THE ARCHITECTURAL FORUM

IN TWO PARTS PART ONE

ARCHITECTURAL DESIGN

MAY 1930

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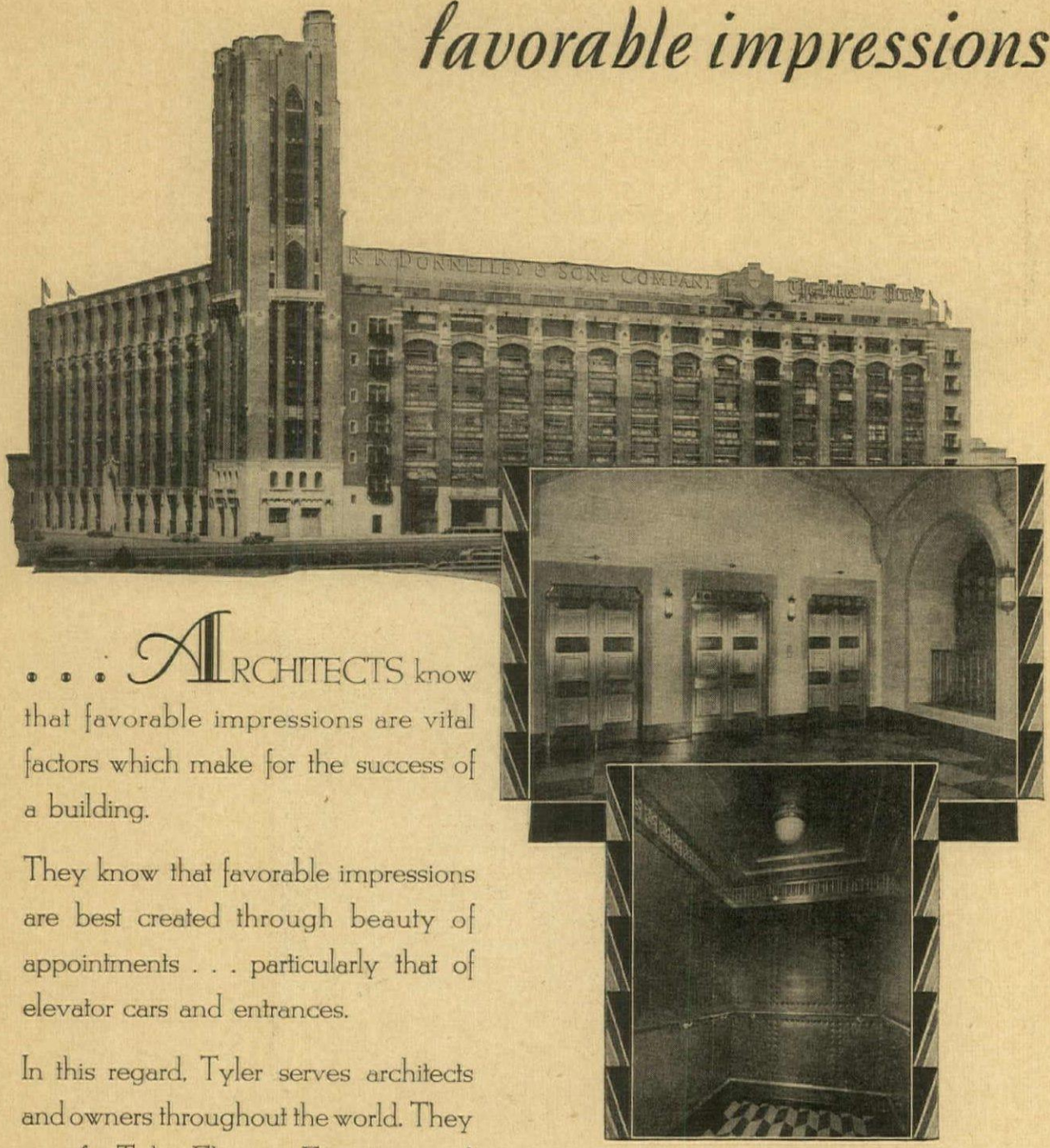

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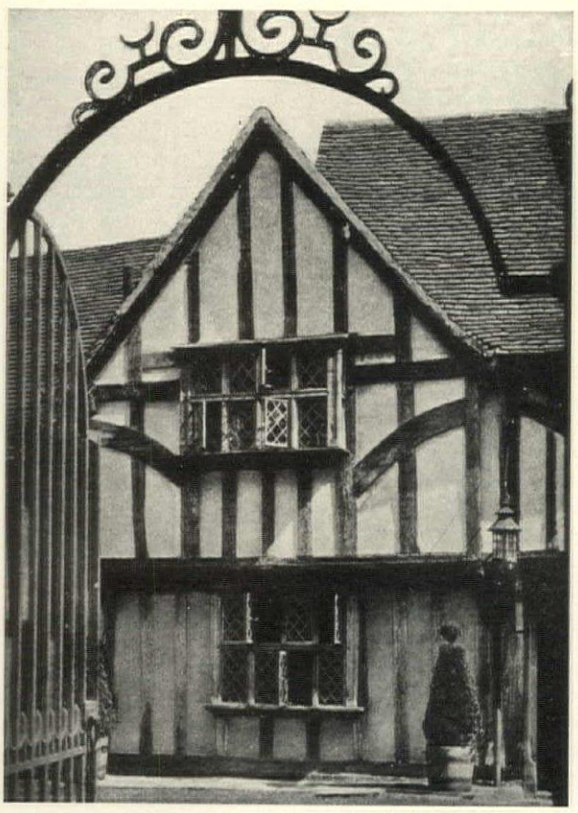
BOOK DEPARTMENT

TUDOR HOMES OF ENGLAND

BY

SAMUEL CHAMBERLAIN

THE work of Samuel Chamberlain as an architectural sketcher has long been familiar to most of those having to do with the practice of architecture. He seems to have devoted his life to the searching out of interesting and intimate bits of architectural charm and bringing them back to us who are too busy or who, for other reasons, are unable to devote the time that would be necessary to cover all the out-of-the-way places in which lie hidden so many beautiful and unspoiled architectural masterpieces. In looking about for new worlds to conquer, Mr. Chamberlain discovered that "surprisingly few works have been dedicated to the worthy topic of Tudor houses,"—probably because of the magnitude of the subject, since only a superman would undertake an exhaustive survey of the domestic buildings constructed between the approximate dates of 1475 and 1625. In fact, only one work has attempted this task,—that is, "Domestic Architecture of the Tudor Period in England," the well known volumes by Garner and Stratton. These volumes, although they represent the labor of years spent in the collecting and editing of material, endless historical research, the photographing of many examples and drawing of countless plans, are yet scarcely able to cover even the high spots of this most important period of English building.



"Josselins," Near Little Hookesley

So it was made necessary for the editors of that work to omit a great many beautiful examples of the builder's art which, although they mark no particular milestone in Tudor architecture, are still full of artistic merit and are altogether charming and delightful in themselves. No doubt, the omission of these seemingly unimportant buildings offered to Mr. Chamberlain just the opportunity for which he had been longing,—to pack his sketching paraphernalia and cameras into his "faithful, if slightly weak-lunged, motor car," and spend several months in the rare English sunshine, going about seeking out remote villages and isolated manors, ever on the lookout for something new and unspoiled to serve up to the somewhat jaded architectural palate. The material collected in this manner, supplemented by exhaustive research in the superb libraries of the British Museum and the Victoria and Albert Museum, constitutes a volume that is almost entirely pictorial and pleasantly practical.

For the most part Mr. Chamberlain has forsaken his favorite means of expression,—the sketching pencil and the etching needle,—and has resorted to the time-saving expedient of portraying his material largely by photographs. These photographs have lost nothing by being taken by an experienced architectural sketcher, and the viewpoint and portrayal of architectural detail are always satisfactory, to say nothing of their great pictorial charm in nearly all cases. Although the majority of the reproductions are from photographs, there are still a great many from pencil sketches and etchings scattered throughout the volume, all done in the inimitable Chamberlain manner,—full of character yet true to life and without exaggeration of any detail.

In his choice of material the author has again demonstrated his understanding of what the architectural reader wants, and the houses shown are replete with architectural precedent easily adaptable to modern building. There is no attempt to classify the houses in chronological order, but instead they are grouped in accordance with their geographical location, by counties. An effort has been made not to place too much emphasis on the half-timber work so characteristic of the period and which is a type of Tudor building somewhat less interesting than others to the architect of today. Some of the best examples of this type of construction have, however, been included and add greatly to the attractive quality of the volume. The small portion of the work devoted to text description is subdivided into short

chapters, each covering a group of counties in which the houses shown are located. Here one finds brief, well chosen data concerning each of the buildings illustrated.

Norfolk, Suffolk and Essex are grouped together as the first geographical division. The examples of Tudor architecture found in Norfolk make up in quality what they lack in quantity, and while the countryside is spotted only at rare intervals with remnants of building of Tudor times, Mr. Chamberlain managed to bring back sketches and photographs demonstrating that here are to be found truly remarkable examples, among which is the well known East Barsham Manor, an exceptional bit of ornamental brickwork which is no doubt familiar to most of us since it has often been the subject of illustrations in works of all sorts.

In the reproductions of photographs appearing in this volume details of the brickwork are featured. Another fine example of ornamental brickwork of the period is found in the rectory at Great Snoring. The stone tracery of the pylon towers of this building is unmatched, in the opinion of Mr. Chamberlain, who is certainly in a position to know. In Suffolk the author stumbled upon a "Tudor gem of purest ray serene" at Gifford's Hall. This little known manor of matchless half-timber work nestles in a perfect setting, and included in the unspoiled interiors is the master's bedroom with its remarkable beamed ceiling, a room which has been said to be "one of the most perfect Tudor rooms in England." Several pages of plates are devoted to the portrayal of this excellent building. Seckford Hall and another Gifford's Hall at Stoke-by-Nayland are fine examples of rather more pretentious Suffolk manor houses, and the author has not been able to resist the temptation to include in the volume some street scenes of that charmingly picturesque country village, Kersey.

The occasional plates of measured details, showing the highly important and complicated brick chimneys, are almost essential to a careful study of Tudor architecture. Tudor homes abound in Essex as they do nowhere else in England, and not only do nearly all the villages contain some gem of domestic architecture, but even the almshouses of many of them are likely to be buildings of rare architectural charm, as, for instance, that at Audley End, which is a remarkable example of the simple and dignified use of brickwork. Horham Hall, in the heart of Essex, leaves little to be desired as a perfect setting for English manor house life of the Tudor period. Moyns Park is also of the pretentious manor house type, its severe facade bristling with pompous chimneys. But there are also more intimate and informal subjects, and Mr. Chamberlain has by no means slighted them. They include an interesting bit of brickwork found in the gatehouse of the isolated Leigh's Priory; details from a group of dwellings called Southfields, in Dedham; a modest little house near Margaret Roding; a village house at Great Coggeshall with marvelous exterior carved woodwork; and the village of Thaxted with its old almshouses, windmill and cottages. St. Osyth's Priory is allotted only a limited amount of space, due perhaps to the fact that it has already been so widely illustrated. Many farmhouses, stables and barns are presented and should be a source of ideas easily adapted to modern residence work. The towering Layer Marney is the nearest approach to a modern skyscraper apartment that one will find, and in the interesting Old Sun Inn at Saffron

Walden there is found the most interesting bit of decorative plaster work in Essex. Measured drawings and details are included, and are well worth study.

The Cotswolds and counties to the north, including Worcestershire, Gloucestershire, Herefordshire, Shropshire, Cheshire and Lancashire, form the next group covered by Mr. Chamberlain in his search for the best of Tudor architecture. This is the region characterized by the finely chiseled stone mansions and cottages of the sixteenth century. Many architectural writers claim that this region contains the finest expression of domestic architecture yet developed, and Mr. Chamberlain agrees that the venerable towns located here "present as pure and as flawless an ensemble of distinguished homes as can be found in this badly scarred Europe of today,—and that is quite a broad statement, after all."

The cottages and mansions included in this particular group are largely of stone, but there is a generous sprinkling of the finer sort of half-timbered work. The cottages are far too numerous to be covered in this review. In fact, the villages of Staunton, Chipping Campden, Broadway and Weston-Sub-Edge, in which are located many of the cottages shown in this section, need no introduction to the architect who has visited England.

Outside the Cotswold district, when one penetrates farther to the north and west, the use of timber in Tudor homes becomes more universal. In Herefordshire the timber work remains simple and essentially structural, with none of the exuberance and flamboyance which manifest themselves in Cheshire and Lancashire. In his travels in this region, Mr. Chamberlain, in addition to photographing numerous cottages and street scenes, made a chance discovery of a fine paneled room in the old Talbot Inn at Ledbury. The measured drawing of the room presented here is very valuable. In Shropshire two especially distinguished examples of Tudor art are Madeley Court and Stokesay Castle, each showing an interesting combination of cut stone with half-timbered work. The magnificent Pitchford Hall is a remnant of the grandeur of a bygone age when enormous timbered houses were popular among people of wealth. The somewhat bizarre timber work is presented in sketch and illustrations from photographs. The four views of that classic of Tudor art known as the Priory of Much Wenlock provide studies from a slightly different angle of this greatly over-photographed structure. The evils of overemphasis of the decorative possibilities of half-timber work are forcefully brought out in the photographs of Moreton Old Hall in Cheshire; the keeper's lodge, however, is in very good taste, and the main structure is full of sparkle and variety. Mr. Chamberlain finds much to criticize in the examples found in this region, but he always manages to include and point out some features of unusual merit. In describing that astonishing manor of timber and stone known as the "Hall I' the Woods" he says: "From one angle it is a somber Tudor mansion of stone, studded, it is true, with rather startling spikes of stone. From another angle it develops into an orgy of blatant timber work which quite defies competition, and which has been likened, realistically enough, to a "colored gentleman's shirt front." Most of the bizarre possibilities of half-timber construction have been realized in " Hall I' the Woods," and it is of great interest for this reason. It would be rash, however, to cast any aspersions on the

stone-built wing of the manor, for by way of contrast, it possesses incontestable beauty and good taste."

The remaining group of counties includes those in the southern portion of England, and in Somerset, Wiltshire Dorset, Berkshire, Oxfordshire and Kent, the author has found a great many worth-while subjects for his camera and pencil, including tithe barns, estates, farmhouses, inns, town houses and even some of the buildings at Oxford University. The 246 plates that make up the bulk of this superb volume contain ample precedent to last a lifetime, and the reproductions of photographs, pencil sketches, etchings and measured drawings constitute a collection of documents so complete as to leave little else to be desired by the student of architecture.

The Tudor period was a time of great prosperity in England, and the building of great country houses was one of the preoccupations of a newly founded aristocracy. Americans indeed marvel at the vast number of such estates which England possesses, and while some have fallen into decay there are many still existing in all their architectural excellence and beauty of setting. That the interest of this architectural type is by no means overlooked by American architects is proved by the existence in the United States of many domestic buildings of this nature, but possibly emphasis has been placed more on the larger and more luxurious than on the simpler and more moderate type, which has received considerable attention from Mr. Chamberlain in this excellent work.

THE TUDOR HOMES OF ENGLAND. By Samuel Chamberlain. Text and 246 pages of illustrations, 12 x 16 inches. Price $27.50 net. Architectural Book Publishing Co., 108 West 46th Street, New York.

THE EDITORS' FORUM

OFFICE BUILDING REFERENCE NUMBER JUNE, 1930

THE ARCHITECTURAL FORUM for June inaugurates an important, new publishing idea.

Mr. R. H. Shreve, of Shreve, Lamb & Harmon, will open a series of articles dealing with a *single* project, the Empire State Building, the largest office building yet to be constructed. This building has many new and unique features in design, construction and equipment.

This feature, presented in all of the regular issues of THE ARCHITECTURAL FORUM, will run for more than a year prior to its publication in book form. The chapters will take up in detail the fundamental information concerning all phases of this exceptional building. The material is being developed for publication in the office of Shreve, Lamb & Harmon in close coöperation with the Editors of THE ARCHITECTURAL FORUM, and will be of exceptionally useful character, with plans, details, statistics and comprehensive comment.

SUMMER SCHOOL AND NEW COURSE IN CONSTRUCTION, NEW YORK UNIVERSITY

THE summer session of the Department of Architecture of New York University will begin June 9, continuing until July 19, 1930. The classes will be held from 6 to 10 P. M. at the Midtown Center, so that students can gain practical experience by working in architects' offices during the day. A new course beginning in September, 1930, leading to a degree of Bachelor of Architecture, will be given to students who desire to become architects and to specialize in the structural side of architecture. This course will be known as Option II (Construction). The course is well balanced and will prepare students to design and execute the structural side of architecture, not only according to the best engineering practice, but also in terms of beauty.

BEAUTY AND BUSINESS

PUBLIC demand for beauty is growing, according to C. Herrick Hammond, President of the American Institute of Architects, who declares that beauty and business, twin requirements of the profession of architecture, are gaining ground in industry, notably in the manufacture of automobiles.

The architect of today, Mr. Hammond points out, is both a business man and an artist. Contrary to a belief widely prevalent, he says, the architect is close to the practical realities of life. "An architect's office of modest size," Mr. Hammond declares, "will handle with care the businesslike expenditure of $2,000,000 of his clients' money and see that every cent is accounted for and that value has been received for every dollar spent. A business concern expending this amount in a year would have an important standing in business and financial circles, and its owners would be recognized as leaders in the business world. An unjust opinion of the architect has probably been brought about because of the architect's inherent desire to bring beauty into all his work.

"Formerly those with a weakness for beauty were tempted to conceal it lest they be suspected of unfitness for a place in this practical, hard headed, efficient world. However, we now go on record, without apology, in attaching the greatest value to the appreciation of art and beauty in even the most utilitarian objects, and we seek to educate the contractor and the layman to a realization that beauty enhances the value of every commodity with which the public comes in contact. The public is more and more demanding beauty with utility, beauty with amusement, and beauty in the things with which it lives.

"Henry Ford once said in substance that he would not give five cents for all the art the world had produced. However, because of the desire to sell, in competition with other automobile manufacturers who had added beauty of design and color to mechanical efficiency, he was forced to scrap all of his original dies and machinery and is said to have spent $200,000,000 in producing new dies incorporating that element of beauty now demanded by the public. This enormous investment has now been proved to be another evidence of foresight. Similar experiences can be applied to almost every industry serving the public. Where the public has free choice, it will invariably purchase the thing that is most attractive."

WINNERS OF LE BRUN SCHOLARSHIP

THE Le Brun Traveling Scholarship of the American Institute of Architects has been awarded for 1930 to Joseph B. Wertz of Durham, N. C., it is announced. The award is made annually by the New York Chapter of the Institute for excellence in architectural design. First honorable mention went to Richard J. Pearce of Seattle; second honorable mention to Miss Jean Brand, New York, and third honorable mention to N. J. Sapienza of New York. Miss Brand is the first woman to compete for the scholarship. According to the announcement, she made a splendid showing.

The winner will spend six months in European travel studying architecture otherwise than by entering any foreign school or atelier. The scholarship is designed to supplement school or office experience.

The committee in charge of the competition, in accord with the intent of the deed of gift, devised a practical problem "and one which comes under the observation of many communities in various parts of the United States." Within the latitude of free interpretation, the competitors were required to design a natural history museum for erection in a public park of a city of moderate size. Available space for the building and departments essential to its utilization were specifically required. Three drawings, a main floor plan, a front elevation and a section in either direction, were necessary. The Chairman of the jury was Chester H. Aldrich. The other jurors were Eric Gugler, Richard H. Dana, Jr., Oliver Reagan and D. Everett Waid.

THE ARCHITECTURAL FORUM

VOL. LII, No. V MAY, 1930

CONTENTS

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

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

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IN this issue we take pleasure in presenting articles by our two new Contributing Editors, Royal Cortissoz and Kenneth M. Murchison, who will write regularly for THE ARCHITECTURAL FORUM. With Mr. Cortissoz' article, "The Vitality of Tradition," is a group of exceptionally distinguished photographs by Arnold Genthe, taken in Classic Greece. In juxtaposition to Tradition, the spirit of Modernism is set forth in the words of Frank Lloyd Wright. Ralph Walker's thoughtful discussion of Skyscrapers is preceded by plates showing a modern telephone building in Newark, N. J., by Voorhees, Gmelin & Walker.

Kenneth M. Murchison opens his regular feature, "FOR ARCHITECTS ONLY," with "Be Businesslike," on page 750, Part Two, written in his own inimitable style.

We take this opportunity of welcoming Mr. Cortissoz and Mr. Murchison as Contributing Editors of THE ARCHITECTURAL FORUM.

THE EDITORS.

TWO COLUMNS OF THE PARTHENON, ATHENS. FROM A PHOTOGRAPH BY ARNOLD GENTHE

THE
ARCHITECTURAL
FORUM

VOLUME LII NUMBER FIVE

MAY 1930

THE VITALITY OF TRADITION

BY

ROYAL CORTISSOZ

IT is in the air that when the American Institute of Architects holds its convention at Washington this month the advocates of the ultra-modern side of contemporary architecture are to be given their day in court. On May 22 there will be a symposium, a debate, in which the innovators may state their case and have it submitted to argument. I sympathize with them, up to a point. It is impossible to look about, among the new buildings of today, and not feel that something affirmative is happening in American architecture. But one of the obligations laid upon the student of this subject is to think in terms of centuries, or at least in those of generations, and in this extravagant country of ours, in which "progress" thinks nothing of scrapping a structure worth millions, it is permissible to surmise, even in the presence of a super-skyscraper, that we are in an age of transient experiment as much as in an age of permanent achievement. So unæsthetic a factor as congestion in human traffic may call a halt to the soaring building, and, in the process, lead to a new deal all 'round in the matter of design. In the meantime my imagination is stirred by the vitality of tradition. Its spokesmen at Washington—where it will of course have its spokesmen—are, after all, in the position of the "ins" repelling the onslaughts of the "outs." The latter would like us to believe that they have substituted something unquestionably superior for "the column and the arch." But the burden of proof rests upon their shoulders. While they are seeking to advance it, conservatism may linger with a measure of satisfaction upon the unmistakable durability of the conservative hypothesis.

I was moved to reflect upon this by certain incidents in the exhibition of the Architectural League last February. It contained, naturally, a sufficient admixture of what I venture to designate as the dizzy vertical motive, the design abandoning the old string course and placing all the emphasis on infinitely extended vertical lines, with nothing save the "set backs" in the upper stories to break the monotony. These buildings have the majesty of sheer bulk to commend them but is a terribly bleak majesty and it is gained at the expense of one transcendently important element, that of artistic individuality and character. The architect, to my mind, is nothing if not an artist, a sensitive creature, full of imagination and personality. How much of him is left by these bald, factory-like facades, reduced to a common denominator which makes the work of one firm look astonishingly like the work of another? A building must have a physiognomy, attributable not to a convention but to the initiative of the designer. As it happened, I found such a physiognomy in the Lee Higginson building, designed for a site in Broad Street by Cross & Cross. It is pure Greek but it has individuality, the individuality of a vitalized design. The architects were lucky, as Peruzzi was when he did the Palazzo Massimi, in Rome. Their building line was dictated for them on a slight curve and this contributed much to the grace of their facade. They were lucky, too, in that they didn't have to challenge the sky but could put up a building of modest height. Starting with these advantages they proceeded to make distinguished play with line, mass and detail—and to secure beauty.

There lies, to be sure, the true key to tradition, the everlasting life of beauty. In the "Laws" of Plato we are told that "tradition, if no breath of opposition ever assails it, has a marvelous power." Artistically speaking, no matter what breath of

opposition assails it, its power does not fade. Seeking to define tradition as something utterly removed from academic formula, I have thought of it as simply the tribute which the genuine artist pays to the wisdom of the finer spirits in the art of all ages—and he invariably pays that tribute in his own coin. It may take him time. In the library of the cathedral at Siena there is a marble of "The Graces" which is believed to have first brought Raphael into contact with classic art. It was pretty certainly in his mind when he painted the little picture of the same subject that is at Chantilly. That is heavily tinctured by the style of his master, Perugino. He had to slough something off before he could beat out a style of his own. But as he did so, how faithful he remained to the Greek spirit of order, balance and serenity, to the key of an ancient tradition! The stupendous decorations of the Vatican, which are Raphaelesque to the core, are also profoundly classical. It was his sense of beauty, and no pedantry, that caused him thus to prolong the continuity of tradition. Looking over the photographs recently made by my friend Arnold Genthe, in Athens, I have found myself musing upon, specifically, the poignant life in his subjects. A strange mobility, momentarily arrested, not brought to a definitive end, seems to mark the caryatides of the Erectheum. And those pillars of the Parthenon, chipped, stained with the patina of time, wearing "the sacred rust of twice ten hundred years," uplift the soul with a beauty so vivid that even in a photograph the architect's imperial lines vibrate with an immortal inspiration.

It is inspiration that tradition gives, and by which it perpetuates itself, not a pattern to be copied. My memory goes back to a number of different masters, all stemming in their individualized ways from classical antiquity. I think of Bramante and the lucent purity of his style, his nobility and his elegance. I think of Palladio, a hundred years later, rearing up in Vicenza those massive palazzi, especially the redundant "Consiglio," which in its full-blown detail is enough to make Bramante turn in his grave, but which still has something of the grand air about it. I think of Bernini, in the eighteenth century, forgetting for the nonce the Baroque rhetoric of his sculpture and framing in his colonnade at St. Peter's one of the great orchestral moments in architectural history. As I think of these men I see how each one of them used the antique motive with a new energy, coloring it with his own personal quality. And then, leaping across the centuries, I see what McKim did when he built the Pennsylvania Station in New York, remembering "dead" Rome but producing a living architectural organism. We have nothing finer than that heroic pillared front of his. Henry Bacon, in his turn, remembered the Parthenon when he built the Lincoln Memorial but he used the language of Greek architecture as though it were his mother tongue. Is it a language, merely, of historic forms? Say rather that it is one of austere simplicity, of exquisite proportions, of an elevated style, of the fundamental things that have persisted through all the periods. It is, above all, a language that drives at beauty. It is the imponderables that count. I love the anecdote of McKim that Moore tells in his biography of the artist, referring to a moment in which John Russell Pope was admonishing some students on the importance of "the plan." McKim "fidgeted" and finally burst forth,—"Young men, the thing of first importance in architecture is—beauty."

It was that view of the matter that was at the bottom of the service rendered to the country when McKim, Hunt, Burnham and the rest built the Chicago fair. It was, in a sense, only incidentally that they made it classical. The essential point was that they made it beautiful. They did not merely revive the Roman column and cornice. They clarified and steadied American taste, recalled it from nondescript and ugly architecture to a sense of style and beauty. The real problem of the man who is about to build, whether it be a dwelling or a hive of offices, is not so much one of style in the historical, chronological sense, as it is one of finding an architect who is an artist. None of the styles is moribund, not even mediæval Gothic, as Goodhue clearly showed. Richardson's Romanesque did not die of itself but because Richardson died. The Romanesque lives again, as a matter of fact, in certain aspects of the work of York & Sawyer. What is the most brilliant work of modern architecture in London, the one most richly significant of creative genius? It is Westminster Cathedral, and the late J. F. Bentley, who designed it, took his cue from Byzantium. No, there is nothing of the insensate copyist about the inspired traditionalist. It is the mediocrity who is content to copy. The artist does not discharge his own responsibility when he subjects himself to the influence of the masterpieces. He gets a divine urge from them. Wordsworth thus develops the point:

The spirit of antiquity—enshrined
In sumptuous buildings, vocal in sweet song,
In picture speaking, with heroic tongue,
And with devout solemnities entwined—
Strikes the seat of grace within the mind.

There is another passage, from a great artist, that I never tire of repeating, it is so eloquent, so true. It was Whistler who said: "We have then but to wait until—with the mark of the gods upon him—there comes among us again the chosen who shall *continue what has gone before.*"

THE LOGIC OF CONTEMPORARY ARCHITECTURE AS AN EXPRESSION OF THIS AGE

BY

FRANK LLOYD WRIGHT

I DO not like this title because it seems to me either too obvious or too ambiguous. But it is the Editor's and so I shall keep it. Is it logical to assume that this age may find Expression in contemporary architecture, that is to say, in an Architecture of its own? I wonder, because contemporary architecture in this age has neither logic nor expression. The Age has, so far, given itself away! But, is it logical that a contemporary architecture should express its own age?

Is the rising sun logical, Mr. Editor? It is natural, and that is better.

It is just as natural as that the sun should rise that contemporary architecture should also rise to express its own "age"—in this instance—our own time. To express our own time would be to characterize our age for all time. An Architecture might be borrowed for this purpose, but only to stigmatize the age! An Architecture might be conceived and taught as something fine in itself, much admired as such, to no greater end than to sentimentalize and therefore stultify the age.

To no greater end, I say, because only contemporary Architecture could possibly express this age or has ever expressed any other age,—such as the Architecture or the Age happened to be. What other Architecture could express the age except the architecture of the age itself?

Of course we may imagine an era wherein there was nothing architectural to express or there were no architects to express whatever there was, and recourse had to plan-factories, academies, and schools to supply the lack out of the world's stock to save the situation,—so to say. And that would be about all the "contemporary" architecture that particular era or age would get,—or deserve to get,—as "expression"—even if that lack were ever so quickly and richly supplied and every fine thing that ever happened in ancient Architecture was externally applied as "Contemporary Architecture." That shame would really be the "logic of Contemporary Architecture" as an "expression of that age"—the expression of the fact that the age had no architecture of its own and had tried on at least 57 Varieties to find one ready-made to fit.

It is no exaggeration to say that the *expression* of this Machine Age has, so far, been waste and *repression*. How about the wasted timber resources—the lost trees of a new-continent to merely rot or burn as "mill-work"? How about the butchery by machinery of every traditional-form ever borrowed and worn to win the contempt of the civilized world, especially of the Beaux-Arts—that was supposedly its advocate? How about neglect and insult by way of Traditions to great, new materials, and the separation in consequence of Engineering and Architecture: and the great change in human-thought the ideal of Democracy represents, left without any interpretation in Architecture whatsoever?

Traditions had for us the vitality of inertia—the "vitality" of the ball and chain, instead of the inspiration of traditional-forms loved only as an expression of the age to which they were "contemporary." That love would honor Tradition as distinguished from the abuse of traditions. And that love might have instructed us and saved our age for a great Architecture of our own. What made Traditional-Architecture modern and living in its own age—that was the only business we had with Tradition in Architecture. And that was great business.

But twentieth-century America must pay a ghastly price for nineteenth century grave-robbing in architecture, a price that staggers reason, and pay it all back for lack of a simple sense of Tradition that would allow America to live its own life, and by so doing, greatly honor Tradition. Imitation may be the sincerest form of flattery, but whom have we flattered, and how—and, for what?

Creation knows Imitation only as a form of self-abuse. It takes creative imagination to see stone as stone, see steel as steel, see glass as glass, and to view traditions as Tradition. Perhaps that was too much to expect, but where, I ask, is there one honest, living word, Tradition as a vital-force has been allowed to say for itself anywhere in this area prostitute to traditions, 2,000 miles North to South and 4,000 miles East to West, that is to say, the length and breadth of this great new ground of ours—let the climate rage or smile upon it how it may? If the Editor of THE FORUM will compile a list, I will take it up item by item and either convince myself or convict him.

This is the Machine Age as distinguished from all other ages; this is the age too, of steel and steam. Ours is the age of the individual, supreme as such, in a life that he can call his own. These great new needs in Art were the Architect's great opportunity. His great office consisted in the fact that Human thought is, here and now, stripping off old ideas like old garments, and such cutting fitting and trying on as we have done—to find ready-made to wear,—all ends naturally in a mis-fit.

All are a mis-fit. But the age is still young and

healthy. It seems at last to have shaken off the expedient-interest and be willing now to find the great urge to awaken the creative-faculty that has been lying sterile, neglecting the wretched need of great imaginative interpretation in good work for four hundred and thirty-eight years.

If great Life is sure of great Art, and it is,—how can America fail of great Life—once this confusion of ideas, arising perhaps from the Babel of tongues and the embarrassment of the riches of a great, but antiquated inheritance passes—and the great immediate facts of the Life that is her destiny stand out clearly before her people?

For America's future none but the working of Principle is safe Tradition. The only precedent she can find worthy is Principle. If, now, modern-architecture may be both Modern and Architecture, we realize great Architecture as greatest proof of human greatness as it ever was before and in all ages.

Architecture is the scientific art of making structure express Ideas.

Architecture is the triumph of Human Imagination over materials, methods, and men, to put man into possession of his own Earth.

Architecture is man's great sense of himself embodied in a world of his own making. It may rise as high in quality only as its source, because Great Art is Great Life!

Now what is the American Ideal of Great Life?

Liberty is the foreground, middle-distance, and future of that Life. Toleration and Liberty are the foundations of this Great Republic?

Notwithstanding all powerful threats—of a Machine Age—to this Ideal, why not the hope in American hearts that Liberty in Art will be the native offspring of Political Liberty? And for a new people—a new Architecture!

The old culture itself, for nearly five-hundred years, miserably failed with the form-language of the human-heart and mind in Architecture. The Renaissance was that failure and the pseudo-Renaissance in America was a tragic betrayal of such ideals as we are learning now to love to call "American."

The sense of Romance suffered most by the betrayal. But this sense is already shifting its circumference, therefore its horizon, as it has done before and will continue to do, for Romance is Immortal.

Industry in the Machine Age can only become a machine without it. Modern Architecture itself will become a poor, flat-faced thing of steel-bones, box outlines, gas-pipe and hand-rail fittings—as sun-receptive as a concrete side-walk or a glass tank, without Romance,—the essential Joy of Living as distinguished from Pleasure,—alive in it.

Architecture without that Joy could inspire nothing but mediocre emulation and would degenerate to a box fit merely to contain the objects of Art and Decoration it should itself create and maintain.

Constructing architectural features and parts to give the decorative effect of simplicity is not good enough. It comes to just the same thing in the end as—America's disgrace,—now.

Why should Architecture or objects of Art in the Machine Age, because they are made by Machines, resemble Machinery? Because they were so made might be the best of reasons why they should not. Nor is there good reason why Forms stripped clean of all considerations but Function and Utility should be admirable beyond that standpoint. They may be abominable from the human standpoint. Let us have no fear, therefore, of Liberalism in our Art of Architecture, nor in our Industries.

Romance, all great poets are agreed, is only Liberalism in Art. It never did apply to "make believe" or to constructing Architectural features and parts for ornamental effect, or to falsifying, or to degenerate to sentimentality—except as it was betrayed by the Renaissance.

The taste for mediocrity grows by what it feeds upon, therefore the public of this Republic is more than ever likely to find the love of commonplace-elegance that curses it, and that was gratified by the sentimentality of the ornamental, now replaced by a pleasure in the ornamentality of affected-simplicity, or a reaction toward the sterility of ornaphobia.

Yes, this Machine Age, especially now at the moment of awakening from damnation by senseless sentimentality, may be in danger of being sterilized,—castrated by a factory-aesthetic.

The Machine is the brainless craftsman of a new-freedom in social order. Untried and unqualified this "New" is a dangerous means to great-realization in Architecture.

But,—Scientists and Philosophers!—convention us no narrow *conventions,* New or Old, to rise up in middle-minds and get into selfish, meddling hands as *preventions* in this Modern World that,—thanks to an Organic-Architecture,—we are going to build upon fertile new ground. As Sons-of-Liberty we are going to build that New Freedom in Art upon ground fertilized by the Old,—ground in which the carcasses of ancient Architecture lie rotting beneath our feet if Traditions are to die where and how and when they should die that Tradition may nobly live.

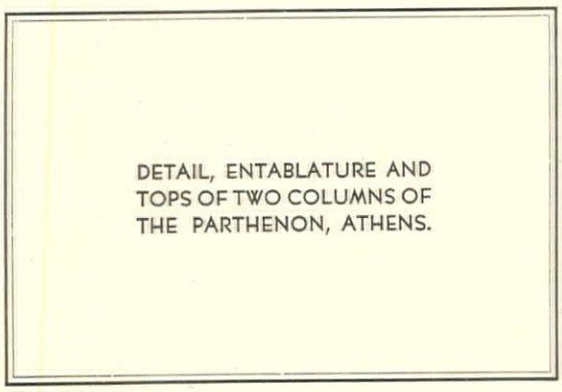
Until the dead-past has buried its dead — Life is poisoned and itself dies of its own dead.

GREEK ARCHITECTURE

PHOTOGRAPHIC STUDIES BY ARNOLD GENTHE

BETWEEN THE COLUMNS OF THE RUINED PARTHENON IS SEEN THE CARYATIC PORCH OF THE ERECHTHEUM.

From a Photograph by Arnold Genthe

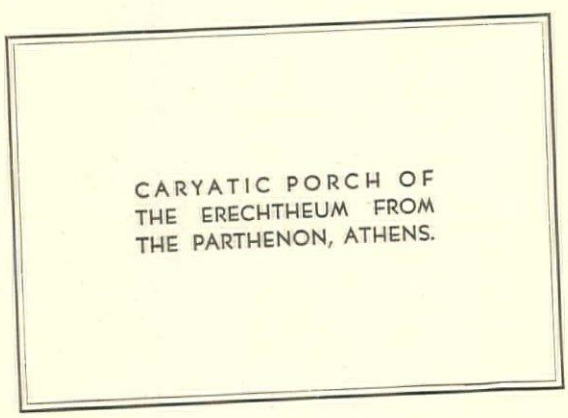


DETAIL, ENTABLATURE AND
TOPS OF TWO COLUMNS OF
THE PARTHENON, ATHENS.

From a Photograph by Arnold Genthe

TIME-SCARRED DRUMS
OF THE COLUMNS OF THE
PARTHENON AT ATHENS.

From a Photograph by Arnold Genthe



CARYATIC PORCH OF
THE ERECHTHEUM FROM
THE PARTHENON, ATHENS.

From a Photograph by Arnold Genthe

THE CARYATIDS OF THE PORCH OF THE ERECHTHEUM ON THE ACROPOLIS, ATHENS, ARE AMONG THE EARLIEST EXAMPLES OF SCULPTURED FIGURES USED AS SUPPORTING MEMBERS.

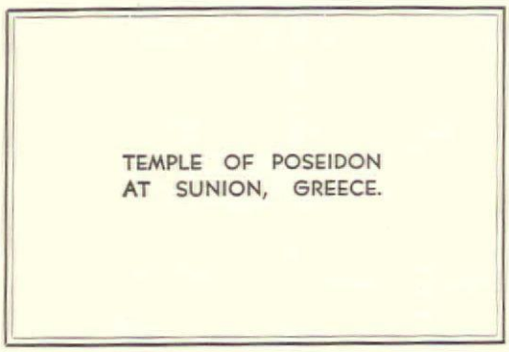
From a Photograph by Arnold Genthe

DETAIL, CORNER OF THE ERECHTHEUM, ON THE ACROPOLIS AT ATHENS.

From a Photograph by Arnold Genthe

THE PROPYLAEA OF THE ACROPOLIS
GUARDED THE ENTRANCE TO THE
SACRED DOMAIN OF THE GODS.

From a Photograph by Arnold Genthe



TEMPLE OF POSEIDON
AT SUNION, GREECE.

From a Photograph by Arnold Genthe

THE PALMOLIVE BUILDING, CHICAGO

HOLABIRD & ROOT, ARCHITECTS

BY

HENRY J. B. HOSKINS

MICHIGAN AVENUE, the aristocratic thoroughfare of Chicago, wide open to Lake Michigan, and the eastern boundary of the city's most congested center, has asserted its pre-eminence, and afforded relief to the congestion of an extensive development northward,—a development perhaps seldom exceeded in the rapidity of its growth and the excellence of its architecture. With a resplendent array of office buildings, clubs and shops, this thoroughfare now extends from the northeast boundary of the congested "Loop" to a point where the residential life of the "Gold Coast" begins,—a spot with quiet side streets, sprinkled with charming exclusive shops in a bright, smoke-free environment and where the North Shore Drive joins the beauty of the lake-front thoroughfares and beaches. With the advantages of rapid transportation to all parts of the city, the exhilaration of clear skies and the close proximity to delightful residential centers, it is not remarkable that the Colgate-Palmolive-Peet Company should erect a towering landmark as a distinctive termination to this north side gateway of Chicago.

