner not only desires to know the cost of the building as such, but he also desires to know whether such a building will serve the purpose he has in mind—in other words, he wants to know first whether his money invested in the project will produce the results desired. A reasonably correct answer to

this question of cost, therefore, is not an academic matter to the architect. Upon the preliminary figure the architect gives may depend the decision of the owner to go ahead, to abandon his idea, or to proceed in some other direction.

There is no logical reason why this responsibility should be placed upon the architect. He is the owner's immediate consultant, it is true, but he is only one party to a transaction which later will enlist the work of many parties each, contributing his share, a necessary part of the whole. The owner, contemplating some construction project not always entirely clear in his mind, quite naturally consults his architect, who is equipped by education, training, and experience, to whip the ideas of the client into form, upon which later definite plans may be predicated. Now this form or scheme is an indefinite thing at the outset, and yet, the owner expects the architect to place a definite cost valuation upon it.

In order the better to understand just how difficult the problem of the architect is, it may be well to consider just what cost means in the building industry. In all the world of business, the cost factors upon which an estimate may be based are more indefinite and sketchy in the building business than in any other. In the first place, costs are relative.

LOCATION AND PURPOSE

An architect commencing to develop a building of given dimensions and purpose, will be confronted at the very outset by two major considerations, entirely apart from the actual costs of the project, which are controlling and yet afford no data sufficient to warrant a statement from him as to the probable costs. I refer to the location and purpose of the building, and the contractor who is to do the work. In one locality the factors of transportation, materials and labor conditions are radically different from those in other localities. Secondly, the type of contractor who finally is awarded the business, enters even more intimately into the situation.

In great cities like New York or Chicago there will be conditions not present in lesser centers like Cleveland, Detroit or Milwaukee. Again, there will be radical variations and conditions, in one part of the country as against another, in trade customs, local regulations and even traffic conditions, which will definitely affect any estimate the architect may be called upon to make as to costs.

CONTRACTOR AND COST

Then there is the question of the contractor, always an important factor in the final cost of a building. This aspect of the cost problem goes

directly to the very life-center of the building business. We are accustomed to buy practically everything we use on the reputation of its maker. Thus, when we come to buy an automobile, we know that our money will only buy a certain type of machine. There is no confusion or misunderstanding about this. Quality commands a price.

THE OPEN MARKET DANGER

When a buyer goes into the market to buy a building, on the other hand, he leaves behind him apparently the buying habits he is accustomed to following in the purchase of other manufactured articles he may require. Moved, no doubt, by the prevailing belief that the construction of a building is merely a matter of letting a contract, he compels his architect to throw the project into the open market, inviting bids from all and several, without regard to the reputation of the bidders in respect to skill, integrity and responsibility.

Assuming that his final choice of a contractor is not a happy one, the problem of costs will take on added difficulties because sound construction, speed of completion, etc., probably will enter very definitely into the situation, adding to the normal costs attending the work of a competent and properly organized contractor. There is no need to go into this subject more fully, because every one concerned with the building business knows that the whole problem of costs to the owner sooner or later resolves itself into the question of his own responsibility in the selection of his contractor.

Therefore, the first approach to any organized effort to develop cooperation of all the elements in the building business must concern itself seriously and thoroughly with this situation. Costs are stubborn things. A dollar will go no further in the purchase of quality in a building than in any other article of commerce. This is the nub of the whole situation. So long as the man who pays the bills labors under the delusion that a competitive scramble initiated by himself can produce good results, so long will the architect be handicapped in his preliminary estimates of costs on any given project.

WORKING AT ODDS

The vast volume, the division of the work into many departments, the mobility of organization have in the past forced individualism, which long since has been eliminated from other industries. The general contractor under existing conditions, as a rule, submits a definite price for his work far in advance of production. The general contractor, in turn, exacts the last farthing of price from his sub-contractor; and thereafter, as the work goes along, the interests of each of the elements in this conglomerate operation become the

jealous concern of each individual. And over all the owner and his architect are watchful and suspicious, hoping to get a good job yet fearful, perhaps unconsciously, that the very conditions they themselves have set up will intervene to prevent such a fortunate outcome.

At this point I feel called upon to withhold responsibility from the architect for the disorganized situation just described because, we all know that the architect would much prefer to have it otherwise and could easily do so if not frequently forced by his client to throw his project into the open market for bids from any one regardless of fitness for the job.

Fortunately, the subject has been receiving some public attention of late, particularly within the building industry itself, and there are not lacking hopeful signs that the time is ripe for a concerted action of all the varied interests to bring about a change for the better. For one thing, I believe that there is now some small realization that the building business, as such, is in need of reorganization, along lines of modern community of interest action, whereby the large number of elements now working independently of each other may be coordinated and brought into more general realization of the fundamentals common to all. This disorganization about which there is beginning to be discussion grows out of the very nature of the industry itself.

A GROUP OF GROUPS

In the United States, there are many organizations, for the most part restricted to the trades, and many groups for the most part local in their membership, working intelligently and devotedly, each in the interest of progress but to a restricted goal prompted by their own individual problems. Abroad, there is a great international organization which has brought together the forces that work in the various countries for quite a large measure of cooperation, particularly with reference to problems of materials and methods and codes of conduct. I refer to the International Federation of Building and Public Works. This body includes in its membership leading builders in forty countries. The United States has joined this International organization, acting through the Associated General Contractors of America.

The Associated General Contractors of America and all the various trade organizations are fully awake to the needs of the business and are making every possible effort to bring about better conditions. In various cities there are organizations known as the Building Congresses, enlisting in their membership architects, contractors and sub-contractors and representatives of labor. They are doing a notable work.

Notwithstanding the fine work all these organi-

zations are doing, there still remains disorganization, unsettled and uneconomic practice and almost lack of community action on the part of the industry as a whole.

ARCHITECTS AS LEADERS

I believe that the solution of the problem will follow when the architects take the initiative in the task of bringing together all the elements of the building industry, all of whom look to the architect as their source of business. The architect is the natural leader to whom we all must look; and, therefore, it seems to me that the architect is the one to start the movement toward bringing us all together for the good of all into some semblance of common understanding, common purpose and common realization that only by cooperation can the industry go forward as other industries are going, toward sound and economic production.

A GENERAL CONFERENCE

I, therefore, respectfully offer the suggestion that the American Institute of Architects take steps to call a general conference of all the elements in the building industry to consider the problem of working out a basis of cooperation.

It seems to me that this conference should include leading men, representatives of outstanding achievement in their respective fields who for the common good would be willing to give their time and ability to the great task which reform in our industry would require. This conference, in my judgment, should include representative investors in construction; leading investment and commercial bankers; outstanding economists; executives of foundations; men who have to do with the construction of schools, colleges, hospitals and other institutions; public officials in charge of public work; general contractors and sub-contractors; manufacturers of building material and equipment; production engineers, cost accountants and, in some way or another, representatives of the public which finally pays the bills.

A conference of this sort, I believe, would capture the interest of the American people because no industry is more in the minds of the people than the building business. The success of such a conference would directly affect the entire body politic intimately and personally.

Not the least of the important consequences of such a conference would be the publicity which naturally would grow out of it. This publicity would have far-reaching results in the education of the buying public to the basic facts of cost and bring about a better understanding, I am confident, of the responsibility of this buying public for many of the bad conditions which now contribute to the high costs of building.

AN UNUSUAL SOLUTION IN STEEL

THE ROOF AND LANTERN FRAMING IN THE FIRST SWEDISH BAPTIST CHURCH

MARTIN HEDMARK, ARCHITECT
CARL HARTZELIUS, ENGINEER

ONCE again ingenuity triumphs over traditional usage. The Swedish Baptist Church offers an unusual solution to a familiar problem in steel framing. The radical departure from the time honored system of colonnades and long-span roof trusses to this arrangement of free standing columns not only simplifies the roof framing but also makes these supports an interesting architectural feature of the building.