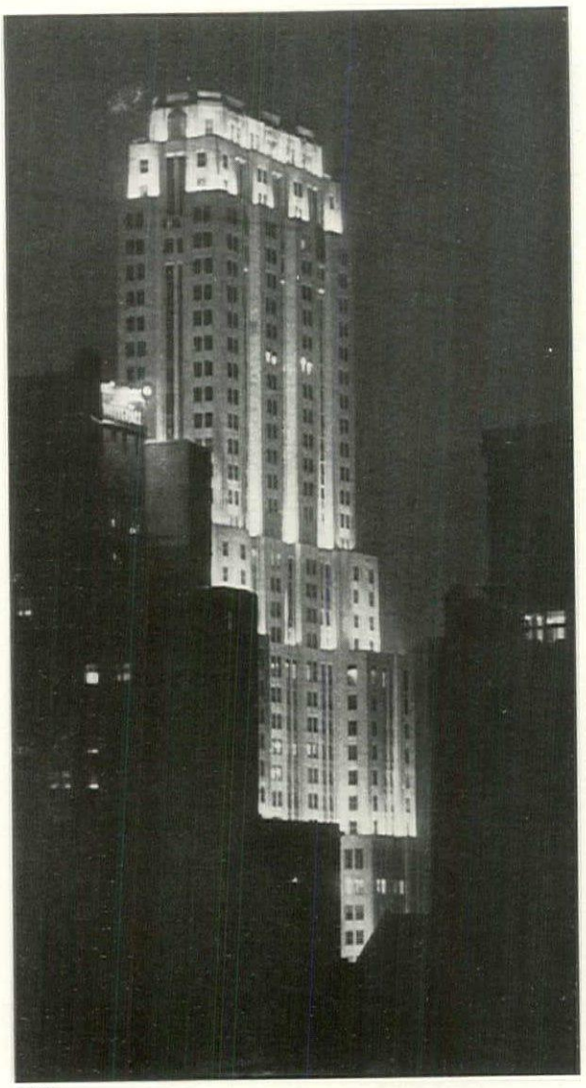
The structure, which has a frontage of 172 feet on Michigan Avenue and 231 feet on Walton Place, rises for 37 stories to a height of 468 feet, 6 inches and terminates in a beacon light at a point 620 feet above the sidewalk. Below the sidewalk grade, the basement, first and second sub-basements and the boiler room extend to a depth of 36 feet.

Modern thought, which in this age of transition follows along the lines of economic adjustment, is rapidly changing the character of architecture as a social manifestation. The rhythm of youthful exuberance, breaking away from the shackles of the past, has given new life to the lesser arts of music and literature, painting and decoration, in fact the whole gamut of things affecting the environment of our home and business life. Our architecture, always slow and reluctant in its response to change, is happily emerging from its growing pains and leaving dead styles behind. Our new structures have an abstract quality of design, emotionally felt rather than reasonably explained, and in their inherent fitness the old quarrel as to the untruthfulness of their curtain walls and superficial facings, as opposed to the inherent structural expression of mediæval structures, is forgotten.

After all, structure and its purpose determine style. The exterior of our modern skyscraper bears the same relation to the internal fabric as the hood of an automobile does to its chassis and engine. Such a building is the structure erected by the Colgate-Palmolive-Peet Company. In the various factors influencing the design of the exterior, the paramount idea was probably the creation of an edifice, which, while monumental in character, would not be unduly stressed as an advertising feature in giving expression to the achievements of the Company.

The main structure, buttressed in a manner suggestive of pyramidical completeness, attains great individual distinction in the soaring verticals of the central mass. In a series of simple diminutions of its perimeter it builds up as a satisfying unit and will ultimately terminate in a beacon tower. For the maximum effect of artificial illumination, a product of the new age, its surfaces are kept flat and unbroken, relieved only by the verticals of the fenestration and the sparse use of flat sharply incised ornament at various focal points. From the terraces of the setbacks, floodlights will illuminate the surface, and from the roof the polished aluminum surfaces of the "Lindbergh Light" beacon will be picked out with brilliant distinctiveness. With the added gaiety and joyousness of life, the use of color is increasingly evident and undoubtedly will be used in schemes of illumination.

The base of the building is equally individual and distinctive, the two lower stories of shop fronts having an interesting treatment of ornamental cast iron and nickel metal. Fluted colonnettes with illuminated terminations form vertical separations and frame the show window enclosures, which are trimmed in nickel metal. At present, this cast iron work is painted in gray tones in harmony with the general structure, but with opportunity for any varied color treatment that the passing fancy of future times may dictate. Above this story, with the exception of the use of terra cotta in certain of the spandrels, the entire building is faced on all sides with stone which is variegated Bedford Indiana limestone having a plain finish. The typical windows throughout are double-hung steel windows, glazed with plate glass. The "Lindbergh Light," a beacon towering 150 feet above the roof level, will be constructed on a steel framework, clothed with tapering units of burnished aluminum and will be of sufficient dimensions to contain an elevator for



Gillies

Palmolive Building, Chicago.
Holabird & Root, Architects

its entire height. The building is, of course, of fireproof construction throughout, the steel frame resting on caissons carried down to bedrock. The floors, roofs, etc., are of reinforced concrete. There are no outside fire escapes or any of the usual excrescences of this kind, and every latest scientific mode of construction, together with the finest of materials, is employed in its erection, insuring permanence and safety

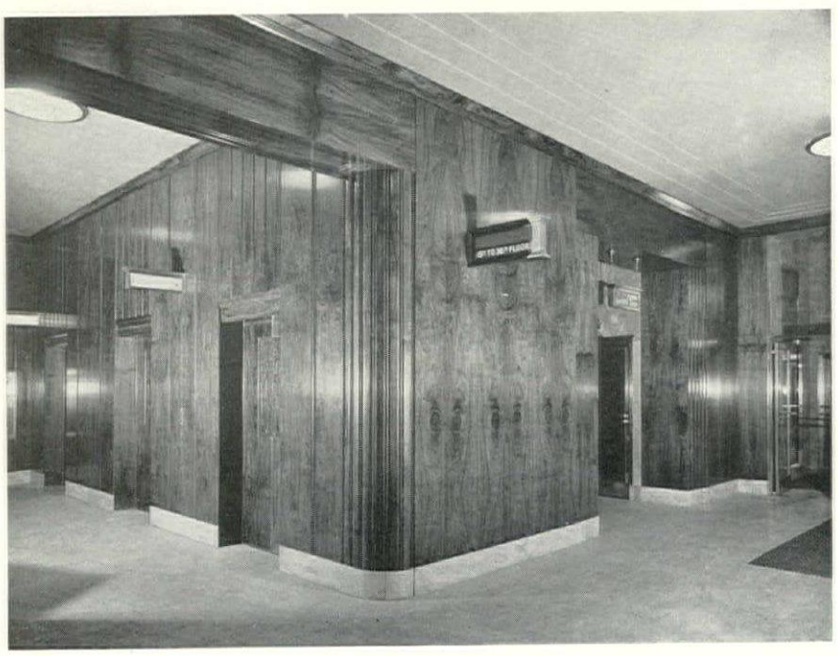
The maximum amount of daylight is assured by the plan shape at the various levels and the diminishing size of the floor plans permits of the possibility of the rental of entire floors with varying space requirements, as illustrated by this table of areas:

First floor	15,885	square	feet
2nd to 10th	11,850	"	"
11th to 16th	10,500	"	"
17th to 21st	5,800	"	"
22nd to 32nd	4,100	"	"
33rd and 34th	3,842	"	"
35th and 36th	3,196	"	"
37th	2,914	"	"

The series of setbacks on all four sides offers opportunities for promenade decks from which it is possible to enjoy incomparable views unimpeded in any direction.

THE INTERIOR.

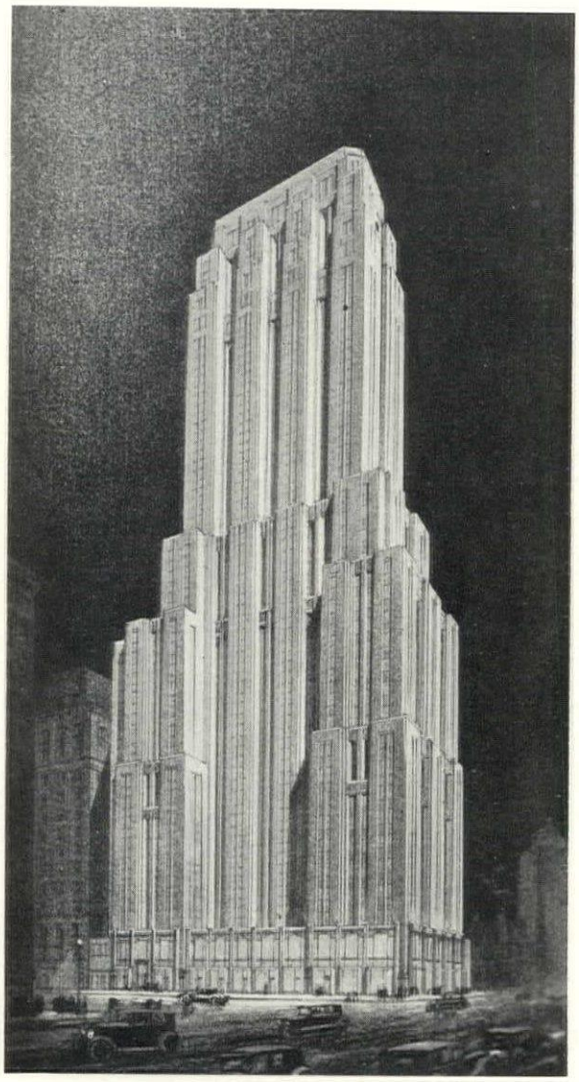
Entrance is afforded on both street fronts through vestibules, which, with the doors, are entirely of nickel metal, to an extensive arcade, lined with exclusive shops and restaurants, which leads to the main elevator lobby. From the floor, patterned in gray and pink Tennessee marbles and above a base of Notre Dame marble, the walls are lined full height with Circassian wal-



Wood Paneled Lobby

nut in large flat panels vertically fluted over door openings and in other places to enhance the vertical effect and the beauty of grain in the contrasting flat panels. A plaster cornice in flat relief separates the wainscot from the ceiling in which the etched glass lighting fixtures are set flush. The elevator doors on this level are faced with Circassian walnut, edged with insert nickel metal bands and accented with panels of great interest carved by Enrique Alfarez. The store fronts, display cases, mail boxes, etc., are of nickel metal forming a pleasingly sharp contrast with the woodwork.

Adjoining the arcade near the Michigan Avenue entrance and with separate street entrances, is the *Tour d'Argent* Fountain Lunch Room which has plaster walls and decorative grilles interestingly painted in horizontal striping of varied shades of salmon and pink. The center column is a special feature, having an illuminated mirror and nickel metal enclosure, which is echoed in the cove lights at the ceiling. The floor is of terrazzo in multi-colored patterns, gray and pink, to harmonize with the painted decorations. To the east of the lunch room is the *Tour d'Argent* Dining Room which also has a terrazzo floor in tones of chocolate brown and pale yellow. Above a Belgian black marble base there is a Circassian walnut wainscot and trim. Plaster fluted decorations are carried vertically up the walls and extended lengthwise across the ceiling and decorated in copper, harmonizing with the warm pale yellow of the general field. At the east end of the arcade is the *Tour d'Argent* Coffee Shop, a painted plaster room in blue and silver with a Carthage gray marble wainscot and base. The

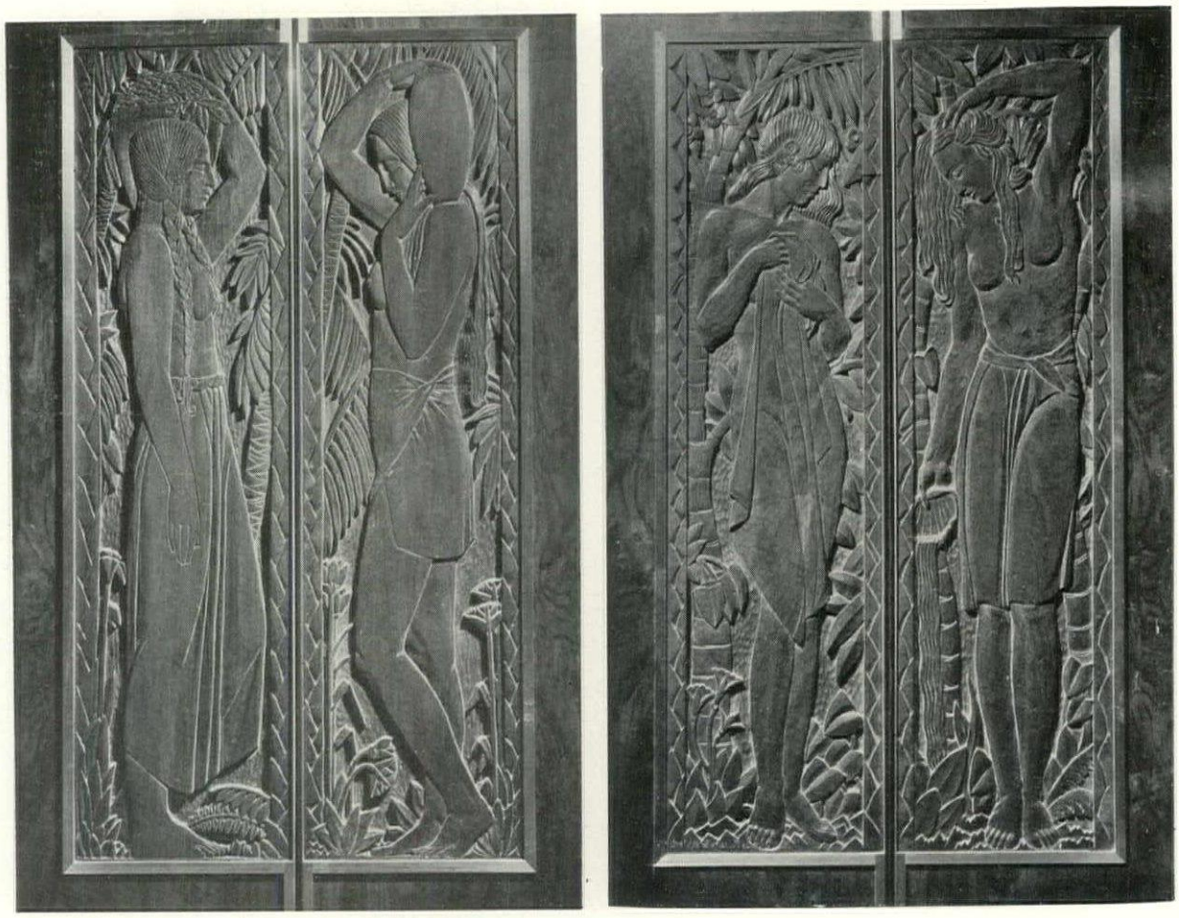


Palmolive Building, Chicago.
Holabird & Root, Architects

Shops and Lower Stories

floor is terrazzo in shades of blue with nickel strips and inserts of pale yellow stars. The counter chairs are all aluminum metal with gun metal pedestals and blue leather linings. The soda fountain room, which adjoins the coffee shop, is somewhat similarly treated except that the wainscot and trim are maple, and the decorations in gray, black and yellow.

On the second floor, the shop fronts and elevator doors are of bronze enclosed by a full height wainscot of Notre Dame marble capped with an ornamental plaster cornice. The floor here is terrazzo, and the doors are walnut. The stair halls leading from the first to second floor are lined with Notre Dame marble, and the stairs are finished with same material except for Tennessee marble treads. The newels and balustrades are of nickel metal. The typical stairs throughout the building are of the steel pan type construction with cement-filled treads. The typical corridors have a wainscot of clear Tennessee Tavernelle marble with a Belgian black marble base and cap with a trim of this material around the elevator openings. The doors and trim are walnut, and the floors terrazzo. The typical elevator doors are single-panel hollow metal construction. In the typical offices the floors are finished with smooth cement to receive material as individually selected by the various tenants. The metal windows have plaster jambs and heads returning into them, and the stools are of metal. The toilet rooms have Tennessee Tavernelle marble stalls, wainscot and divisions, and art marble coved base and terrazzo floors. The barber shop on the second floor is a study in the contrast of the scintillating surfaces of dark and light materials. The walls are lined with black vitrolite in tiles approximately 18 inches square and capped with a black and white cornice. The cases, mirror frames and trim around openings are of polished Allegheny metal, while the doors and the general woodwork are of natural maple.



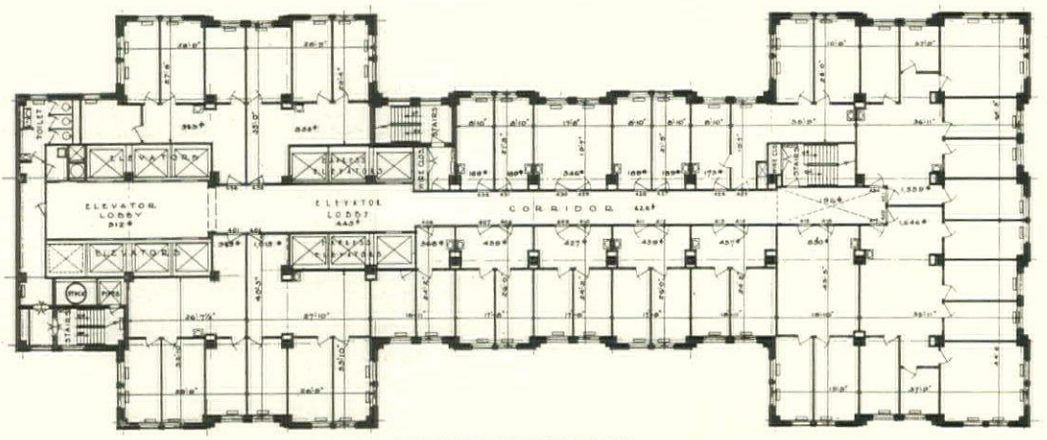
Designs on Elevator Doors,
Palmolive Building, Chicago.
Holabird & Root, Architects

PALMOLIVE BUILDING, CHICAGO

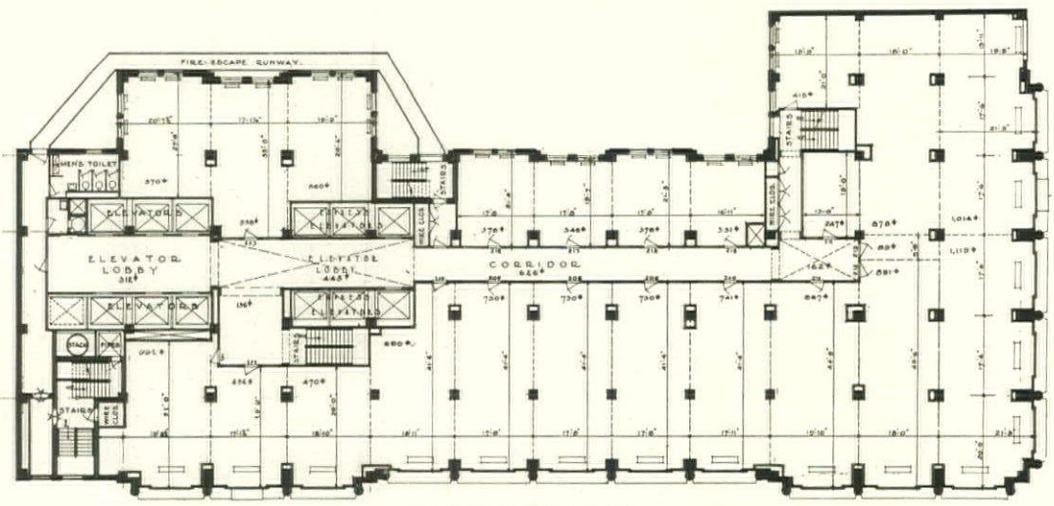
Gillies

NIGHT ILLUMINATION

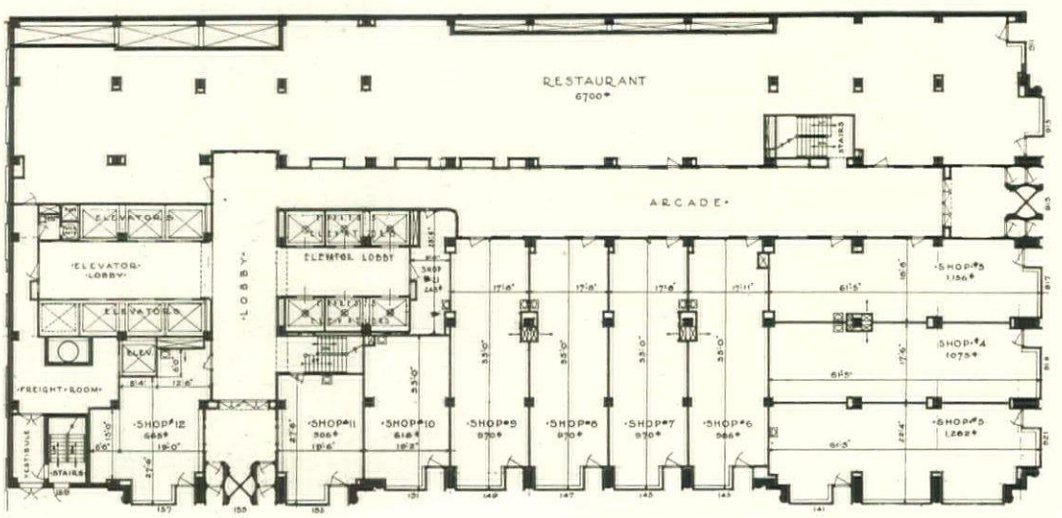
HOLABIRD & ROOT, ARCHITECTS



FOURTH FLOOR PLAN



SECOND FLOOR PLAN

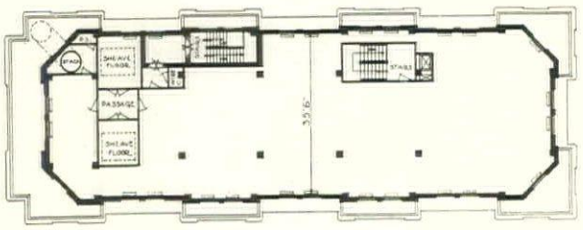


FIRST FLOOR PLAN

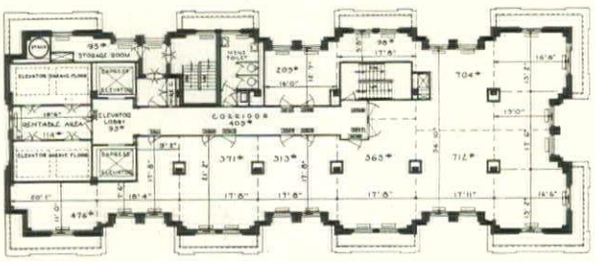
PALMOLIVE BUILDING, CHICAGO.
HOLABIRD & ROOT, ARCHITECTS

Chicago Architectural Photographing Co.

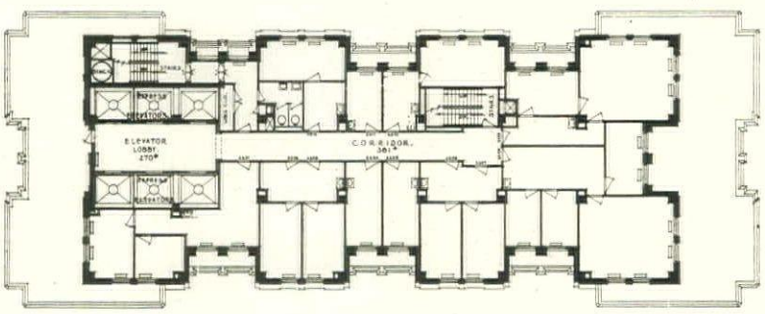
PALMOLIVE BUILDING, CHICAGO.
HOLABIRD & ROOT, ARCHITECTS



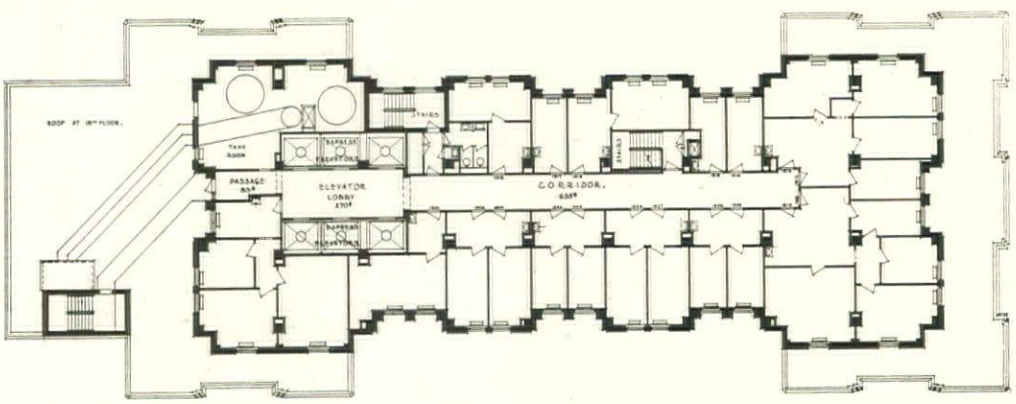
THIRTY-SEVENTH FLOOR PLAN



THIRTY-FIFTH FLOOR PLAN

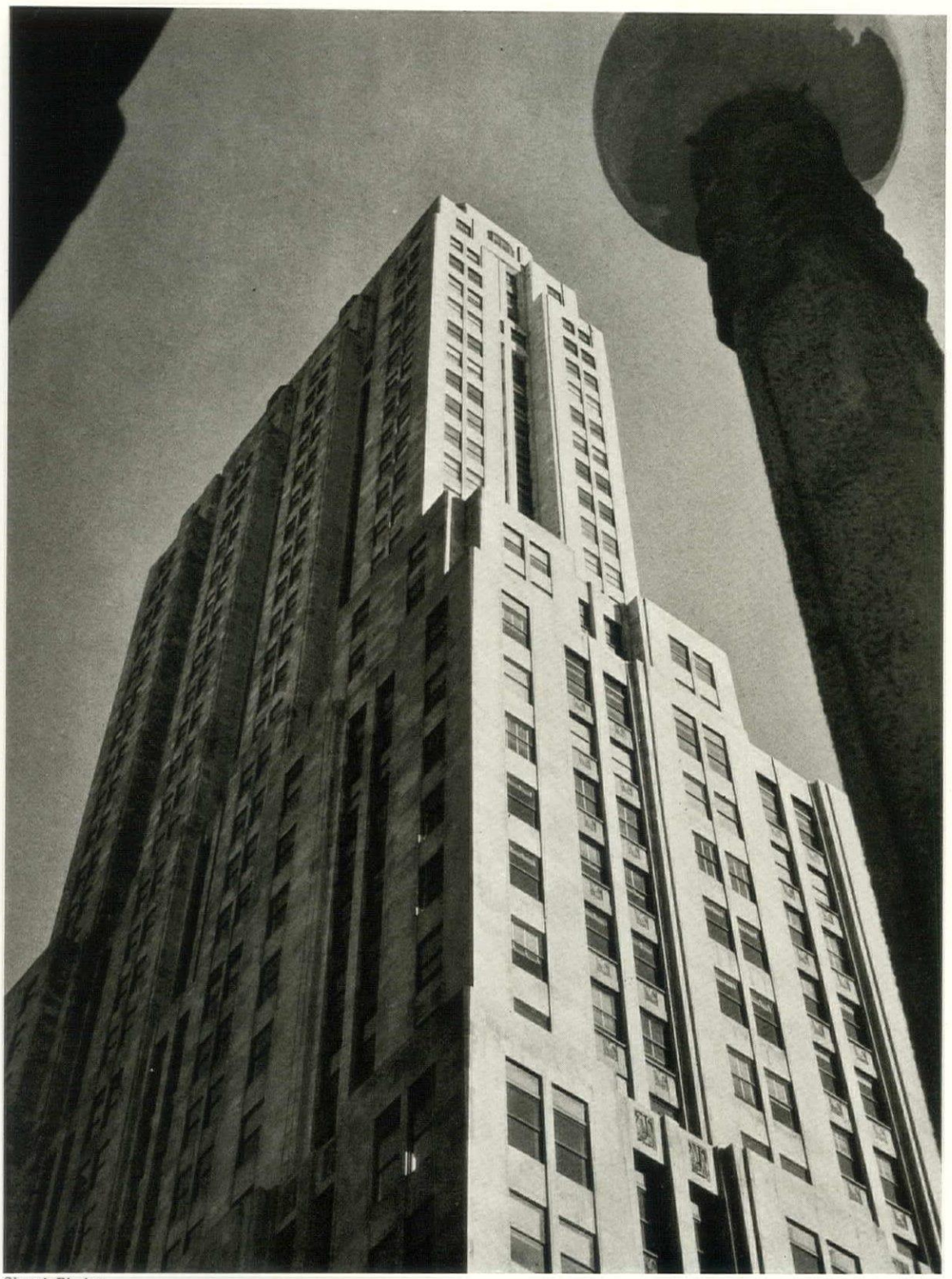


TWENTY-SECOND TO THIRTY-SECOND FLOOR PLAN



EIGHTEENTH FLOOR PLAN

PALMOLIVE BUILDING, CHICAGO.
HOLABIRD & ROOT, ARCHITECTS



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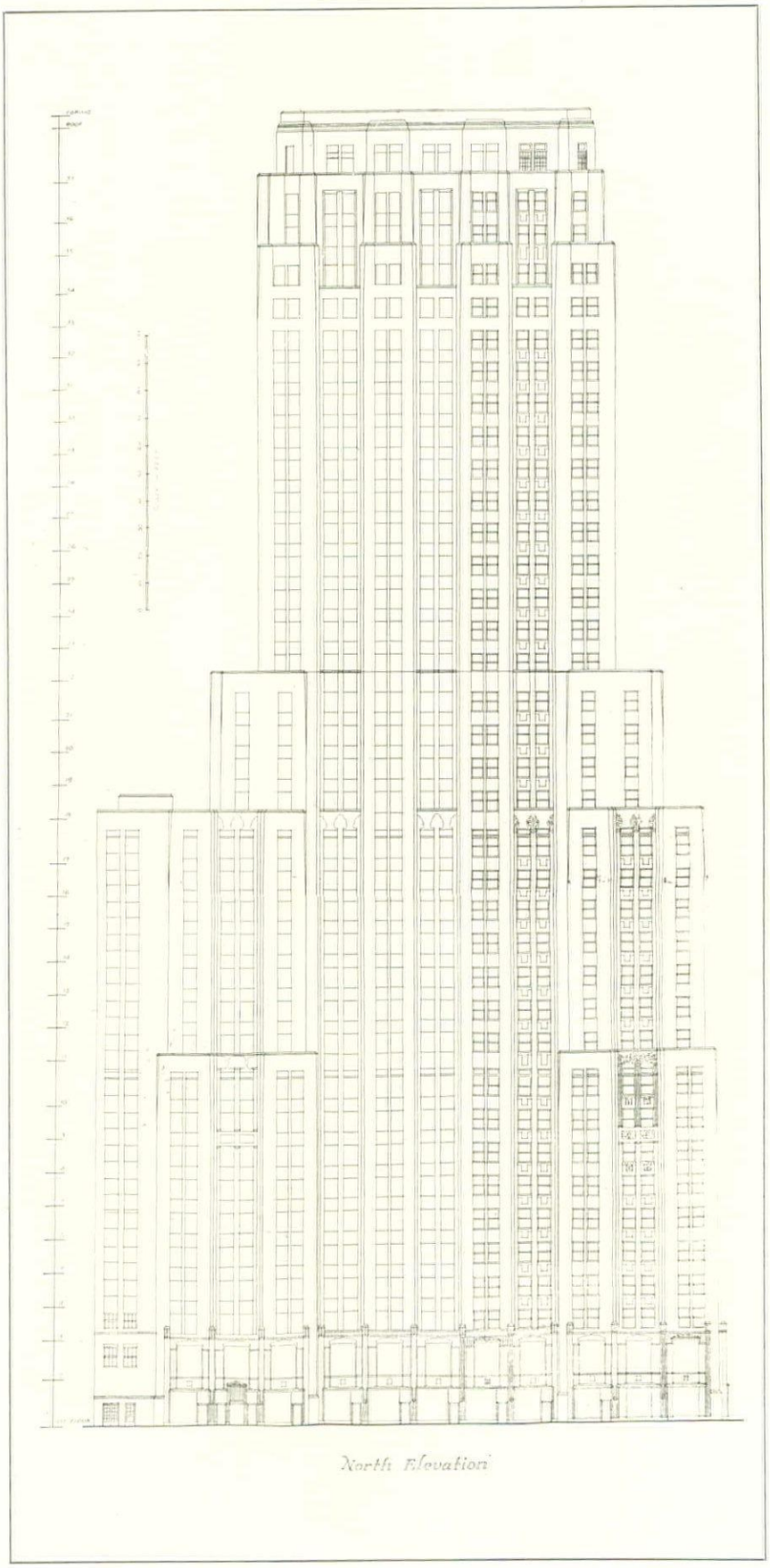
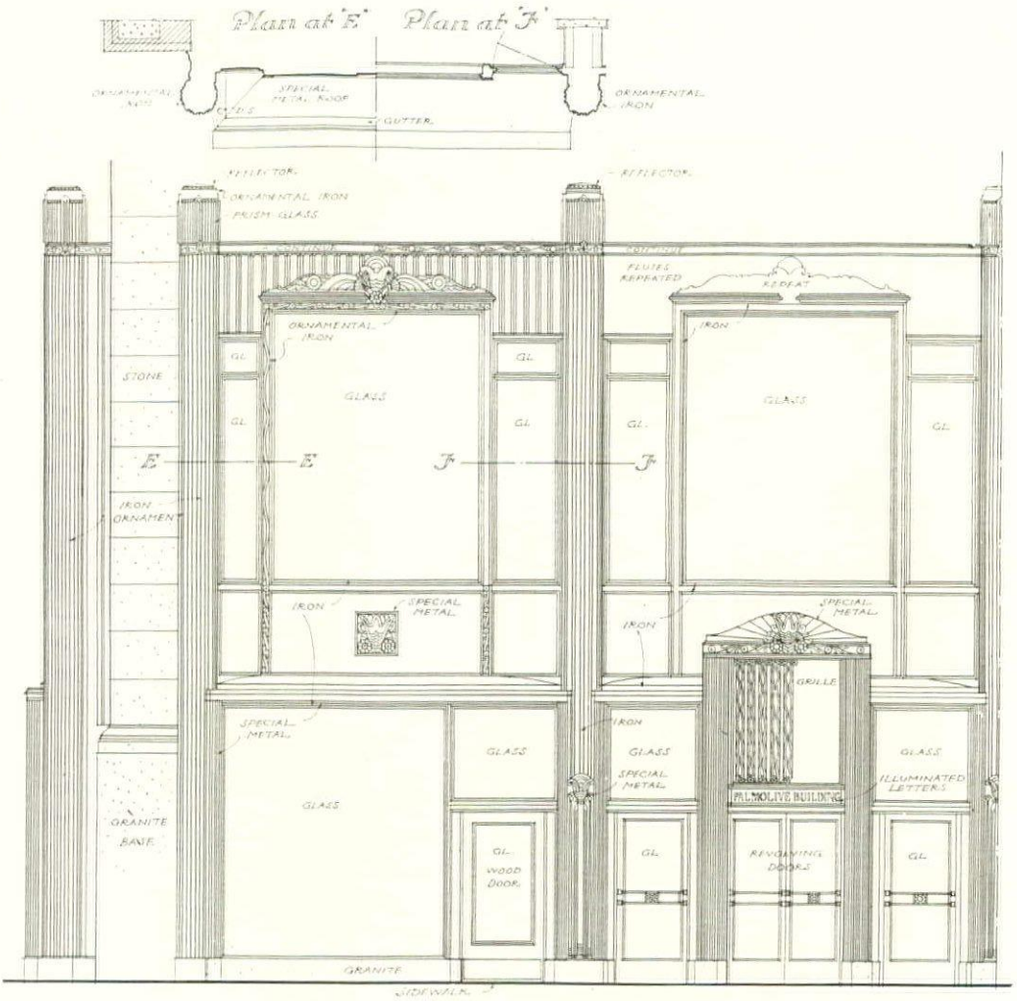
PALMOLIVE BUILDING, CHICAGO.
HOLABIRD & ROOT, ARCHITECTS



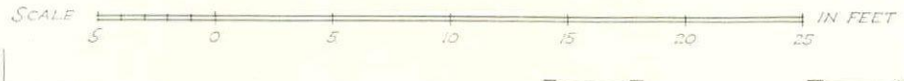
North Elevation

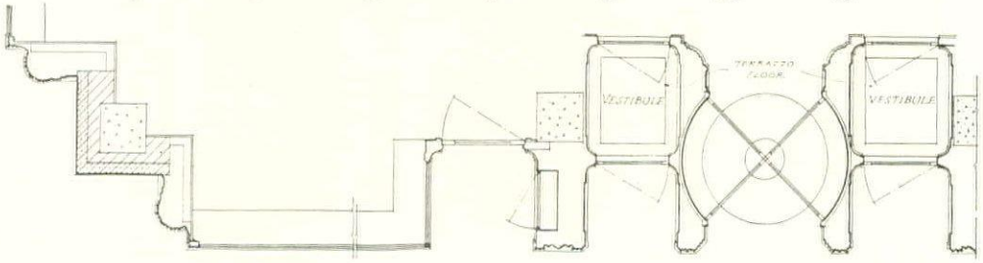
PALMOLIVE BUILDING, CHICAGO. HOLABIRD & ROOT, ARCHITECTS

PALMOLIVE BUILDING, CHICAGO. HOLABIRD & ROOT, ARCHITECTS



Typical Elevation





Corner Plan of Typical Shop Plan of Revolving Doors

PALMOLIVE BUILDING, CHICAGO.
HOLABIRD & ROOT, ARCHITECTS

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK

Sigurd Fischer

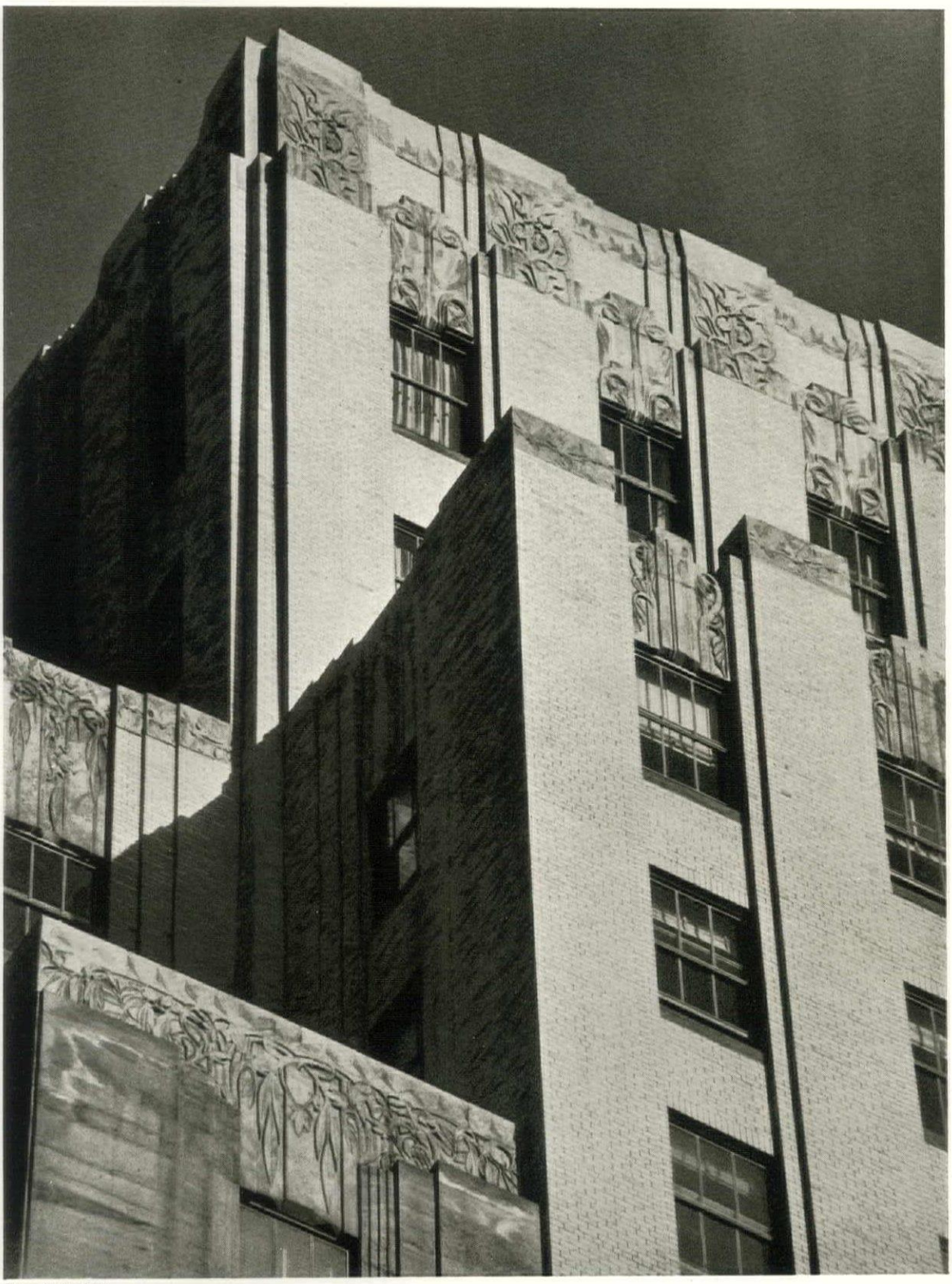
MAIN ENTRANCE

VOORHEES, GMELIN AND WALKER, ARCHITECTS

Sigurd Fischer

THE BROAD STREET ELEVATION

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS



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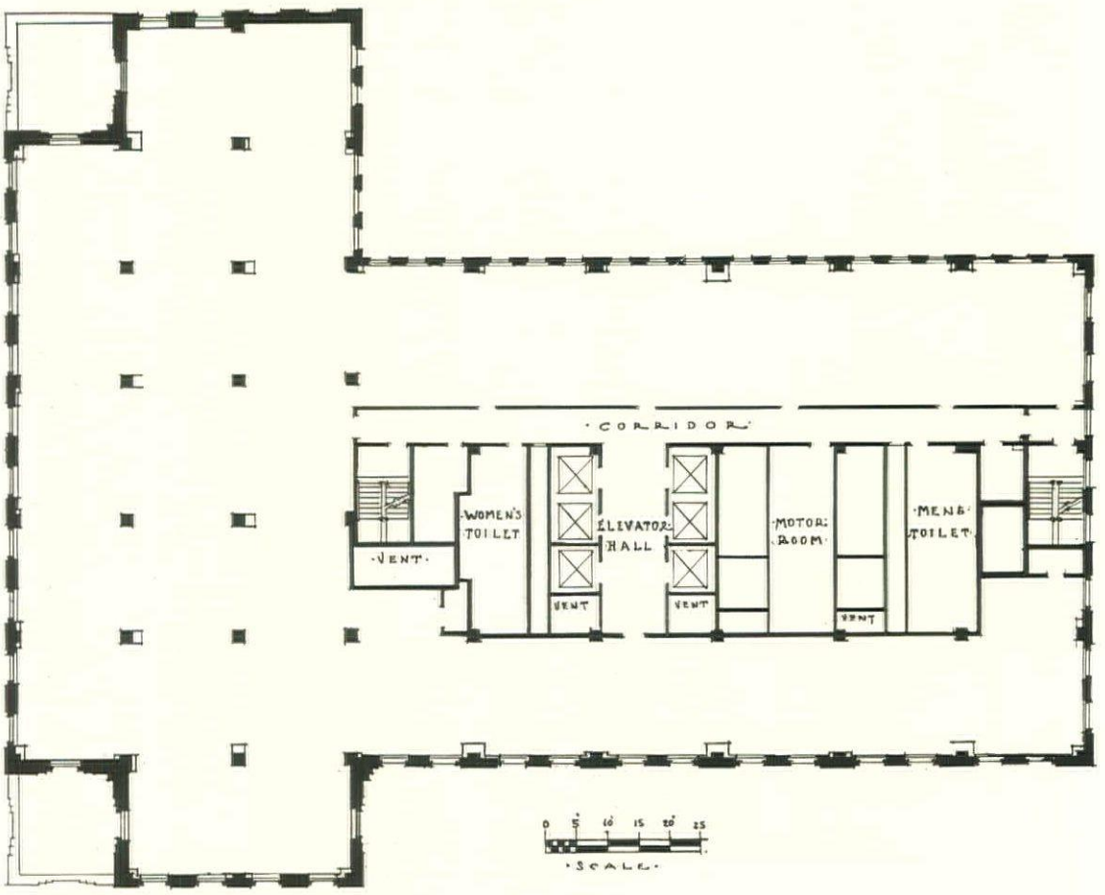
DETAIL AT THE TOP OF BUILDING