The eight interior columns indicated on the accompanying plan are so located that they materially reduce the spans of the ceiling framing. The main hung-ceiling has a slight camber, as is shown in the section on page 434. The roof framing to support the lantern is simply and logically arranged by a system of squares and diagonals, shown on the left half-plan in the diagram below. The inner circle is formed of short 9-inch I beams framed into the girders. The lantern is constructed

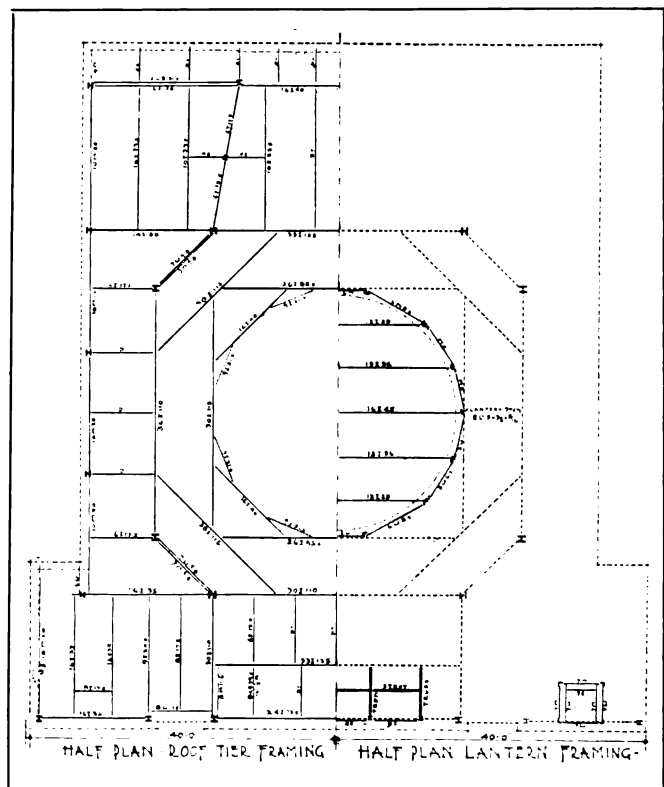
of vertical $5 \times 3\frac{1}{2}$ -inch angle struts, roofed with parallel I beam framing rather than radial, as this is preferable, being simpler and more economical in spite of the fact that the loading of the verticals is not uniform. A grilled ventilating opening is placed in the center of the curved hung-ceiling of the lantern.

The two-inch terra cotta fireproofing required for the columns was designed to express the steel form rather than to disguise it or simulate stone supports.

The exterior walls are of brick and terra cotta block and the floor and roof arch construction is of the usual cinder concrete. The building was completed in less than eight months by the contractors, Miller Reed Company, and the cost was approximately \$195,000 unfurnished, and about \$250,000 completely equipped. The church is illustrated on pages 431 to 438 of the plate section.

The drawing at the right shows one easy method of framing a difficult roof which makes for ease of fabrication, assembly and erection. Shapes carried in stock have been used throughout. The nine inch "I's" introduced inside the central opening simplify the subsequent problem of furring. The beams spanning the lantern opening support the usual roof construction, and are in turn supported by angle struts braced against lateral deflection, and fixed to the flanges of the beams below. The illustration is of the finished lantern which reflects the lack of complications in the steel design.

Danielson



PLANNING BY ANALYSIS

BY
EUGENE H. KLABER

An explanation of the planning methods employed in the development of the Michigan Boulevard Gardens, an urban housing project in Chicago, for which Eugene H. Klaber and Ernest Grunsfeld, Jr., of Chicago, were the architects, and Henry Wright and Associates, of New York, the consultants.

AS a usual thing, the architect who has an apartment project to design is confronted by the limitations imposed on him by a comparatively small piece of property. If he has a frontage of one hundred feet, a depth of one hundred and fifty feet and a corner plot, he deems himself fortunate in having a terrain which will allow him a little flexibility in his layout. Nevertheless, at every moment he encounters restrictions imposed by the requirements of court sizes and the proximity of his lot lines. This is so generally the case, that by dint of many trials, certain rather well defined types of plan have been developed, which solve reasonably well the problem as it appears in narrow confines.

Presented with the opportunity to develop a vast terrain, covering almost an entire city block, 342 feet by 594 feet, the architects of Michigan Boulevard Gardens faced a new problem, new at least for Chicago, where previously only one project of comparable scale had been undertaken. Obviously the narrow courts and limited vistas of the average apartment house were to be avoided, but nothing in past experience indicated just how much of the property was to be covered by buildings, nor what the layout of the individual buildings should be.

It was decided that the logical starting point was a study of the proportion of the total area to

be covered by buildings and possible group forms which the buildings might assume.

The known factors with which such a study could commence were the following:

- A. The cost of the land, which had been acquired.
- B. The anticipated rental per room. Since the project was intended for colored occupancy, extended study had been made of the wages received in the better paid occupations of negroes. The make-up of families, their habits and needs as tenants had been investigated, as well as the current rentals of buildings which they occupied.
- C. An assumed cost per cubic foot for the type of building it was intended to erect.
- D. An assumed gross area of building per rentable room. This area of 195 sq. ft. was derived from previous experience with housing projects and was used only in the initial stage of the study to determine approximately how many rooms per floor could be obtained with a given layout.

Figures 1 and 2 show a few of the initial outline studies. As they were made, cost and return were studied. This was done repeatedly throughout all stages of the work. The form of set-up changed slightly from time to time, but the following may be said to be a typical skeleton form:

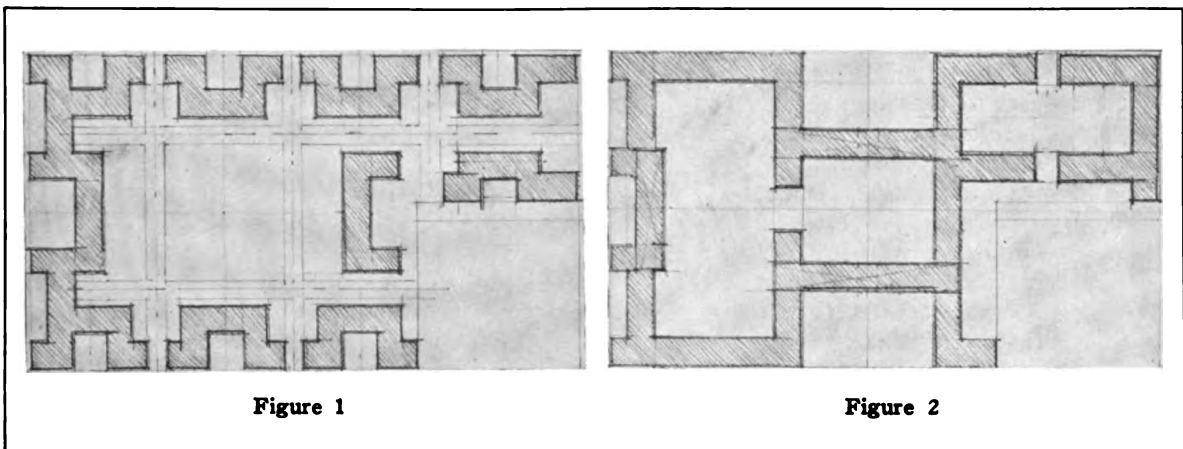


Figure 1

Figure 2

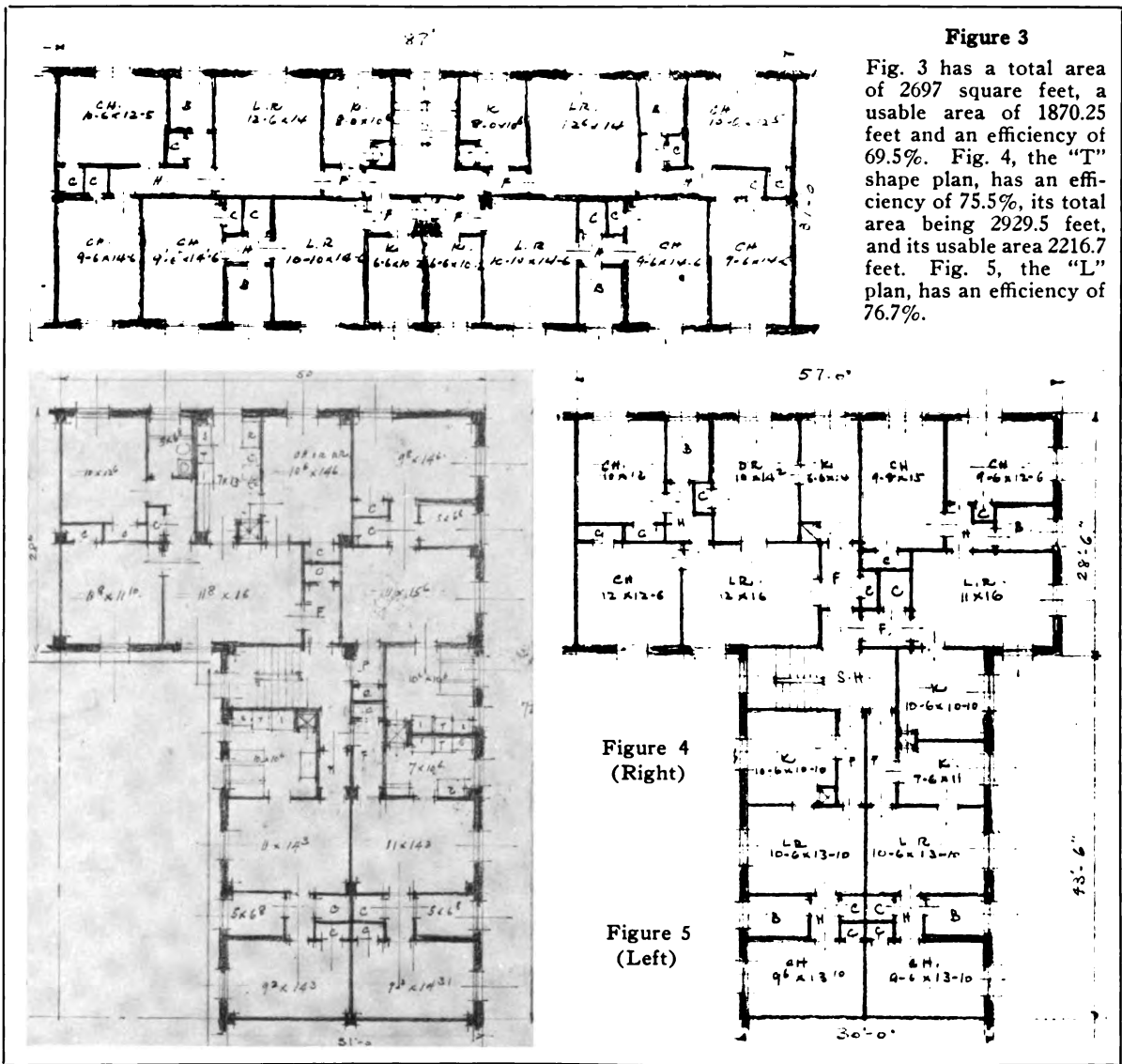


Figure 3

Fig. 3 has a total area of 2697 square feet, a usable area of 1870.25 feet and an efficiency of 69.5%. Fig. 4, the "T" shape plan, has an efficiency of 75.5%, its total area being 2929.5 feet, and its usable area 2216.7 feet. Fig. 5, the "L" plan, has an efficiency of 76.7%.

Figure 4 (Right)

Figure 5 (Left)

COST OF LAND AND BUILDING:

LAND—Cost of Land.....	\$.....
Legal fees and services.....	.....
Taxes during construction..	.....
Interest on investment during construction .....	.....
Total Land Cost.....	\$.....
BUILDING—Cost of Building.....	\$.....
Architects' fees .....	.....
Incidental equipment (refrigerators, ranges, etc.).....	.....
Landscape work.....	.....
Interest building cost during construction...	.....
Insurance during construction .....	.....
Financing cost of mortgage .....	.....
Total Building Cost..	\$.....
Total Cost of Land and Building...	.....

FINANCED AS FOLLOWS:

Mortgage	\$.....
Invested Capital .....	.....
Total	\$.....

ANNUAL INCOME AND EXPENSES:

INCOME —.....Rooms @ \$.....	\$.....
per room per month..	\$.....
.....Stores, total rental .....	.....
Total Income.....	\$.....
EXPENSE—Operating Costs	\$.....
Real Estate Taxes.....	.....
Vacancies and Bad Debts .....	.....
Depreciation on Building at 2 per cent.....	.....
Interest on Mortgages... ..	.....
Total Expenses.....	\$.....
NET INCOME	\$.....
PERCENTAGE OF NET INCOME TO INVESTED CAPITAL.....	PER CENT.

AS a result of the initial study it was determined that with the given cost of land and assuming a three-story and basement building, a land coverage of somewhere between 35 per cent and 41 per cent would be necessary.

At this point the study entered the second stage. So far the building had been considered as a block or blocks of a certain width between outside walls (which would allow two rooms in depth) and of variable lengths. Obviously, in extended buildings, more than one staircase would be necessary. Each staircase could give access to only a limited number of apartments of the desired sizes. The staircase with its surrounding apartments constituted a separate unit for purposes of detailed study, and the block plans indicated three general shapes which the unit might assume, depending on its location and relation to adjacent units. These shapes were the "I," the "L" and the "T." On these three basic forms a series of studies was made, showing apartments of various sizes grouped about a single staircase. Figures 3, 4 and 5 are typical studies. None of them is retained in its entirety in the final scheme, but they will serve to illustrate the method of investigation. As

each was made it was judged not only for arrangement but for plan efficiency. Plan efficiency, as used in this special sense, is the proportion of the gross area of a floor that is usable; that is to say, the total net area of living rooms, bedrooms, dining rooms, baths and closets, divided by the gross area of the layout. The gross area per rental room was also determined. By repeated trial, the most desirable units were selected. If in two studies of corner units ("L's"), having the same number of rooms, study A had a gross area of 205 sq. ft. per room and an efficiency of 67 per cent, and study B a gross area of 190 sq. ft. and 75 per cent efficiency, A was discarded in favor of B.

AS a result of this second stage of study, a series of efficient units, eight in number, was developed. Knowing the overall dimensions of these units and the number of rooms per floor in each, it was then possible to take them in outline form and return to the study of the general plan, using the units juxtaposed in a variety of arrangements. This constituted the third stage of plan study. Figure 6 is typical of this stage. As will be noted, there were attached to these studies,

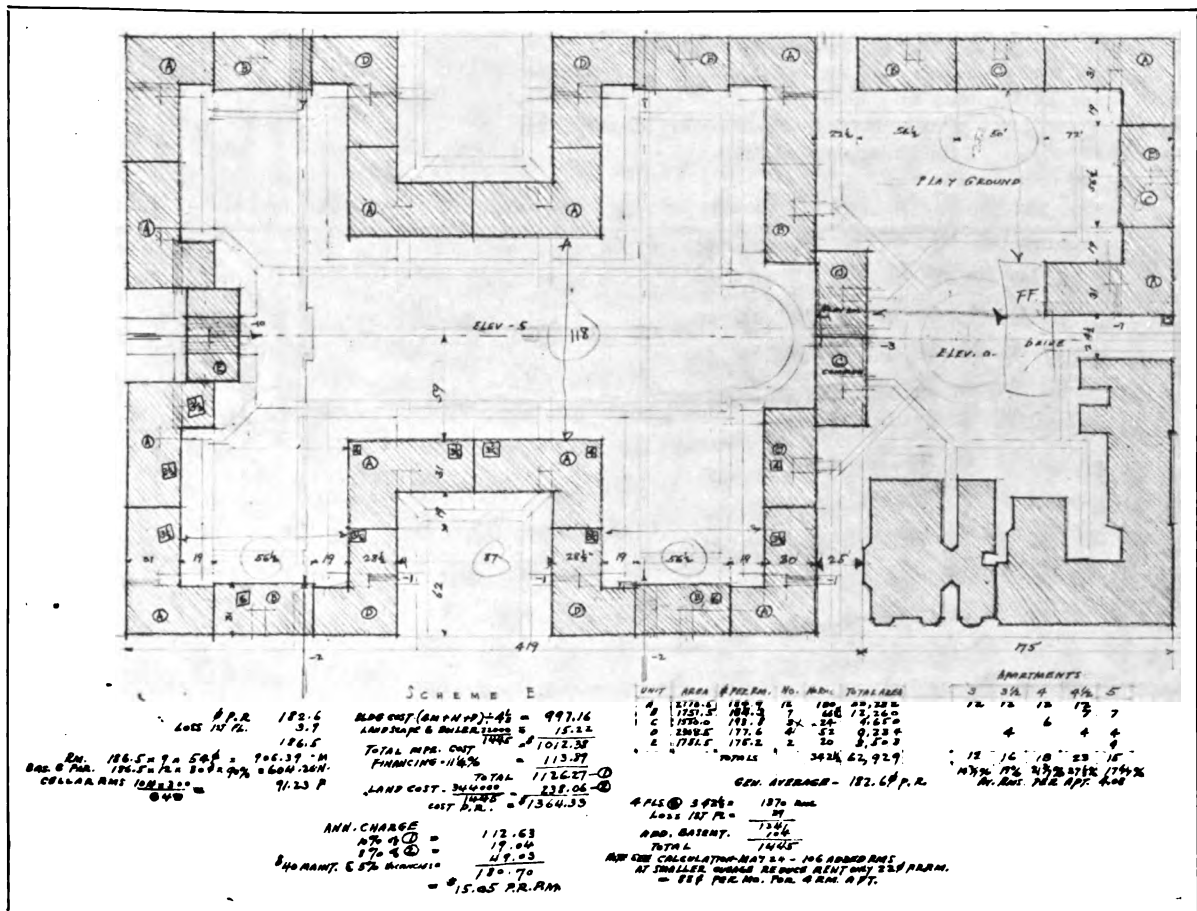
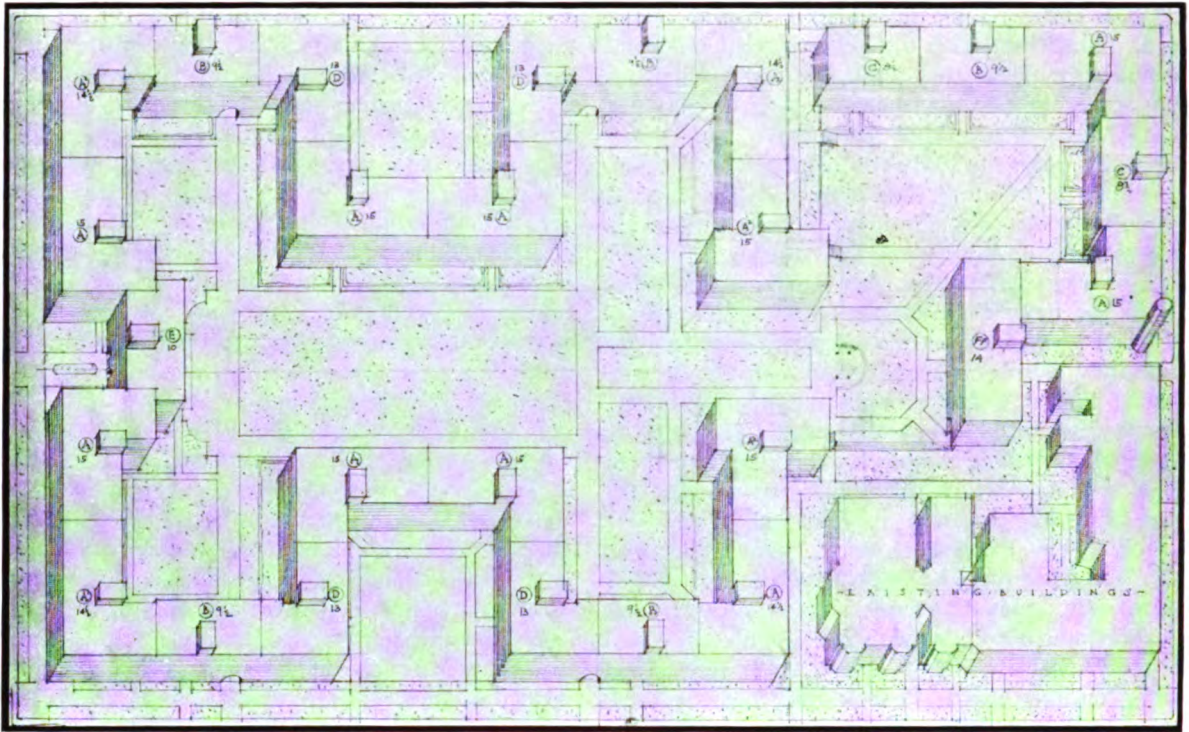


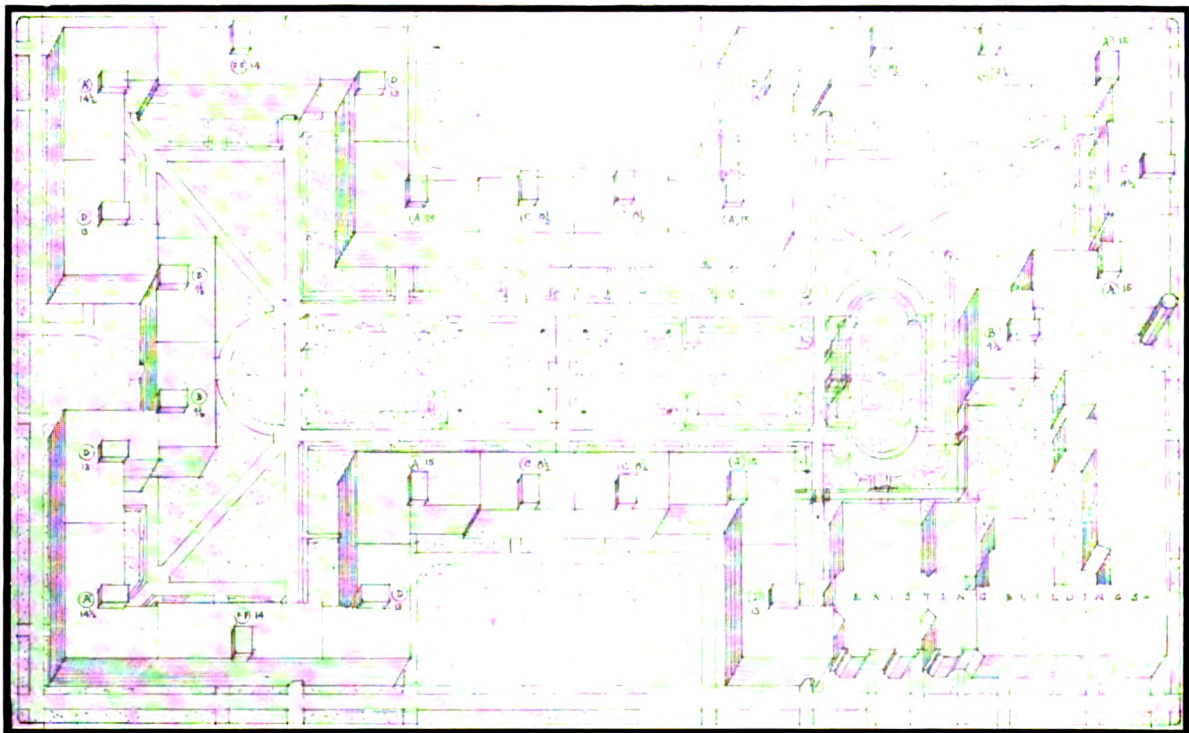
Figure 6. The third stage of plan study, using the units to form a floor plan, with cost analysis included



Schemes I and II, which were selected for intensive study of cost and return with buildings of varying heights. In Scheme I, above, it was estimated that the return would be \$16.46 per room from 1375 rooms in a four-story building. The same height in the lower plan showed a return of \$16.90 per room from 1229 rooms. Total difference, \$1,862.40.