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS



SIXTEENTH FLOOR PLAN

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

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MAIN LOBBY

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

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MOSAIC PANEL IN MAIN LOBBY

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

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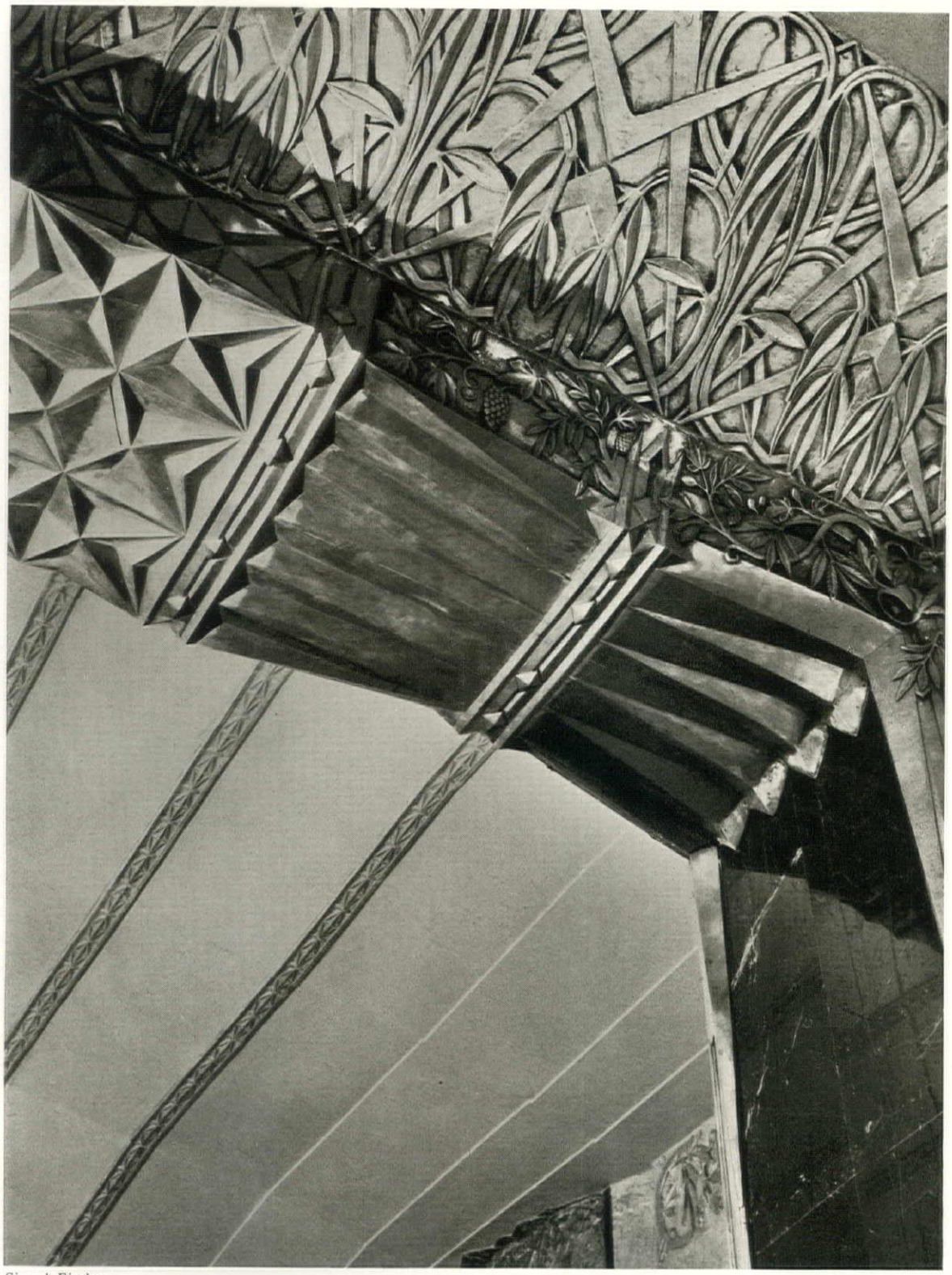
ARCHITRAVE BETWEEN MAIN LOBBY AND ELEVATOR LOBBIES

BUILDING FOR THE NEW JERSEY
BELL TELEPHONE CO., NEWARK.
VOORHEES, GMELIN AND WALKER,
ARCHITECTS



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ARCHITRAVE BETWEEN ENTRANCE AND ELEVATOR LOBBIES

BUILDING FOR THE NEW JERSEY
BELL TELEPHONE CO., NEWARK.
VOORHEES, GMELIN AND WALKER,
ARCHITECTS

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AUDITORIUM

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

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BOARD ROOM

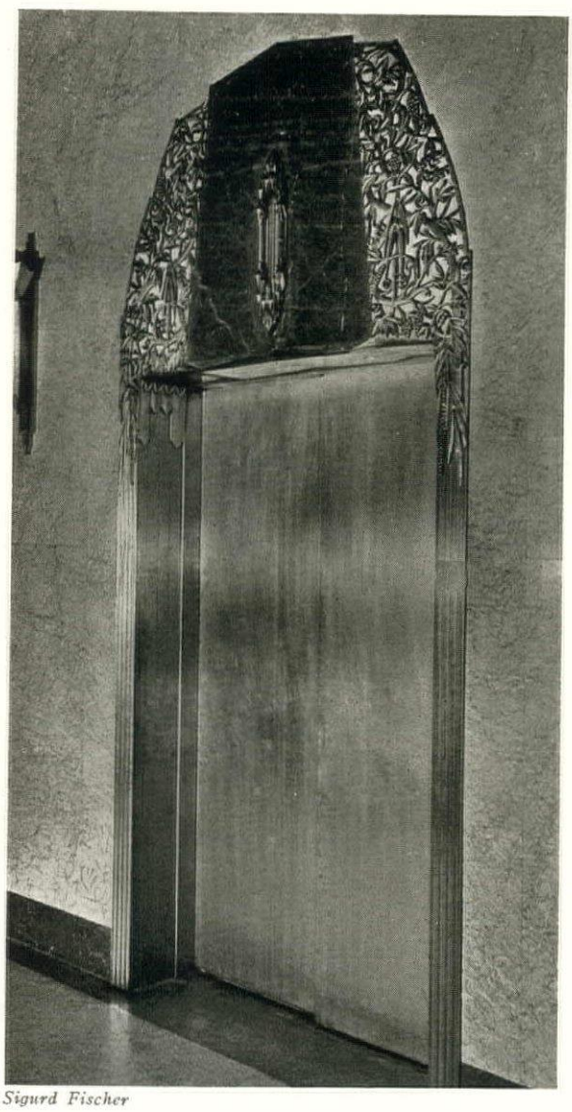
BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

Sigurd Fischer

PRESIDENT'S OFFICE

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

DECORATIVE ENFRAMEMENT
OF THE ELEVATOR DOORS



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BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

THE RELATION OF SKYSCRAPERS TO OUR LIFE

BY
RALPH THOMAS WALKER
OF VOORHEES, GMELIN & WALKER

An Address for the Department of Architecture, New York University, February 27, 1930

EDITOR'S NOTE. The Department of Architecture of New York University organized an exceptionally authoritative series of lectures by leading architects, on MODERN AMERICAN PROBLEMS, given for architects and draftsmen. Announcement of the series was made in the March issue of THE ARCHITECTURAL FORUM, Part I, page 35. The addresses are of such interest that the hall at the University has proved inadequate. In order that architects throughout the country might have these lectures, arrangements have been made with the Department of Architecture for publication in THE ARCHITECTURAL FORUM.

I WANT to change the subject as originally announced a little bit and not just talk about skyscrapers. I want to talk about the relation of skyscrapers to our life. The urge to "build high" is probably almost as old as building itself; it is a vertical urge,—that is, just as soon as man stood upright and started to build, he tried to build vertically. A very good example,—I was looking at it a while ago,—proves the fact that this vertical urge comes through even horizontal architecture in a very noticeable way. All through the ages, men have tried to secure a vertical feeling in architecture. I want to refer to that again later on.

Most of the tall buildings of early history were built for either praising God or for catering to the vanity of man. The pyramids were built to please the vanity of a king. The Parthenon on the Acropolis was for the praise of a goddess. One may not think of the Parthenon as a skyscraper, but in its relation to the surrounding country it was placed as high as it could be placed to advantage. It was placed there for two reasons,—in the first place to stand out as a symbol of the goddess, and in the second place because it could be more easily defended. One finds this urge for height in the shrine to Apollo at Parnassus, for instance, and in the hanging gardens of Babylon. The hanging gardens of Babylon is the first building I know of that was built for the same reason that a skyscraper is built,—that is to meet a human need, a living need. Actually, those gardens were built for the pleasure of a king and a queen, and they were built so as to resemble the mountains in the country from which the queen had come. Where we have a tall structure that has no relation to death, like the pyramids, or to religion like the Parthenon, which was placed on a high elevation to emphasize the position of a goddess we have something meeting a human need.

The thing I want to say about skyscrapers is that we are living in an age that is a great deal different from any other age in history. In the first place, the machine has definitely exaggerated all the tendencies that heretofore have existed. The first tendency that has been exaggerated is that toward urbanization. The city is growing larger. In other words, the cities are much larger than they have ever been in the history of the world. Not only are the cities growing larger, but country life is changing to city life. In other words, up to 50 years ago there was a marked difference between life in the country and life in the city. An interesting thing is that within the last ten years, since the war for instance, I doubt whether many of us have heard the word "hick" used in a derogatory sense. In fact, the "hick" with the hayseed in his hair is definitely passing out of our civilization. He is becoming to all intents and purposes a man whose life is similar to that which is lived in the city. This has brought into effect a marked change in the relations of people. It is going to make a great change in the appearance of our world in general.

Now, there is a degree of standardization that the machine is bringing into effect, but it is not a standardization that we have been accustomed to thinking of, I believe, as related to the machine. To my mind, it is a development out of provincialism and into cosmopolitanism. The farmer or the man in the country is becoming almost as cosmopolitan in his life as the man who lives in the city. The Ford car, the radio and the "movie" give to the man in the country exactly the same opportunities enjoyed by the man in the city,—transportation, knowledge and entertainment,—so that in a sense their lives are coming closer together. The farmer or the country man actually depends upon the city for a large part of his life. Heretofore, that was not so. The country man was actually independent of the city. But farm machinery, rapid transportation and easy com-

munication are constantly bringing country and city life more closely together, weaving them into an ever tighter and more centralized whole. Moving toward similarity of life is a tendency today.

For instance, a new country like Australia, already has 50 per cent of its people living in cities. We don't quite approach that in America, although last year over 50 per cent of the housing,—around 60 per cent actually of the housing that was built in this country,—was multiple-family housing. That shows the tendency toward what one might call "urbanization." The next thing that has made a great difference in our life,—I am going to tie all this up to the skyscraper by and by,—is the specialization of effort. There has always been a certain amount of specialization. The guild of the middle ages meant a specialized effort in a certain trade. Within those guilds one would find many subdivisions; for instance, in the cloth weavers' guild one would find the carder, the spinner, the weaver, the dyer, the fuller and so on all the way down. We today carry those specializations even further. We break it down to the conveyor in the Ford factory. That is a descendant of the handicrafts. It is hand work, a man doing a certain number of hand operations. It may be specialized, but the interesting thing about it to my mind is that it requires a higher intelligence for this specialized effort on a Ford conveying machine than it does for a man carding flax, for instance, although it may only take him three or four days to learn his work. An interesting aside on that is, I heard Mr. Swope, the president of the General Electric Company say, that in this country a man could tend nine automatic machines at one time; in Germany, five; in China, only one. In other words, the intellectual level in this country, due to our specialization, is much higher than where handicraft work is still done.

The most interesting tendency of this age, to my mind, has to do with the position of women, economically and socially. All through history women have been economically subordinate to men. Their industry as a whole has been domestic industry that did not require very much except habit and the acquirement of habits. The woman's early home industries were weaving, knitting, basket making, pot making and dressmaking. These were things done after she had finished with her household duties, and her life has always been a combination of housekeeping and some minor industry. Due to the introduction of machines, all the cottage industries have been taken away from women, even down to most of the housekeeping, except those that are still work of drudgery. But the interesting thing is that before the introduction of machinery the women who worked were peasants largely,—that is, outside of the home. The middle class women, or, one might call them, the tradeswomen and mechanical class, were housekeepers largely. Upper class women depended upon servant labor for their luxury, comfort and ease. Up to the World War, woman's relation to the outside world was in general still that of housekeeper. If she went into business or industry it was usually to occupy herself until she married. During the war we found that women were a great deal more necessary in industry than ever before, and today a larger percentage even after marriage are engaged in industry or business. This fact has a very definite relation to the housing problem. These three things,—specialization of work, the growth of the city, and the new position of women,—have a tendency to congest cities. Specialized effort only can be done in community life. Urbanization of course means community life, and an economic position for women also means a community life. The skyscraper is a result of urbanization and community life upon which I shall enlarge later.

There are also three other things, which I shall treat briefly, that have had a great deal to do with this closer tie between city and country life and the spreading out of city life in a universal way. One is shorter working hours. Not only the shorter day but the shorter working week has, strange to say, brought people together. It has again meant specialization which in turn has meant community life. In other words, a man living alone works from sunup to sundown. It is only by the concentration of effort that one can have shorter working time. Of course we all know what rapid transportation and easy communication, such as the electric trains, the subway, the telephone and the telegraph have done toward actually condensing the city. Again, they are community efforts. It is much cheaper to have rapid transportation in the city than it is to spread it out over the country. The interesting thing is that there are more automobiles used in the city than there are in the country. They are actually much more convenient there than they are in the country. The same is true with the telephone. One would naturally think that the telephone would spread population, but it does not. We start off with this idea very definitely,—that there are at least six, and there are really a few more, tendencies today that make for city growth.

The old city was a town where one could walk the breadth of the place or around it or across it without any difficulty. It didn't mean any transportation. The streets that were devoted to the tradesmen, the shoemakers' guild, the weavers' guild, the carpenters' guild, were all very closely constricted, and one could go from one to the other without a great deal of effort. Today the city has grown so large that one finds cities like

London and Paris spread out over enormous areas. New York is spread over an even larger area. But it is a fact that the handling of traffic there is very difficult, and that they have just as much congestion in the city streets as we have with all our subways and our skyscrapers.

Now we come to the skyscraper. We have always thought of the skyscraper,—I think most of us have,—as a tall building. Those who have read anything about them have read criticisms of them as being just a means of obtaining more use from land, therefore more rent and more return on the capital invested in the land in the first place. This is largely true. There is also an element of vanity in them. A man like Woolworth built the Woolworth tower as a personal expression. Chrysler is doing the same thing, and I am sure that Smith and his group are doing the same thing in the Empire State Building. Leaving them out of consideration,—those great piles built to personal vanity,—there are enough skyscrapers being built in New York that have a definite relation to life to prove the point that I am going to make. The skyscraper, to my mind, is the only means, and I am making that very broad, of living in this age of the machine. It is a perfect example as an expression and a reflection of the age. It is built by probably the finest piece of organization outside of the automobile industry, a coöperative effort that is amazing to everybody from the other side who comes here and sees it. If we can make the assumption that the skyscraper exists as a means of living and not just a means of making money, I think we are going to have an entirely different point of view. We shall then try to design the city to take care of the skyscraper, instead of trying to impose the skyscraper on a city that was planned for a wholly different type of building. One of the complaints, perhaps the chief complaint, that we have against the skyscraper is not due to the building itself but to the plan of the city in which it is built. It is very easy to contemplate a skyscraper,—we are making a study in our office of this condition,—taking the place of a village. We are taking a unit of Radburn, N. J., which is claimed to be a town built for the automobile age, with a unit of some 36 houses. Placing the equivalent of these 36 houses in a skyscraper, we find that we could build fireproof homes, give all the people hill-top sites, give them more bathrooms, give them a garage with a complete workshop, a nursery for children, so that the women need not stay at home to take care of the children,—all this for less, and that is what our figures are today, than we could build a series of individual houses for. One can easily see that we could make an enormous saving in all the roads, sewage and water supply; the electric light company could make a saving on its pole lines, the telephone company could make a saving on its pole lines and its services, and we can begin to pool the results actually.

Now, economically that is so. One will say that socially it is not so good, and to me and my generation, it makes no great appeal. We would not care to live in that sort of housing. Nevertheless, I belong to a generation that was born in private houses. This is becoming less true. The sentiment attached to a house from the standpoint of its being a birthplace is passing away. Most children now are being born in hospitals. The tendency will be more and more that they be born in hospitals. The sentiment connected with the fact that the house was the homestead of the family has already disappeared, here in America. No one thinks of the single-family house any longer as a homestead. I doubt if there is anybody in this room whose family has a homestead. There may be a few, but there are not many. The sentiment attached to the single-family house is rapidly going. If the women no longer occupy only the position of housekeeper in the home, but instead want and demand greater freedom, this is also going to take away some of the sentiment for the single-family house, and we shall find that community housing,—and I am not thinking just of the apartment house, but actual community type of housing,—will become more and more common.

One can actually save land by building a skyscraper. In this city which we built on the Radburn idea, I think our ratio of land used for building was something like 5 to 30. In other words, the builders of Radburn used about 30 per cent of this area for housing, and we used 5. We regained an enormous amount of area which we could actually use for play and recreation. Under the present system in Radburn, there is no real land devoted to recreation. One couldn't have a series of tennis courts adjacent to the house. All of the tennis courts shown on the Radburn plan are temporary and planned to be moved off whenever the land is needed. Actually, if one used the same amount of land for community housing that would be required for housing the same number of families in single family houses set 10 feet apart, the land would be used economically and to much better advantage.

I tried to suggest to a certain extent the social side of the skyscraper. I don't know whether I have been convincing or not. I should like now to take up the subject of the city plan. As I have said before, most skyscrapers are built in cities which were planned for two- or three-story houses. The streets were planned for the horse-drawn vehicle, which probably goes eight miles an hour, and for the man who, at a very good pace, walks three and a half miles an hour. Upon

a city thus planned we have endeavored to superimpose a type of building that is 100 stories high, and upon the streets of this city a motor transportation which, to get economy out of it at all, should proceed at least at 40 miles an hour.

An interesting commentary on this situation is that the city keeps having "growing pains" all the way through its history. Londen is a very good example. At the end of Queen Elizabeth's reign, the coach was introduced into England. In about 40 years, there were 25 of them in London, and the London City Council, or whatever was the governing body at that time, passed an ordinance saying that there were to be no more coaches,—that they were actually blocking the public ways. Twice since then, before the introduction of the automobile, the London City Council has passed the same ordinance,—that there should be no more stage coaches. In other words, the streets which at that time were 12 and 15 feet wide were jammed by the coach just as our streets at the present time are jammed with the automobile. One of the reasons for our streets' being jammed by the automobile is not the existence of the skyscraper. It is the things that have to be brought to the skyscraper. The fault lies not in the building itself, but in the means by which we handle the freight that is brought to it. Many of the side streets, one will find, are used for parking. We can get four lanes of cars going through these side streets, but two of them are generally taken up by parked vehicles. When a truck is "staggered" on the street to get freight off the rear end, the width of the street is reduced to one lane of traffic. This condition exists at almost any time during the day. Actually, parking and freight delivery belong to the building and not to the street at all. The streets should be used for the purpose for which they were designed, which is motion. All parking and freight delivery should be within the building.

In considering the relation of the city plan to the building, this condition must be recognized and taken care of. It is bound to exert a great deal of influence on the plan of the future city. At the present time most of our cities are laid out on the gridiron plan. We have a series of very narrow streets running in one direction with wider streets or avenues crossing them in the opposite direction. The blocks formed by the intersection of the streets and avenues we fill up solidly with buildings. One would naturally think that to get rid of traffic more streets were needed. To my mind the future building is not going to occupy one block or part of a block, but will probably occupy several blocks. S. W. Straus & Company figured out what should be obvious, that it is much more economical to build over the entire block than to have a number of separate operations on one block. If this is true, and, as I say it is obvious to me at least, it would be much better if we could erect a building covering several blocks and make wide streets all around it. We would increase the street width for light and air noticeably. Then, the first floor of such a building should be used for the parking of trucks and the unloading of freight. In other words, the streets would actually be used to take care of vehicles in motion only.

One will ask, perhaps, that if we use this first floor for the handling of freight and parking, where are we going to place our shops? Well, it is just as easy to build shops on the second floor. In fact, if these buildings get to a point where one of them is housing for business and for living, a population of from 50 to 60 thousand people,— and that is entirely possible,—because the building for the New York Life, it is contemplated, will house 30 thousand people during working hours and it only covers one block,— this population is that of a second class city. One will find that by necessity this building will have a certain number of stores to take care of its tenants. The thing we have to get into our minds in thinking of a skyscraper is that it is not a *building* but a *city*. If we have a population of from 30 to 60 thousand people in buildings, they are no longer just buildings, but cities. A building of that type is as much a city as the pueblo is a village for the Indians of the southwest.

The logical thing to do in designing a skyscraper would be to arrange for courts coming down through the building, and then, as I say, use the ground floor for parking and for delivery of freight. In downtown New York we could probably put the parking below grade. It all depends on foundation conditions. The best place for stores in a building of this sort would be up at the center of vertical travel. It is quite possible that we may have a ground floor arcade of stores, or we may have an arcade of stores going around all four sides of the block. We are coming to be people who depend on elevators and not on stairs. It doesn't make any difference, once we get into an elevator, whether we go one floor or ten floors or 40 floors or 60 floors, and it will soon be 100 floors. The time element is not important. The only time element of any importance in an elevator is how long we have to wait for it. We are all children of swift motion these days, and riding on an elevator is not any more unpleasant than riding in an automobile or an aëroplane. As I say, stores may be on upper floors. I can conceive that when we get this sort of thing we may even have branches of department stores.

Under a plan such as this we shall be leading coöperative lives in every way except socially, and gradually we shall begin to lead a coöperative

social life. Then life will be entirely coöperative. In other words, grocery stores and meat stores logically belong to a community. They should buy more cheaply because they buy in bulk. Their rent will be lower, and in fact one of the things that I think a skyscraper will do when it is fully developed will be to give people more value for their dollars, and then they will have more dollars left for things other than living. That is not true today, but the tendency is in that direction. Actually, we shall see that instead of having more streets we shall have fewer streets, because we have abolished some of the reasons for having street area by placing shops, parking spaces and delivery courts within the building.

Coming back to the shorter working period, we are now in a time of the five-day week. This will probably be general for the next 5 or 10 years, and will be the beginning for even a shorter working week. If Edison and Ford are correct, we are probably due for a three-day working week. That will not be likely to happen in our generation, but it will surely happen in time to come. That means that men will have a great deal more leisure than at present, so they will probably use buildings in the city for parking places only, as they will want to get out into the country for rest and recreation if they have two or three days to do with as they please. This is what our age is coming to.

One of the reasons why I think we shall have a tendency to become even more individual than in any preceding age is because people will have more time to do things that they want to do. People will not be able to say: "You can't do this, or you can't do that," all of which means that we must work out some sort of a system for getting people out into the country. Le Corbusier has an idea, with which I don't altogether agree, that there was a time when a city might be said to be roughly a large town with walls around it in which one could walk to any place without difficulty. We are still trying to design the city that way. One could have an office in the center of the town and live outside the town. And it wasn't very difficult to get back and forth. Now we have New York with Westchester County, and Long Island and New Jersey and Staten Island grouped around it; we are all working in the center of Manhattan Island, and we go way out here and way out there in this direction and that to live. "Suburbanites" and "commuters" we are called.

Well, it seems to me that we have reached the limit of this sort of thing, so that we may have a city here in which part of the people can live and a city there in which another group of people can live, and so on. In other words, for the people who actually work, the old type of town should be brought back, where it was possible for them to walk to and from their work. In that skyscraper which I have sketched for you, occupying three blocks or more and having vertical transportation, the horizontal transportation will be within its walls, which will take a great deal of the floating population off the streets, as well as off the subway.

Now comes the question of how to get the people out to the country for week-ends, and what sort of places they are going to live in when they get there. We have developed rapid transit already. Flying fields can be arranged for the use of people with large incomes, and electric trains and automobiles will serve, as they do now, to take the rest of the people beyond the city rapid transit facilities. Also, we must have larger and wider roads to permit greater and safer speed, so that it will be possible to run an automobile continuously at 40 or 50 miles an hour. This can't be done in or about New York at the present time. There is only one street in New York on which an automobile can actually make good time, and that is Park Avenue above the Grand Central Station. I think that my idea of building a series of cities within the city where a man may have his home and his business close together is different from that of Le Corbusier.

I have been talking about the skyscraper and a new type of city plan from the social standpoint. Now I am going to talk about their appearance. As a matter of fact, elevators are in their infancy, heating is in its infancy, ventilating is in its infancy, lighting of buildings is in its infancy, and so is the building itself. I think that as architects we might be interested in thinking of the problem from the standpoint of appearance, so I will talk about beauty and stop talking about being practical. Let us consider this a city of four-story houses, and suppose that there is a skyscraper built in its midst. I think we can all see that if this were to be the only skyscraper in the town we would design it from a viewpoint of mass rather than detail. It would be much more important that the building should have a pleasing mass than that the details which could be put on it should be good, because most of the detail on skyscrapers is too high up for examination or appreciation. But suppose we put another skyscraper alongside of the first. We would then want to decorate this building in a way to interest the people who would be looking out of the windows of the other tall building. If we build a series of skyscrapers, what we have actually done is taken this street line and raised it every floor that we build. This decorative treatment then, to be logical, should be carried all the way up and on every exposed face of the building. Although the Woolworth Building is one that modernists don't think much of because it has Gothic detail on it, to my mind it is still the

best example of the skyscraper in New York. A good example of another type is the Transportation Building alongside of it, which has no decorative interest at all. But you stand over in the American Telephone & Telegraph Building, for instance, and look across, and you find decorative interest in the Woolworth Building all the way up, story after story.

We figured out, roughly, that the building we are doing at 1 Wall Street would in one year have 200 thousand people looking at it from all sides,—from adjacent buildings, from the streets, from people coming in on business, from tenants, and so forth. This is equivalent to the population of a first class city. The people who are looking out of the windows of tall buildings should have something to interest them. This brings me to a point that I want to make about design. Design is divided into two kinds. One kind is physical design, controlled by the necessities of the human body in its housing, and inspired by the desire to house it well and efficiently. The other kind is psychological, which design to my mind is very much more important. I think the architect of the future will have to be a psychologist, because it is just as important for the architect to design a building for man to be mentally comfortable in as it is for him to design one in which he will be physically comfortable. Take a room like this. It is good enough for me to give a lecture in and for you to sit and listen in. But to my mind, it is a deadly room. I find it very hard to talk against a deadly room. If I didn't see a bright face here and there it would be still harder. Now, I know that this room could be designed and decorated so that it would be easy for me to talk in it and so easy for you to listen in that you wouldn't go to sleep.

I think it is important that we consider the facts that the exterior of a building has to be viewed by thousands, and that we have got to give them mental relief and pleasure. In the shorter working time of which I have already spoken, people will work harder during the time that they are working. The speed will be much more intense, so we have to consider the fact that people will look about them more.

Whether we call it beauty or whether we call it mental comfort, I shall not make the distinction, because the question of taste is debatable. But I do think that the next generation or two will be able to appreciate beauty and to plan for mental reaction and satisfaction. I have made a statement around my office,—and I see some of the boys here and they will recognize it,—that no room is large enough, because after you have lived in it for a while you feel the walls come in to you. It becomes too familiar. Actually, what a room should do is to lose its walls for your mind's sake. You should feel space rather than seclusion and restriction in a room. A very good example of this characteristic is something they have in jails,—a steel box, 6 feet square with a door in one side with bolt holes for ventilation, and one lamp hanging from the middle of the ceiling. They put a man in this box for punishment. The temperature of this room never gets beyond that of body heat, which is quite warm but not uncomfortable. It can be endured. The man sits in this room or lies in it or stands in it, but he sees nothing but the six sheets of steel which enclose him. He has one light. He cannot be left in this room or box more than two hours before he is mentally affected, and as most of the prisoners do not realize the fact that they can ask for a Bible in solitary confinement, they get no mental relief or relaxation. The interesting fact is that if you left a man in this box cell for 24 hours he would become insane. He begins to imagine that the room is very much hotter than it actually is, that the light is a great deal brighter than it really is, and that the air is fouler than it actually is. This mental strain reacts on the mind and wears down the mental resistance and nerve tissues to such an extent that it drives the man insane. Now this is an extreme illustration to bring out the point that no room is large enough. As a matter of fact, this cell room is large enough for comfortable occupancy if one had the means of entertaining oneself. This brings me to the point that whether we call it beauty or mental comfort, things must be designed to please and entertain the mind. It is very important to do this. It can be done in a brick building by making different motifs out of brick, or in a stone building by use of carved decorations or different textures of stone. All this sort of thing must be carefully considered in designing a building.

I myself am not an admirer of the extreme modern work done in concrete, steel and glass in Europe at the present time. I think it is a physical expression of a machine age without any appreciation of what the machine can do. It is like a young painter who came in to see me a while ago with a series of paintings of cog wheels. I looked at them without enthusiasm or pleasure. He said, "Don't you think that they are interesting?" I said, "Well, it seems to me that you have never seen machinery." He said, "What do you mean." "Well," I said, "I would go, if I could, up to the Rockefeller Institute and look at the finest microscope they have. Then I would go to some observatory and see one of the biggest telescopes. I would look at machinery from the standpoint of perfection and precision. I would not look at it from the standpoint of power alone." In other words, the mind, it seems to me, is interested in this point of view much more than

it is in just the application of power. The artist said he had received the same criticism from a scientist, so he thought that he would follow out my suggestion. To my mind Le Corbusier is creating an expression of power and not an expression of precision. Here in America we are trying to get what might be termed a feeling of beauty into our buildings. Whether we are successful or not, I don't know, but at least we are getting mental relief out of the work that has to be done. We have tried several ways of doing this. Architecture and music are somewhat similar in character. In both, you can develop harmony, you can break up harmony with dissonance, if you wish, and develop a higher harmony. You can do many things with it. You can create rhythmic beauty.

You will find that the Baroque architects thought of architecture as something rhythmic even more than did the Greeks, who had a simple, almost primitive rhythm of one column and a space used in repetition. To my mind, the fine thing about the Baroque was the sense of rhythm that existed in the building, forgetting all its bad design and Rococo ornament and its lack of invention in detail, the placing of which was always full of rhythmic value. We have expressed in the skyscraper a good deal of primitive rhythm, the rhythm of the drum beat. The "dum-dum" rhythm it is called.

At 1 Wall Street, in the building for the Irving Trust Company, we have tried to do something different. We have tried to superimpose one rhythm upon a basic rhythm. We have one rhythm which goes around the entire building. These rhythmic motifs are not the same size. Although we endeavored to break them up, still they didn't give enough interest, so we decided to break them up again, which happens generally to be about every 20 to 22 feet, with another motif, which we enlarged. This we broke up in a way and placed our basic rhythm above it. It is a sort of fluting motif. We are a little old fashioned in our belief that one would rather have some solid spaces in the walls than to have them all glass. We do it too because of Hood's idea that the people on the inside can use only a certain amount of light; they cannot use too much. It is possible to have too much light as well as to have too little light. So, what we actually have on the face of our walls is two rhythms, one imposed upon the other. We believe that the building is going to show, as a matter of fact, the influence of this rhythmic design. To my mind it is quite sophisticated and quite in line with our machine age in which precision as well as motion is necessary. I think the design will have a lot of power at the same time. But it is no longer a primitive expression,—that is certain. It is a very sophisticated rhythmic movement, in which even the windows conform to the movement. As we went up vertically in designing the building we found that the long flutings did not require much above them. Our eye was able to pass over this break without interruption. The mistake we made on the Telephone Building was that we placed too much decoration in certain places. In this new building the design is actually readable. It reads from the point of view of a man on the street looking up who should feel the power of that vertical lift upwards throughout the entire wall height. The design keeps on up with a slightly different rhythm as it approaches the top, where it breaks into a crowning rhythm.

This design for the new Irving Trust Building isn't wholly my contribution. I am not talking about my work, necessarily. I am talking about the work of a group of men. This is what is happening in our office today,—groups of men work on each problem. Mine happens to be, for our office, the standard of taste. I am the analyst of beauty, so to speak, but the final design is the work of many minds, each contributing something to it. It is not the work of my mind alone. We all feel that we have created something that is modern, spiritually and mentally, rather than modern for the physically modern.

Sigurd Fischer

CORRIDOR ON UPPER FLOOR

BUILDING FOR THE NEW JERSEY BELL TELEPHONE CO., NEWARK. VOORHEES, GMELIN AND WALKER, ARCHITECTS

CHURCH OF THE HOLY CROSS

CHESTNUT HILL, PA.

HENRY D. DAGIT & SONS, ARCHITECTS

DESCRIPTION BY ALBERT F. DAGIT

THE Church of the Holy Cross is the result of an effort to build a small parish church which would honestly fulfill its requirements with sincerity of purpose and enduring dignity. The general requirements to be met were first, the proper relation of the building to its present and future surroundings, second, the construction, of a substantial structure of lasting qualities, third, the provision for a seating capacity of approximately 750 to accommodate the modern needs of a semi-suburban congregation, and fourth, the creation of interest and charm to the greatest degree obtainable at moderate cost.

The site is a large plot of ground generously landscaped with old shade in the midst of a semi-suburban district. The location of the church was carefully studied so that it rises gently from the ground among a group of tall trees which immediately soften the lines of its general mass and lend help to the upward movement of the structural buttresses. With simplicity as the keynote, it recalls the 13th century village churches of England in its form, yet its detail creates an interest which satisfies the sophistication of the surroundings and the people who attend it.

The first step in the conception of this building was to form as an ideal the happy words of Ruskin, "Therefore when we build let us think that we build forever." The logical materials, consequently, to be chosen for this work were stone, iron, copper, and wood, in their various forms and uses. The materials for both the exterior and interior walls are the same, consisting of stone secured from the local quarries at Chestnut Hill and Foxcroft, Pa. The two types of stone have been mixed and laid at random giving a beautiful color range from a warm gray to a golden brown. Antique buff Indiana limestone was used for the tracery, quoins and carved figures in soft contrast to the warm tone of the local stone. The upward movement of the buttresses leads to the copper gutter supported by the stone walls, and above is the subtle variegated slate roof. Thus there comes the comfortable realization of permanence.

The composition of the entrance facade is dominated by a carved limestone Crucifixion group. Here absolute unity of collaboration between architect and sculptor was sought. The inspiration was taken from the figures on the west porch of Chartres, and the modeling flows with a modern interpretation of the vitality and decorative convention of the ancient masterpieces. Mr. Joseph C. Fleri, the sculptor caught the feeling to be expressed in each studied mass and the decorative drapery of the group. Above this group there is a large tracery window accentuating the vertical lines of the elevation.

The nave, being of course the principal element of the plan, dominates it from within and without. On the exterior its seven bays, recalling the seven days of creation, are separated by the structural buttresses casting shadows on the walls and windows. Inside the nave lofty hammer beam trusses, and the tracery of the windows set in the stone walls bring to mind its relation to the exterior. The effect of height of the nave, which is a clear span, is accentuated by means of the low narthex through which it is entered. Height is also stressed by the upward movement of the two limestone arches, one over the framing of the high altar and one over the organ gallery at the opposite end of the nave for its entire length.

As the eye becomes accustomed to the dim light of the interior, it searches for the materials of this frankly structural building. In the walls each piece of stone has been cut smooth with infinite care and precision by pneumatic tools and laid in a horizontal random range. The raked joints, the soft variegated color, and the subtle texture of the stone walls, stripped of all decoration, leave a lasting impression of character. The windows piercing these walls, being the source of light, were chosen as the dominating decorations of the interior. Again Chartres is the basis of design and color for modern treatment of pot metal mosaic medallion glass. Only the elemental colors are used in very small pieces, giving the sparkling effect of jewels and the richness of color of an old Persian rug. In these windows the 84 medallions portray the life of Christ.