Figure 7

Figure 8



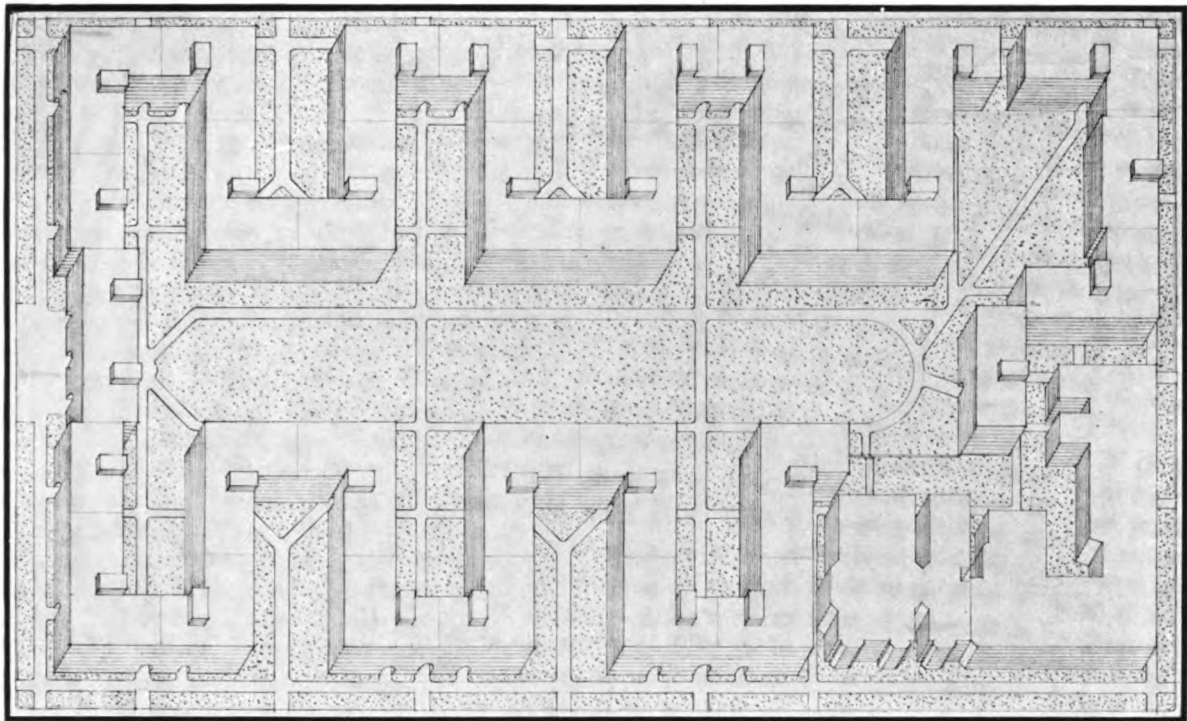


Figure 9

Scheme III, the most crowded of the three, with a total of 1628 rooms in four stories, figured to return \$16.20 per room. This was considered overcrowding the land, and so Scheme I was chosen for further study.

tabulations showing the number of each typical unit, the number of rooms per typical floor, the number and size of apartments, and of areas occupied. As a result of these studies, three schemes, I, II and III (Figures 7, 8 and 9) were selected for intensive study of cost and return with buildings of varying heights; and in each case the per room per month rental, which it would be necessary to charge, was determined. The following is a brief summary of the result for a four-story building:

Scheme No.	Monthly rental per room	
	No. of rooms 4 stories	4 stories
I	1375	\$16.46
II	1229	16.90
III	1628	16.20

It will be noted that the difference in room rental per month, between the most crowded scheme (III) and the most open (II) is seventy cents. This means that the tenant of a four-room apartment in scheme II would have to pay only \$2.80 per month more than for a similar apartment in scheme III. With so small a difference, it was apparent that there was no advantage in overcrowding the land with buildings.

Considerable attention was given, at this time,

to the proportionate number of apartments of 3, 4 and 5 rooms. Previous research indicated that the largest proportion of apartments should have four rooms. This enabled the tenant to have two bedrooms, one of which he could sublet to a roomer, this practice being common and often necessary among colored tenants. The effect of adding a fourth and fifth story to the three originally contemplated was also investigated. Set-ups were made on the basis of reducing the rentals of apartments on these two floors. The reason for this was that three stories is the time-honored height of apartments in Chicago. To overcome the objections to walking up more than two and a half flights, it was deemed wise to give the tenants of the upper floors an advantage in price. In the subsequent renting it was found that, on account of this differential in cost, the upper floors rented quicker than the lower.

AS a result of the discussion of these three schemes, number I was chosen for final development. As it then stood, it represented a series of units, separately planned and each joining its neighbors on a straight line across the building. As the building was to be of fireproof construction (thus permitting partitions to be set anywhere on the concrete slab), there was no

occasion to maintain a rigid line of demarcation, especially if a slight shift, here and there, would improve the plans of adjacent units. Therefore, where advisable, units were interlocked. This proved of special advantage at points where passageways occurred on the first floor between the street and the interior court. The passages are indicated by the letter "P" on the final plan (Figure 10). In all instances there are two bedrooms above these passages, one belonging to a four-room apartment to the right and the other to another on the left. On the first floor each apartment loses a bedroom, but it remains a complete three-room unit, otherwise identical with the suites above and requiring no shift in plumbing lines for the baths and kitchens.

In the course of this development of the plan it was determined that the one-staircase unit was not, after all, the logical unit division. This was seen on studying the basement in conjunction with the upper floors. To repeat the basement services (storerooms, laundries, incinerators, etc.), for every staircase would have been extremely wasteful. It was found that the building was divided logically into ten basement service units and these service units determined the final unit divisions of the upper floors. Except for heating, which is

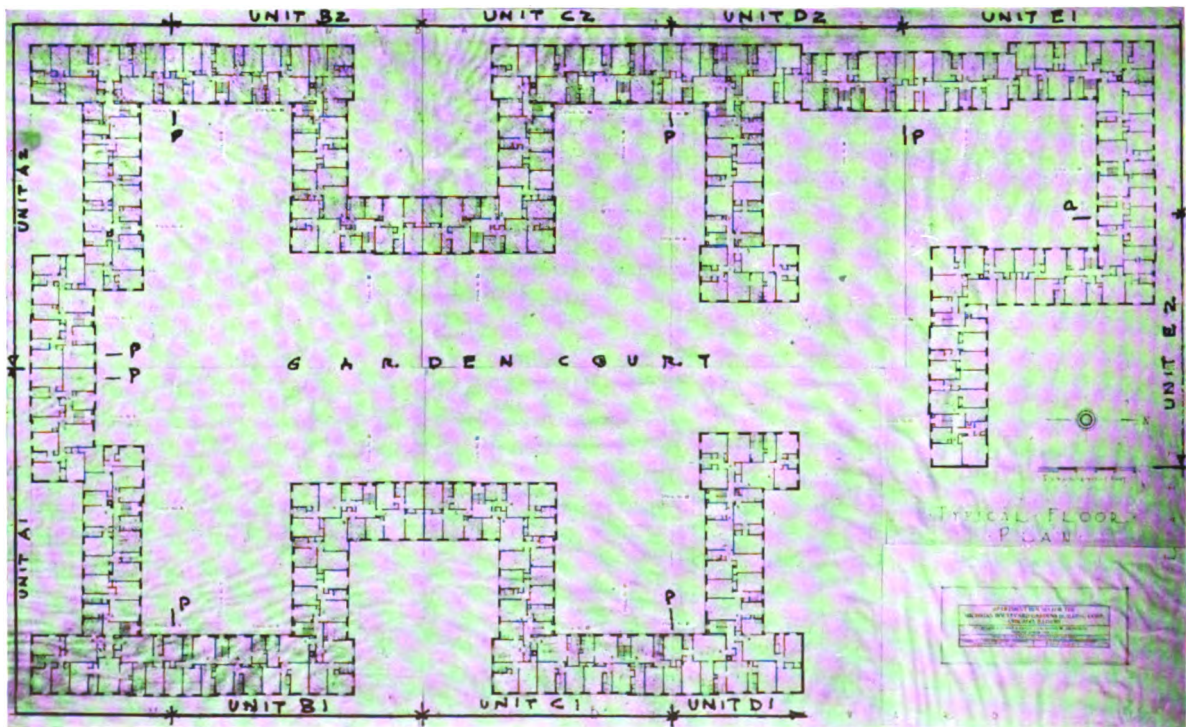
supplied through a tunnel from a single boiler room, these units are separate buildings, although they are separated on the upper floors only by partitions.

It will be seen from the general plan that all staircases are entered from the central garden court. This feature was of special advantage at the south end of the plan, where there are stores on the first floor. The stores have the entire street frontage, and the tenants of apartments above the stores enter their homes without being conscious of the commercial use of the first floor.

The process of plan study I have described will seem complicated to the reader. It must be borne in mind, however, that there was no established tradition for this type of planning on a large scale. To avoid a purely haphazard layout it was necessary to proceed by gradual steps, working first with limited and largely assumed data and proceeding to more specific and detailed considerations as the scheme developed. As more projects of this type are constructed, there will very possibly develop a technique of planning which will short-cut some of the study that the authors of this scheme were obliged to do. If so, I imagine that the basement layout will play a large part in determining the size of units.

Figure 10

The final floor plan, evolved from Scheme I by shifting and interlocking units. On the first floor, each apartment lost a bedroom, but the units remained otherwise identical with the suites on floors above



SUPERVISION OF CONSTRUCTION OPERATIONS

BY
WILFRED W. BEACH

CHAPTER 25—GLASS AND GLAZING (Continued)

NOT all confusion in glass grading has, however, been eliminated by federal standardization, inasmuch as many manufacturers are now claiming that their grading is stricter than that of the government. To secure such glass, one is urged to specify by the name of the manufacturer and to insist that its label appears on each sheet installed. If the specification writer is persuaded that such procedure is the correct way of obtaining what he wants, the superintendent is somewhat relieved in his responsibility, as any reputable glass manufacturer will gladly supply a man to identify its product, on request, if the job is large enough and not too remote. Some architects appear satisfied to stipulate that their glass must be "paper-packed and labeled," but they should take the precaution to stipulate the thickness and grade, also, for the material thus specified. All labels should remain in place until the glass has received its final inspection. But all these precautions do not protect the superintendent against actual cheating, if a contractor is so minded. Labels can be transferred or counterfeited, or other means resorted to by any such rascal intent upon swindling; hence a wide-awake superintendent knows his glass grades,—at least well enough to suspect such tactics and question them.

FLAT-DRAWN PROCESS

Until recent years, ordinary window glass was blown in cylinders, split, re-heated and flattened, and hence its warp and convexity, as referred to in the government specifications just quoted. Now, however, several prominent manufacturers of window glass are advertising that theirs is "flat-drawn" on a plane surface, and hence is absolutely flat. It still, however, possesses the power of distorted reflection, the practical absence of which in plate glass is one of the most valuable attributes of that product. The government specifications for plate glass enter into the subject most comprehensively, but a digest of their stipulations is sufficient for a building superintendent:

"Plate glass is made at present by casting and rolling large sheets periodically or by rolling a continuous sheet. The sheets are then ground and polished for the desired finish.

"The standard thicknesses for plate glass shall be $\frac{3}{8}$, $\frac{3}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, and $1\frac{1}{2}$ in. Sheets are available $\frac{1}{4}$ in. thick in sizes having a maximum area of 250 sq. ft. Glass of $\frac{1}{4}$ -in. thickness may be furnished having almost any desired dimensions under these maximums: 120 x 280 in., 144 x 260 in., 160 x 240 in. The standard stock thickness for glazing purposes is $\frac{1}{4}$ in., but this may vary between $\frac{3}{16}$ and $\frac{3}{8}$ in."

TWO GRADES OF PLATE GLASS

Plate glass for glazing is of two grades, "known as second silvering and glazing qualities," the latter representing "the usual selection of plate glass supplied when quality is not otherwise definitely specified." As to allowable tolerances in quality, the specifications say:

"As allowable tolerances in quality must vary considerably with the size of sheet required, different specifications will apply in each of these four divisions according to size:

Division I. Sheets up to and including 10 sq. ft. in area.

Division II. Sheets having an area greater than 10 sq. ft., but not greater than 25 sq. ft.

Division III. Sheets having an area greater than 25 sq. ft., but not greater than 75 sq. ft.

Division IV. Sheets having an area greater than 75 sq. ft."

From the second paragraph just quoted, it is seen that the maximum width of a sheet of plate glass is 13 ft., 4 in. The use of very large panes is not encouraged because of difficulties in shipping, hauling, handling and setting; as well as the continuous hazard thereafter, due to wind, etc. In localities where there are no complete stocks carried, the limiting width for plates is 102 in., which is the maximum that can be loaded through a box-car door, and hence governs L. C. L. (less-than-car-lot) shipments. Larger lights, one or more, if insisted upon, are shipped on flat cars, at full car rate, at an additional cost of \$15 or more for the shipment, dependent upon distance. Large lights, set in locations where wind pressure is especially dangerous, are frequently equipped with a pressure-resisting member, resting against the glass on the inside, and carefully adjusted.

The various defects in all sheet glass are

bubbles, seeds, open bubbles, skim, strings, cords, ream, fire cracks, sand holes, short finish and scratches. The standard specifications for glazing quality as applied to Division II gives a fair idea of the method of inspecting and grading plate glass:

"The central area may contain small bubbles and fine strings or ream which do not give visible distortion when looking straight through the glass, but no long or heavy scratches. The edges may contain bubbles over $\frac{1}{32}$ in., visible scratches shorter than 10 in., small areas of ream, strings, and small stones not larger than $\frac{1}{32}$ in., but these defects should not be grouped nor interfere with the vision. The polish over the central area should be good, but patches of light short finish may be present about the edges.

"*General.* None of the grades or sizes (Divisions I and II) may contain any heavy or long lines, streaks of ream, any bubbles larger than $\frac{1}{8}$ in., visibly poor polish, open bubbles, areas of skim, or stones over $\frac{1}{8}$ in. in diameter."

VARIANCE IN DEFECTS

Sizes in Division I and the second-silvering quality (Divisions I and II only) are slightly better than this Division II specification, while those in Divisions III and IV are correspondingly less exacting, but "the large defects should be confined to the upper edge and upper corners of the sheet, the lower and central areas to be relatively free from major defects." And, in Division IV: "Sheets larger than 75 sq. ft. may contain defects of almost any kind except that they must not show large areas of heavy seed or bubbles, nor have any defects which will cause spontaneous breakage, such as skim or large stones ($\frac{1}{8}$ in. in diameter) or show any areas of unpolished glass." Judging from the specifications emanating from the offices of some architects, they expect all plate glass to be perfect, and inspected accordingly. Manifestly, this is impracticable, and hence a specification reading "all glass marked 'P. P.' on the drawings shall be best American polished plate, of good commercial quality, free from cracks, scratches, paint spots or other defects" means nothing to a contractor until he has ascertained that what the architect actually expects to get is regular glazing quality, with no second-hand or other questionable stock introduced.

CONTRACTORS' RESPONSIBILITY

Whether or not mentioned in the specifications, an architect expects the contractor to see that all glass is properly cared for until accepted. The Plate Glass Manufacturers of America (Pittsburgh), offer these rules for caring for plate glass after delivery at a job, before setting:

"(1) Plate glass shall not be laid flat but shall be stood on edge with paper between sheets. (2) Glass shall not be laid flat (for cutting or other purposes) upon a table or other object that has not been previously covered with a clean, soft, protection of some sort. (3) No dust or dirt shall be allowed to accumulate upon glass. (4) Plates shall be handled one at a time and surfaces shall never be allowed in contact. (5) Glass shall be unpacked as soon as delivered, cleaned and dried if necessary, and stored on edge in a dry place. This is to avoid what is known as 'stain.' (6) Alkalis attack the polished surface of plate glass and should not be allowed near it. Especially is this true of ammonia fumes."

INSURANCE OF LARGE LIGHTS

The setting of a large light of plate glass is a job for experts only. It is not only difficult, but extremely dangerous; so much so that men have been killed in bungling it. The chief interest of the superintendent in the operation is to know that, if the specifications call for the maintenance of plate glass insurance by the owner, he is notified a day or two in advance of the setting, since the glass passes from the care of the glazier to that of the owner (or his general contractor) as soon as the last glass stop is in place on a given pane. Such insurance customarily covers first story lights only; those of stories above only when they also are large show windows. Ordinary sized window lights above the first story are not easily broken, and hence need no such protection; do not get it unless so specified. The importance of placing the insurance promptly cannot be too greatly stressed. Large lights of plate glass are a constant hazard. In one building, containing 36 such lights, they began to break the day after setting. Fourteen were gone, costing over \$1,000, before the cause of the damage was located in the swelling of the bulkhead floor, induced by the freezing and thawing of the water of condensation from the drying plaster. Thereafter, that architect favored bulkhead floors of single thickness in cold climates; he also saw to the proper drainage of his sash-bar.