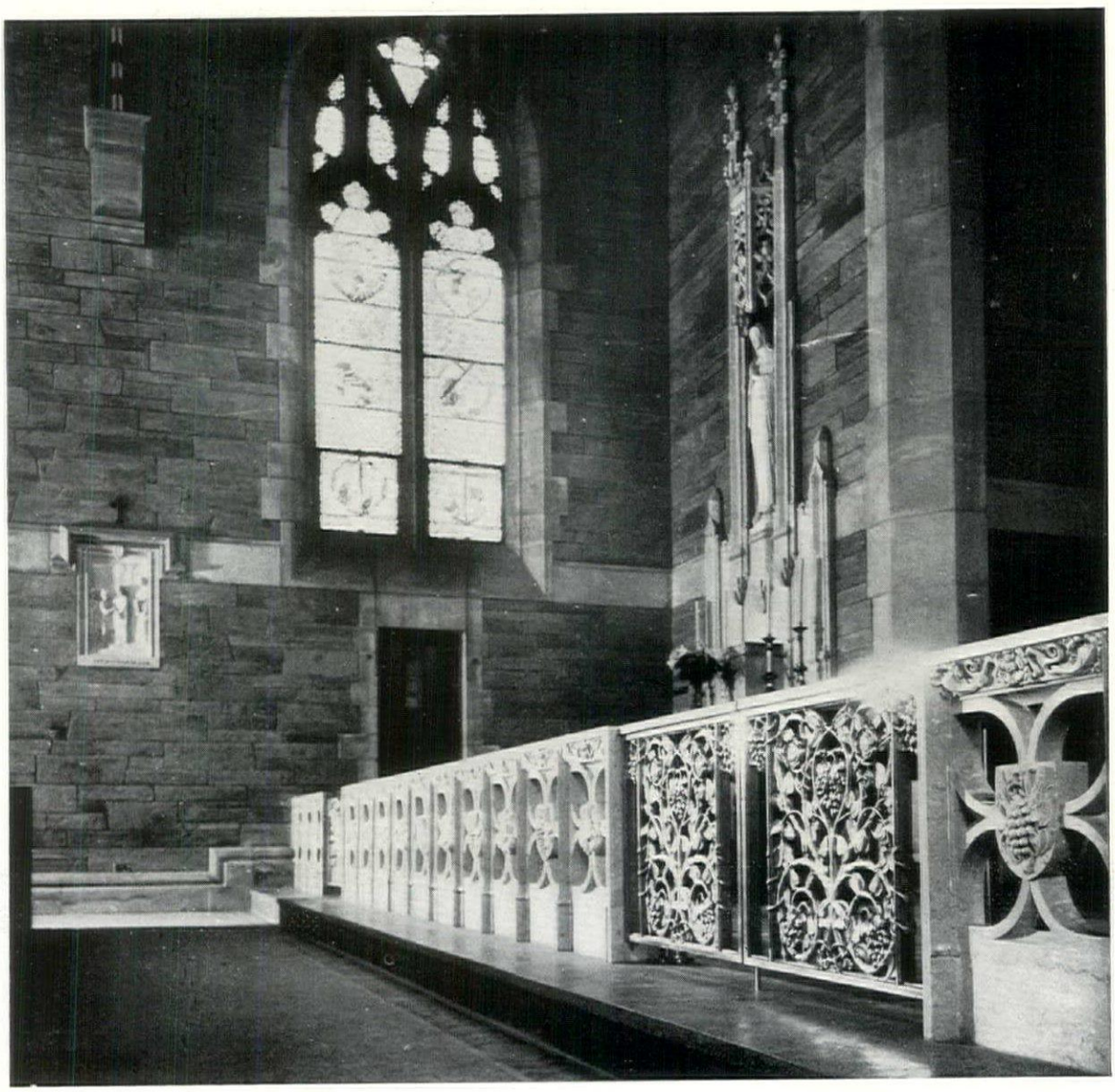
The open timber roof and wood ceiling possess beauty and dignity. The trusses are exposed in all their rugged strength. Each truss is given scale by means of a carved wood angel carrying a shield on which is portrayed a symbol of one of the fruits of the Holy Spirit. The entire ceiling shines with lustrous beauty, giving warmth and scale. This scheme definitely ties the coloring of the windows to form a unified decorative system for the nave. Vistas of unusual interest are obtained following the repeating motifs of the trusses with their high wooden arches along the

nave for its entire length. All is in harmony.

Nothing tends more to destroy the character of a church in the Gothic style than tightness of design and detail. The furnishings are the final link between the building proper and the people who use it. They must therefore be treated as such, and the materials to be chosen must be those of worth and familiar quality. The execution of their detail should produce a feeling of comfort as well as beauty. Botticino marble was selected for the altars because of its warm tonal value against the stone background and also because of the softness that is obtained in carving in this medium. In execution the vertical line is constantly expressed, giving an upward movement. The sculptured figures of the Blessed Virgin and St. Joseph on the side altars and those of the Apostles with the Crucifixion group of the high altar are carried out in a modern way. The buttressed canopies of the high altar rise gently to a silhouette, which at the top recalls the line of the crowning rose window of the Four Evangelists above it.

The confessionals, organ screen and pews are of selected oak, carved with subtle refinement in keeping with the scale and style of the old English churches. The pew details were inspired from the pews of St. Peter's Church, Medmenham, England, in which church each pew end was carved in a different manner. Special mention should be made of the altar lamp and the lighting fixtures of bronze and wrought iron. Skillfully forged by hand, they are executed in a manner without effort to conceal the modern influence of the present day.

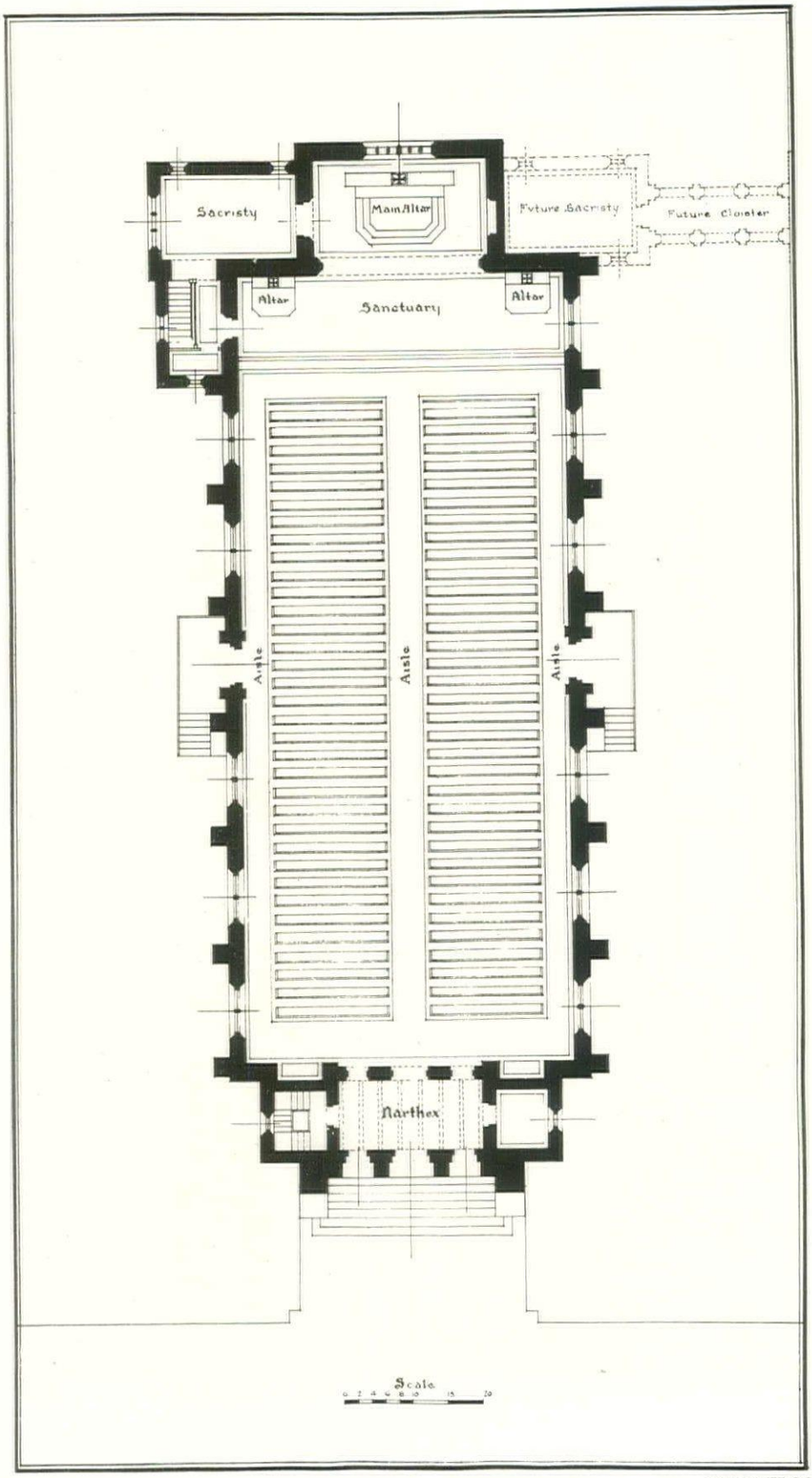
The building therefore, develops finally in execution with an unusual quality of sincerity and soundness, possessing inherently true architecture which will grow old gracefully and with age giving only a greater dignity and increased poise.



Rittase

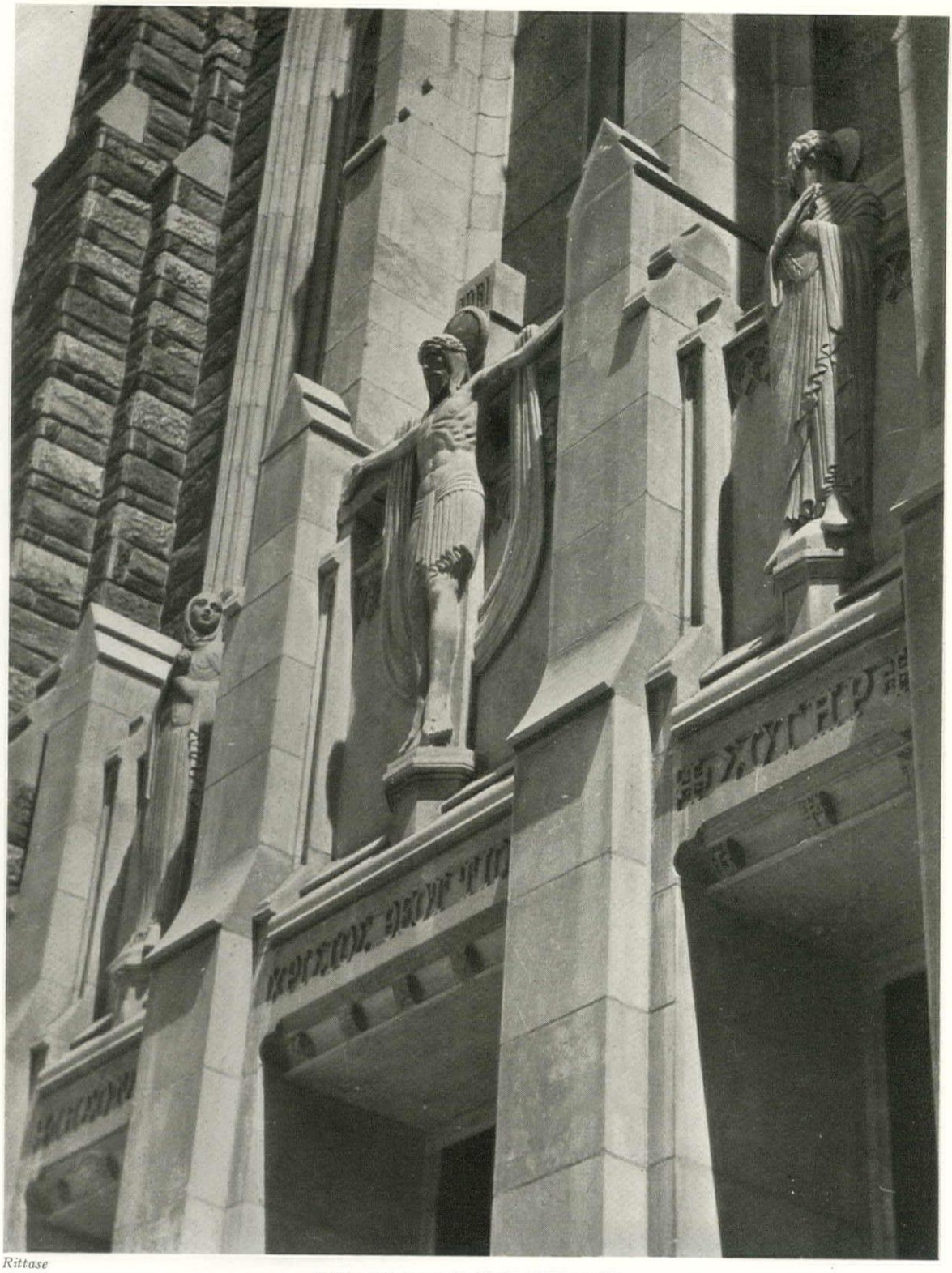
WEST FRONT

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS



MAIN FLOOR PLAN

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS



Rittase

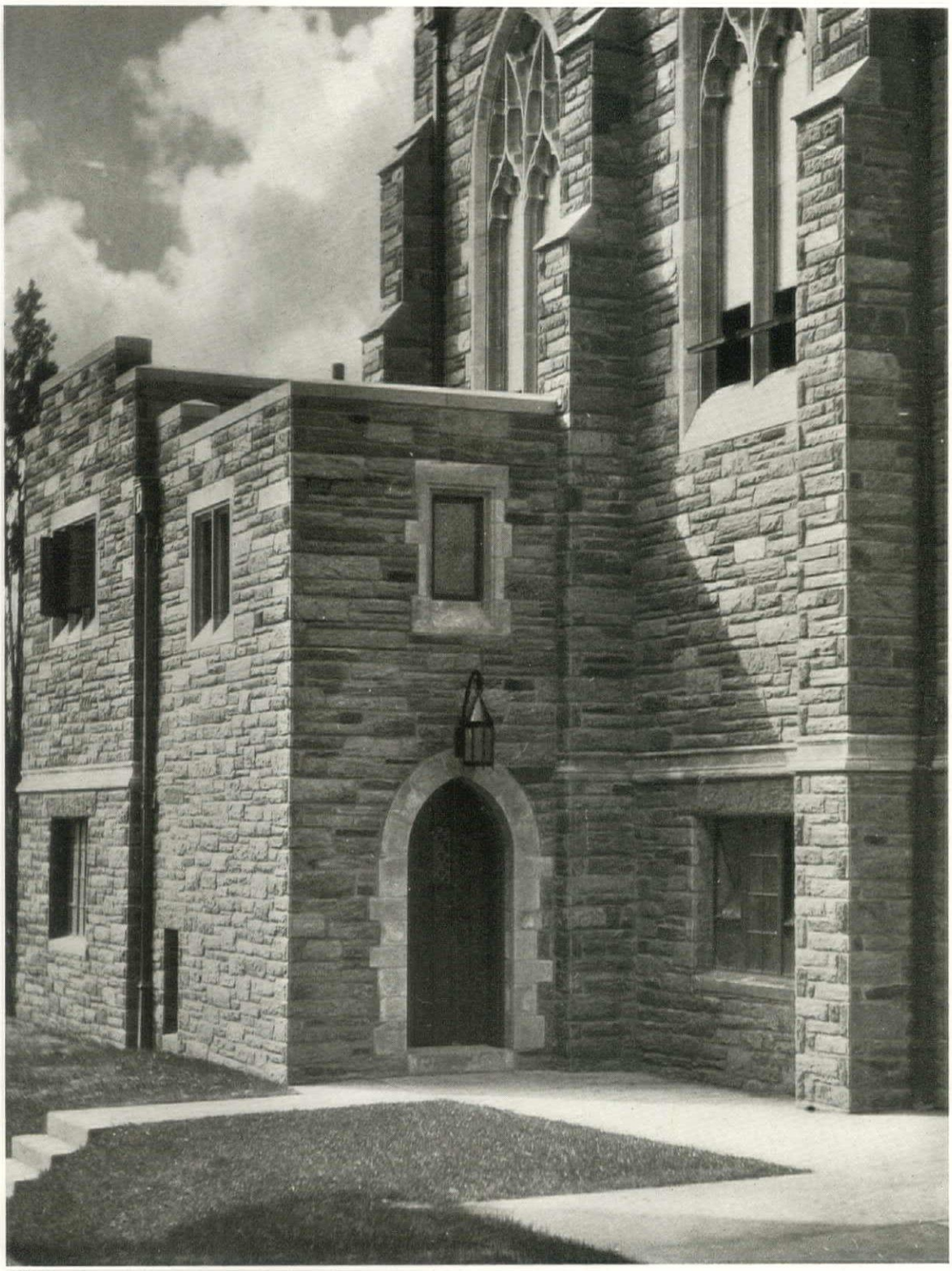
SCULPTURE OVER MAIN ENTRANCE

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS

Rittase

SIDE ENTRANCE, BAYS AND BUTTRESSES

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS



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ENTRANCE TO SACRISTY

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS

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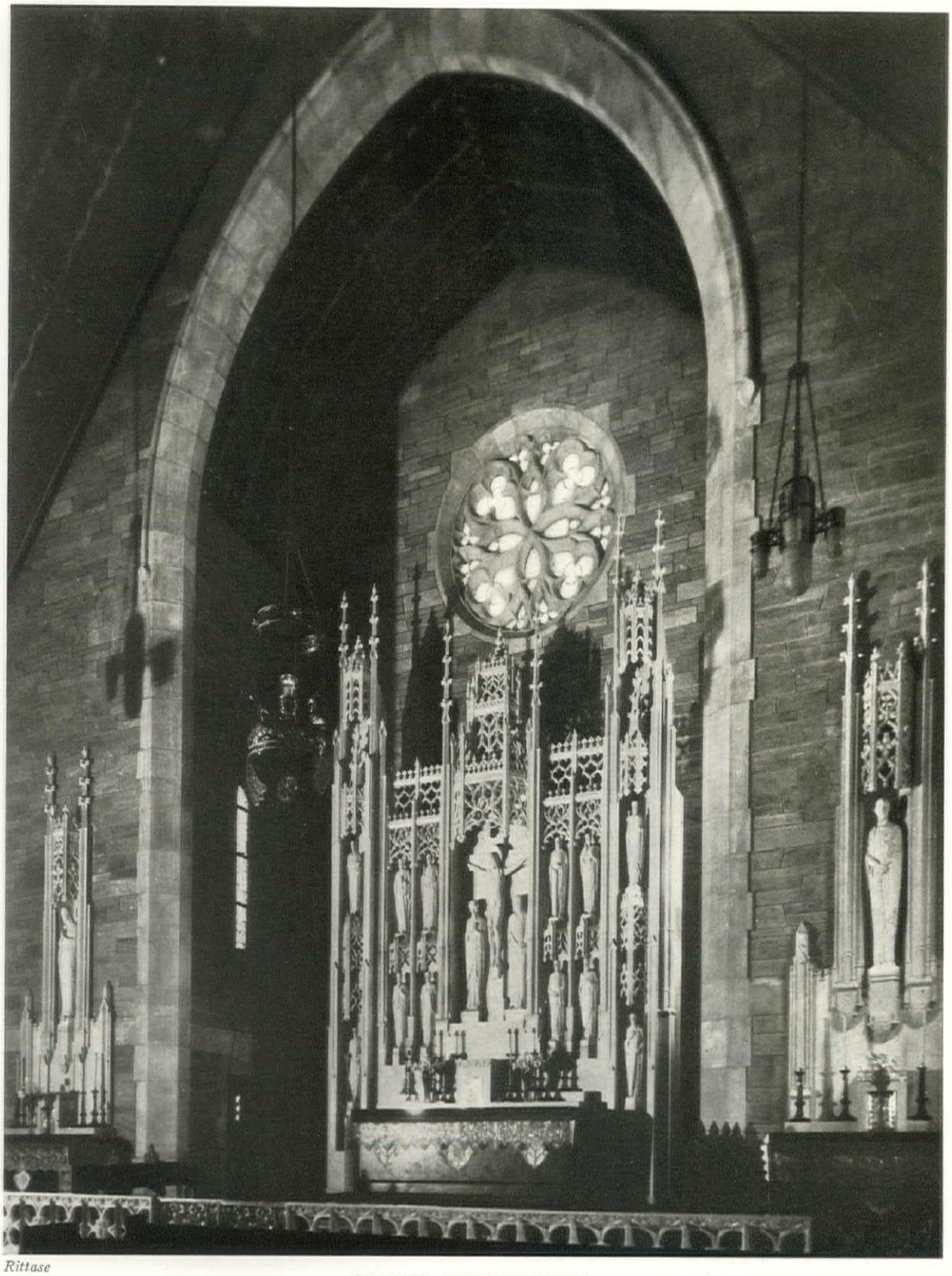
NAVE LOOKING TOWARD CHANCEL

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS



Rittase

CHANCEL AND HIGH ALTAR

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS

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CONFESSIONAL AND A STATION OF THE CROSS

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS

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LADY ALTAR, AT LEFT OF CHANCEL

CHURCH OF THE HOLY CROSS, CHESTNUT HILL, PA.
HENRY D. DAGIT & SONS, ARCHITECTS

PETER BEHRENS, ARCHITECT AND TEACHER

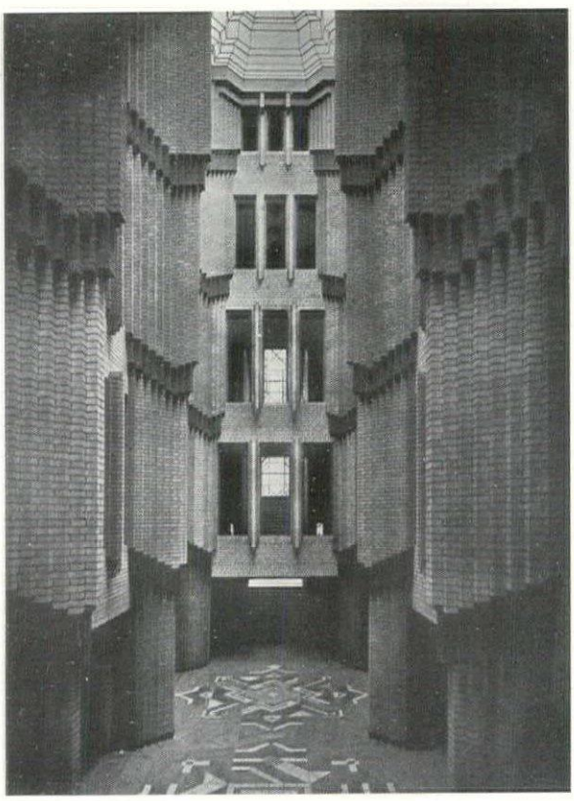
BY

SHEPARD VOGELGESANG

WHEN architects first went from this country to Europe for schooling, the various academies offered little which was not represented by the teaching of the Ecole des Beaux Arts. Architectural tradition had become the same from Paris to St. Petersburg. The slow formation in the nineties of individual, non-academic schools in England, Holland, Austria and Germany passed for the most part unnoticed in this country until work of the teachers and students of these schools began to attract attention a few years ago. Of these early movers, Berlage in Holland, Wagner in Vienna, and Van der Velde in Belgium were the leaders. All laid emphasis on functional planning and on mass as opposed to facade, on an art derivative from contemporary life as opposed to the academic interpretation of style. Berlage's special emphasis may be said to have been on the functional interpretation of materials; Wagner exhibited greatest force in plan and in the formation of the present-day æsthetic of utility; Van der Velde devoted himself to what was known as Art Nouveau, and his research was for the expressive, powerful line,—a line of growth. The influence of Berlage in Germany and Scandinavia was great; that of Wagner covered Central Europe from Rome to Helsingfors, and Van der Velde's sphere reached from Paris to Berlin. The Art Nouveau lingers, imparting an indirect influence to work of the present day in the general love of sweeping, inclusive line, in a certain interpretation of growth in functionalism. As a style, it died with the war and the collapse of Van der Velde's institute in Weimar. Contemporaneously with these three men of influence in Europe, Louis Sullivan was fighting in this country for the same ideals, differing chiefly from the Europeans in the poetic interpretation he gave his ideas. The movement, starting with much in common between its great originators, in Europe had greater continuity than in America, and it has attained, in the work of five European countries, a unanimity of expression which is striking. The Werkbund Exhibition in Stuttgart, in 1926, bears witness to an art borrowing no forms from a common source but working according to principles of handling materials and a philosophy of expression of life. These principles and this philosophy have made in an international exhibition of housing an astonishing architectural harmony. The influence of the early teachers is now carried on by successors themselves no longer young. In Germany and Austria, Peter Behrens is one of these successors of much the greatest prominence.

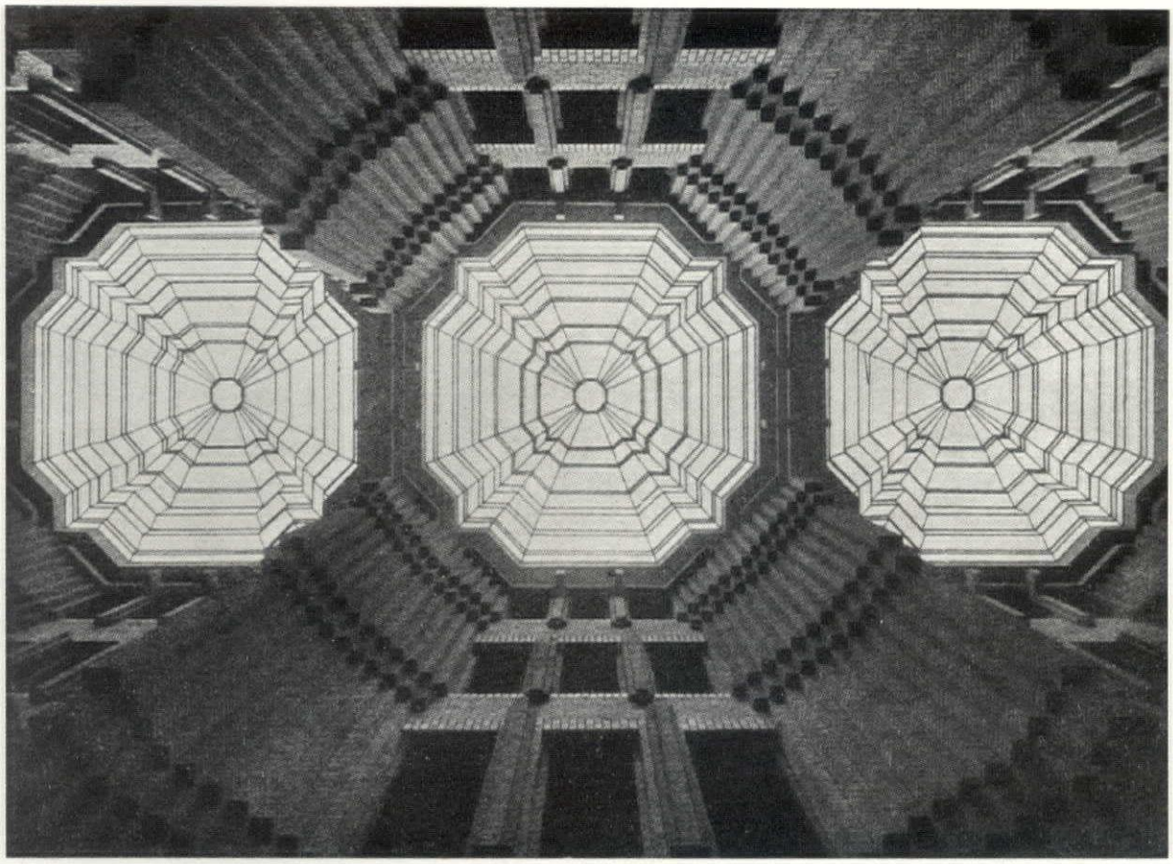
When Otto Wagner died, his place in the Vienna Akademie was filled by Peter Behrens. Commencing as a painter, Behrens' start as an architect dated from the erection of his own home in the Darmstadt colony in 1901. When called to the directorship of the Dusseldorf Kunstgewerbeschule in 1904, he selected as assistants men from the Berlage circle in Amsterdam and the Wagner school in Vienna. The interweaving of influences and the upbuilding of a contemporary art had been fairly begun. From the outset Behrens' efforts were directed towards architecture formed, as he phrased it, "at a single casting." A building in which there was no irrelevancy, in which every part was an essential contributing to

Dye Works at Hoechst,
Peter Behrens, Architect



Hall of Honor of the Dye Works

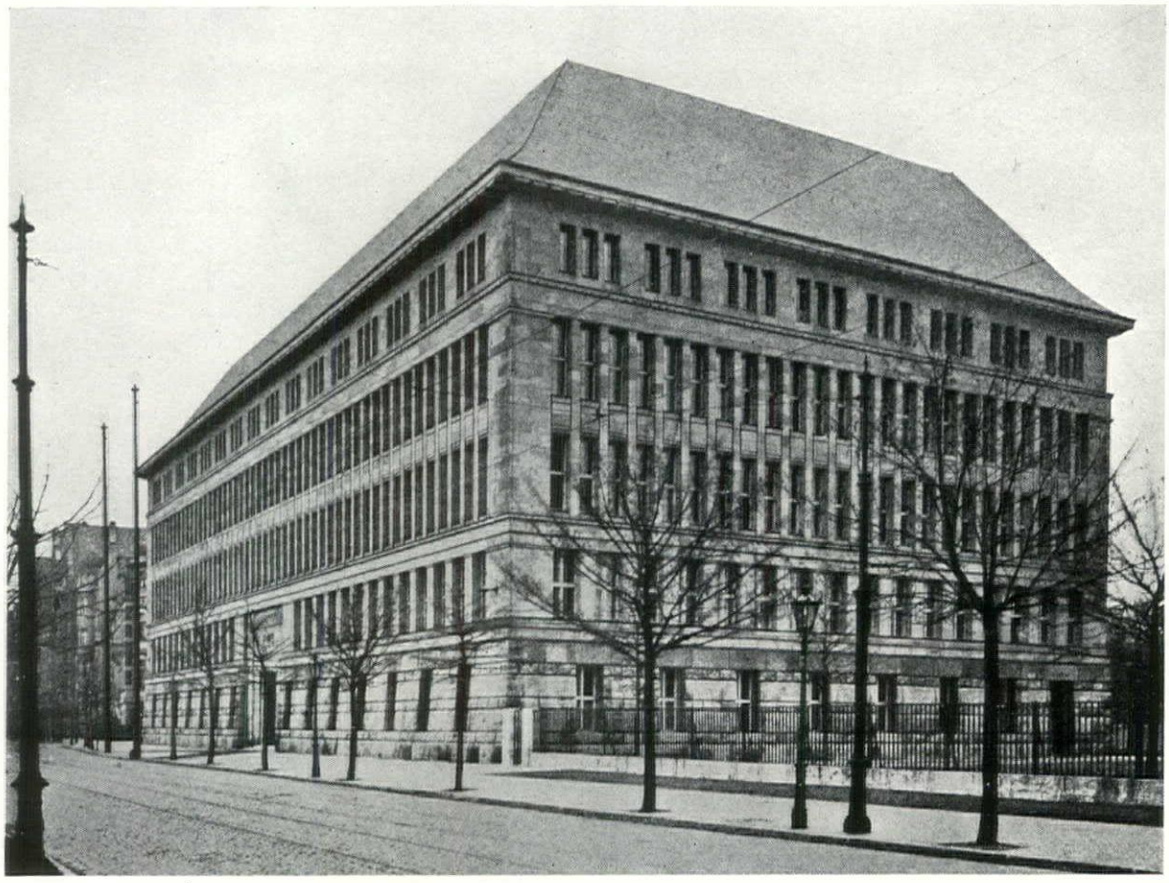
a complete function. From the time when he built his little house in Darmstadt with its axis carefully planned to give the maximum interior dimensions of the building, architecture was to him the art of arranging space. In his own development he passed through the stage of subjecting building to a rigid proportional system and was fortunate enough to have the opportunity of building his experiments and of judging the effect. Early he realized the power of the simple, geometric form, and whether his work seemingly recalled the early Tuscan Romanesque or the German Empire of Schinkel, this quality dominated it. When called upon in 1909 to design the turbine hall of the Berlin A. E. G., General Electric Company, he transformed industrial building to an art of overwhelming power. At the time he said, "Art should no longer be held as a private affair of which the individual avails himself according to his pleasure. We want no æsthetic which seeks its rules in romantic dreaming but an æsthetic rooted in the laws of surging life. We want, however, also no technical development which goes its own way but rather a development which preserves an open mind to the artistic will of its age." Possibly the greatest contributions which this painter has



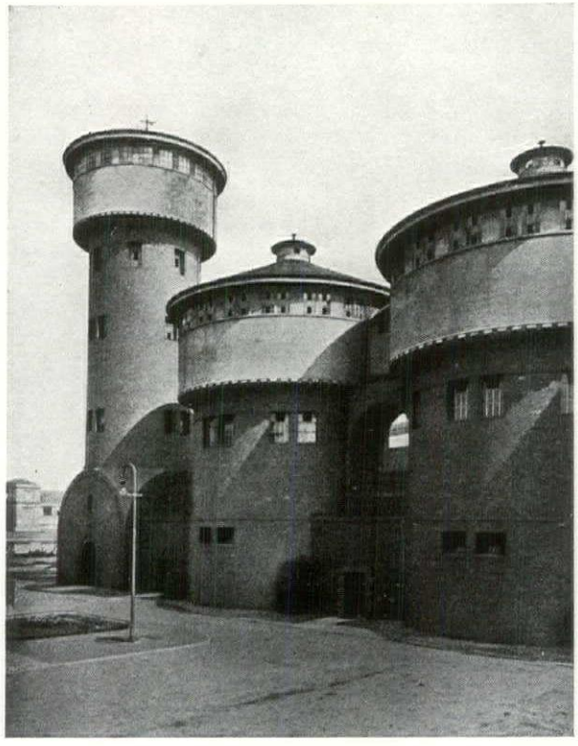
Ceiling, Hall of Honor
Dye Works at Hoechst

made to art are his industrial buildings. With the Turbinenhalle of the Allegemeine Elektrizitats Geschellshaft came a realization of the difference in scale between the usual building and the industrial plant. Here was a structure to house not men but engines, traveling cranes and the machinery which extends man's arm of power beyond all precedent. Coupled with this new conception of scale was Behrens' older feeling for the creation of architectural space. He disciplined the web-like character of steel and glass to an orderly succession of units larger than was customary, and by emphasizing the corners of the building and the overhang of the roof gave to the structure interior volume and exterior mass. In the Kleinmotor Fabrik his problem was conceived as a rhythmic expression of industrial production, 10,000 small motors produced a month within a building 600 feet long. As far almost as one can see stretches the succession of purplish brick piers subtly varied from curved to rectangular to give emphasis to the change in function of the building they front. In 1911 he completed the Frankfort Gas Works, the German Embassy in Petrograd, and the Mannesmann administration building in Dusseldorf. The extreme simplicity of the latter arises from a repetition of the unit form of a typical office within. Behrens realized that the problem of arrangement of the modern administrative organization is a changing one. Within the building large spaces may be subdivided into smaller units, and partitions may be taken down to give great operating areas in new locations. By composing the building of the smallest practicable interior units a flexibility with minimum waste was insured, and the division of the unit cell appearing on the exterior gave human measure to the scale of the organization. This year of varied achievements for Behrens dates also the general entrance of the architect into industrial fields and the beginning of an increasingly technical interest in building in Germany. A building by Gropius in the Cologne Exhibition of 1914 foreshadows the direction which German and much other continental work was to take after the war.

It was against a totally material expression of architecture that Behrens inveighed with his doctrine of the Romantik after the war. He felt that the new movement took parts of the essentials of architecture and emphasized the fragments to the prejudice of the whole. Their doctrine of honest use of materials to Behrens became materialism, structure became a separate

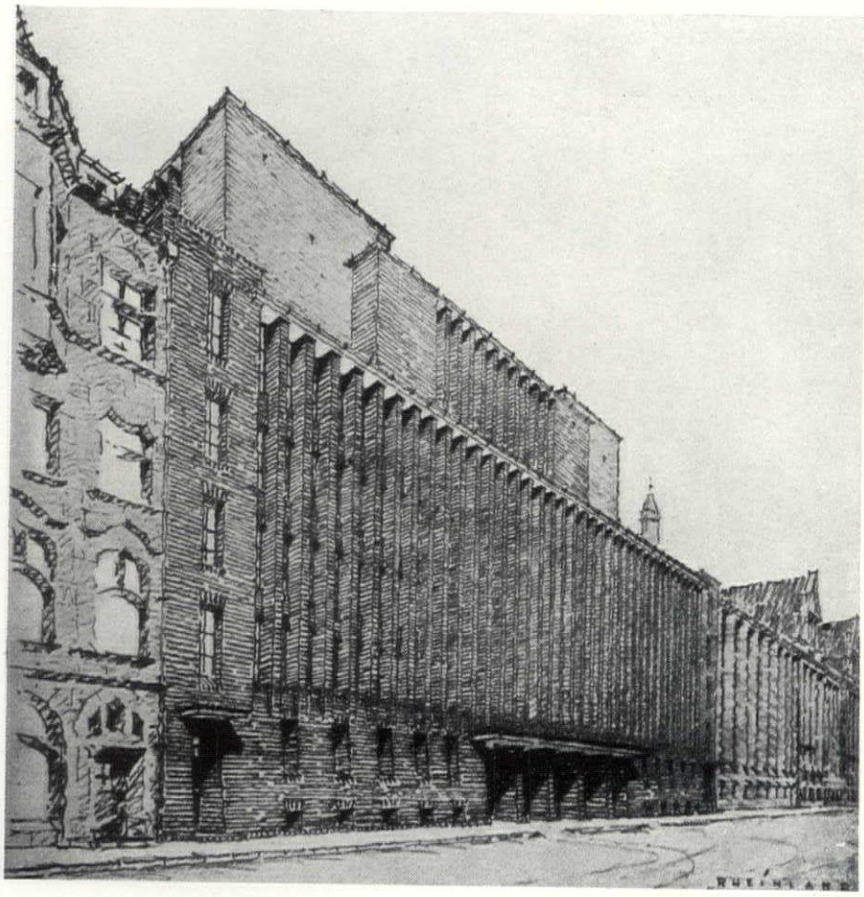


Administration Building
Mannesmann Pipe Factory, Dusseldorf



Frankfort Gas Works

school of constructivists, and function became an end in itself with beauty and inner context left to shift for themselves. With Behrens as with Berlage and Wright, personality is the primal source of greatness. Romanticism is to Behrens many things; the spiritual universality in work; the open minded awareness to the problem and the force to solve every problem; it is to the will for creative sovereignty over the material means; it is the germ of artistic phantasy which bursts beyond the limits of the obvious and the cheaply attained; it is what Frank Lloyd Wright means by "poetry"—which gives legibility and an accent of feeling without which the building would lack connection with the sentiment of humanity; it is also the battle of the personality in which the nature of a people becomes sublimated with the spirit of the future. Behrens built the dye works at Hoechst and the Administration Offices at Oberhausen partly in protest against a materialism too little mixed with his ingredients of the Romantik. If the Behrens apartment building at the Stuttgart exhibition be excepted, most of his post war work has contributed to the emphasis of this point of view, nor has it been small in quantity, variety, or quality. Besides Hoechst and

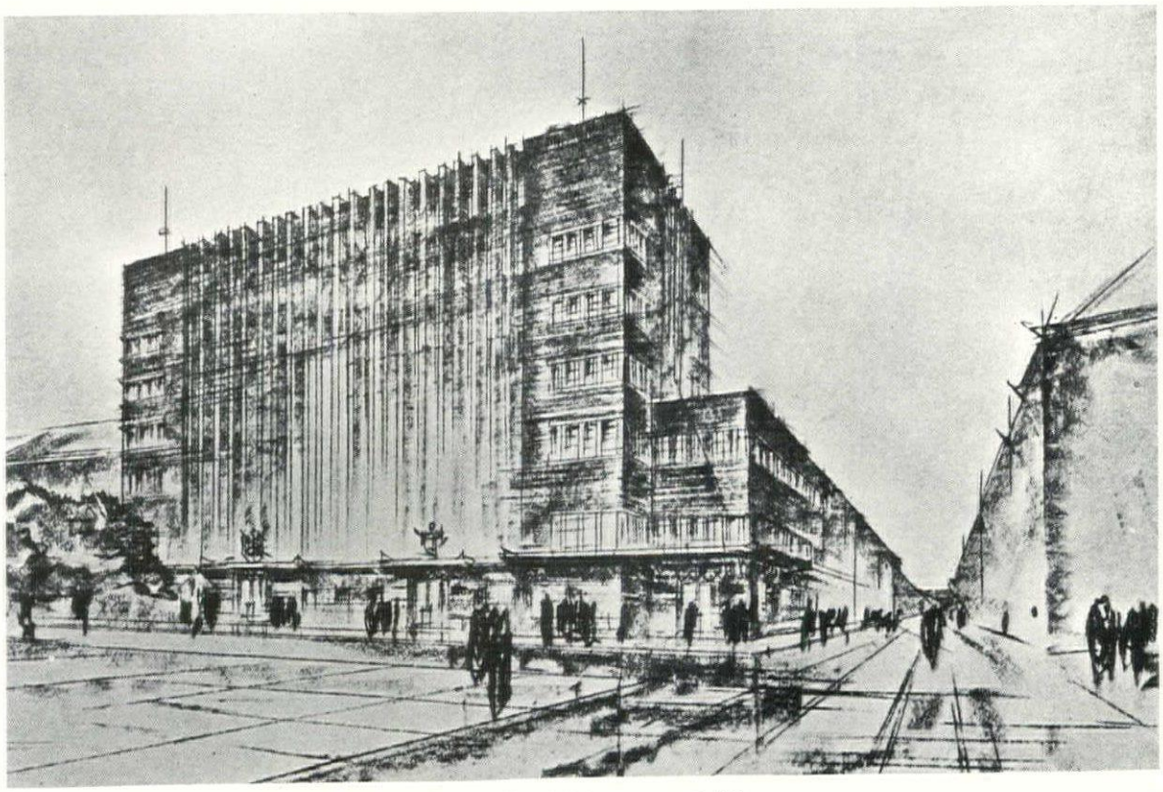


Project for Office Building for Stumm Factory at Dusseldorf

Oberhausen there have been vast settlement groups, private houses, a monastery, a church exhibition, a conservatory at the Paris Exhibition, industrial work in Russia, and now a building scheme for the Alexander Platz in Berlin.