OTHER PATTERNS

Thin plate ($\frac{1}{8}$ -in.) is used by some architects in place of double-strength for window glass. It can be glazed in $1\frac{3}{8}$ -in. sash, whereas $\frac{1}{4}$ -in. plate is too thick to allow enough room for putty in the rabbet of such sash. In addition to clear polished plate, there are many patterns and finishes of glass (commonly called "plate" when over $\frac{1}{8}$ in. thick), with which a superintendent must familiarize himself. Among these are wire glass (rough, ribbed, polished or in patterns), prism, etched, sand blast, chipped and other sur-

faces in endless variety. The surface characteristic from which each of these takes its name is on one side of the glass only, the other being plain (not perfectly smooth, sometimes called "rough"), or polished as ordered. "Selection of a definite style prior to asking for bids minimizes the possibility of substitution and misunderstanding," likewise insures lowest price. A specification describing glass must be exact in every respect. Many special types are supplied in different thicknesses,— $\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ in., etc.,—which must be stated. If a bevel is wanted, the width must be given, usually $1\frac{1}{4}$ to $1\frac{1}{2}$ in. If etched glass is called for, it may be a stock or special design. Beveled, etched and other special glass cannot be cut to fit, and hence the glazier should be made responsible for correct sizes. Chipped-glass surface is obtained by gluing canvas to the heated plate, then drawing it off, with flakes of glass adhering. Double-chipping is done by repeating the process, producing a more delicate pattern. At a slight additional expense, panes may be "chipped to a line" along all four edges, leaving a plain or clear border all round, of any desired width. From all of this, it may be inferred that, if a superintendent finds his glass specification in any degree "sketchy" or lacking in definiteness, he had best make careful note of all uncertainties and get them cleared up with the least possible delay.

TREATMENT OF EXPOSED EDGES

Where edges of glass are to be permanently exposed, as in showcase and bank counter work, they should be ground or polished, never left rough-cut. Much of this work is highly specialized, and hence precisely detailed. Corners are put together with and without continuous metal bars or angle clips, and with or without felt or other cushions, all dependent upon the specifications. Glass for such work is generally plate, for which regular glazing quality will be supplied, unless second-silvering quality is stipulated by name. The use of the word "glazing" as the name of a grade is, perhaps, unfortunate, as it is an excellent aid to a glazier's contention that there is but one grade for the purpose, and hence there can be no better grade. He may even insist that he never heard of "second-silvering" quality, or that it is only used for mirrors (as its name implies); hence, if that is what is wanted for showcase or other high grade work, it is best that it be so "nominated in the bond." Calling simply for the "best grade of polished plate glass" does not necessarily save the superintendent from argument. Perhaps he himself doesn't know what is intended, and hence had best find out early in the proceedings. Glass for counter work varies greatly, may even include "bulletproof" plate for

cashiers' cages, generally specified by maker's name. This latter is true also of the various makes of "ultra-violet-ray" glass on the market, much used in glazing of hospitals, solariums, etc. Supplied in clear, wire and cathedral types, and various thicknesses, it is not readily distinguishable from ordinary glass; therefore an inspector is entirely dependent upon the maker's labels, which should be carefully preserved in place until after final inspection.

OPALESCENT GLASS

In addition to the types of glass already alluded to, we have the non-transparent cathedral and opalescent (commonly called "art" glass); and the opaque types in various colors and thicknesses, for use as table tops, counters, wainscoting, tiling, etc. For all these and for other glass of special type or unusual design, reference should be had to approved samples, duplicates of which should be in the hands of the superintendent, if he is to handle his part in the work intelligently.

Glass is set in rabbets (or rebates) in wood or metal construction, either in sash or without, and held in place with glaziers' points ("sprigs") and putty, or by means of wood or metal stops or "beads." In general, glass with surface other than clear, is glazed with the smooth side out. This is quite essential for office doors and where it is likely a sign may be painted. Good glazing is specified to be "backputtied," that is, a thin layer of putty is placed in the rabbet, into which the glass is pressed, either to be face-puttied or stopped. If puttied in wood sash, the glass is first secured with triangular zinc sprigs (about $\frac{3}{8}$ in. for S. S. and D. S. glass, and $\frac{1}{2}$ in. for plate), spaced every 8 to 12 inches, then puttied. For steel sash, special clips or clamps are provided by the makers of the sash, to be used in place of sprigs.

APPLICATION OF PUTTY

Putty is a composition of whiting and linseed oil and must be of a nature suited to the material to which it is to be applied. There being no absorbency to steel sash, putty to be applied thereto must contain a drier (such as litharge), unnecessary in connection with wood sash, except in very cold weather. To prevent freezing, glaziers are accustomed to mix a *small* quantity of benzine or gasolene with their putty. Wood sash should be filled or primed before glazing, both to prevent undue suction of the oil from the putty, and to avoid staining, if the sash is to have natural finish. The putty should be applied to continuously fill the rabbet, and should have a smooth, even finish. A good glazier uses the right putty and correct method to effect this,—and there is no excuse for inferior workmanship.

Putty glazing is done on the outside of a building; stop glazing usually on the inside. Glass in doors should always be back puttied and stopped, never face puttied, since the continual operating of a door will cause putty to loosen. Except when glazed before delivery, the stops for glass panels in wood doors are properly fitted and lightly tacked in place, to be removed and set in permanently by the glazier, unless it be particularly stipulated that the carpenter must return and attend to this. Glazing beads for metal doors and sash are likewise provided by the manufacturer, to be secured with screws supplied especially for the purpose.

SETTING STORE FRONTS

Bronze sash bar for store fronts and the like is so essentially interesting to the glazier that many are equipped to install it. This subject was discussed in Chapter 18, Miscellaneous Metal Work, though architects frequently specify sash bar under either Carpentry or Glazing. Carpenters are ordinarily employed to put it in place, but, from the standpoint of the superintendent, it is well to have these mechanics hired by the glazing contractor in order to forestall any allegation on his part that a poor job of glass setting was due to faulty installation of the bars. The chief factors to be watched by an inspector of plate glass setting are:—that the glass itself is right; that it is of proper size to fill its grooves (neither too small nor too large); that the setting does not exert undue pressure at any point; that the pane is adequately secured all round; and that it is afforded such temporary protection as it may need. This latter includes the insurance previously mentioned.

LEADED GLASS

Leaded glass, also known as "art glass" and "stained glass," is most seen in church buildings, but may be encountered in any kind of public or private structure where its decorative function warrants its use. Coming down to us from the middle ages, leaded glass appears to be considered by our designers as in two classes,—the imitation of an antique material, or a modern material, to be treated in accordance with best modern methods. Leaded glass may be included in a regular contract (glazing or general) by an architect, detailed and otherwise fully described; or it may be specified at a given price per superficial square foot, in place; or a lump sum may be allowed for its purchase, including setting. In either of the two latter instances, it is customary for the architect to make direct selection of a producer, or to request more than one to submit competitive drawings and samples of what they can supply at the price or prices quoted.

In work of the highest class, such glass is chiefly a decorative medium, designed by real artists, whether they be the architects or their employes, or those of the producer. Such being the case, architects who are exacting in their requirements are likely to eliminate competition in this particular by dealing only with concerns of demonstrated satisfactory performances. With such, a regular construction superintendent has little to say. But, with an ordinary competitive leaded glass job, or one wherein such glass is merely an incidental feature, he is in no way absolved. For even the simplest of these, he must see that the glass is as intended, that it is divided into small panes in accordance with the drawings, and that the dividing members and enclosing frame are "o.k." The glass selected for the work may be clear, cathedral, opalescent, or any other type,—even hand painted and re-fired in expensive work.

DIVIDING MEMBERS

The dividing members, individually, are called "comes"; collectively, are known as the "leading." Here is another case of confusion of terms, inasmuch as we are told by makers of leaded glass that "lead" does not necessarily mean *lead*, but that "leading can be constructed of brass, copper, zinc or sheet metal and lead coated." These comes are of varying widths, from $\frac{1}{8}$ to $1\frac{1}{2}$ in. The $\frac{1}{8}$ -in. width is not recommended by producers, for exterior work, since the groove is less than $\frac{1}{8}$ in. deep; hence the $\frac{1}{4}$ -in. size is usually the minimum. The comes should be wider around the border of a window, so that there will be a sufficiently exposed margin between the edge of the putty (or masonry) and the glass, to match the remainder of the leading. Sometimes, the additional width around the border is had by setting the window in a frame of galvanized bar iron, to which the lead is sweated securely. For openings over a certain size (about 144 running inches of perimeter, if not specified) ordinary small comes are not sufficiently rigid, and hence wider comes are introduced at intervals, or other methods of reinforcement resorted to. Such members may be from 10 to 15 in. apart, depending upon the width of the window, or upon the design. Lead comes with steel cores are to be had for such purpose, but, if one is adhering to tradition in his leaded glass design, he will do as the ancients did,—use reinforcing bars or rods, placed horizontally against the leading on the inside, the glass firmly attached with copper wires. These bars frequently have nothing to do with the pattern in the glass, simply cut across it. Their ends are extended and secured into the wood or masonry. Leaded glass is often set directly in reglets in masonry, without sash, and cemented

or grouted in, after the manner of metal sash, leaving a margin of leading exposed all round, the same as if set in putty.

Leaded glass is rendered solid and waterproof in the comes by the thorough application of a thin putty or cement, a standard specification for which reads:

"Glass shall be thoroughly cemented on both sides with a cement containing 50 per cent pure white lead putty, 30 per cent of whiting, 10 per cent of litharge, and 10 per cent of red lead, and mixed with pure linseed oil, and absolutely guaranteed against leakage."

It should also be guaranteed against bulging or sagging. At the intersections of the leading, certain comes run through and the others are cut in between, and the exposed flange joints mitered (or lapped, if of flat lead) and soldered "in such a way as to make a firm, rigid and workmanlike job, to meet the approval of the architect."

Where protection is essential for expensive windows, provision is made for the setting of "storm glass" outside of the leaded glass. Obscure glass, at least $\frac{1}{4}$ in. thick, without leading, is generally used for this purpose. Sometimes, this outer

glazing stands alone in such openings as are awaiting the donation of memorial windows. Separate rabbets are provided in the wood or masonry setting for the inner and outer glazings, spaced about $1\frac{1}{2}$ in. apart. Ordinarily, both windows are built in solid, with no provision for access to the space between. If it is desired to make this accessible for cleaning, special provisions must be made for having one window of each opening set in a hinged sash.

Ventilation is provided in leaded glass by the insertion of movable sections of metal sash. These are pivoted or hinged, in metal frames, and may be provided with insect screens, if desired. All members are kept as small as practicable, in order not to be much more conspicuous than the comes. The make and type of both ventilator and its hardware should be specified, or the leaded glass contractor be permitted to supply his regular standards. Similar ventilators may be inserted in openings having the double glazing, and are known as "double double" ventilators. Their framing is of regular metal sash type, but with two sets of grooves, spaced the correct distance to receive glazing of inner and outer windows.

CHAPTER 26—PAINTING AND VARNISHING

A SUPERINTENDENT'S tribulations regarding paint and painting are due to commence as soon as structural steel or wood frames begin to arrive. Unless the former is to be encased in concrete, it is customarily provided with a shop coat of paint, either of red lead or other mineral, or some proprietary make, as specified. But fabricators prefer to paint in accordance with their own standard practice,—whatever it may happen to be,—and will likely do so, unless they are particularly cautioned by notation on shop drawings, or happen to know that the particular architect with whom they are dealing is a stickler for specification demands.

THE VITAL SHOP COAT

The superintendent should likewise ascertain just how discriminating in this matter he himself is supposed to be, since it is probably of less importance that any particular one of several serviceable red lead, graphite or other metal paints be used, than that it be properly mixed and applied, under favorable conditions, to surfaces in fit condition to be covered. Mechanics are less careful in dealing with structural parts than with finished surfaces intended to be exposed, and hence structural iron and steel are often im-

properly coated. Thus, the first coat may be applied when the metal is too cold, or the surface is wet, greasy, scaly or dirty, or the paint be too thin or clotty, or otherwise in poor condition. Red lead is especially hard to handle unless exactly right, and hence some architects, guided by several adverse experiences in that medium, rule against it. It is stiffer than other paints, and therefore harder to apply unless thinned improperly, which painters will do, if not watched. It drags under the brush and leaves bare spots which need re-touching. It should be used only on the day it is mixed; but one almost never sees any dumped, and hence the old evidently finds its way into the new. But the shop coat on steel and iron is the *vital* coat, and therefore it *must* be right, or the successive coverings are wasted, and rust may result.

INADEQUACY OF "PURE"

Architects who are careless with their paint specifications are likely to fortify themselves with the statement that paints, such as lead-and-oil (either white or red lead), shall be "pure" (presumably commercially pure), when they should know that such a term can possess no general application. All paints, good and bad, are com-

posites, and there is abundant latitude for argument as to which of the admixtures are adulterants and which are truly beneficial, either in extending the paint's covering capacity, or in prolonging its "life."

The United States Army specification* for a "Priming Coat on Steel" calls for not less than 60 per cent of the "pigment portion" to be red lead, the balance to be "silicious matter, such as aluminum silicate, magnesium silicate, silica or a mixture thereof;" the liquid portion to consist of not less than 90 per cent of "pure raw linseed oil," the remainder to be combined drier and turpentine. Even the red lead itself is not "pure." The confines of this text forbid an exhaustive discussion of the constituents of paint and varnish or their chemical derivatives. Several volumes might be devoted to the subject, but it is doubtful if the attempt to assimilate such knowledge would make one a better building superintendent. However, he should appreciate how nearly impossible it would be to know *all* about the subject, in order that he may realize that there is always something more to be learned. It would, perhaps, save him from being too certain on occasion. "A little knowledge is a dangerous thing,"—but a superintendent's knowledge of nearly every branch of the building industries is comparatively little,—as he comes to believe after his cumulative experiences.

WHAT PAINT IS

As an example of what one learns in essaying to "know paint," one finds that red lead is a "pigment formed by the exposure of litharge to the action of air at a temperature of 560°, under which condition it absorbs oxygen." Also, according to the Century Dictionary, that litharge is the "yellow or reddish protoxid of lead (PbO) partially fused." From these definitions, one can better understand the further statement in the specifications of the War Department that red lead "shall contain not less than 85 per cent Pb_3O_4 , the balance to be PbO." In other words, this standard demands only 85 per cent of pure red lead (tetroxide of lead), permitting 15 per cent of litharge (protoxid or monoxid). We learn further that the American Society for Testing Materials† has recently decided that red

lead can be produced 98 per cent "true," and hence other government specifications (not those of the War Department) have been revised to demand 95% purity in this pigment. Perhaps other specifications may do likewise before this goes to press. It is to be noted, however, that 98 per cent purity is not demanded, not only because this higher percentage is unnecessary, but because it is understood that but one concern is making such a product.

BANNING THE WORD "PURE"

From all of which, one deduces that the word "pure" had best be omitted from a paint specification, unless it be qualified by a mention of the degree of purity intended. To say "commercially pure" is only providing a *casus belli* for the poor superintendent—whereas "chemically pure" may mean a much better product than is needed. In treating of paint and varnish, perhaps more than of any other commodity entering into building construction, is a specification writer forced to confine himself well within the bounds of his definite knowledge, avoiding both general statements and such definite statements as are based upon guesswork.

Before ready-mixed paints were in such general use as we find them today, architects in general stipulated that all paints should be mixed by the painter at the job. Some still do so. This presupposes a certain degree of knowledge of the subject on the part of the superintendent. He knows that white lead is a standard basic material for painting woodwork, as is red lead for steel and iron. He should know, also, that white lead may be carbonate or sulphate ("sublimed"), either of which may be specified or admitted. But there are two commercially known sulphates, one of which has the formula $PbSO_4$, and the other, known as "basic sulphate," is $(PbSO_4)_2Pb(OH)_2$. The former is inferior, not to be used in paint.

Zinc oxide, another paint base, is a white powder of varying degrees of fineness, of which two grades are known commercially,—"first" and second." The second grade is used only in the cheaper paints. A grade better than first is to be had, but it should be specified by name, to insure against possible errors.

To be continued in THE ARCHITECTURAL FORUM for May.

*The reader is referred to an article on "Protective, Preservative and Decorative Coverings" in the 1927 *Handbook of the Illinois Society of Architects*. Other treatises pertinent to the subject matter of this chapter are to be found in the same volume: "Lacquers, Composition and Uses," by W. S. Colfax, Jr., and "Fillers, Stains, Varnishes and Enamels," by R. W. Lindsay, chemist.

†For a general outline on the subject of painting and varnishing, the reader is referred to the chapter on "Paints and Other Protective Coatings" in "Building Construction" by W. C. Huntington, C. E. (John Wiley & Sons, Inc., 1929); to "Circular 69, Paint and Varnish," of the United States Bureau of Standards; to the standards of the American Society for Testing Materials, etc.