From a man of Behrens' breadth of experience and viewpoint, a broad philosophy of teaching is a natural sequence. His class in the Akademie is composed of Meisterschuler, students who already have had training in architecture. They come from all parts of Europe and from the United States, bringing their own problems with actual data concerning the sites and the legal restrictions. In working they express the culture of the countries from which they come. Behrens visits his school for a period of a week four to five times a year; the rest of the time the student learns from his comrades and surroundings. A final thesis is required besides the work it is necessary to show the patron on his visits. It is expected that whatever is undertaken will be in readiness for Behrens' visit. Study, after the plan is prepared, is continued in perspective and models. Elevations are held as by-products of the masses and are never considered as ends in themselves. This conception is so general in modern, German instruction that the word "facade" scarcely exists,—a building is a body; to be viewed from the sides, top and possibly from the bottom; it possesses no "front" and no "back." When Behrens criticizes, his remarks are more in the nature of a philosophical discussion, and the student incapable of a conception provoking such discussion fares badly. The student's motivating idea may be basically fanciful or utilitarian, but his choice must have justification and his conception energy.

By working within the actual restrictions of a problem, the student is trained to grasp the requirements of modern design. He must think clearly and create an order that is real, rather a schematic pattern on paper. He is held to the realities of his problem rather than encouraged to slight them in an effort to produce grandeur of effect. The logical mind develops a problem along the line of concrete realities and organization rather than forcing his work into the intangible logics of form for its own sake. The fanciful mind creates freely in the vein of fantasy, which is a law to itself and is also outside of the constraints of a code of form. There is an implicit reliance upon the student to find himself and an implicit confidence in the critics' ability to appreciate the mould in which the student is formed. What matters is not the adherence to a preconceived scheme for producing architecture;

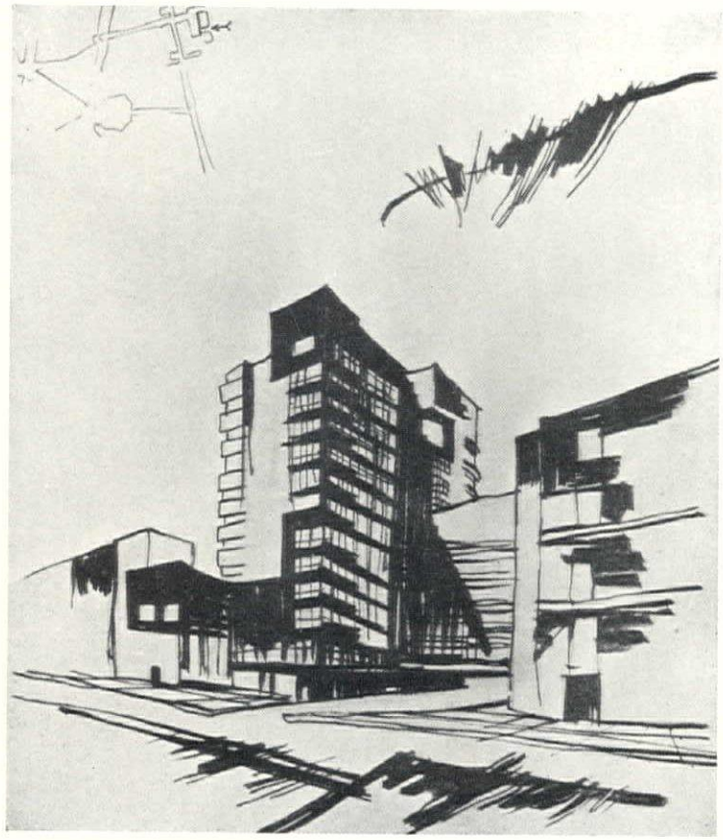


Project for Administration Building
Thyssen-Konzerns Factory, Dusseldorf

it is the force with which the student presents his own conception. Such a method of teaching relies heavily upon the calibre of the students attracted to the school. It is founded on the willingness of the student to begin a difficult undertaking rather than on the safe drill of a routine; in so doing it offers a challenge to the artistic will and puts struggle against defeat at a premium. It is no more a system than mediæval apprenticeship, or life itself; in the medium of instruction it is itself an artistic creation.

The illustrations accompanying this text are part of a traveling exhibition shown throughout Germany. It has for two years been Professor Behrens' hope to bring this exhibition to the United States and to lecture here himself upon the development of modern architecture in central Europe. The drawings cover the work of Austrian and German students together with one American, Muschenheim, who two years ago received the Behrens prize for the house shown. For an understanding of the more constructivistic direction of work the following analysis by a member of the student group is of interest.

The combination of the results of mathematical calculation with the aim to create a spacial sensation was always the primary idea of architecture. Examples are: the pyramid, the Doric column and Roman arch construction. Monumentality is a seemingly clumsy expression of primitive building wherein stone is laboriously piled on stone. Of this constructive method the dome is the most ingenious result. Today we have the steel or concrete structure. It is a pure mathematical skeleton building completely different in proportion from preceding constructions. (Probably more akin in structure properties to Nordic wood construction than first appears.) To give this almost bodyless skeleton the massively monumental covering of former brick and stone buildings is like dressing a modern person in knightly armor. Such procedure cannot possibly be the means to a consequential and innerly pure new form of æsthetics. Rather the way would seem to lead to subjection of facade monumentality and establishment of an organic vitality. The sense of the building as an organism may be pushed to the point newly termed kinetics, where the environment influences the organization strongly and the whole swings in rhythm with the traffic or the landscape surrounding. Such a mode of approach to present-day building problems would seem to provide a solution of the inextricable modernistic academic problems; for example, the conflict in desire for wall surface on the one hand and the practical necessity for light on the other. The shying at a frank approach with its unrealized possibilities for

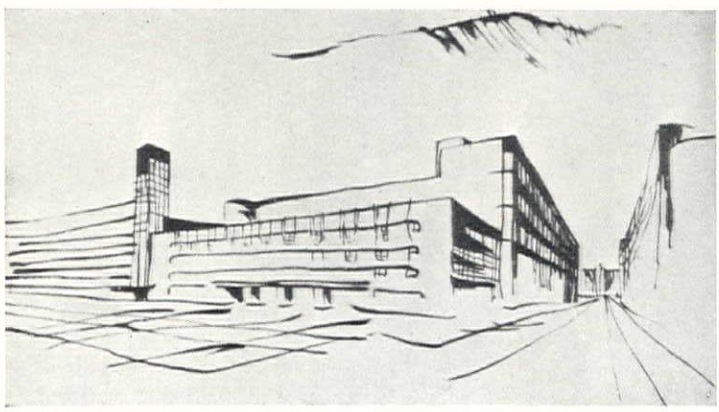


Sketches for Projected Buildings on Extension of Jagerstrasse at Berlin

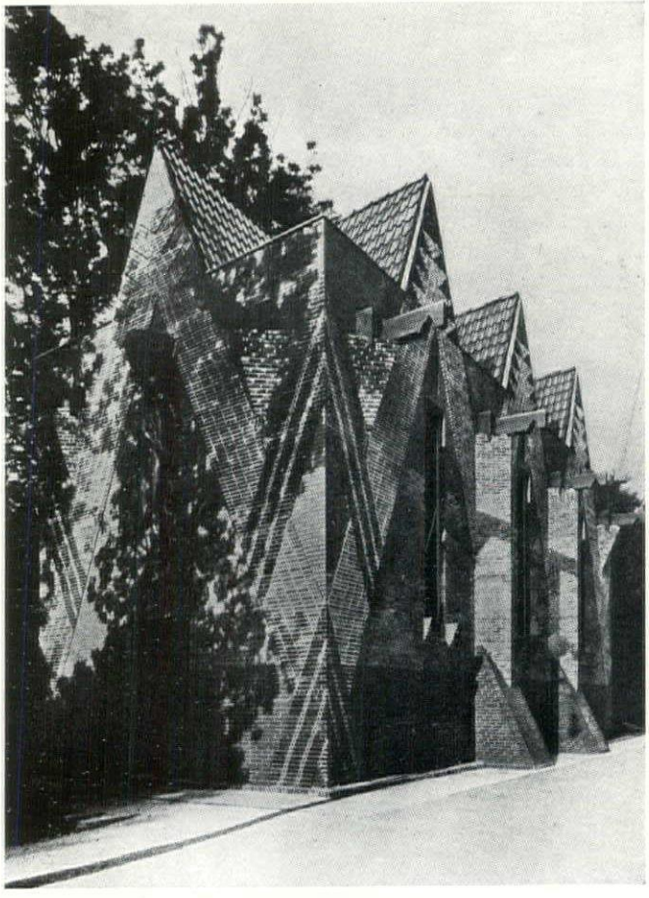
solution of the problem can be explained only as a lack of strong primary pleasure in creation. The way we would follow leads not to the erection of monuments after the old canons of beauty but to the fabrication of organisms according to their own requirements, that they may fulfill their purpose with functional ease and exist with a being of their own.

It would be difficult to find in the work of another German school more comprehensive examples of the tendencies in German design, the point of view of study, and the type of competition rendering. In comparison with German competition work they rank well with the presentations of more seasoned architects; production of school work which has the verity of actual building expressed in these drawings is rare. Modern architecture, as represented here, is beyond the effort to be new or to establish a mode; it has become frank study of the problem, frank acceptance of the economy and the material means of the present day. Inspiration is offered in this school to attack imaginative and utilitarian problems of our civilization in the spirit of the artist.

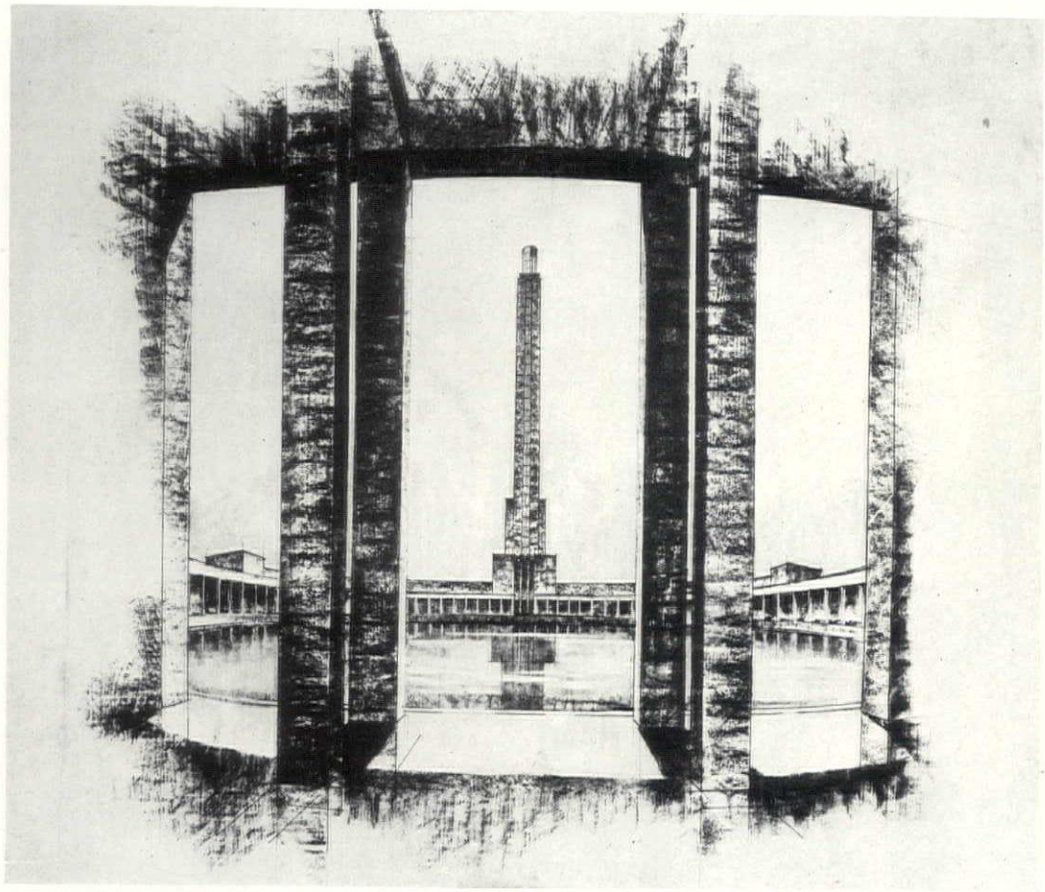
EDITOR'S NOTE. For the illustrations on pages 718 to 725 we are indebted to the volume on Peter Behrens by Paul Joseph Cremers, published in Germany by G. B. Baedeker, Essen. The illustrations of some of the models and plans at present on exhibition in the Brooklyn Museum were especially taken for THE ARCHITECTURAL FORUM.



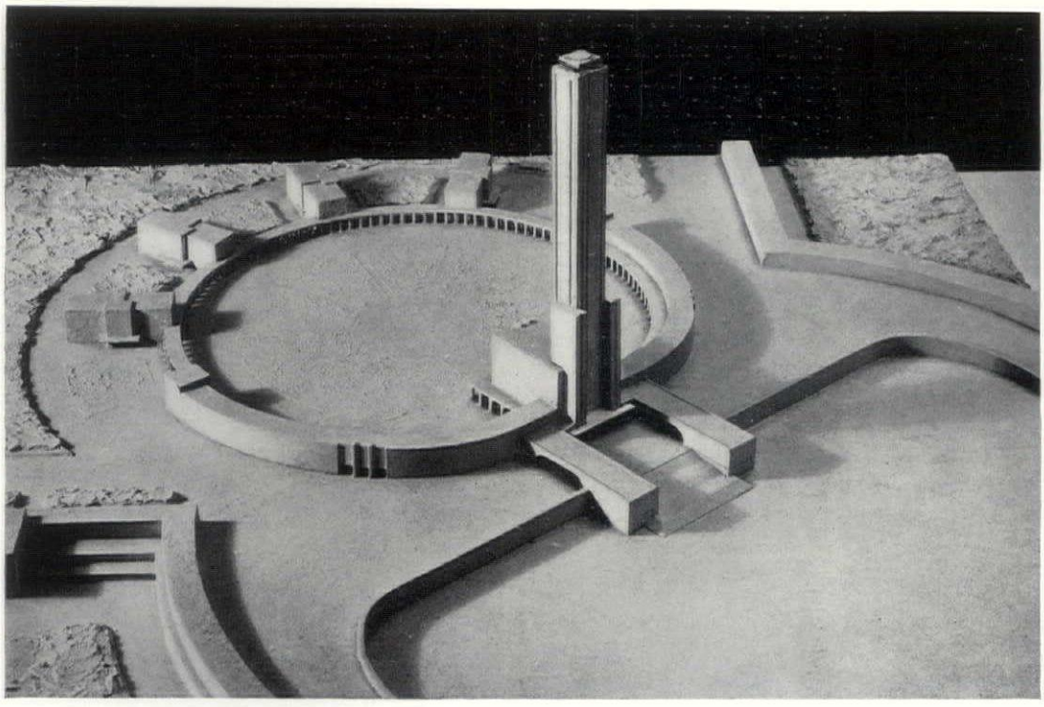
Project for a Hall for
Industrial Exhibitions in Essen



Cult Building in the Spirit of
the Middle Ages at the Indus-
trial Exhibition in Munich, 1922

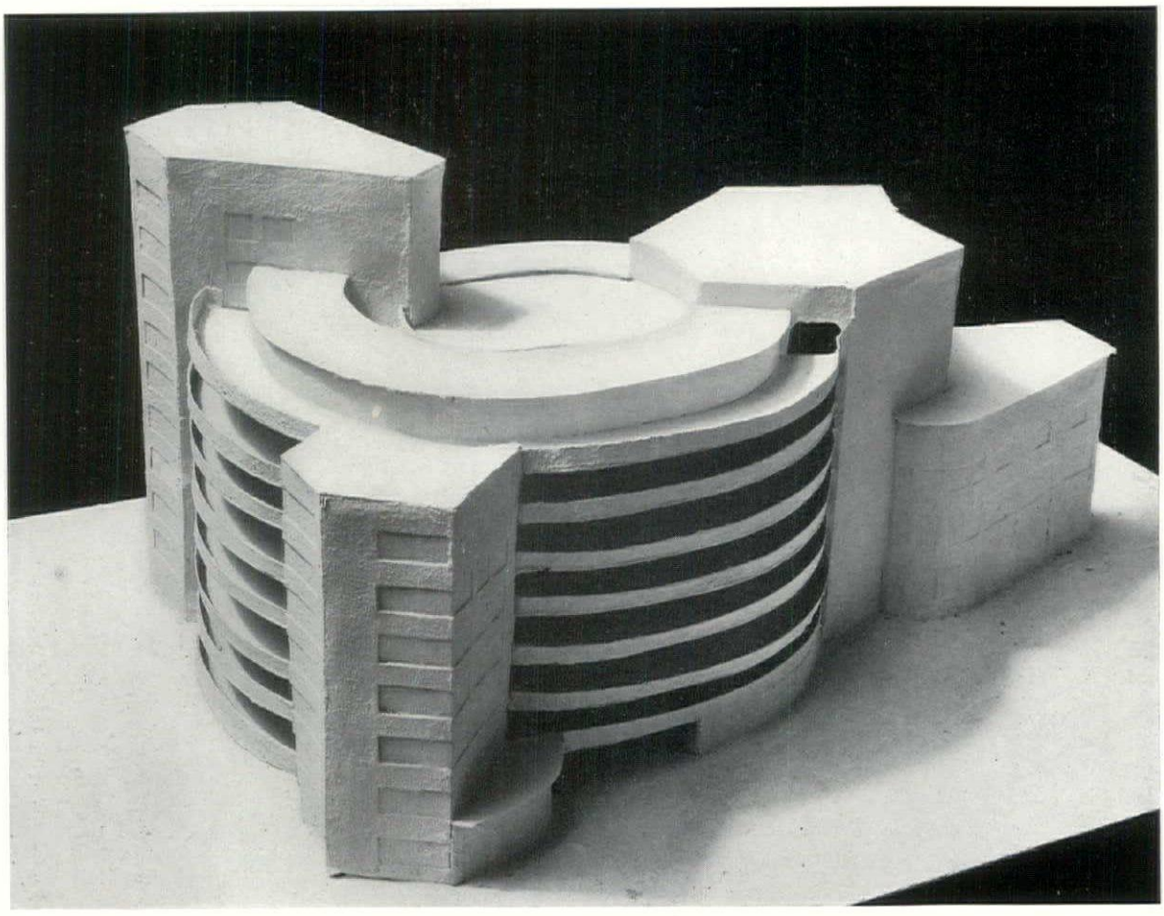


PERSPECTIVE



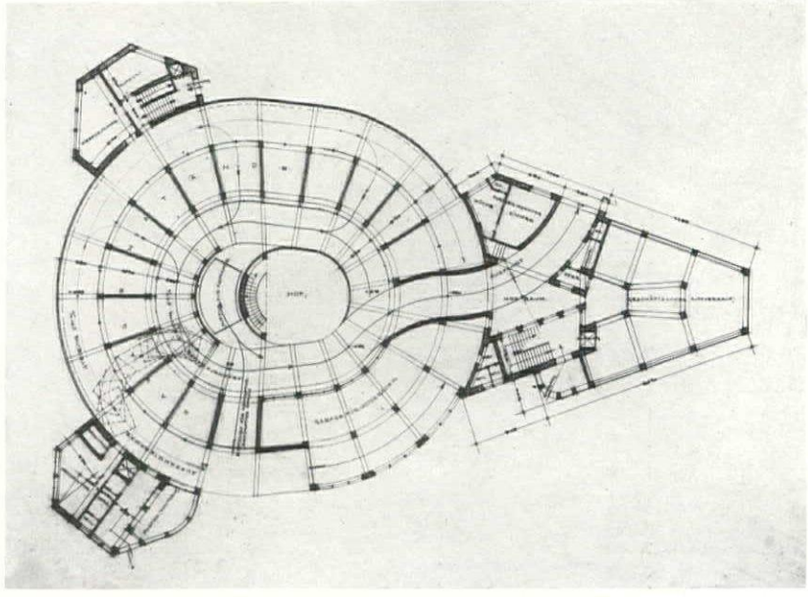
MODEL

DESIGN FOR A LIGHTHOUSE, SANTO DOMINGO
EMIL BUSCH AND JOSEF DEMETZ, ARCHITECTS



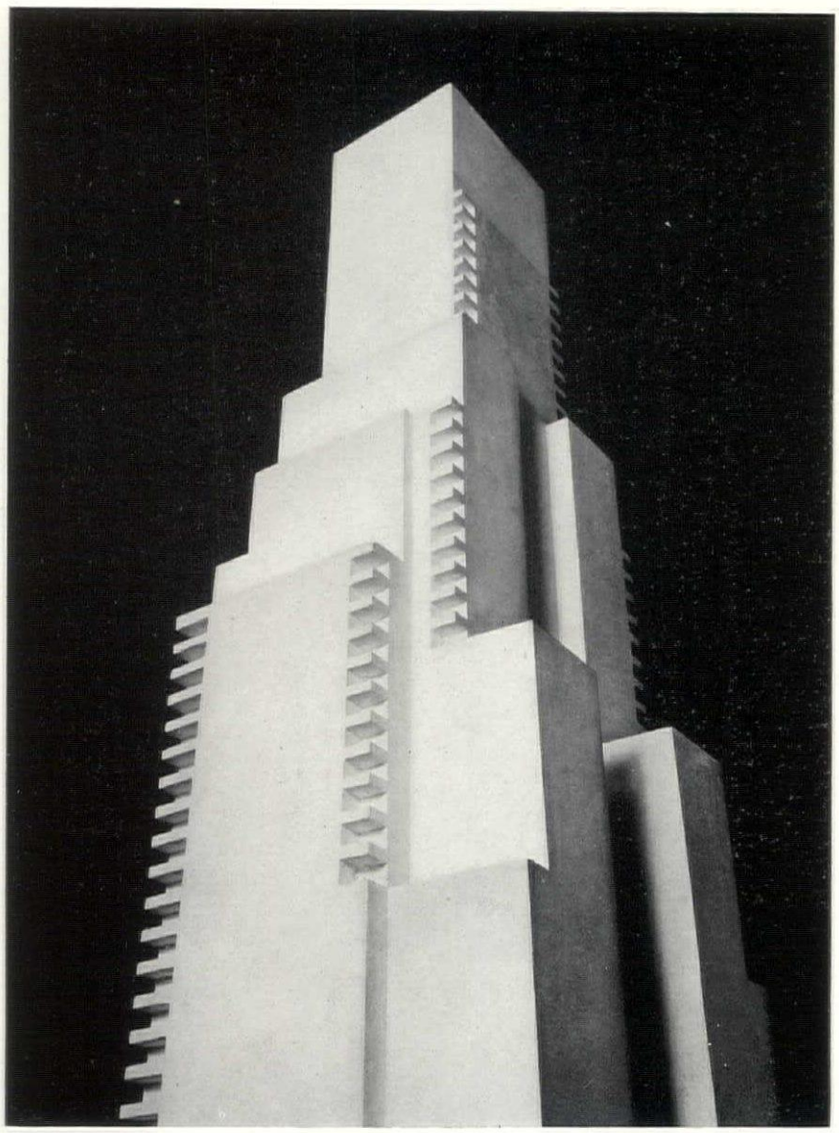
MODEL

A GARAGE BUILDING
BY THEODA SCHOLL

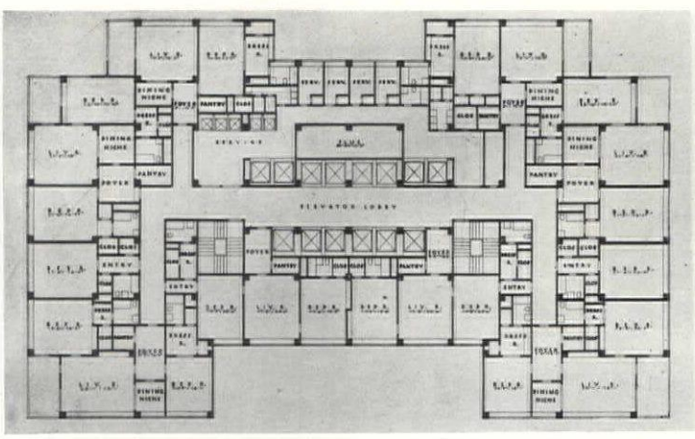


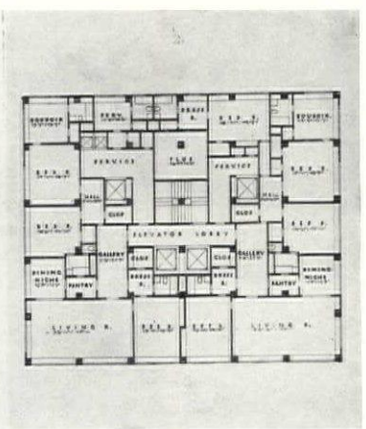
PLAN

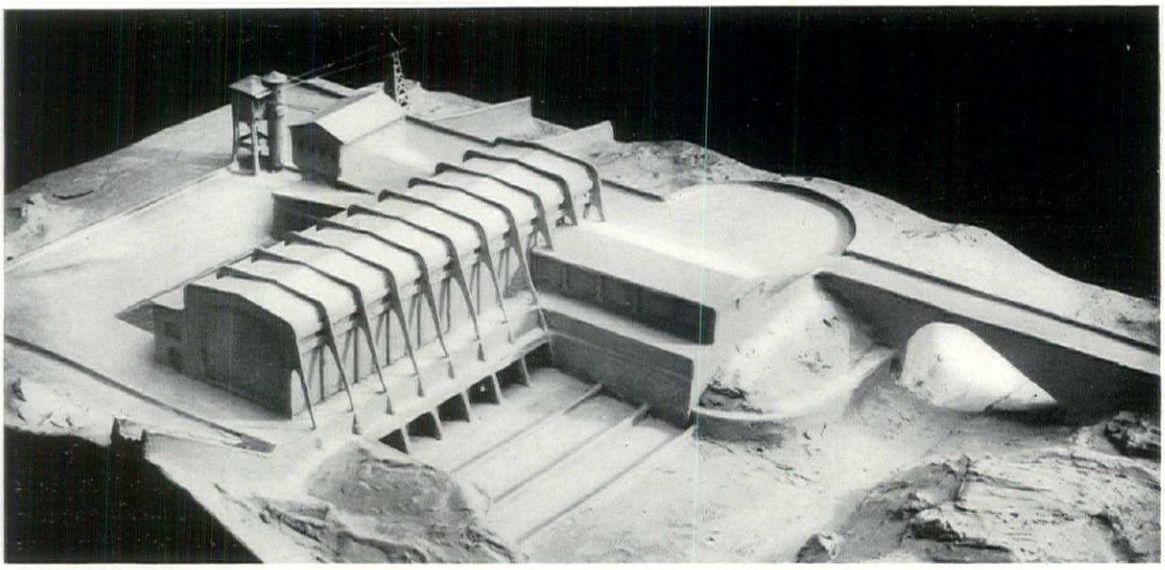
PORTION OF MODEL

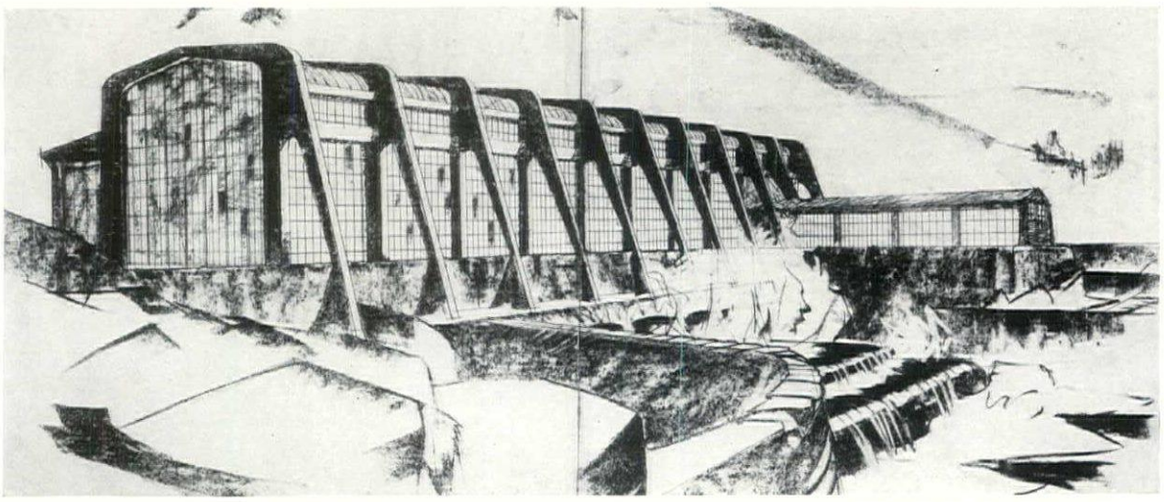


APARTMENT HOTEL
FOR NEW YORK CITY
WILLIAM MUSCHENHEIM, ARCHITECT

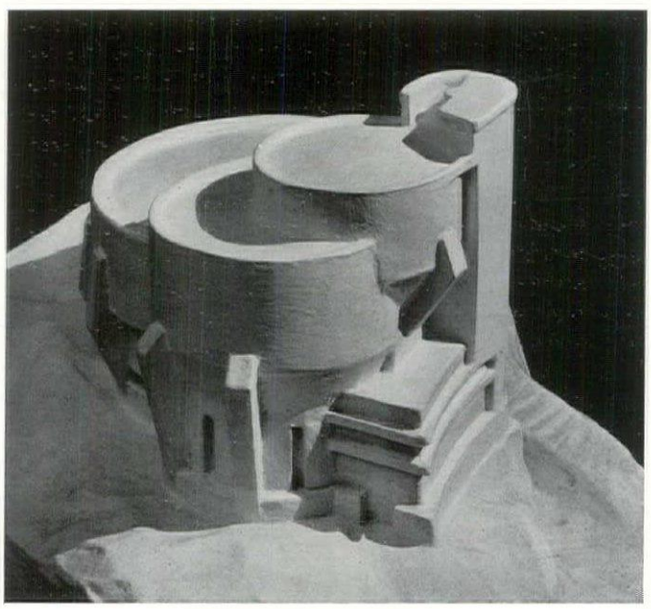








ABOVE, MODEL AND SKETCH OF MODERN WATER POWER STATION JOHANN SCHREINER, ARCHITECT



MODEL OF A WATER TOWER, BY JOHANN SCHREINER, ARCHITECT

A THEATER ON THE FIFTIETH FLOOR

BY

R. W. SEXTON

ART makes its greatest appeal in the opportunity it affords to express creative ability. Until very recent years, American architects have shown no signs of possessing the creative urge peculiar to the artist. By profession, architects have always been recognized as artists, and yet they have not always had the artist's instinct. Or have they been handicapped, perhaps, by public opinion? For, unlike other arts, architecture is not merely an expression of the artist's tastes and ideas, but is an art that is surrounded by conditions and stipulations.

And, as the years went by and so-called "period" architecture held sway, this urge to create accumulated. Copying, reproducing and adapting became a drudgery, and finally a few of those more inclined to be progressive could stand it no longer and protested. Their patience gave out. They could no longer let it be said that this country could not be represented in exhibitions of modern art because we had nothing of original design to exhibit. And modern architecture, as we see it today, resulted.

For, after all, is not modern architecture an expression of our original ideas rather than an opportunity to "be different," as some would have us believe? Naturally an architect in giving expression to his originality must do so in designs that are logical and are based on the fundamental principles on which architecture is so firmly established. Of these principles the first and foremost stipulates that structure is the basis of design. This is merely another way of declaring for honesty in design. We spent years and years in studying design first and structure after. We selected the "style" first, and constructed our buildings, both inside and out, as best we could to conform to this chosen "style."

We have finally been awakened. The architects themselves have convinced us that architectural design is a matter of materials. Modern architecture is the opportunity to give form to materials rather than to shape materials to some stipulated form. Standardization is thus replaced by originality. New materials and new methods of construction naturally inspire new forms; but original ideas can just as logically be expressed in materials which have been used for years.

It is well for us to remember, too, that our problems in architecture are modern. Many of our present-day problems are "the result of new economic and social conditions, and, if the requirements of the problem are studied and met, if we use the methods and materials of this day and age, the building that we build cannot be other than modern." The words quoted are those of Raymond Hood.

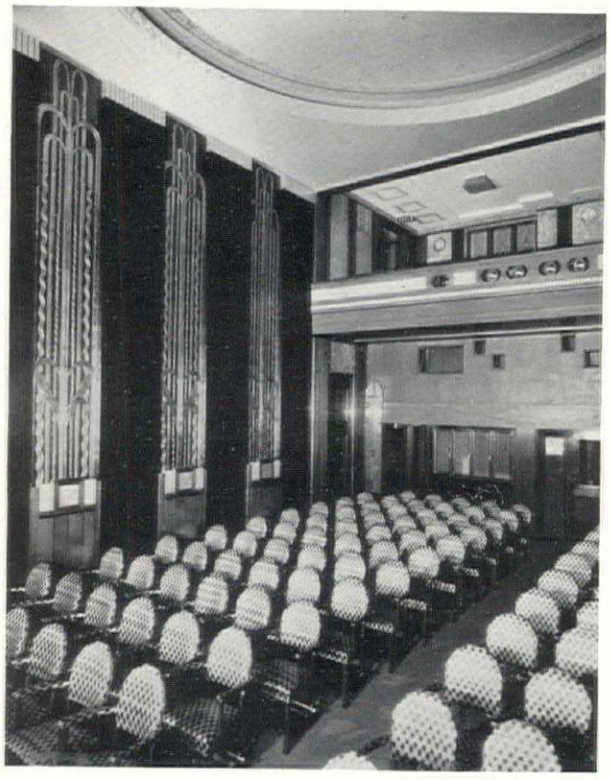
In laying out the business offices of the Chanin Brothers in their new building in New York, the architect of the organization found himself face to face with a peculiarly modern problem. For it was stipulated among the requirements that there be included a theatre, naturally a small theatre, but one fully equipped in every detail, for the presentation of both motion and sound pictures, and with a stage, curtain, gridiron, and so forth, so that the theatre might be used for performances of the legitimate type. It is natural, I think, that the solution of a problem so modern in character would bear evidence, too, of modern tendencies in its design.

The design is theatrical, yes. But I would not have you understand that I mean it is "stagey." For architecture appears stagey when it is unreal, dishonest and insincere. Certain architects who pride in calling themselves conservative claim that modern tendencies might be appropriate in the design of a theatre, but no where else. They call anything modern, theatrical and stagey, drawing no distinction between these two words. I claim that this theatre is given a theatrical quality in order to allow the design to reflect its purpose. But it is in no sense of the word stagey, for it is evident throughout that structure was the basis of the design and the decorative or theatrical quality of the design is due to the selection of materials used in construction rather than to the application of meaningless ornament which not only conceals structure but serves no other purpose than to adorn.

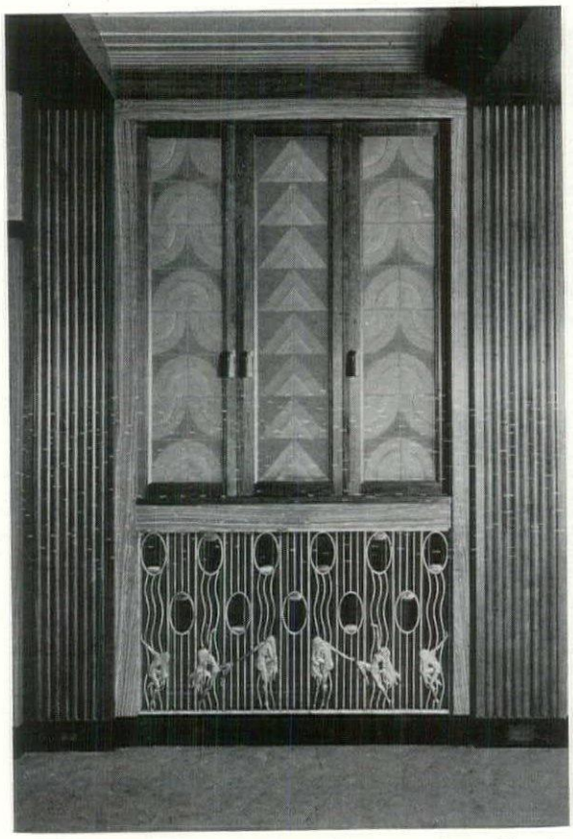
So when I say that the design is theatrical I mean that the materials have been selected with the idea of making a composition that will be somewhat sensational and startling, you might say, in both form and color, and yet every material plays its part in the basic structural scheme.

One might ask the question: Of what use is a theatre in a business office? This auditorium has been devised to meet the so-called "get together" spirit of modern times, and is intended to serve stockholders and directors of corporations, conventions of sales managers, conferences of aviation, radio and railway companies, institutes of stylists and designers, and meetings where models

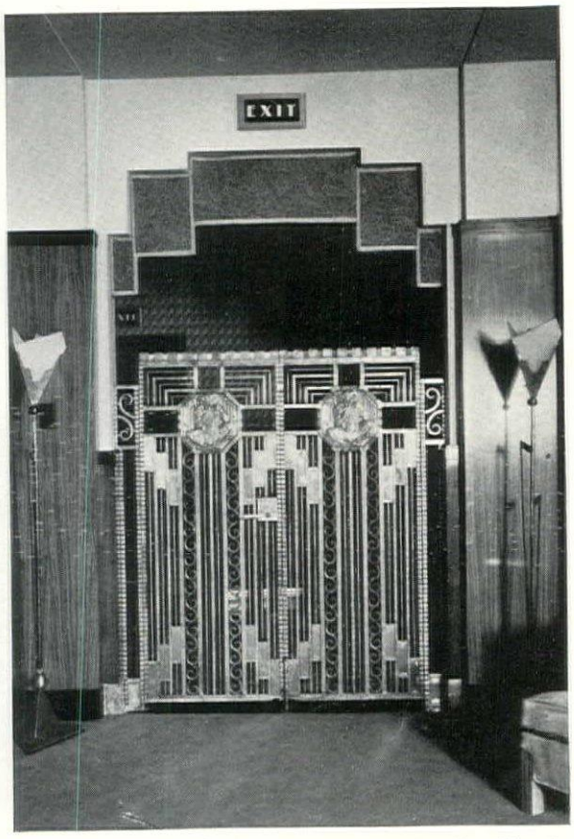
Above, Main Foyer Adjoining Theatre. Below, Fireplace in Foyer, Chanin Theatre, Chanin Building, New York. Jacques Delamarre, Architectural Director; Chanin Construction Co., Designer



Interior Color Scheme of the Chanin Theatre is a combination of Silver and Black. Chanin Building, New York. Jacques Delamarre Architectural Director; Chanin Construction Co., Designer



Windows and radiator grilles in the Chanin Theater, Chanin Building, New York



Wrought iron and bronze gateway in the Chanin Theater, Chanin Building, New York

and designs can be displayed either directly or through picture projection, or where manufacturing processes or operating methods can best be demonstrated through the medium of the motion picture. While every large business concern now has recurring need for such a meeting place, it requires that place only at intervals. Both from the standpoint of floor space and costs, it is burdensome for all but the largest concerns to have an auditorium for their exclusive use, and for that reason such meetings now are held largely in halls or in banquet rooms of hotels where conditions are far from ideal. Thus, the booking of the theatrical business is adapted. A certain company which has its offices in the building may make arrangements for using the auditorium one night at a certain fixed cost, and that is the end of the expense. Another night it is used for a style show of another concern which also needs such facilities only a few times in the course of a year. In this way, the auditorium meets the need of various business firms in an economical manner. Enough revenue is produced, at the same time, to justify the investment in the actual equipment of the theatre, as well as repaying for the floor space that might otherwise be rented for conventional office purposes. Besides, the auditorium is used at frequent intervals for meetings which mingle the social and business sides of the Chanin organization.

The theatre is so complete in every respect, including equipment, lighting and acoustical properties, that it might be considered as a typical modern theatre in miniature. The seating capacity is only two hundred, but the care with which the various details of both the architectural and decorative schemers have been studied is worthy of a theatre ten times its size.

The orchestra floor is level with the fiftieth floor of the building and the balcony lines up with the fifty-first story. Naturally, certain provisions were made for the theatre in the structural design of the building, so that columns would not mar sight lines and that motion pictures might be projected on the screen without disturbance. As already suggested, the character of the structural materials plays a large part in the decorative scheme. The metal grilles in the side walls of the auditorium are decorative in themselves and yet their decorative qualities are closely identified with the lighting scheme. The use of unusual woods with interesting figure and grain is readily accounted for when one considers how largely the designer depends upon the wood to give the interest to the scheme. For one also notices, with a certain amount of enthusiasm, too, an absence of meaningless classic mouldings and unaccountable applied ornament.

BOOK DEPARTMENT

"MASTERING A METROPOLIS"

A REVIEW BY
CLIFFORD WAYNE SPENCER

IN 1811, when a committee consisting of Governeur Morris, Simeon DeWitt and John Rutherford drew up the first plan for the city of New York, they expressed the opinion that it was "improbable that (for centuries to come) the grounds north of the Harlem will be covered with houses," and because Manhattan was "embraced by large arms of the sea," they allowed for less open area than would otherwise have "consisted with the dictates of prudence."

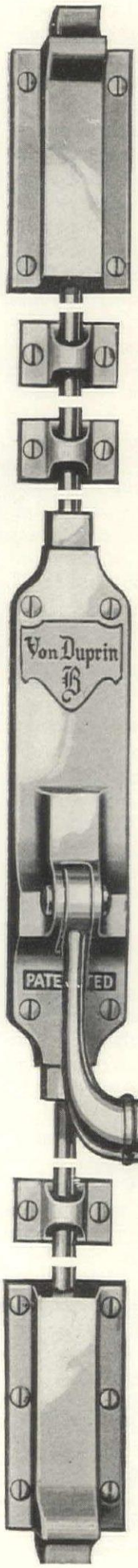
The inadequacy of this plan, based as it was on the best knowledge and experience of the time, shows how impossible it is for men to attempt to predict with any degree of accuracy what is likely to happen in the future. These early planners had no way of foreseeing the havoc that would be wrought to their picturesque waterfronts by the development of modern industry or the great centralization of population that would occur in the New York district as a result of improved transportation and natural conditions. Nor can we of the present day conceive of the new developments that will take place in the years to come that will have a telling effect on the way in which the city is to grow. We have, however, a much larger experience on which to base studies of the natural tendencies of the growth of the city, and moreover we have the advantage of being able to visualize things on a vastly greater scale than was possible at that early date. Added to this there is the possibility of making use of the methods and resources of modern science in carrying on research on which to base logical plans for the future. Although there have been attempts from time to time to provide plans for the city's growth, the rapidity of this growth has been so great that the plans could never catch up with it, and the city has gone on developing in a haphazard manner which gave rise to conditions of living and travel that have, to say the least, been far from satisfactory. Improvements have been made only after conditions became so intolerable as to make them absolutely necessary, whereas, had they been

made in advance, according to a well studied plan, such intolerable conditions need never have existed at all.

The movement which led to forming the present Regional Plan was largely brought about through the efforts and ideals of Charles Dyer Norton, who came to New York from Chicago, where he had been chairman of the Committee on Plan of Chicago. After vainly attempting to accomplish his purpose through official channels, Mr. Norton decided that "although whatever was to be done in the way of planning would have to be carried out by the governments of the communities concerned, the task of obtaining and presenting the necessary preliminary information, and of stirring up the necessary enthusiasm among the citizens, would call for volunteers from private life. He also realized that any plan, to be a success, would have to be on such a vast scale as to arouse the interest and enthusiasm of the population as a whole, and that the cost in time and effort of making such a comprehensive survey would be stupendous. As a quarter of the income from the Russell Sage Foundation was available for the exclusive benefit of the city of New York and its vicinity, Mr. Norton and the other trustees of the Foundation decided that there could be no better way of serving the city than in making studies on which a regional plan could be based, and study for such a plan was begun.

"The committee was faced with the task of organizing under one plan a vast region covering some 5,000 square miles, territory including mountains, plains, rivers, lakes and seashore, in which there is concentrated a population greater than was ever included within an equal area since the world began. Suitable living conditions for the population had to be provided, as well as facilities for recreation and means of travel from place to place without undue congestion. The plan must look far into the future and provide for 20,000,000 population, instead of the present 10,000,000, and it must be so elastic that it can be fitted to new and unforeseen conditions as they shall arise." We have observed that the plans for the great country village which the commissioners of 1811 drew up were rendered obsolete within a generation by the construction of railways. A city planner in 1811 might be excused for believing that the city would spread northward in a thin line along the shores of the Hudson. As far as anyone could tell in 1811, inland transportation would always follow the navigable rivers. We are not quite so likely to be surprised today, for we already travel on earth, air and water and can estimate the probable future of all these means of getting about the country. Still, it is not likely that everything will go exactly as we plan it. We must allow not only for changes brought about by inventions, but for the growing wisdom and experience of the race. Some of the things we do and plan now may seem foolish later on.

The work of the Committee on the Regional Plan of New York and its Environs covered a period of seven years and resulted in the publication of ten detailed and technical volumes of findings and recommendations. Obviously this is not the form in which the plan should be presented to the public for its approval and inspiration, and the need of translating and condensing the ten volumes into a simple readable work which conveys the broad outline of the proposals resulting from this exhaustive study was evident. The task of preparing this story of the Regional Plan was entrusted to R. L. Duf-



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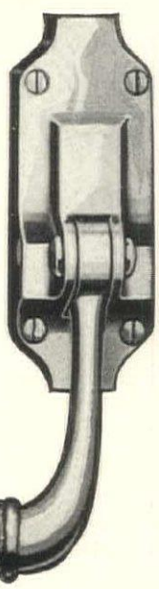

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fus, and the volume which is the subject of the present review attests to his ability in dealing with the outstanding results of the Committee's findings in such a way as to give them a wide public audience. In presenting this volume for the consideration of the citizens of New York and vicinity, Frederic A. Delano, chairman of the Committee, says: "We believe that Mr. Duffus has been conspicuously successful in dealing with the great mass of technical imformation and in selecting for presentation in this book the general picture of the findings and proposals of the Committee in such a way that its recommendations will be widely understood and discussed. The volume shows that he has read the long story and has grasped the salient and interesting points; that he has been able to study a difficult and complicated problem and still preserve his enthusiasm for its essentials. The aim in this presentation is thus to submit for public evaluation and discussion the high points of our research and to offer our findings in the hope that critical appraisal and eventual endorsement may follow. When the public is once convinced that this is the right way to proceed, that it does not mean spending vast sums of money unnecessarily, that it really means the spending of money wisely, and in the end avoiding the waste of mistakes, the plan of the New York region can be said to have been launched. We believe that the work which Mr. Duffus has written is a practical step in accomplishing this important purpose."

In order that the reader may have a better understanding of the conditions as they exist, on which to base his study of the recommendations and predictions put forward by the Committee, the author explains some of the natural phenomena which led to a vast number of people being located in such a limited area, and presents an interesting historical sketch of how the city gradually spread from the tiny settlement located by the Dutch at the tip of Manhattan Island because it was accessible from the sea, because it was easily defended, and because it was at the junction of two rivers. He describes the outstanding physical features and points out the effect they have had on the natural growth of the city and how the building of a system of railroads led the march of progress into new and unexpected directions. The great national crises such as the Revolution and the Civil War also had an important bearing on the city's growth, as did the phenomenal development and prosperity of the west and the building of the Erie Canal. All this is highly important and interesting as an introduction to the recommendations and predictions proposed in the Committee's report. An important part of the work of the Committee was to make a thorough study of the great industries of the city and their geographical distribution, with a view to deciding, if possible, what part of the work must be done here or can best be done here, and what might as well or better be done somewhere else. New York is preëminently adapted by nature to perform the function of a port, but there have also sprung up a large number of incidental industries, and we find here manufacturing plants that could just as well be located in an outlying district but now occupying some of the most desirable residential and business sites. In making their study of this problem, the Committee investigated carefully nine of the more important industries and were able to make many recommendations as to how such conditions might be corrected and how

the various industries might be located to best perform their part in the work of the great city in other locations.

In continuing his survey of conditions as they are, the author describes in some detail the systems and means of transportation and travel within the city as well as between the city and the rest of the world. Under the heading, "Hours of Leisure," the playgrounds and park systems of the city are studied and the shortcomings as they exist at present are pointed out. A comprehensive view of housing conditions and requirements shows that the housing shortage is gradually being relieved and that there has been a considerable migration from the congested areas to the suburbs. Mathematical calculations show that there is theoretically "plenty of room in the region for every family that is likely ever to live here to have a separate house, front yard, and garden, should it be desired." This fanciful situation is presented only to show that "our difficulties come from our failure to make efficient use of the abundant space at our disposal. Nature does not crowd us. We crowd ourselves." Other cities have in many cases progressed more rapidly than has New York in respect to city planning, and in making its investigation the planning committee has collected data from these cities in order that we may profit wherever possible by their experience.

It will be noted that up to this point all the discussion has been in the form of description of the existing materials with which the planners have to work. The author now turns his attention to a consideration of the scope of the new plan, and the way in which the Committee approaches the problem of planning a home, playground and shop for 20,000,000 people. The remaining pages of the volume are filled with recommendations based on the findings of the Committee and predictions of what the city of the future will be like. Truly it is an inspiring picture that the author draws for us of the great city of 1965 with its great civic center, the rivers lined on all sides with two-level roadways, the lower for commerce the upper for drives along which magnificent dwellings arise. The neglected Harlem River valley has become the setting for a scene of great beauty, comparable to the river Seine as it passes through Paris, and the vast wastes of the Hackensack Meadows have become a thriving industrial center. Everywhere great boulevards lead out to pleasant suburbs and metropolitan farms; traffic lines are well organized, and ample provision is made for the landing and maintenance of all sorts of aircraft. In discussing the probable style of the city's future buildings, the author says, "No conception of a future city can be complete which does not seek to obtain beauty as a by-product of healthful living and working conditions and of orderly growth. The architect is the agent through whom this beauty has to be expressed in buildings. He is the instrument by means of which buildings reveal the soul of the city. Individually, each building expresses the personality of the artist; collectively they express or should express the dominant emotions of the people." Surely it should be the aim of every architect to know his city and its people to the greatest possible degree, that in his buildings he may so "reveal the soul of the city" as to express its spirit.

MASTERING A METROPOLIS. By R. L. Duffus. 302 pp. 5¾ x 8½ ins. $3. Harper & Brothers, 49 East 33rd Street, New York.

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CONTENTS

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

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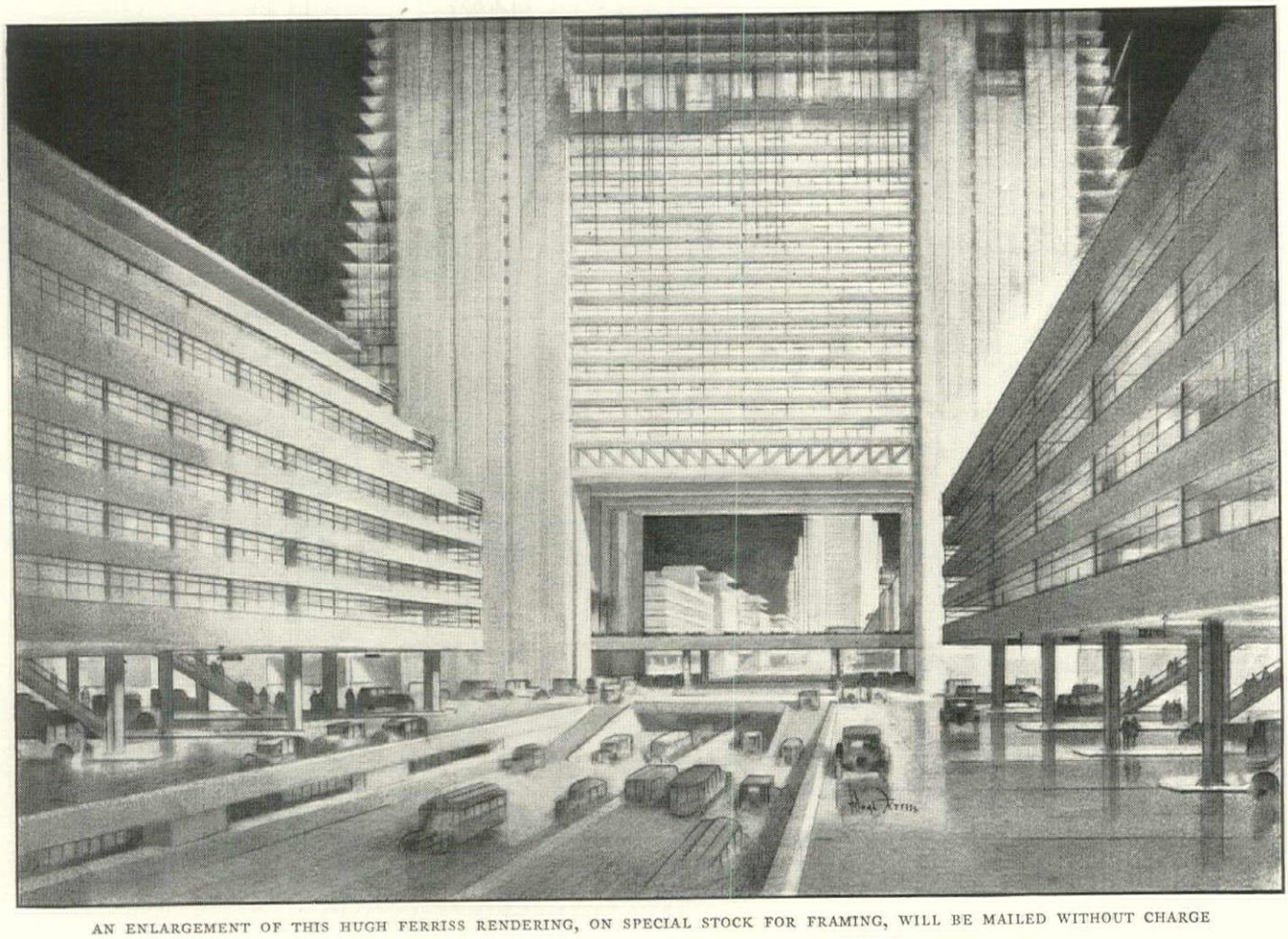

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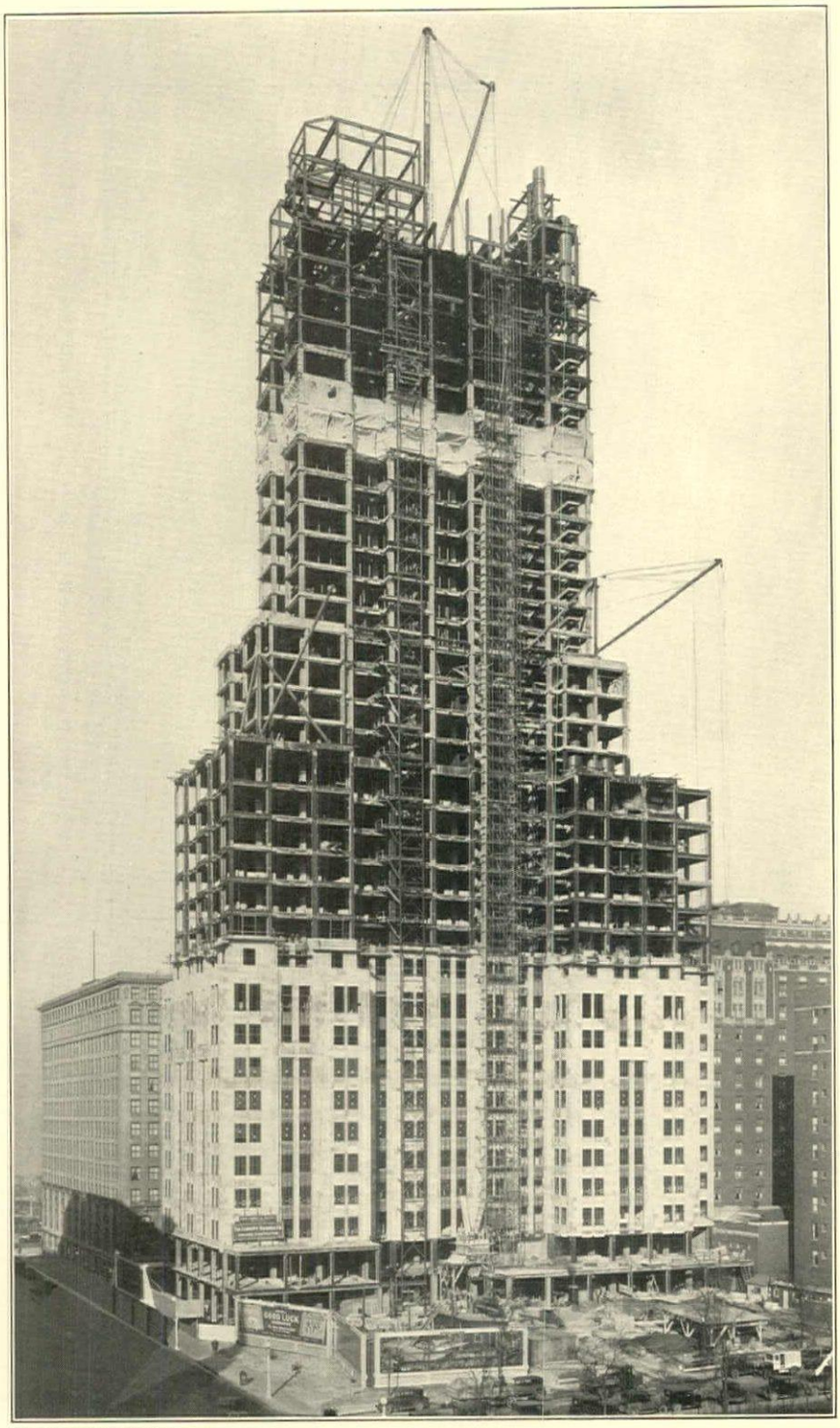
IN this issue we take pleasure in presenting articles by our two new Contributing Editors, Royal Cortissoz and Kenneth M. Murchison, who will write regularly for THE ARCHITECTURAL FORUM. With Mr. Cortissoz' article, "The Vitality of Tradition," is a group of exceptionally distinguished photographs by Arnold Genthe, taken in Classic Greece. In juxtaposition to Tradition, the spirit of Modernism is set forth in the words of Frank Lloyd Wright. Ralph Walker's thoughtful discussion of Skyscrapers is preceded by plates showing a modern telephone building in Newark, N. J., by Voorhees, Gmelin & Walker.

Kenneth M. Murchison opens his regular feature, "FOR ARCHITECTS ONLY," with "Be Businesslike," on page 750, Part Two, written in his own inimitable style.

We take this opportunity of welcoming Mr. Cortissoz and Mr. Murchison as Contributing Editors of THE ARCHITECTURAL FORUM.

THE EDITORS.



Kaufmann & Fabry

CONSTRUCTING THE PALMOLIVE BUILDING, CHICAGO

HOLABIRD & ROOT, ARCHITECTS

THE
ARCHITECTURAL
FORUM

VOLUME LII NUMBER FIVE

MAY 1930

STRUCTURE AND EQUIPMENT OF THE PALMOLIVE BUILDING

HOLABIRD & ROOT, ARCHITECTS

BY

HENRY J. B. HOSKINS

QUITE contrary, perhaps, to what might be expected, judging from the exterior view of this towering structure, there were comparatively few problems of an unusual nature encountered either in the preparation of the drawings or in the erection of the building. Its purpose, that in the main of providing units for typical office accommodation together with shops on the first and second floors, presented a comparatively simple problem.

WORKING CONDITIONS. The principal point of interest would appear to lie in the speed of its erection in the face of unusually severe weather conditions. It was erected in the winter of 1928-29, one of the most severe in the 40 years of the Chicago Weather Bureau history. Located on the edge of Lake Michigan, the Palmolive Building presented a perfect target for the zero winds that came tearing down over the 360-mile open stretch of water to the north. Under these conditions working upon the scaffolds was impossible, and men working upon open floors were often lashed to beams to prevent them from being blown overboard. It was impossible to hoist steel or stone, and then on calm days men had to employ blow torches to melt away the snow and ice. In spite of this, the definite building schedules were adhered to and with very few accidents.

Work on the caissons and foundations was commenced on March 5th, 1928, and completed on August 1st, when the towering steel structure soaring 468 feet above the street level was begun. Tenants were installed in their offices, occupying two and one-half floors by the 1st of April, 1929, just eight months after the steelwork was begun, and the entire building was completed within the following month.

FOUNDATIONS. All of the 78 main building columns are supported on cylindrical concrete caissons carried down to solid rock which occurs at a level approximately 132 feet below the sidewalk grade. Work was started at the site by driving sheet steel piling around the south, west, and north sides of the lot. On the east side the presence of a hotel structure rendered this unnecessary. This sheet piling was considered to be necessary by reason of the fact that the clay line of the neighborhood is about 26 feet below the street surface or 12 feet below the level of Lake Michigan. Sand is found above the clay, and of course that portion below the lake level is water-bearing. Therefore the sheet steel piling was driven several feet into the clay in order to minimize water troubles during construction. The lot was then excavated to a depth of about 16 feet below the street grade, and all caissons were sunk from that level.

After the concrete caissons were poured up to the required level, which in most cases was considerably below the excavation line, the steel columns were lowered into the open wells, accurately leveled by means of the leveling screws, which are indicated in Fig. "A" and grouted in and the first tier of columns lowered and accurately set upon their bases.

STRUCTURAL FRAME. With this much of the work done, it was possible to carry up the structural steel frame of the building quite independently of the remainder of the work below grade. While the structural steel frame was being

erected, all retaining walls and other concrete work below grade was carried out. Thus the building work was extended upwards at the same time that it was extended down without the two operations interfering with each other in the least. In fact the building above grade was fairly well along before the sub-structure work was completed.

The exterior retaining walls were poured directly against the sheet steel piling which was left permanently in place, and special attention was paid to the quality of concrete in order to make sure that there would be no water leakage after the building was completed.

WINDBRACING. Great care was used in designing the windbracing of the structural steel frame. The horizontal wind pressures to be resisted were assumed at somewhat higher values than required by the current City Building Ordinances inasmuch as the building is very high and relatively narrow with considerable exposure. Special details were used at offset floors where necessary for the purpose of transferring the heavy horizontal wind shears from one system of windbracing brackets to another.

The floors generally were of the steel pan and concrete joist type carried upon structural steel girders. As a rule, 30-inch pans were used, making the concrete joists about 3 feet on centers.

Due to the many breaks in the surfaces of the exterior walls, the problems encountered in supporting the stone facing of the building on shelf angles were rather unusual and difficult. Naturally this large number of setbacks, requiring the offsetting of exterior columns in each case, made the structural steel detailing quite exacting. The illustration shows one of the many girders used for supporting offset columns and also indicates details of the connections of one of them to the upper and lower columns.

HEATING AND VENTILATION. The building is equipped with three boilers for heating, of 250 HP each. These boilers are operated at low pressure and are arranged with Dutch ovens set in front of the boilers which enclose over-feed stokers. The stokers operate on natural draft to burn Illinois screen coal which is supplied by gravity from the street level to overhead bunkers which feed direct to the stoker hoppers through weigh lorries. Ash removal is taken care of by a system of endless bucket elevators discharging to trucks at grade.

A boiler of the firebox type is installed for hot water heating in the summer time and for the burning of rubbish. This boiler is provided with downdraft water tube grate and is connected to steam coils in the heaters for summer use.

The heating system throughout is of the vacuum return type and is provided with motor-operated combined vacuum and boiler feed pumps. Except in a few locations where the radiators are entirely concealed, the radiation is of the paneled or phantom type and is hand-operated except in special instances where it is automatically controlled. The steam distribution piping is arranged for upfeed lines to the basement and first floor, and two distribution lines, one below the 18th floor and one below the 37th floor, each feeding down. This arrangement was governed somewhat by the occupancy of the building to provide the measuring of steam to the upper and lower sections.

VENTILATION. In the basement and some of the office spaces on the upper floors, automatically controlled air supply systems with exhaust are provided. These systems are arranged to care principally for the storage spaces and offices of the Colgate-Palmolive-Peet Company. Other sections of the building, including restaurants and office spaces are also provided with special ventilation. The fans are motor-operated and generally with direct connections between the fans and motors, and the heating units in connection with the air supply are thermostatically controlled. Certain spaces in and under the subbasement are occupied by a substation of the

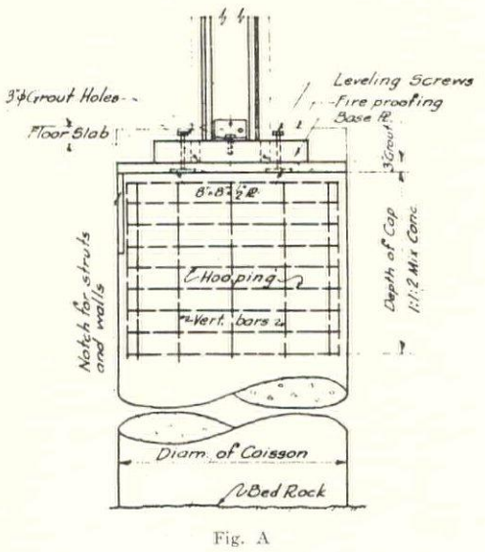


Fig. A

Typical detail of caisson, the Palmolive Building, Chicago. Holabird & Root, Architects

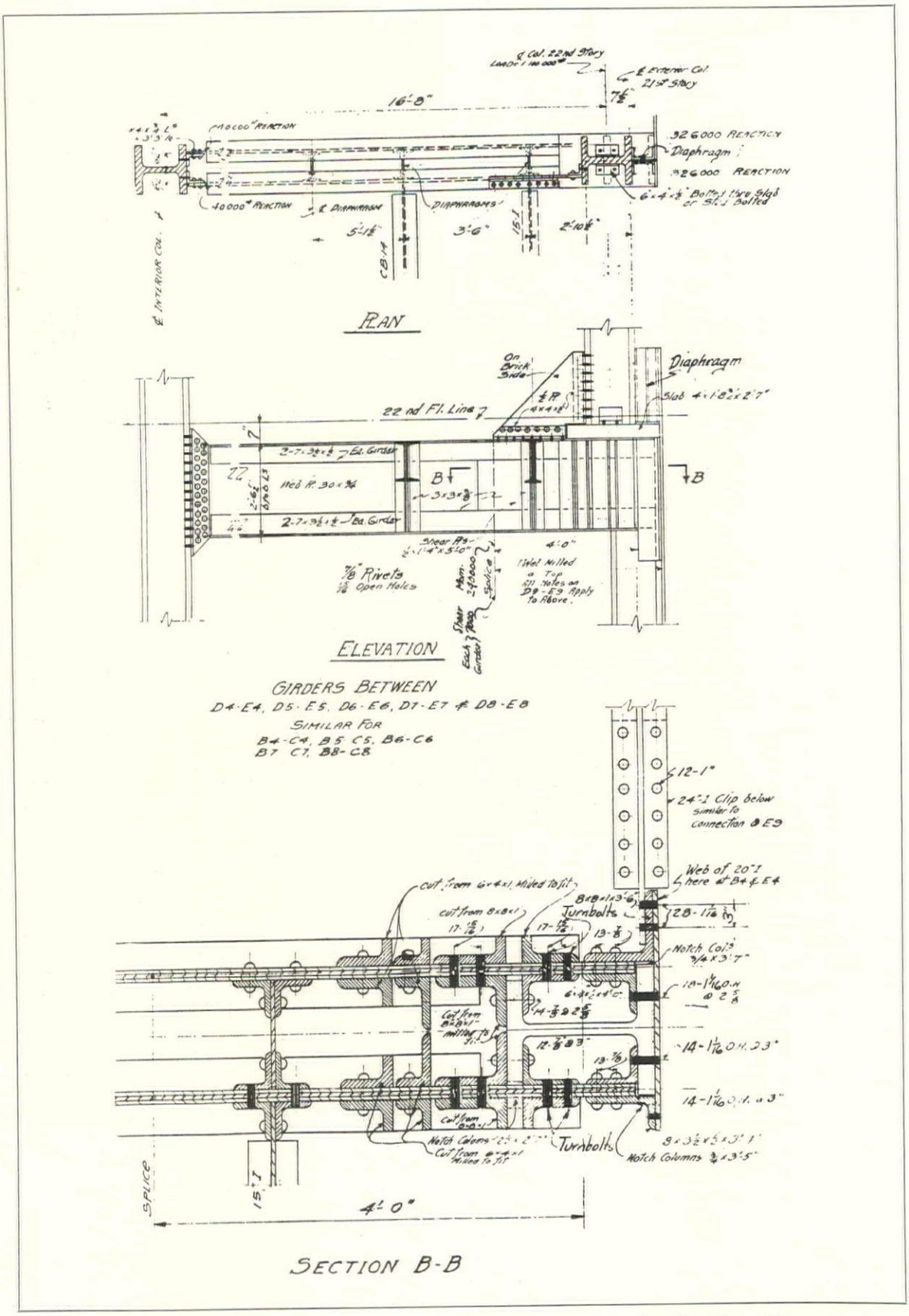
The Palmolive Building, showing steel frame with wind bracing and pan system of structural floor construction. Holabird & Root, Architects

Commonwealth Edison Company, and its requirements made necessary the provision of large volumes of air to these spaces from the outside.

FIRE PROTECTION AND PLUMBING. The building is provided with a moderate amount of sprinkler and piping for fire protection in the basement and shop spaces and in the rubbish chutes and waste paper rooms. A full automatic fire pump with standpipes and hose outlets and with hose at each floor is provided to maintain pressures of 50 lbs. on the highest roof tower. The standpipes for the sections below the tower are on a separate pump operating at lower pressure. Each of these two fire pumps is rated to discharge 500 G. P. M. on the roofs of the main building or of the tower section.

The water supply system is divided to provide a separate pressure for the tower and for the spaces below the 26th floor. The upper level is provided with a water supply from house tanks in the tower feeding down to the 18th floor and the spaces below the 18th floor are provided with water from tanks located on the 19th floor. House pumps are motor-driven, taking suction from a duplicate system of supply lines from the city mains and all pumps are in duplicate and are of a centrifugal motor-driven type. Basement ejectors are of the vertical submerged centrifugal type and are set in duplicate to take care of the building and also to provide against flood conditions in the Commonwealth Edison substation where they are also acid-proof.

ELECTRIC WIRING. The building is provided with a comprehensive system of wiring and equipment to provide for the distribution of electrical facilities. Electric service is direct current, 110-220 volts for lighting and 220 volts for power, all obtained from the Commonwealth Edison Company's system. Service mains are brought in underground from a man-hole in Walton Place to the main service and distribution switchboards which are located in the sub-basement. Three



Details of steel framing to accomplish setback of columns, Palmolive Building, Chicago

separate switchboards are provided, one for the main service disconnect switches, one for lighting service distribution and one for power service distribution, the latter two having individual main service circuit breakers. The main portion of the building is provided with two wire shafts and the tower section has one wire shaft. The metering is arranged for the re-sale of current by the owners to the various tenants by means of a master meter located on the main switchboard and the individual tenant watt hour meters in the wire shafts on the various floors.

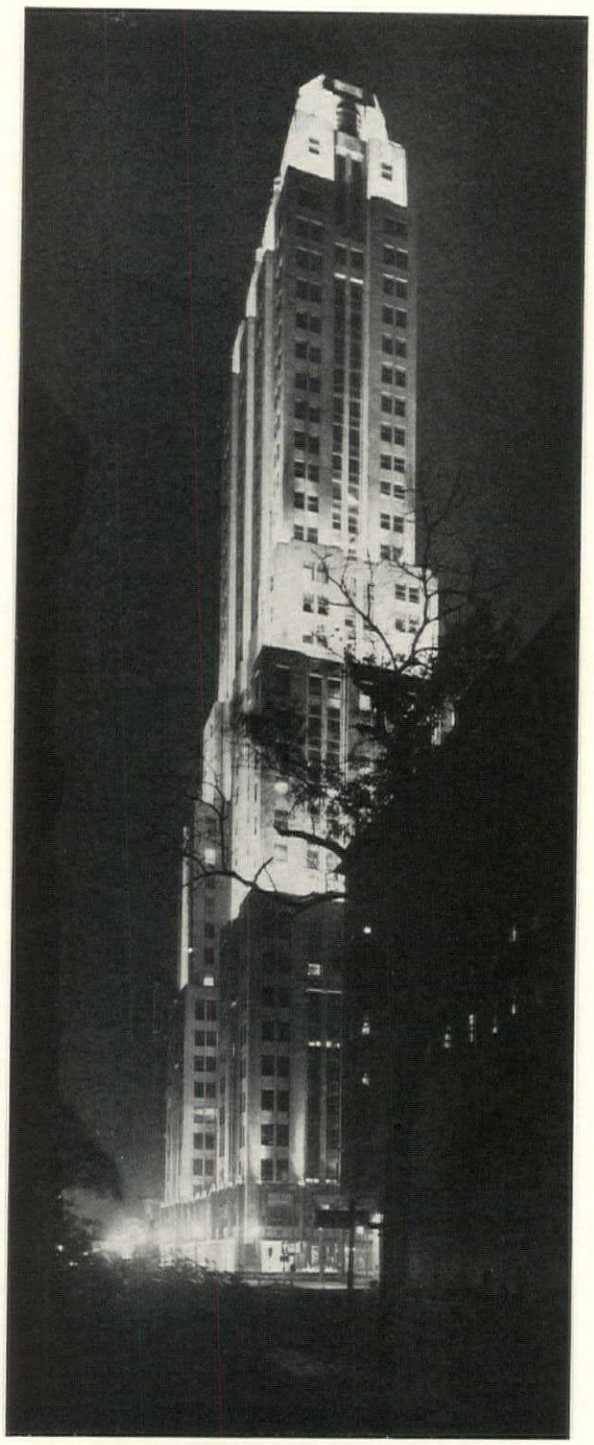
The branch circuit wiring on the rentable office floors is arranged for by an ovalduct system of distribution for the various floors. Under this arrangement, the "home-run" circuits from the cutout centers are brought to master outlets in the corners of the various typical office bays and are terminated in these locations in the initial installation until such times as the individual tenant requirements can be determined. When the tenant layouts are available, extensions are made with ovalduct from the master outlets to local outlets.

On certain of the open floors occupied for general office use, underfloor duct system has been provided for high and low tension distribution. A separate system of wiring and central apparatus is provided for the emergency lighting of public corridors, stairs and exits throughout the building. There is a low tension supply and distribution system provided to accommodate tenants' requirements for signaling service. This service is at 24 volt D.C. furnished by duplicate motor generator sets and distributed by means of vertical risers at intervals along the outer walls of the building and with distribution cabinets at each riser on each floor.

TELEPHONE SERVICE. Telephone service distribution is provided in a similar manner except that distribution terminal cabinets around the outer walls are connected individually to the main riser wire shafts. The location of these low tension and telephone service cabinets on the outer walls insures their permanent location without regard to tenant subdivision requirements and gives ready access to wiring space provided at the rear of removable wood baseboard throughout the office spaces.

SIGNAL SYSTEM. A building signal system is provided consisting of colored light annunciators in the public corridors which are operated by control switches in the office of the building, thereby enabling the building manager to summon various maintenance men with the least possible delay.

CLOCK SYSTEM. An electrically synchronized clock system is provided and also distributed throughout the building to afford time service facilities to such tenants as may desire this ser-



Night photograph of the Palmolive Building, Chicago, showing floodlighting produced by the arrangement of lights according to the plan shown on the next page

vice for employes' recorders, time stamps, time indicating clocks, etc.

There is also a portable clock system provided for watchman's service throughout the building.

FLOODLIGHTING. An elaborate installation of floodlighting has been provided covering practically the entire exterior of the building and utilizing a total of 372 projectors which have a current consumption of approximately 175 K.W. These projectors are distributed in general on all roof decks on all sides of the building with the exception of the central section on the north at which location the value of flood lighting would be limited due to obstructions in viewing the lower portion of this elevation. From the silvery effect produced by the illumination, the name "*La Tour d'Argent*" has been derived and given to the restaurant on the first floor.

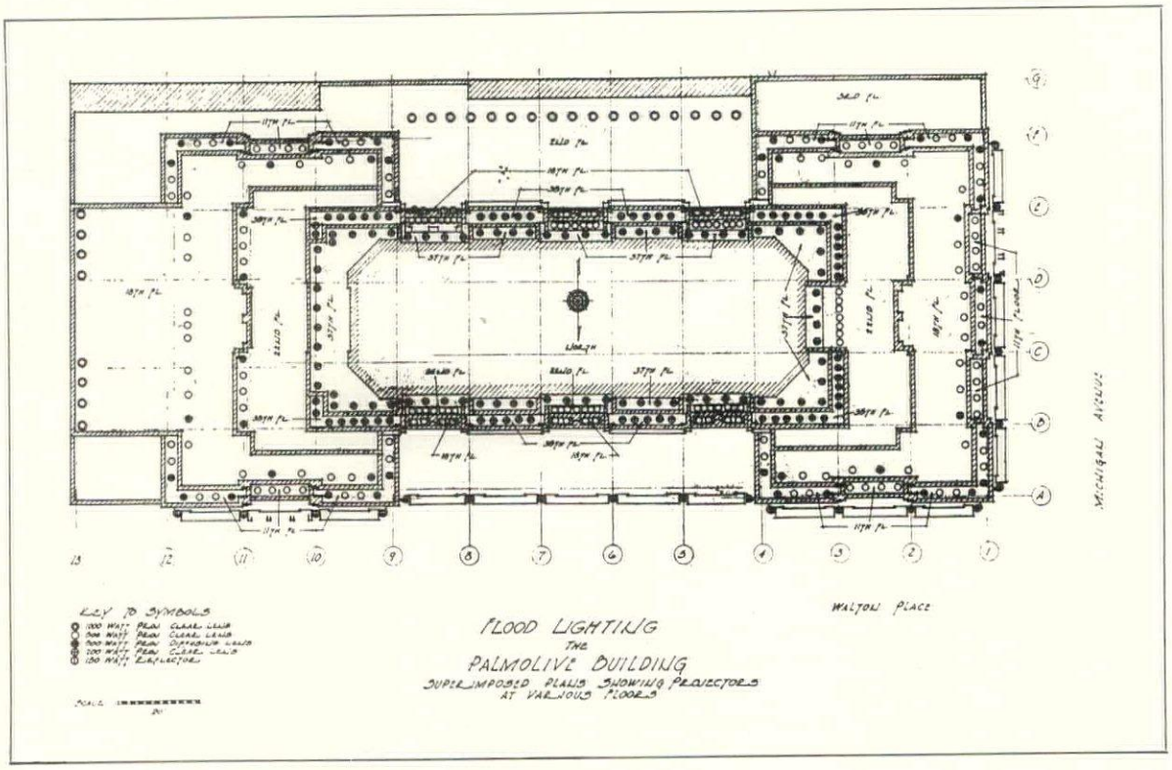
ELEVATORS. The building is equipped with a total of twelve high speed, gearless traction elevators. These elevators are arranged in two groups, one for express service and one for local service, each consisting of six elevators. The six local elevators serve the 1st to 15th floors inclusive. Four of the express elevators serve from the 15th to the 34th floors inclusive, and the remaining two express elevators serve from the 15th to the 36th floors inclusive. The duty ratings of the elevators are 3,000 lbs. at 600 feet per minute for the local service and 3,000 lbs. at 700 feet per minute for the express elevators.

All of the elevators are of the signal central type, incorporating automatic stopping and levelling and both the cab doors and the outer enclosure doors are equipped with automatic electric door operators. In a recent test the world's record for speed in operation would appear to have been broken. By touching the buttons for the first ten floors, the elevator stopped at each floor, the doors were opened and closed and the trip up was completed in 55 seconds and that down in 54.

The elevator installation is equipped with all signaling accessories including illuminated position indicators over the first floor opening to each elevator and also multi-light position indicators in each cab which automatically register and indicate the location of the cars during the travel in the hatches. The number, speed and location of the elevators for the different services are based upon the area and assumed occupancy of the various offset sections which areas are as given in the table:

1st Floor	15,885	Square	Feet
2nd to 10th Fl.	11,850	"	"
11th to 16th "	10,500	"	"
17th to 21st "	5,800	"	"
22nd to 32nd "	4,100	"	"
33rd to 34th "	3,842	"	"
35th to 36th "	3,196	"	"
37th "	2,914	"	"

The assumed occupancy naturally varies with the type and would probably average approximately one person to each 100 square feet.



FLOOD LIGHTING
THE
PALMOLIVE BUILDING
SUPERIMPOSED PLANS SHOWING PROJECTORS AT VARIOUS FLOORS

ARCHITECTURE AND BUILDING ECONOMICS

BY

HENRY A. BABCOCK

EDITOR'S NOTE. Positions are attained and maintained in any division of affairs commensurately to the contributions made thereto. The building industry, a principal division of affairs in this country, is subject to constant change as a whole and necessarily in *all* of its constituent elements. The practice of architecture undergoes corresponding changes.

It is necessary for architects to be familiar with all the components of the building industry unit and by active, intelligent participation maintain a controlling position. A failure so to do is an inevitable relinquishment of control to others.

Practically all building construction is financed with borrowed capital. Its proper investment is controlled by certain basic laws developed largely by experience rather than by academic assumptions.

THE ARCHITECTURAL FORUM presents an address by Henry A. Babcock, of William H. Babcock & Sons, Chicago, delivered before the Chicago Chapter, American Institute of Architects, February 11, 1930, in which is explained the relation of the architectural plan to the economic experience of a structure. The explanation is clear and explicit. It includes an analysis of two structures, comparing the conditions that produce certain income results. The relation of the plan to income is apparent. The generally accepted truism that building cost is not the measure of value is demonstrated. The function of the architect is well described in the statement: *"The man who says cost is value fails to capitalize the skill of the architect."* To attain that skill is an essential objective of the architect.

THE best starting point for any technical discussion probably lies in a definition of terms. Now, to be sure, I am not going to attempt a definition of Architecture before a group of distinguished members of that profession. By the same token, I am not going to try to define Economics either,—there may be some economists about the premises. It will be necessary, however, to understand just what is meant by the statement that a building enterprise is "economic." In a word, *a building enterprise is economic when its value exceeds its cost.* If the cost exceeds the value, it is *uneconomic.* This definition is obvious enough when applied to some operation outside of real estate. For example, suppose it costs a manufacturer of paper pulp $20 per finished ton of product for his raw materials, $30 per finished ton for manufacturing costs, and $10 a ton for freight costs. This is a total of $60 per ton. Suppose the finished product,—the paper pulp,—can be sold for only $50 a ton. There would be a loss of $10 on every ton sold, and such an operation would, of course, be uneconomic.

Suppose a sales engineer calls on this same manufacturer to interest him in installing some improved equipment. This engineer is able to demonstrate that the new equipment will cut the cost of manufacturing $3,000 per year. The only hitch seems to be in the cost of the machine, which is $100,000 installed. The saving then is only 3 per cent per annum on the investment. The manufacturer can earn this much by putting his money in a savings bank, and twice as much by buying bonds. The conclusion is that the investment is not warranted by the prospective rate of return, and that, therefore, the machine is uneconomic. Of course, it is uneconomic for a different reason than applies to the case of the product costing $60 and selling for $50. In that case the operation itself was uneconomical, while in the case of the machine costing $100,000 the investment was uneconomic. In the one case there is an operating loss; in the other there is an inadequate return. $100,000 is worth more than $3,000 a year. To pursue this idea a little further, let us suppose that there are plenty of opportunities in this paper mill to make improvements that will pay 10 per cent on the investment. On that basis the manufacturer would not be warranted in paying more than $30,000 for the machine that is going to save him $3,000 per year. In other words, the value of the machine is only $30,000, whereas its cost is $100,000. The cost exceeds the value, so the machine is uneconomic.

This test of the economic soundness of a project is clear enough when applied to something outside of the field of real estate. It ought to be equally clear when applied to a real estate enterprise, but apparently a great many people justify the costs of such projects by the argument that the costs are "fair"; in other words, that the cost has been reduced as low as possible by competitive bids. The value test isn't applied at all. Absurd as it may sound, set-ups are actually made backwards. The land is to cost or is "worth" so much, the building is to cost so much, and the financing costs are so much. The argument pro-

ceeds along the line that the owner is entitled to a fair rate of return on this total cost, and the rental schedules are set up accordingly. The whole argument presented in this paper refutes this view. The National Association of Real Estate Boards, through the Appraisal Division, has gone on record condemning summation appraisals and their attendant costs.

The economic problems involved in building are of several different kinds. Some of these are only remotely related to architecture. There is one type of problem which will not be discussed here because of its simplicity and because it is not related to the main argument. That is the problem of determining whether a certain required floor area can be more economically produced by increasing the number of stories and reducing the amount of land. Such problems are solved by comparing the cost of the land with the cost of additional stories. They are similar to such problems as involve the determination of the type of truss which is most economical under a given set of conditions.

OVERPRODUCTION

Probably the most important question involving building construction before American communities today is the problem of oversupply and overbuilding. If we confine our attention for the moment to those classes of properties which are either to be rented to produce an income or to be sold in the market (as for example, office buildings and dwellings), it is immediately obvious that the condition of the market for such properties at the time of construction is a very important factor in their respective successes.

The problems of overproduction in the real estate field are engaging the attention of bankers, economists, owners and architects throughout the country. It is high time that we realize that the erection of the third butcher shop in a community which can profitably support only two is an economic crime. It is highly desirable that we smooth out the violent fluctuations in our building curves and control our building activities so that they keep pace with the growth of demand. Please do not misunderstand this. This is not an argument against replacing old fashioned and inadequate structures. I am not advocating the protection of unearned values in obsolete improvements; but there is no profit in erecting buildings which cannot be rented because of an existing oversupply. The determination of the supply and the demand constitutes a question which is fairly up to the real estate appraisers. Their surveys and analyses must be carefully and conscientiously carried out from a disinterested point of view. Such surveys show existing vacancies and the probable rate of absorption of new space.

Before an economic study can be made of a specific proposed office building enterprise, for example, it is necessary to know something about the current competitive building program in the community, as well as to know the existing vacancies and rate of absorption. With this information, the rate of filling of the office building can be roughly determined, and hence the expense of carrying the project from completion of the physical structure to normal occupancy can be approximated. It is illuminating to consider these expense items as additional costs and add them to the rest of the investment. Now anything that adds to cost without increasing earning power narrows the margin between cost and value. The cost of carrying a partially rented building, therefore, decreases its chances of economic success. In extreme, over-built situations these carrying charges can easily produce an uneconomic enterprise.

THE ECONOMIC BALANCE

It may be interesting to discuss very briefly the economic balance which should exist between earning power, total cost, and financing. In any properly set-up building project the earning power is estimated first. Next the entire cost is determined, *including the cost of carrying from the date of completion to normal occupancy*. At this point the first balance is made. If the anticipated earning power does not show a satisfactory return on the total investment, the case is similar to that of our $3,000 income from the $100,000 machine, and the project is uneconomic. If it does show a proper return, the next step is to determine the capital structure or financing.

Financing an enterprise is a little more complicated than merely getting the largest loan it is possible to extract from the bankers. And financing includes the junior financing and the equity financing, as well as the first mortgage financing. Now, what are the requirements of the capital structure? Well, in the first place, the total capital from all sources must at least equal the total cost. Obviously, you say. It is certainly obvious, and yet there have been numerous deals financed in which inadequate provision was made for tenant installations, extras, bond interest during the renting period, and contingencies. More than one project has run out of money before reaching its full earning power.

So much for the first requirement. As for the second, the interest, sinking fund and other requirements of the securities involved must be such that the total does not exceed the normal earning power. This is another elementary and obvious statement, and it would not be worth making if it were not for the fact that, in a number of newly constructed buildings with which I am familiar, the sinking funds set up originally,

especially on the second mortgage bonds, are so heavy and begin so soon that the total debt service exceeds the earning power. The trouble is not by any means always the result of overestimating the earning capacity. In many instances the interest and sinking funds are determined solely by the demands of the market. This three-way balance, then, can be stated in these words: The total required investment, including financing and carrying charges, must be such that the earning power shows an adequate return on the investment, and the capital structure must be so set up that the total capital from all sources covers the entire required investment, and must be so arranged as to debt service and dividend requirements that the total of such requirements per year does not exceed the earning capacity.

THE UNECONOMIC ENTERPRISE

The failure to establish such a balance in setting up a project indicates that in some particular the enterprise is uneconomic. In practice, this balance is determined by making a spread sheet showing the cash available from all sources (from the financing and from operations) by periods, also showing the cash requirements for the same periods. The accumulated cash surplus cannot vanish at any point if the deal is sound. If it is unsound, this cash surplus will run into red figures; in other words, the accumulated requirements will exceed at some point the accumulated availables. This excess of cash available over cash requirements at every point is a necessary but not a sufficient condition that the project be economically sound. The other condition is that the rate of return be adequate in view of the risk of the specific enterprise under consideration.

Failure of a project to balance on the initial set-up may not be fatal. In a great many instances the fault can be remedied. The trouble may lie only in inadequate or unsuitable financing. In many instances, however, the trouble is much more deep-seated and has its root in excessive costs. In such cases absolutely nothing is gained by proving that the cost cannot be reduced; somewhere costs *must* be cut. It makes not a particle of difference how many other buildings were built at the same or higher figures. If the deal doesn't balance, something must be changed. Unfortunately, in the past few years, the tendency has been to "high-pressure" the appraiser in an attempt to get him to increase his estimate of net earning power. I say "unfortunately," because increasing the estimate of earnings to the point where uneconomic costs can be justified, (on paper) doesn't produce the earnings when the building is finished. You have all heard the story of the college professor who asked his class, "How many legs has a lamb?" "Four," they said. "Correct," said the professor. "Now if we call his tail a leg, how many has he?" "Five," said the class. "No," said the professor, "calling his tail a leg doesn't make it one." And so with these dressed-up earning forecasts. Adding a fictitious 10 or 20 per cent to an originally sound earning forecast never yet paid any bond interest with the extra 10 or 20 per cent.

ARCHITECTURAL PHASES

Up to this point we have been discussing the non-architectural phases of building economics. We now come to the relation between architecture and the economics of building, which, after all, was the title of this paper. Suppose that a building as originally designed is uneconomic because of the unbalanced relation between its cost and its earning power. Now there enters the architect. He can work along two separate lines of endeavor. First, there is the possibility of altering the design or the specifications to reduce the building cost. Second, there is the possibility of increasing the earning power by improving the design. It may be possible to do both. Even apparently slight changes may make the difference between an economic and an uneconomic project. I know of one instance in which moving the smoke stack in a proposed office building from the inside of the alley wall to the center of the building increased the value over $200,000. This change (which did not increase the cost at all) produced another rentable unit on each of 22 floors. Don't forget that earning power is value. The secret,—if it is a secret,—of sound economics in building is to lower cost and increase earning power. Don't misunderstand this. Lowering cost doesn't mean "cheapening" the product. It doesn't mean the elimination of beauty or the substitution of inferior materials and equipment. It means the best use of materials, driving good bargains and getting your dollar's worth.

It is not at all strange that the architect has in his hands the power to increase the earning power of a project, whereas the appraiser has not. The latter simply *measures* the earning power of the design submitted to him; the architect can *change* that design. *The man who says cost is value fails to capitalize the skill of the architect.*

Just a word about beauty and its economic value. The old idea that beauty in a commercial building is an unnecessary luxury and a waste of money or worse, has, I believe, passed away not to return. In the last few years it has become generally recognized that beauty of design and appointment pays dividends. Ugly buildings and awkward buildings stand half empty, while their graceful or majestic neighbors draw the tenants. Beautiful buildings frequently overcome the handicap of poor locations.

ARCHITECTURE, EARNING POWER AND COST

In regard to the relation of the architect's work to the earning power and cost of a projected enterprise, it may be interesting to discuss a specific office building design for a given site. Time will not permit a detailed discussion, and in particular it will not be possible to work through an analysis of the market into which this project is assumed to be thrust. For purposes of illustration we shall assume that this market has been studied and that the rate of renting of our proposed building has been determined within the limits of accuracy possible in such cases, so that we have before us the problem of determining the economic soundness of the proposed design.

We shall assume that the site is a downtown corner, 180 x 180 feet, with an alley on one side and a building line on the other. The structure must conform to the building and zoning ordinances of the city of Chicago. An office building with stores on the first floor is indicated. The accompanying sketch plans were prepared by my associate, John S. Small, A.I.A. The design adopted is that of a center closed court with the tower near the building line side. Scheme "A" shows the arrangement and the rentable areas of the various units. Schedule No. 1 summarizes appraised rentals, miscellaneous income, vacancy allowance, operating expenses, and net earnings.

The rental schedules were prepared in detail, the anticipated rental of each separate unit, both stores and offices, being determined. I wish to emphasize the fact that these rentals are prepared on a unit basis and not on a square foot basis. For example, unit No. 1 on the eighth floor, containing 1,135 square feet, was appraised at $210 a month, or $2.22 per square foot, whereas unit No. 5 with 417 square feet was appraised at $92.50 a month, or $2.66 per square foot. The difference in square foot value lies in the shape of No. 1 space and its lack of daylight as compared to No. 5. Similarly, No. 21 is worth, say, $97.50 per month, or $2.81 per square foot, although identical with No. 5 in every respect except that No. 21 has street exposure and No. 5 faces on the alley. A definite rental schedule was thus built up, taking account of depth, width, number of windows, amount of dark space, exposure and elevation in the building, as well as other factors such as wire glass windows and fire escapes. Each of these factors is given a certain and constant weight in determining the rental value, unit by unit. Experience shows that, while such schedules may not be adhered to exactly in the actual renting of the building, they average out very well, as indeed they should. The operating expense schedules are also set up item by item. Only the totals are given in Schedule No. 1.

DEPRECIATION AS RETURN OF CAPITAL

It will be noted that depreciation is not included among the items of expense. In an earlier article* I pointed out that in the case of non-investment properties, such as private dwellings, the gradual lessening of value is an expense of occupation, but that in the case of investment properties, office buildings for example, depreciation can be considered as a return to the investor of the original capital invested, such return being made year by year out of net earnings. In other words, in the case of investment properties, annual net earnings may be treated as annuities, returning to the stockholders annual dividends on the investment and annual liquidating dividends. The sum total of such liquidating dividends, over the life of the enterprise, equals the original investment. In the illustration given here, depreciation is treated as a return of capital and not as an expense. In the preceding general discussion it was indicated that the second step in the analysis was the estimate of cost. Inasmuch as the total cost includes the cost of financing, it is desirable, at this point, to determine the kind and amount of financing to be done. We shall assume that the plan contemplates first and second mortgage bond issues, with the equity provided by the sale of common stock to the syndicate owners.

EARNINGS AND COST

Let us assume also that the first mortgage interest requirement must be earned twice, and that on this basis the money can be borrowed for 6 per cent per annum and the loan sold to the underwriters at 92. The estimate of normal annual net earnings given in Schedule No. 1 was $987,839, half of which is $493,920, which in turn is 6 per cent on $8,232,000. We will assume a first mortgage of $8,100,000. The amount of the second mortgage will be assumed at about 25 per cent of the first, or $2,000,000. The second will carry an interest rate of 7 per cent and can be sold, let us say, at 90.

We now turn back to the survey of rental market conditions, which survey was the basis of the forecast of the rate of filling the building. Assume that, in this example, the predicted occupancies are:

At completion	63.5%	
First 6 months	70.0%	av.
Second 6 months	78.0%	"
Third 6 months	82.5%	"
Fourth 6 months	85.0%	"
Fifth 6 months	87.5%	"
Sixth 6 months	89.0%	"
Seventh 6 months	90.0%	"
Eighth 6 months	90.0%	"

* "Depreciation and Obsolescence," *National Real Estate Journal*, June 24, 1929.

The building will not, in all probability, reach normal occupancy until during the fourth year of operations, which is the fifth year that the bonds will have been outstanding. It is decided then to start retiring principal of both first and second mortgage bond issues, five years from date of issue. The sinking fund on the first is to be 1 per cent per annum plus the savings in interest; and on the second, 2-1/3 per cent per annum plus the savings in interest. The calculations will not be given here, but the results are that $290,000 semi-annually on the first mortgage and $96,000 semi-annually on the second mortgage will meet the entire funded debt service.

According to the net earnings estimate, we have available, beginning in the fifth year, $987,839 per year. The total debt service of both issues is $770,802, leaving $217,037 per year for the common stock. We now assume that the syndicate owners require at least 10 per cent on their investment in common stock, on the average over the life of the enterprise. After the fifth year there is available $217,037 per annum. After the second mortgage is retired, this increases, and it increases again after the first is paid off. Furthermore, complete analysis indicates that there are probable stock earnings before the fifth year. Time will not permit giving the details of this calculation, but the syndicate owners are warranted in investing not over $2,000,000.

To summarize, we have determined that the total investment justified by the probable earnings is:

First mortgage	$ 8,100,000
Second mortgage	2,000,000
Common stock	2,000,000
Total	$ 12,100,000

The next step is to determine the cost of the project and see if it comes within this limit. We shall assume that the land cannot be purchased for less than $100 per square foot, or $3,240,000. The cost estimate is given in Schedule No. 2 and totals $11,740,055 exclusively of carrying charges and without taking account of interest earned on balances and operating revenue. So the question is as yet unanswered if the project can be financed with a total of $12,100,000.

THE "SPREAD SHEET"

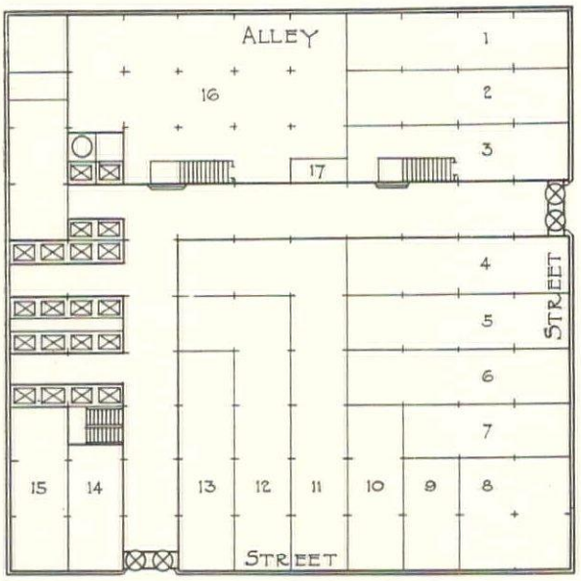
It is now necessary to make a "spread sheet" of cash available and cash requirements. This analysis is given in Schedule No. 3. It indicates a failure to balance in the first half of the first year of operations. The maximum deficit occurs in the first half of the second year of operations and amounts to $288,988. This difficulty could be avoided by increasing the owners' investment, but we have already shown that $2,000,000 is the maximum that they are warranted in putting in, in view of the earning expectancy. We shall assume that none of the cost items can be reduced to bring this project into balance, and so, if there is a solution, it must lie in an improved design which will cost less to build or have a greater earning power, or both.

Scheme "B" shows a deep court on the building line and a shallow open court on the front of the building. The tower rises from the recessed front line. The factors which were used in determining the rentals of each unit and the expense items in Scheme "A" were used without change in setting up Scheme "B." Schedule No. 4 gives the summary of appraised rentals, miscellaneous income, vacancy allowance, operating expenses, and net earnings. It will be noted that the rentable area of "B" is less than that of "A," but that the net earnings are greater, amounting to $1,001,636. In Scheme "A" we borrowed $8,100,000, with net earnings of $987,839, so, maintaining the same ratio, the first mortgage in Scheme "B" will be $8,250,000. The second mortgage is again assumed at $2,000,000 and the common stock at $2,000,000. The discounts, interest rates and sinking funds remain unchanged. In Scheme "B" the total investment justified by the probable earnings is:

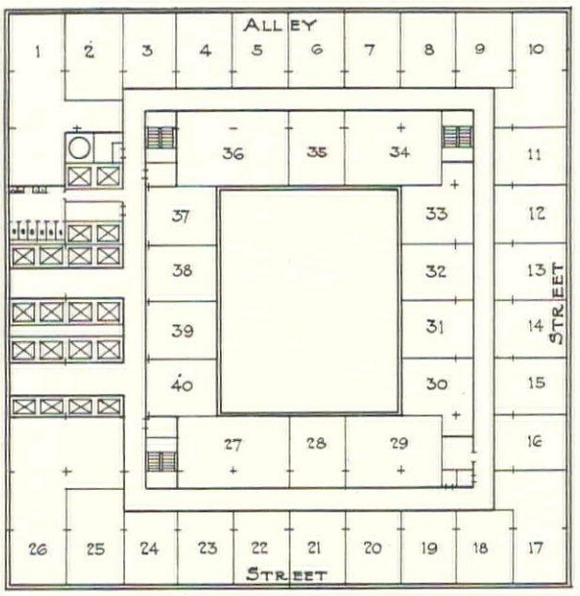
First mortgage	$ 8,250,000
Second mortgage	2,000,000
Common stock	2,000,000
Total	$ 12,250,000

Schedule No. 5 shows the cost estimate, and Schedule No. 6 the "spread sheet." It will be seen that the lowest cash surplus occurs in the first half of the second year of operations and amounts to $236,837; whereas in Scheme "A" at the same point there was a *deficit* of $262,052. The conclusion drawn from this comparative analysis is that Scheme "B" is economic, whereas Scheme "A" is not.

In conclusion, let it again be emphasized that the study just presented is only an illustration of a method. It should not be assumed that office buildings always open up 63.5 per cent rented and take three more years to reach normal occupancy. Nor should it be assumed from this demonstration that the H-shaped building is always superior to the square building with central court. The figures given here are applicable only to this specific problem. It is hoped that this paper will make a little clearer the problems which confront the real estate appraiser, and help assure for him the coöperation of the architectural profession so that it will be possible to plan buildings of the future to stand not only against tornado, flood and earthquake, but also against any economic storms which may arise.



First Floor



Fourth to Eighth Floors

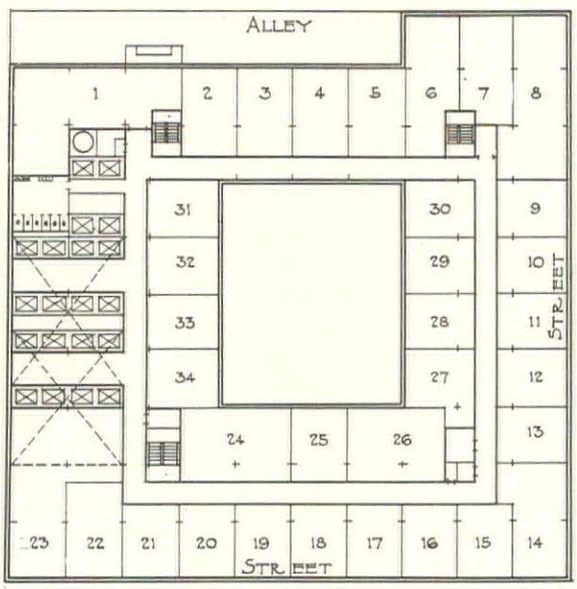
SCHEME "A"

UNIT	AREA	UNIT	AREA	UNIT	AREA
1 & 2	1,260	9	639	14	728
3	1,092	10	958	15	958
4-6	1,260	11	2,520	16	4,188
7	958	12	1,881	17	126
8	1,998	13	1,260		

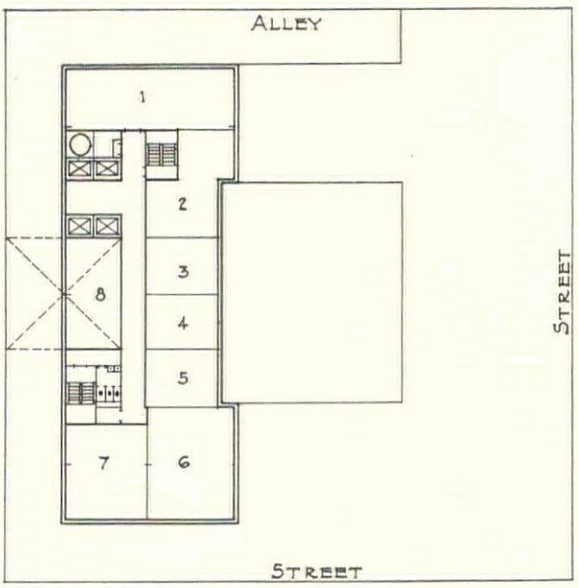
Total 1st Story	23,606
Total 2nd Story	28,448
Total 3rd Story	28,448
Total Basement	24,000

UNIT	AREA	UNIT	AREA	UNIT	AREA
1	1,135	25	532	33	493
2	487	26	1,349	34	728
3-9	417	27	822	35	417
10	678	28	417	36	846
11-16	417	29	713	37-40	417
17	678	30	477		
18-24	417	31 & 32	417		

Total per Floor	20,616



Ninth to 23rd Floors



24th to 40th Floors

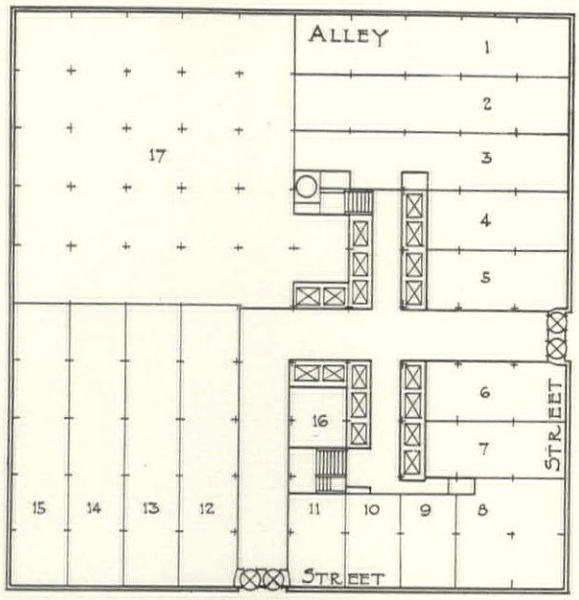
SCHEME "A"

UNIT	AREA	UNIT	AREA	UNIT	AREA
1	1,318	14	678	26	713
2-5	497	15-21	417	27	477
6	732	22	532	28-30	417
7	550	23	1,349	31-34	417
8	1,077	24	822		
9-13	417	25	417		

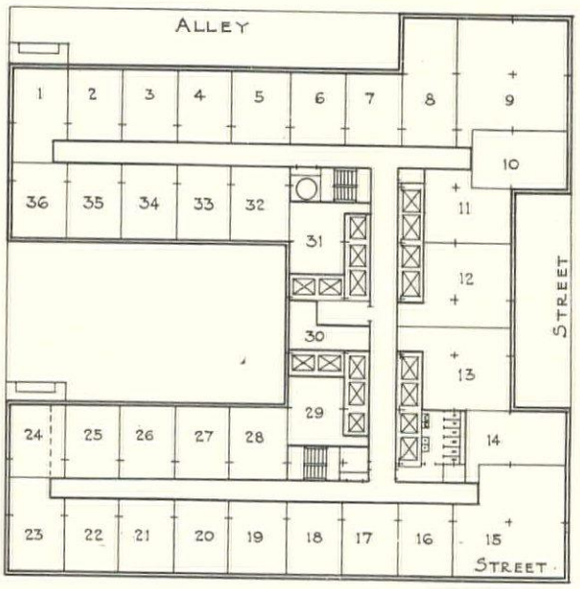
Total per Floor 9th to 13th Stories	18,576
Total 14th Story	17,928
Total per Floor 15th to 23rd Stories	19,512

UNIT	AREA	UNIT	AREA
1	1,026	6	994
2	705	7	780
3-5	417	8	630

Total per Floor 26th to 38th Stories	5,386
24th and 25th Stories	4,756



First Floor

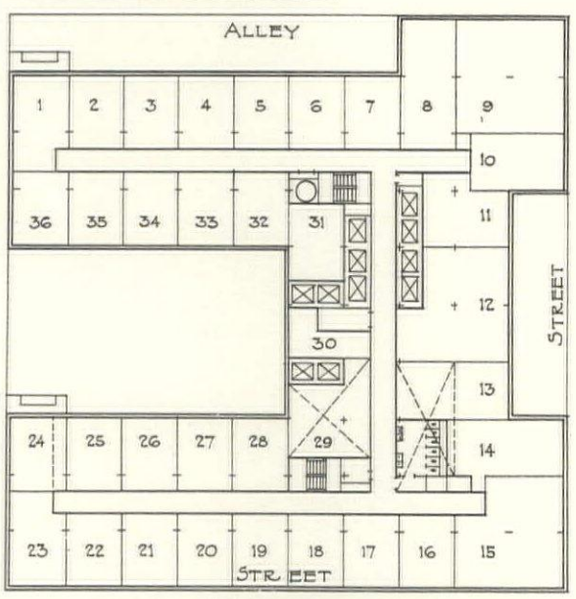


Fourth to 13th Floors

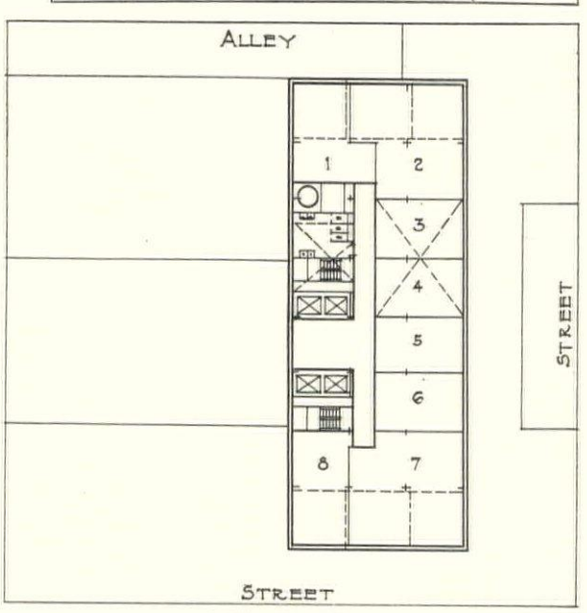
SCHEME "B"

UNIT	AREA	UNIT	AREA
1 & 2	1,562	9-11	532
3	1,406	12-15	1,562
4-7	816	16	324
8	1,266	17	7,105
Total 1st Story.....			24,333
Total 2nd Story.....			27,810
Total 3rd Story.....			27,810
Total Basement.....			21,000

UNIT	AREA	UNIT	AREA	UNIT	AREA
1	522	12	828	24-28	417
2-7	417	13	828	29	432
8	720	14	592	30	280
9	1,312	15	1,208	31	432
10	576	16-22	417	32-36	417
11	590	23	522		
Total per Floor.....					18,433



14th to 23rd Floors



24th to 40th Floors

SCHEME "B"

UNIT	AREA	UNIT	AREA	UNIT	AREA
1	522	12	1,134	24-28	417
2-7	417	13	639	29	649
8	720	14	664	30	280
9	1,312	15	1,208	31	432
10	576	16-22	417	32-36	417
11	590	23	522		
Total per Floor 15th to 23rd Stories....					18,839
Total 14th Story.....					17,866

UNIT	AREA	UNIT	AREA
1	636	7	1,256
2	1,124	8	648
3-6	497		
Total per Floor 24th & 26th to 35th Stories...			5,652
25th Story.....			4,658
36th & 37th Stories....			4,356
38th Story.....			3,708

SCHEME "A" Schedule No. 1

SUMMARY OF
APPRAISED RENTALS, INCOME, EXPENSE AND NET EARNINGS
AT NORMAL OCCUPANCY

Items	Floors	Area Per Floor	Av. Rate Per Sq. Ft.	Annual Rental and Expense		
REVENUE	Basement	24,000	$1.00	$ 24,000		
	1st	23,606	10.16	240,000		
	2nd–3rd	28,448	3.00	170,640		
	4th–8th	20,616	2.51	258,300		
	9th–13th	18,576	2.66	247,440		
	14th	17,928	2.74	49,200		
	15th–23rd	19,512	2.77	486,900		
	24th–25th	4,756	3.09	29,400		
	26th–38th	5,386	3.52	246,450		
	Totals	573,528	$3.05 Av.	$1,752,330		
Miscellaneous Income—Electricity, etc.				60,793		
Gross Revenue				$1,813,123		
Vacancy & Contingency Allowance—10%				181,312		
Effective Gross Revenue				$1,631,811	$1,631,811	100%
EXPENSE						
Heat, Light, Power, etc.			0.175	$100,424		
Janitor Department			0.249	142,865		
Elevator Department			0.085	48,520		
Maintenance, Repair, and Alteration			0.132	75,648		
General Expense			0.171	98,360		
Taxes			0.310	178,155		
			$1.122	$643,972	643,972	39.5%
NORMAL ANNUAL NET EARNINGS					$987,839	

SCHEME "A" Schedule No. 2

ESTIMATE OF COST

Cost of Land		$3,240,000
Building Construction, 9,543,806 Cu. Ft.	$5,472,033	
Foundations	332,750	
Tenant Installations	824,292	
Allowance for Contingencies	133,525	6,762,600
Architects Fees		405,756
Surety Bond		99,450
Taxes During Construction		55,000
Insurance During Construction		7,500
Bankers Supervision		24,000
Advertising and Renting Expense		171,590
Trustees Disbursing Fees		28,159
Discount on 1st Mortgage. 8% on $8,100,000		648,000
Miscellaneous Bond Expense on 1st Mortgage		30,000
Discount on 2nd Mortgage 10% on $2,000,000		200,000
Miscellaneous Bond Expense on 2nd Mortgage		7,400
Appraisal Fees		20,400
Mortgage Title Policy		20,200
Legal Expense		20,000
		$11,740,055

To which must be added carrying charges and from which must be deducted operating revenue and interest on balances.

SCHEME "B" Schedule No. 4

SUMMARY OF APPRAISED RENTALS, INCOME, EXPENSE AND NET EARNINGS AT NORMAL OCCUPANCY

Items	Floors	Area Per Floor	Av. Rate Per Sq. Ft.	Annual Rental and Expense		
REVENUE	Basement	21,000	$1.00	$ 21,000		
	1st	24,333	9.99	243,000		
	2nd–3rd	27,810	3.00	166,800		
	4th–13th	18,433	2.70	497,670		
	14th	17,866	2.83	50,490		
	15th–23rd	18,839	2.88	488,520		
	24th	5,652	3.11	17,550		
	25th	4,658	3.28	15,300		
	26th–35th	5,652	3.46	195,360		
	36th–37th	4,356	3.86	33,600		
	38th	3,708	3.88	14,400		
	Totals	551,950	$3.16 Av.	$1,743,690		
Miscellaneous Income—Electricity, etc.				58,506		
Gross Revenue				$1,802,196		
Vacancy and Contingency Allowance—10%				180,219		
Effective Gross Revenue				$1,621,977	$1,621,977	100%
EXPENSE						
Heat, Light, Power, etc.			0.175	96,646		
Janitor Department			0.249	137,490		
Elevator Department			0.085	46,694		
Maintenance, Repair and Alteration			0.132	72,802		
General Expense			0.171	94,659		
Taxes			0.312	172,050		
			$1.124	$620,341	620,341	38.25%
NORMAL ANNUAL NET EARNINGS					$1,001,636	

SCHEME "B" Schedule No. 5

ESTIMATE OF COST

Cost of Land		$3,240,000
Building Construction, 8,960,601 Cu. Ft.	$5,169,825	
Foundations	332,750	
Tenant Installations	796,425	
Allowance for Contingencies	127,000	6,246,000
Architects Fees		385,560
Surety Bond		94,500
Taxes During Construction		55,000
Insurance During Construction		7,125
Bankers Supervision		24,000
Advertising and Renting Expense		171,183
Trustees Disbursing Fees		26,864
Discount on 1st Mortgage 8% on $8,250,000		660,000
Miscellaneous Bond Expense on 1st Mortgage		30,566
Discount on 2nd Mortgage 10% on $2,000,000		200,000
Miscellaneous Bond Expense on 2nd Mortgage		7,400
Appraisal Fees		20,700
Mortgage Title Policy		20,600
Legal Expense		20,000
		$11,389,498

To which must be added carrying charges and from which must be deducted operating revenue and interest on balances.

SCHEME "A"

Schedule No. 3

Items	Construction Period		1st Year		2nd Year	
	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.
CASH AVAILABLE						
Anticipated Occupancy			70%	78%	82.5%	85%
Effective Gross Occupancy % of $1,813,123			$634,593	$707,118	$747,913	$770,577
Expense			300,798	309,273	314,040	316,689
Net Earnings from Operations			333,795	397,845	433,873	453,888
Less: Allowance for Discounts and Assumed Leases			126,919	141,424	96,123	83,404
Net Earnings			206,876	256,421	337,750	370,484
1st Mortgage Bond Issue	$8,100,000					
2nd Mortgage Bond Issue	2,000,000					
Common Stock Sale	2,000,000					
Total Available	12,100,000		$206,876	$256,421	$337,750	$370,484
CASH REQUIREMENTS						
Cost of Land	$3,240,000					
Building Construction	1,930,514	$3,144,878	862,916			
Tenant Installations		641,116	73,270	41,215	22,879	22,897
Architects Fees	318,113	67,355	20,288			
Surety Bond	99,450					
Taxes During Construction		27,500	27,500			
Insurance During Construction	3,000	4,500				
Bankers Supervision	6,000	6,000	3,000	3,000	1,800	1,800
Advertising and Renting Expense	20,380	95,679	20,662	13,890	10,096	8,616
Trustees Disbursing Fees	8,915	14,839	3,829	218	130	125
Discount on 1st Mortgage 8%	648,000					
Interest on 1st Mortgage 6%	243,000	243,000	243,000	243,000	243,000	243,000
Trustees Fees, Normal Tax, Engraving, etc. on 1st	36,000	6,000	6,000	6,000	6,000	6,000
Discount on 2nd Mortgage 10%	200,000					
Interest on 2nd Mortgage 7%	70,000	70,000	70,000	70,000	70,000	70,000
Trustees Fees, Normal Tax, Engraving, etc. on 2nd	9,125	1,725	1,725	1,725	1,725	1,725
Appraisal Fees	20,400					
Mortgage Title Policy	20,200					
Legal Expense (including incorporation, etc.)	20,000					
TOTAL REQUIREMENTS	$6,893,097	$4,322,592	$1,332,190	$379,048	$355,648	$354,163
Balances	5,206,903	962,415				
Interest on Balances	78,104	14,436				
Accumulated Cash Surplus	$5,285,007	$976,851	$148,463*	$271,090*	$288,988*	$272,667*

*Deficit

Scheme "A" continued

	3rd Year		4th Year	
	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.
CASH AVAILABLE				
Anticipated Occupancy	87.5%	89%	90%	90%
Effective Gross Occupancy % of $1,813,123	$793,241	$806,840	$815,905	$815,905
Expense	319,337	320,926	321,986	321,986
Net Earnings from Operations	473,904	485,914	493,919	493,919
Less: Allowance for Discounts and Assumed Leases	52,581	45,328	9,066	4,533
Net Earnings	421,323	440,586	484,853	489,386
1st Mortgage Bond Issue				
2nd Mortgage Bond Issue				
Common Stock Sale				
Total Available	$421,323	$440,586	$484,853	$489,386
CASH REQUIREMENTS				
Cost of Land				
Building Construction				
Tenant Installations	$13,738	$9,159		
Architects Fees				
Surety Bond				
Taxes During Construction				
Insurance During Construction				
Bankers Supervision	1,200	1,200		
Advertising and Renting Expense	1,360	907		
Trustees Disbursing Fees	61	42		
Discount on 1st Mortgage 8%				
Interest on 1st Mortgage 6%	243,000	243,000	243,000	243,000
Trustees Fees, Normal Tax, Engraving, etc. on 1st	6,000	6,000	6,000	6,000
Discount on 2nd Mortgage 10%				
Interest on 2nd Mortgage 7%	70,000	70,000	70,000	70,000
Trustees Fees, Normal Tax, Engraving, etc. on 2nd	1,725	1,725	1,725	1,725
Appraisal Fees				
Mortgage Title Policy				
Legal Expense (including incorporation, etc.)				
TOTAL REQUIREMENTS	$337,084	$332,033	$320,725	$320,725
Balances				
Interest on Balances				
Accumulated Cash Surplus	$188,428*	$79,875*	$84,253	$225,914

*Deficit

SCHEME "B"

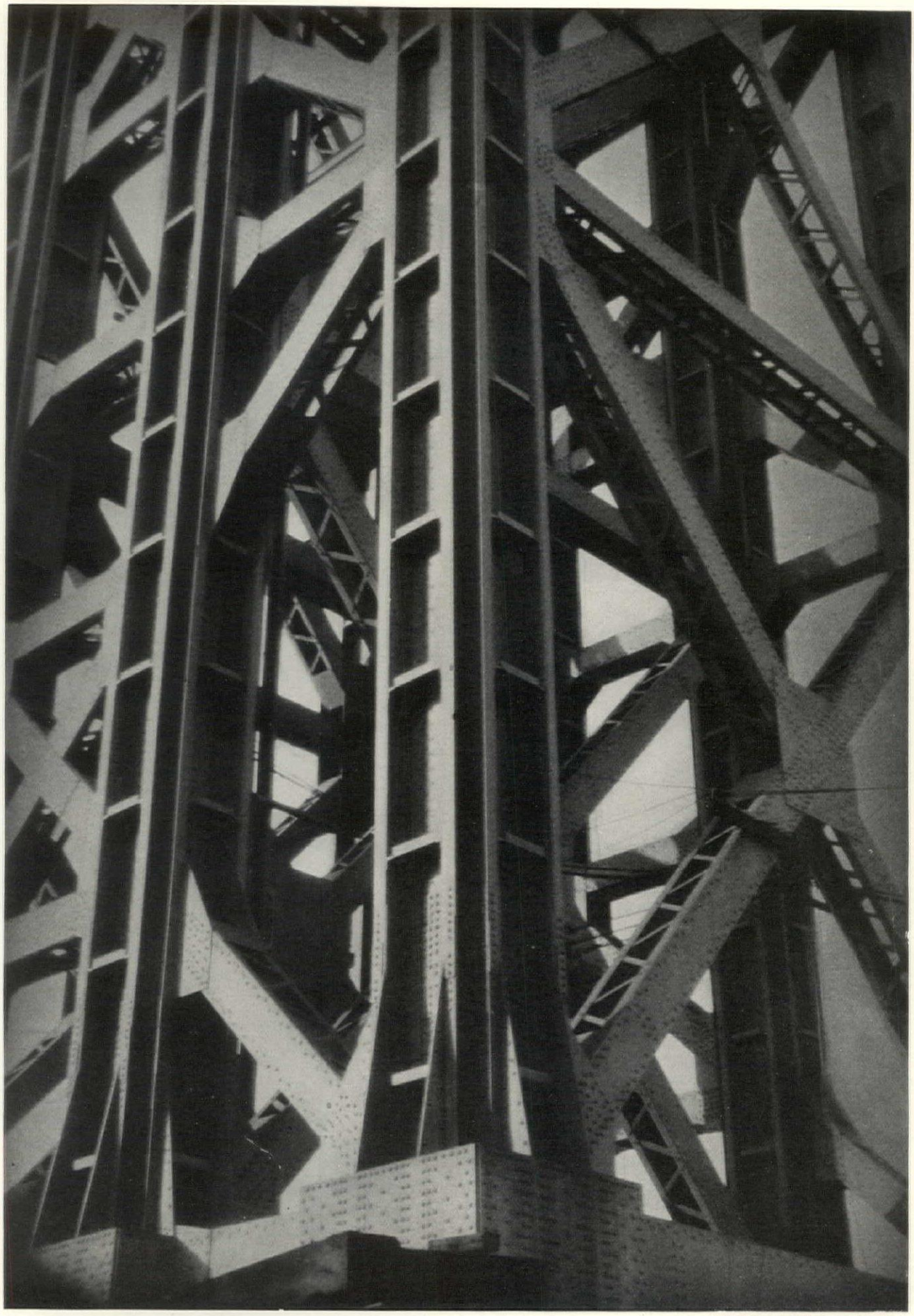
Schedule No. 6

Items	Construction Period		1st Year		2nd Year	
	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.
CASH AVAILABLE						
Anticipated Occupancy			70%	78%	82.5%	85%
Effective Gross Occupancy % of $1,802,196			$630,768	$702,856	$743,406	$765,933
Expense			291,305	298,851	303,096	305,454
Net Earnings from Operations			339,463	404,005	440,310	460,479
Less: Allowance for Discounts and Assumed Leases			126,154	140,571	85,604	82,901
Net Earnings			$213,309	$263,434	$354,706	$377,578
1st Mortgage Bond Issue	$8,250,000					
2nd Mortgage Bond Issue	2,000,000					
Common Stock Sale	2,000,000					
Total Available	$12,250,000		$213,309	$263,434	$354,706	$377,578
CASH REQUIREMENTS						
Cost of Land	$3,240,000					
Building Construction	1,835,241	$2,961,156	$833,177			
Tenant Installations		619,442	70,793	39,821	22,123	22,123
Architects Fee	302,279	64,003	19,278			
Surety Bond	94,500					
Taxes During Construction		27,500	27,500			
Insurance During Construction	2,850	4,275				
Bankers Supervision	6,000	6,000	3,000	3,000	1,800	1,800
Advertising and Renting Expense	20,380	95,362	20,626	13,870	10,085	8,605
Trustees Disbursing Fees	8,480	14,167	3,654	213	128	122
Discount on 1st Mortgage 8%	660,000					
Interest on 1st Mortgage 6%	247,500	247,500	247,500	247,500	247,500	247,500
Trustees Fees, Normal Tax, Engraving, etc. on 1st	36,666	6,100	6,100	6,100	6,100	6,100
Discount on 2nd Mortgage 10%	200,000					
Interest on 2nd Mortgage 7%	70,000	70,000	70,000	70,000	70,000	70,000
Trustees Fees, Normal Tax, Engraving, etc. on 2nd	9,125	1,725	1,725	1,725	1,725	1,725
Appraisal Fees	20,700					
Mortgage Title Policy	20,600					
Legal Expense (including incorporation, etc.)	20,000					
TOTAL REQUIREMENTS	$6,794,321	$4,177,230	$1,303,353	$382,229	$359,461	$357,975
Balances	5,455,679	1,420,284	351,544	238,022		
Interest on Balances	81,835	21,304	5,273	3,570		
Accumulated Cash Surplus	$5,537,514	$1,441,588	$356,817	$241,592	$236,837	$256,440

Scheme "B" continued	3rd Year		4th Year	
	1st 6 Mos.	2nd 6 Mos.	1st 6 Mos.	2nd 6 Mos.
CASH AVAILABLE				
Anticipated Occupancy	87.5%	89%	90%	90%
Effective Gross Occupancy % of $1,802,196	$788,461	$801,977	$810,988	$810,988
Expense	307,812	309,227	310,170	310,170
Net Earnings from Operations	480,649	492,750	500,818	500,818
Less: Allowance for Discounts and Assumed Leases	52,264	45,055	9,011	4,505
Net Earnings	$428,385	$447,695	$491,807	$496,313
1st Mortgage Bond Issue				
2nd Mortgage Bond Issue				
Common Stock Sale				
Total Available	$428,385	$447,695	$491,807	$496,313
CASH REQUIREMENTS				
Cost of Land				
Building Construction				
Tenant Installations	$13,274	$8,849		
Architects Fees				
Surety Bond				
Taxes During Construction				
Insurance During Construction				
Bankers Supervision	1,200	1,200		
Advertising and Renting Expense	1,353	902		
Trustees Disbursing Fees	59	41		
Discount on 1st Mortgage 8%				
Interest on 1st Mortgage 6%	247,500	247,500	247,500	247,500
Trustees Fees, Normal Tax, Engraving, etc. on 1st	6,100	6,100	6,100	6,100
Discount on 2nd Mortgage 10%				
Interest on 2nd Mortgage 7%	70,000	70,000	70,000	70,000
Trustees Fees, Normal Tax, Engraving, etc. on 2nd	1,725	1,725	1,725	1,725
Appraisal Fees				
Mortgage Title Policy				
Legal Expense (including incorporation, etc.)				
TOTAL REQUIREMENTS	$341,211	$336,317	$325,325	$325,325
Balances				
Interest on Balances				
Accumulated Cash Surplus	$343,614	$454,992	$621,474	$792,462

PHOTO: BERNICE ABBOTT
THE ARCHITECTURAL FORUM

THE HUDSON RIVER BRIDGE

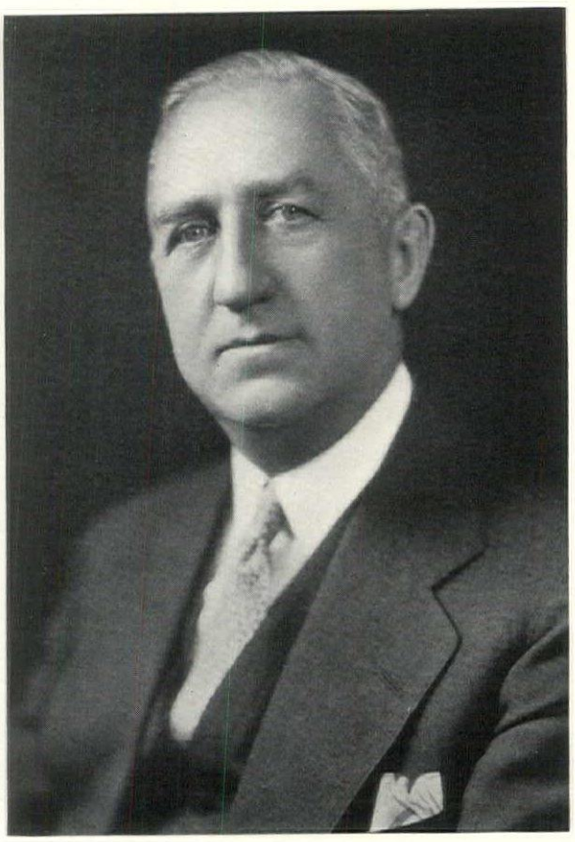


GIANT STEEL AT THE BASE

PHOTO: BERNICE ABBOTT
THE ARCHITECTURAL FORUM

FOR ARCHITECTS ONLY

BY KENNETH M. MURCHISON



KENNETH M. MURCHISON was educated in the course of Architecture at Columbia University and attended the Ecole des Beaux-Arts for four years commencing in 1897. He is credited as having been the first man to actually sell a Beaux-Arts projet to a client, the subject being a Roman bath for a country seat. It is now being used for an airport, showing the versatility of the designer.

His practice has been varied, embracing a great many railroad terminals, hotels, banks, clubs and some modern apartment houses in New York City. Mr. Murchison finds that the development of the pent house has opened up new opportunities for architects to escape from their clients.

Mr. Murchison is Past President of the Society of Beaux-Arts Architects and Past President of the Architectural League of New York. He has always been active in affairs of the American Institute of Architects, and is now Chairman of the Committee on Foreign Relations, but desires it emphasized that he has not participated in the Naval Limitations Conference or the latest Literary Digest Poll. He is a member of the Regional Plan Committee and is in demand as a speaker at architectural gatherings. He invented and popularized the story about the traveling salesman and the farmer's daughter.

Mr. Murchison is one of the very few Union architects in the country, in that he is a member of Local 802, Associated Musicians of Greater New York. However, it was found impossible, in the shortness of time before going to press, to secure a photograph of him with his oboe in his union suit. He is a member of the American Society of Composers, Authors and Publishers, and is an honorary member of the principal architectural societies of South America. Last year he made an air tour of South America, traveling incognito as Charles A. Lindbergh and was enthusiastically received, this practical joke appealing to the native or Latin sense of humor.

He is a contributing editor to THE ARCHITECTURAL FORUM and has recently contributed the expenses of a trip abroad made in the interests of this magazine to give his impression of modern conditions in Italy and France. The FORUM will present Mr. Murchison's observations regularly under the title, "For Architects Only," which will be found two aisles over, third door to the left, omit black gloves.

BE BUSINESSLIKE!

IN America, so the rumor runs, the architects are obliged to furnish more service, more knowledge and more different kinds of information to their clients than do their brethren of any other nation. One reason for this is that our buildings are perhaps more complicated than those of other nations, because they are more advanced in ideas and in new processes of construction. Another is that most of our structures are put up in such a rush that the drawings must show everything that is to be put into the finished product and leave nothing to the imagination.

They Leave It Off

In Europe and in South America the architects as a rule leave a good many things off on the original working drawings; things perhaps to be arranged for when the building gets to that particular point. Or, certain points of decoration, or decoration of entire wings of the building may

be left out entirely and given to outsiders to design and to construct. But for a rapid piece of construction work those things must all be worked out in advance, else the path of the contractor will be cluttered up with the loose ends and the debris of uncertainty. One can easily see how such a thing could wreck the owner's schedule of finish and of finance.

Vignola vs. Babson

The average architect, it pains me exceedingly to say, does not always keep in mind the viewpoint of the client in this respect. He is likely to be sidetracked by other things, important to himself but not so much so to the client, who, with his money involved in the operation, has the finish of his building uppermost in his thoughts, no matter whether or not the dentils in the cornice are according to Vignola. That is in one respect a business side of architecture. Statistics show that in major cities commercial buildings occupy about 80 per cent of the output. They are built for profit. It is the architect's work to get the greatest rentable value out of them; to put in the correct amount of service, elevator and otherwise, and to make the building as attractive as he can within the limits of the expenditure allowed him. If he does not do these things, then he has failed on the business side of his profession. The client may not come back to him. And that's not so good, either.

Chops and Architecture

Take a rapid hotel project for instance. A hotel is about as complicated a structure as we have today, especially if it contains ballrooms and banquet rooms and all sorts of entertaining facilities. The architect must know his work here, for, after all, a hotel sells service, and if the service blows up, then the hotel doesn't seem to be such a winner to its stockholders. How to get a broiled lamb chop from the kitchen to Room 831 in the shortest space of time is sometimes a problem, and how to get incoming baggage from the street to the service lift without disturbing anyone is still another question. There are scores of these to be arranged and dovetailed together, and it is the hapless architect's task to do it without error and without delay.

Hotel Pierre, the Ultra

While on the subject of hotels, let me say right here and now that never have I seen such complete, such exhaustive and such astounding drawings for hotels as I ran across in Schultze & Weaver's office the other day. The hotels in question are big ones and full of the most tricky combinations of requirements that ever an architect had to go against. The Hotel Pierre in New York is going to be ultra smart and ultra everything else. It is built around the restaurants and the kitchen service and, although designed for a comparatively modest piece of property it has entrances for everything, so that one party doesn't know that the other party is being thrown and the roomers or boarders upstairs don't know about anything being thrown.

Three-quarter Bedrooms

This set of drawings is finished—and such drawings! Every bit of painted ornament throughout the building has been drawn out at quarter-scale, then three-quartered. All the bedrooms have been laid out at three-quarter scale. All the bathrooms have been detailed down to the veining of the marble. When we come to consider the number of different entertaining rooms and corridors there are in this building, it staggers the average architect more than he ordinarily staggers to see the way Leonard Schultze has met the enemy and knocked him out in the first round.

The New Waldorf-Astoria

The other hotel, the new Waldorf-Astoria, is a far different problem. In the first place, it sits uneasily over a network of railway tracks under Park Avenue, but they have that network so completely untangled that our big oil and automobile millionaires can run their own private cars on to a siding near an elevator which takes the dust-begrimed millionaires right up to the desk to register. The entertaining floor of the new Waldorf-Astoria is the second floor, and here the architects have made an arrangement where anything may be thrown into anything else and where every known kind of entertainment can be going on at once. When you see these plans, the question that comes to your mind is: "Where are they going to get all the waiters from?" These plans are business plans. They were studied with a view to making the new Waldorf a successful business undertaking, and they do their share as a business-like means toward this end.

One Error, Two Assists

Next, as to our architectural offices. There, of course, we have no end of leakages, of delays, of inefficiences and of troubles. And the bigger the office the more far-reaching are the worries. Mistakes will occur, yes, most decidedly, but if the mistake is likely to cost the client something, then the architect himself should pay for that mistake. We don't think it worth more than a passing notice to have a sub-contractor tell us that that mistake was his and that he will pay for it. But when the mistake is ours it doesn't seem so blamed natural for us to pay for it! We go around trying to find somebody else to stand the gaff, and sometimes we make a grand split of it, thinking that if we get the contractor and the sub-contractor to split it in three with us we are giving him a terrifically friendly break and taking him to our bosoms besides.

And Getting Jobs

Then, the all-absorbing and heart-burning question of getting jobs is a good deal a matter of business. Friendship of course counts for a lot, and in competitions you don't have to be businesslike. But, taking it by and large, you just *have* to be businesslike when you go out in the cold, hard world to try to get a job. You read about these geniuses who whip out a 2B pencil five minutes after they meet the client and clinch the job without even using a rubber, but don't you believe it! It is just the bunk, pure and beautiful, on a par with the young girl's remark, "If I were a man, I'd be an architect! It's such a lovely profession!" Well, it is. It's a swell profession. And I think most of us would rather be architects than be anything else. It irks us to be businesslike when our souls are soaring high in the ether of our creative imaginations; but every once in a while we have to come slap down to earth and be ourselves and find out how much we're overdrawn in the bank and whether we can pay the next payroll or not.

Wasted Lead

I do not consider that we are treating ourselves in a businesslike way when we make a lot of unnecessary drawings in our offices, something that is a stock article for instance, or something that the manufacturer would rather detail himself. Alas, the sheets of kitchen dressers that the mill man uses for wrapping paper! Alas, again, for all the tiles that are drawn out in the bathroom wainscots, never once looked at by the tile-layer on the job!

Those things are a pure waste of time, and yet it is difficult indeed to inculcate that idea in the mind of the average draftsman. Not that the draftsman doesn't try his best to be on the side of the Old Man, but the draftsman's eye is on the paper and not on the building, and there's the rub. In the Department of Specifications we have evidence of a big helping hand from a Big Brother known as the New York Building Congress. This aggregation of talent and brains has gotten out a specification which covers everything and which forgets nothing. How often have we accepted an estimate with consummate joy, within the budget and all that, only to find out that we had omitted the ornamental iron section from the specification!

Who Reads the Spec.?

Our job is pretty complicated. And we, the bosses as it were, haven't time to read the specifications anyhow. We're out trying to persuade somebody to give us a new job. Our mission in life is to keep the drafting room full and happy, —not to read specifications. Imagination and romance and poetry are dismally lacking in building specifications. It is all good, solid stuff but needs a Phillips Oppenheim or an Ernest Hemingway to make it readable at home. All that has nothing to do with being businesslike, but something like it just had to be put in to keep this contribution from falling into the limbo of building specification and a Contract between Owner and Architect.

Super-superintendence

Superintendence, especially in the earlier stages of the game, is to many of us older ones a consummate bore, especially if we have to go down in the celler and look at the furnace, or become interested in a tangle of steam pipes in cases where we take steam from the street. I never could get excited over a store-room or a coal bin, so I generally ask the superintendent if he has put it in according to the plans and if he says, "Yes," I say "Okay." In that way I am sure it was shown on the plans.

It is always safe, when one is on a superintending venture, to explain that you don't want to tread on the toes of the superintendent and that you will take all such questions back to the office and give the builder a written opinion. This is especially useful when you are asked about the size of a certain pipe and how much pitch it should have. You have heard of it, true, but you probably don't know any more about it than you know why a *franc* is worth less than a *lira*.

Don't Be Yourself; Be Businesslike

Therefore, be businesslike. Never say you don't know. Read up on it. Take it to bed with you. For there is always something new confronting us, one more thing to confuse our already disordered minds.

The newest thing expected of the architect is that he shall be a promotor, that he will have an intimate knowledge of real estate values in his city, that he will know the state of the mortgage market here and abroad and that he will be *au courant* with the cost of the operation of a building, including a tabulation on how many windows a man can wash in eight hours. That would be almost too much for the average man. But not for the architect! He grabs it, he nurtures it. Some of us can work out the entire cost, income, upkeep and net profits without even drawing a plan!

Hear Ye, Here

Of course, that isn't architecture as we were taught it at school. But it wouldn't be a bad idea to include in an architectural curriculum such things as Salesmanship, Bigger and Better Business Men, Saving Money for our Clients, and a few other things besides perspective and the orders. We are changing, Vignola is going out, business is creeping in. Therefore, let us hearken to the voice of the present and the future. Be businesslike!

POLICY AND OPINION

TOWARD ACTION

MUCH interest centers this month in the Convention of the American Institute of Architects in Washington, May 21st to 23rd. The program of activities of the Convention has been published in *The Octagon* for March, and the executive committee has "blocked out a tentative program . . . with some hesitation and with emphasis on the fact that there are sure to be changes." The nature of these changes will be of considerable interest to the profession. In the program itself the topic of greatest importance seems to be that of "advertising architecture." With the growing knowledge that architecture is a business as well as a profession, traditional prejudices may give way.

It is sincerely hoped that action will be taken on other questions of vital importance to the business and profession of architecture. In this critical period there is opportunity for the organization to take definite and concerted action on the problems of the relations of architects with financial interests in building and housing, and with engineers and construction organizations, to determine the basis of coöperation. Whether or not architects are to establish and maintain a controlling position in the building industry will depend largely on the immediate constructive effort in these directions. Only under a strong executive leadership and with a constructive working program can the Institute assume its proper role.

K. K. S.

INTERNATIONAL ARCHITECTURAL COMITY

INTERNATIONAL law recognizes in the comity of nations an expected courtesy due to aliens, permitting them to indulge in their native customs and culture except when "prejudicial to public interests." "Public interests" are, of course, subject to interpretation and may include architecture. An alien custom or habit of living and thinking is not always exposed to the public, and association with the natives will inevitably modify it. On the contrary, an alien building is always visible, durable and unchanging.

The architecture of a country is the visible record of its evolution. It changes as the civilization changes—it is a manifestation of national progression and represents its material requirements and æsthetic instincts. This is true of all countries except in the Americas in which the aborigines and their culture have been destroyed. In the United States we have a heterogeneous architecture derived from the many nations that constitute our cosmopolitan population. Freedom from European architectural precedents has been forced upon us by our industrial and commercial progress which demands an architecture suitable for its needs, with the result that the old precedential forms are rapidly disappearing in the development of a contemporary logical architecture.

Japan has an old indigenous architecture that can be adapted to its social and material development. This change can be accomplished and still retain the æsthetic qualities of its architecture—Japan has an architecture of its own to preserve and cultivate. China has done it. As we observe the work of Murphy & Dana, of Henry K. Murphy, of Dwight H. Perkins and others in China, we are impressed by their designing of the most modern structures in plan and equipment along with the preservation of the æsthetic qualities of the native Chinese architecture. It was the bringing in of the essentials of Western architecture without being "prejudicial to the public interests" defined as the preservation of the spirit of the historic native architecture.

An esteemed correspondent, who is Professor of Architecture in one of our most prominent universities, writes: "I have seen illustrations of some bank buildings in Japan, of the kind of Classical design which has been used so much in this country. Perhaps this is what the Japanese banking firm wanted, but what a pity—between you and me—that the Classical tradition should invade Japan!"

On the other hand, Frank Lloyd Wright designed the Imperial Hotel in Tokio, which is modern but in harmony with the Japanese manner. H. Van Buren Magonigle designed the American Embassy in Tokio without violating the native architectural spirit and the surroundings of this splendid group of modern buildings. But an American had the assurance to suggest to Magonigle that he design the Embassy in the "American Colonial" style.

It is refreshing to know that we have American architects of culture and discrimination who can avail themselves of the courtesy of the comity of nations in the architectural sense without being "prejudiced to the public interests," of the country for which they design.

A. T. N.

EAST MEETS WEST

WE hear from all sides,—from the laity and from the critics, especially the radical critics,—that we have no architecture in America that expresses American civilization. In a certain sense this may be true. However, there has never been an age in which the architecture did not express the civilization of the age, nor has there been in any country an architecture that was not expressive of the culture, tastes, interests and abilities of the people at that particular time. One doubts if this age in America is an exception. The architecture of America is an absolutely truthful expression of its life. The fact that we have a Classic bank, a Romanesque hospital, a "modern" restaurant, a Spanish villa, all in the same vicinity, indubitably expresses the eclecticism of the modern American. America is not homogeneous; it is heterogeneous, and its architecture is therefore necessarily heterogeneous. America cannot help expressing itself in its architecture. Neither can any other country. Those who are crying for a single, unified "style" are asking for something which would have to be *imposed* on this country counter to the natural development and evolution of architecture until there is a dominant unity in American life.

In Oriental countries for centuries a culture developed, flowered and decayed without external influence. In recent years the Orientals have chosen to imitate the western world in thoughts of government, finance, commerce and art. It is natural that this change be reflected in the architecture. If they choose European dress for their business life, instead of the beautiful, traditional garments, it is natural that they should change the dress of their business houses to express this change in their ideas and philosophy. Occidental architects should not be accused of breach of trust when they coöperate in giving visible evidence of the Oriental's conversion to Occidentalism, however much we all regret the passing of a culture and art that we believe was superior in so many ways to our own. On the other hand, is it not possible that the architectural forms traditional in China and Japan might as honestly clothe a modern steel and concrete building as do the columns and cornices of the Classical? *K. K. S.*

ARCHITECTURAL CHALLENGE

THE lay public naturally has its limitations in regard to architectural conception—limitations induced by tradition, ignorance and herd instinct. These limitations are imposed unhesitatingly on the laymen and the architects by a dictatorial assumption of authoritative knowledge. Therein is the weakness of the architect's position—his limitations of ability are preconceived and set up for him. It constitutes a challenge.

A recent editorial in the *New York Times* discusses the proposed new Federal Building which will displace the old one in City Hall Park. Without extended reference to the negotiations between the Federal and City authorities, it appears that the former propose to erect on an entire Vesey Street city block a twenty-six-story skyscraper to house a branch post office, the Departments of Justice and Labor, Bureaus of Naturalization, Prohibition and others. The Federal Bar Association of New York City objects to the inclusion of the Federal Courts in a skyscraper. Its protest to the Federal authorities states that "the majesty of the law and its commanding influence upon all of us" should be "clothed in a building which will be the admiration of the whole country." The editorial opinion of the *Times* is that: "Besides, a skyscraper is not the most fitting architectural form for a court house."

These two expressions probably represent the lay idea of a court house. The Bar Association aims to magnify the law by an ostentatious architectural display that will overwhelm the hinterlands and their inhabitants. The editors of the *Times* evidently have an architectural inhibition induced by the traditional court house form—one of the most inefficient of American buildings.

The majesty of the law can be represented only by the integrity of the courts and the members of the bar. It can and does obtain in the most simple and primitive surroundings. Miscarriage of justice can and does obtain in the most admired of buildings.

To contend that a skyscraper is not a fitting architectural form for a court house is to impose an improper limitation on architecture and is a bald assumption made without architectural knowledge, a contention which greatly underestimates the ability of American architects. There are some skyscrapers in American cities that are the "admiration" of cultured peoples and they are fit and proper to "clothe the majesty of the law."

There are some American architects who possess such a broad comprehension of architecture and the forms and needs of our civilization that, with a freedom from the restraints of ancient traditions, they can be entrusted with the appropriate and worthy housing of Federal Courts in a twenty-six-story skyscraper. Who would question the fitness of Cass Gilbert's New York Life Building to house Federal Courts in a dignified and worthy manner, a building which is now the "admiration of the whole community?" It is more than twenty-six stories high. *A. T. N.*

HOUSING BUSINESS ORGANIZATIONS FOR EFFICIENT OPERATION

BY

HARRY ARTHUR HOPF

(*Continued from* THE ARCHITECTURAL FORUM, *April, 1930*)

SELECTING THE SITE

IT may seem strange that in the development of the theme which I am discussing, treatment of the problems involved in selection of the site has been delayed until now and precedence has been given to determining the operating requirements and the character of the building. It is, however, of fundamental importance, in order to safeguard the success of the entire project, that selection of the site be deferred until definite conclusions, based on careful study and analysis, have been reached concerning the two important phases thus far presented. Not until agreement has been secured regarding these major aspects of the project should a commitment be made with respect to the site, and its acquisition should always be predicated upon its adaptability to the successful realization of the objectives of the institution.

It goes without saying that the financial burden involved in the acquisition of a site is of first moment. However, the tendency to regard this factor as controlling, without consideration of the many other angles of the problem, is extremely short-sighted. Basing a decision regarding selection of site solely on consideration of the amount of investment required, without taking adequately into account the bearing of the site on the type of building which may be erected and on the standards of economy and effectiveness which can be maintained from the operating point of view, has proved a very costly experiment to many institutions which have indulged in it. It cannot be stressed too often that the chief desideratum in planning of the character under discussion is the conservation of human energy and the attainment of lower operating costs. Since the value of money is a known factor and, except under abnormal conditions, does not fluctuate very widely, it may readily be determined how far a business organization is warranted in increasing its investment in the site in order to make possible the planning of a building which, through proper design and effective arrangement of the interior, will have an increasingly favorable influence upon maintenance and operating costs.

SITE ADVERTISING VALUE. Of course, financial considerations are not the only ones extraneous to operating requirements which enter into the selection of the site. In some lines of business, notably in the case of banks, accessibility to customers is one of the chief elements to be taken into account. Then too, there is the factor of advertising value to be gained from prominence of location. While it cannot be gainsaid that due weight should be given to this element, in numerous instances its importance has been unduly stressed, with the result that wholly unsuitable sites have been purchased and operating activities, as well as costs, have suffered in consequence. When considering the feature of prominence, it should be recognized that, after all, this is mainly of local value and can hardly be expected to benefit materially a business of national scope.

As a case in point, the experience of a financial institution doing business in many states of the Union may be cited. Several years ago this organization, which is located in one of the largest cities of the country, erected a building for its own occupancy on a plot of ground facing upon a prominent avenue which was used as a main thoroughfare between the suburbs and the heart of the city and was traversed daily by thousands of automobiles. The executives of the organization deliberately chose the site because of its assumed advertising value and without regard to its adaptability to operating requirements. During the building stage, it was discovered that because of certain peculiar characteristics of the site only a building of unusual proportions could be erected thereon. The planning of the structure called for the solution of a number of very intricate problems, and the influence of the limitations inherent in the site was such that the cost per cubic foot rose to a point materially in excess of the cost generally incurred in the construction of comparable buildings. The executives of the organization were not disturbed, but consoled themselves with the belief that their new building in its prominent location would prove to be an asset of great value from the advertising point of view.

Several years have elapsed since this building was erected and, while it may be conceded that its location has afforded a stimulus to business activities in its neighborhood, the rate of progress of the organization itself has not been perceptibly accelerated. Indeed, it may reasonably be assumed that it would have prospered in exactly the same measure had it remained in its smaller home in a far less prominent location. Similar instances of questionable judgment can be cited.

URBAN AND SUBURBAN SITES. Of general interest in connection with the selection of a site is

the question whether it shall be located in the heart of the city or in a semi-suburban or suburban locality. This point should logically be settled by the nature of the business as well as by the operating requirements which must be met by the building to be erected. Generally speaking, banks must erect buildings in business districts; on the other hand, life insurance companies are not required to do so because their business is not conducted over the counter, so to speak. The latter observation holds true, also, of many industrial organizations which find it convenient and altogether practical to erect office buildings in the vicinity of their factory establishments.

As far as operating requirements are concerned, banking institutions must of necessity subordinate these to the dominant characteristic of vertical expansion which is dictated by the location of their buildings on expensive ground in the heart of the city. To provide the space called for by the requirements of the ever-growing staffs of the larger banks, implies that quarters must be arranged on one or more floors above the main banking room. This condition at once introduces difficult problems of personal and mechanical intercommunication. With regard to life insurance companies, attention may be called to the fact that growth in such an organization lends itself most favorably to horizontal expansion. Because, as previously said, the nature of the life insurance business does not require that home offices should be located in the center of a city, it is in consonance with good planning to acquire a site in a semi-suburban location where land is comparatively cheap and horizontal expansion can be adequately provided at relatively low cost.

To sum up what has been said with respect to the problems involved in selecting the site, particular emphasis should be placed upon the necessity of deferring any commitments in this direction until reasonably exact knowledge has been gathered concerning the operating requirements of the organization and the type of building in which these may be most effectively brought to expression. Since the purchase of a site, generally speaking, constitutes a step which irretrievably commits the organization to a course of action, it is indubitably the better part of wisdom to study the problem in all its bearings before the decision is made to purchase a site. Beyond this, it is certainly of great importance to bring the architect and other consultants into the picture at the very inception of the building project so that their combined advice may be made available before and not after the organization has committed itself to so controlling a step as the selection of a site. Only in this manner may serious mistakes be avoided and the building program be based upon sound and constructive considerations.

GENERAL PLANNING OF THE INTERIOR

We come now to a consideration of certain general problems which are associated with the planning of the interior of the building to be erected. Foremost among these is the manner in which the steel frame of the building is to be arranged. The standardized design of the steel frame of a commercial office building is too well known to require comment and, regardless of the extent to which steel columns present fixed interference with effective office planning in such a building, little if anything can be done to change this condition.

With respect to the special purpose building, however, a good deal of latitude is permissible in arranging the steel frame so as to facilitate rather than obstruct the planning of an effective office layout. Successful office operation calls for the spacing of desks and the provision of aisles in harmony with definite standards sanctioned by experience. Where steel columns would interfere with the adoption of these standards, it is wise economy to increase the allowance for structural steel so as to make it possible to span greater distances than the usual twenty feet or thereabouts; it is not at all unusual in special purpose office buildings to span distances of forty or even fifty feet without any intervening support. The benefit of such an arrangement lies in the fact that utmost flexibility of office layout can be achieved and every available square foot of space can be advantageously utilized.

In the early planning stages of a certain fourteen story office building in an eastern city, the commercial type of steel frame had been designed regardless of the fact that the building was planned for occupancy largely by one organization with highly specialized operating requirements. Study of the plans by an engineer who was called in to analyze the office requirements, resulted in the conclusion to eliminate practically all of the steel columns which obstructed the usable space and to compensate for this elimination by increasing the carrying capacity of the columns in the walls of the building. The effect of this change was materially to increase the capacity of each of the floors for operating purposes and thus to make it possible to hold two entire floors in reserve for future development. If the original plans had been adhered to, it would have been impossible to provide any reserve space and in a short time the organization would have overflowed its housing facilities.

In planning the interior of a special purpose office building, problems of great importance arise in the location of the fixed service elements, such as elevators, stairways, toilet and locker rooms. Space will not permit of discussion of these problems in detail; therefore, I must content myself

with emphasizing their general bearing upon good office practice. With due regard for city ordinances, stairways should be so placed as to avoid interference with office planning on the one hand and, on the other, to facilitate vertical communication from floor to floor. In buildings where horizontal expansion is the rule, stairways are usually placed at points equi-distant from the extremes and this is also the case with elevators and toilet and locker rooms. With respect to the last two features, decentralization of these facilities is the modern practice, i.e., toilet and locker rooms for both sexes are provided on each floor of the building. In this way not only can the needs of office workers be adequately served, but the essential control, involving particularly the reduction of lost time to a minimum, can be maintained.

It is of course important to determine peak requirements when planning service elements and to realize that in a special purpose office building, as contrasted with the commercial type, arrival and departure of the entire building population occur within relatively short periods of time, at the opening and closing of the two work periods.

At this point I desire to interpolate the observation that wherever study of the traffic in a large office indicates that employes are constantly going to and fro, that fact is *prima facie* evidence of poor planning. In particular, it implies that departments have not been located in correct relation to one another or that service facilities have not been properly placed. Any evidence of constant circulation should be thoroughly investigated in order to determine what corrective measures can be applied.

Specific Elements of Layout. We come now to a consideration of specific elements of layout, such as wiring and equipment, which have a direct bearing upon clerical productivity. Despite the fact that there is an abundance of evidence in support of the view that individual offices for small groups of clerical workers make it impossible to maintain proper standards of clerical effectiveness, the question of the open versus the private office is still debated on occasion. However, the open office principle is rapidly being applied in all modern buildings and it is justified by reason of the fact that it promotes the forward movement of work, permits of effective placing of movable equipment and files and of proper arrangement of desks, results in a minimum circulation of employes, facilitates supervision, makes it possible to provide for proper entrance and egress and reduces the partition evil to a minimum. Indeed, the advantages to be gained through effective supervision over employes at work alone warrant arrangement of the space in line with the open office principle. There is a vast difference between apparent and real industry and the role of supervision in securing increasingly favorable results from a clerical staff is of first importance. Consequently, anything which can be done in planning an office layout to establish conditions conducive to the effective exercise of supervision will be reflected in the achievement of superior operating results.

With respect to wiring and equipment, it is essential to realize that we are living in an age of electricity and that much office work which was formerly performed by hand is now dispatched with the use of office machinery. In this connection we must consider not alone office operating devices but also intercommunicating systems of auditory, graphic and "carrier" types, time clocks, time stamps, protection systems and a host of other modern contrivances which are now commonplace in the well equipped business office.

Provision for the various types of equipment cited necessitates the introduction of a far more comprehensive scheme of ducts than is usual in the commercial type of office building. The modern practice is to install series of underfloor ducts for the accommodation of both high and low tension wires, so that by tapping the ducts at any desired location, current needed for the operation of machines may be secured at individual desks. The rate of increase in the use of electrically driven machinery in offices is so rapid that unless wiring requirements are amply supplied in the planning of a special purpose office building, it is not unlikely that the building will prove to be obsolete from the moment of occupancy. It is not overstating the case to assert that hardly any problem connected with the planning of a special purpose office building requires more careful and constructive study than that involved in the provision of effective and adequate wiring services, without undue cost.

There are numerous other problems connected with the planning of the interior which might be discussed, particularly if such service features as cafeteria, dining rooms, auditorium, medical department, etc. are to be incorporated in the building. The inclusion of services of this nature demands careful planning of their location, for not only must a suitable type of space and sufficient areas be provided, but the questions of convenience to operating departments and effect on use of stairways, elevators and other service facilities must be taken into account. Furthermore, special wiring and plumbing problems, as well as problems of illumination, ventilation and acoustics are involved. In view of the fact that the provision of services such as those described is somewhat unusual, except for very large organizations, I shall not devote more space to them except to say that there are material advantages

in centralizing the activities in question and not permitting their location to interfere with the probable expansion of operating departments or with free intercommunication among such departments.

Record Vaults. Another specialized problem which should be mentioned is the provision of vaults. Facilities of this character are of course of prime importance for banks and other financial institutions and it is obvious that the highest type of protection must be installed wherever securities, especially of negotiable character, are to be stored on the premises. It is the inclination of business institutions occupying special purpose buildings to go to extremes, however, in their regard for the safety of their property and to seek to apply to office records and papers, a type of protection which is often as formidable as that deemed fitting for securities.

Slightly less cautious is the practice of housing records in so-called vaults which, in reality, are simply spaces surrounded by moderately fireproof partitions in which fire resistant steel doors have been inserted. Facilities of this character present two important problems: in cases where frequent consultation of the records enters into the daily routine, reference is hampered by reason of inaccessibility; moreover, the walls of the "vaults" often constitute fixed and formidable physical obstacles to proper space planning and location of equipment.

The modern practice limits to an absolute minimum the provision of vaults for the storage of records and, when these are of sufficient value to be provided with special fire protection, safeguards them through the medium of portable safe cabinets which are placed in immediate proximity to the desks of the employes who must consult their contents. Ideally speaking, office records should be retained in the working areas only as long as there is real need for consulting them regularly. When this period has passed, the records should be either destroyed or removed to storage warehouses, where space is much cheaper and where they may still be consulted on occasion, even though this involves a little extra effort.

If American business organizations could be persuaded to adopt a reasonable policy concerning the protection and preservation or destruction of office records, operating costs could be materially reduced, office layouts could be more effectively planned and most special purpose office buildings could be built on a smaller scale. Precautions must of course be taken from the legal point of view and the possible consequences of loss through inability to produce records needed in connection with lawsuits should not be overlooked; on the other hand cognizance should be taken of the statute of limitations. Much of the appalling amount of paper work performed in connection with modern American business procedure is a reflection of the inability of business executives to effect a sound compromise with an extreme standard of safety.

PHYSIOLOGICAL FACTORS

Intimately connected with the planning of the interior and of paramount importance by reason of their influence over operating results, are certain physiological factors which should be mentioned. I refer specifically to illumination, ventilation and noise reduction. It is on the correct solution of problems in these three fields that the physical well being of employes, and therefore their productive capacity, must depend. To convey an appreciation of the importance of these three factors, let me state that in my judgment their combined influence over work results equals, if it does not exceed, the benefits which may be produced by a progressive program of personnel policies and practices, supported by an enlightened plan of financial incentives.

There is a definite relation between standards of illumination and the quality and quantity of work produced by office employes. Because of the fact that many office buildings, including those of the special purpose type, are located on sites where adequate natural illumination cannot be secured by reason of surrounding buildings, the provision of artificial illumination to overcome this handicap assumes great importance.

The art of illumination has made rapid strides in recent years but many business organizations still fail to appreciate the necessity of maintaining liberal standards of artificial illumination so that the insidious effects of eyestrain may be eliminated or at least reduced to a minimum. It has long been established by illuminating engineers that a standard of eight to ten foot-candles of illumination at desk height is required for most types of clerical work. Inspection of many business offices, however, reveals the fact that this standard is infrequently adhered to and that false considerations of economy stand in the way of supplying artificial illumination of a character and intensity essential to both health and effective clerical performance.

As a rule it is difficult to trace the effect of a single physiological factor but experience and study of illuminating problems justify expression of the opinion that it is apt to be an exceedingly costly matter to omit to provide a system of artificial illumination which is in harmony with the most approved modern standards. The reaction of employes to superior or inadequate illumination, either artificial or natural, is instant and direct. Because these considerations are valid

and pertinent, it is essential that in the planning of special purpose office buildings the number, distribution and arrangement of ceiling outlets be carefully studied and determined in harmony with the requirements of the particular character of work to be undertaken. Moreover, careful consideration should be given to the type of fixture to be selected, and particular care should be taken to secure not only adequate intensity of illumination at desk height, but also uniform diffusion and freedom from marked shadows.

Although dependence for artificial illumination is placed chiefly upon fixtures suspended from the ceiling, certain other factors which are not always assessed at their proper value have a vital bearing upon the results to be accomplished. It is generally known, but not always observed in practice, that the color of the paint on the ceilings and side walls should be governed by illuminating requirements. The most satisfactory results as far as office workers are concerned have been produced from a color scheme of flat white for the ceiling and light creamy yellow for the side walls. One has only to examine the ceilings and side walls of the average office building, however, to recognize that little, if any, attention is given to this important factor.

The last point I wish to make with respect to illumination is that natural, as well as artificial, illumination should be controlled. It is therefore of importance to consider the manner in which windows may be most effectively screened so that the distribution of natural illumination will be uniform and free from glare.

Of even greater influence on the well being and productivity of employes is the quality of ventilation. When considering problems of ventilation we are dealing with three elements, namely, temperature, humidity and movement of air. Although more or less effective standards with regard to these elements may be maintained by means of a heating system and the introduction of fresh air periodically through the opening of windows, conditions produced in this manner cannot be regarded as satisfactory in the long run. The opening of windows causes drafts and exposes the clerks near them to a range of temperature quite different from that experienced by those in remote portions of the office. Moreover, in cool climates during the winter months, it is seldom that windows can be opened for any length of time and, where dependence is placed upon them for ventilation, temperatures are usually found to be far too high and circulation of air inadequate.

The preceding considerations support the statement that an effective artificial ventilating system should be provided in special purpose office buildings. Such a system should be simple of operation and control, as well as based on sound physiological principles. Very satisfactory results have been achieved by a method which depends solely on the diffusion of fresh, unheated air which has been passed through a screen to remove its impurities. The air is drawn in from the most favorable outside point, cleansed, forced through ducts to suitably located openings at the ceiling and from these is sprayed across the room at relatively high speed. Thus, the air streams spread in fan shape along the ceiling and when the initial velocity has subsided, the fresh air drops gradually to the breathing zone and, mingling with the warmer air of the room, becomes palatable for human consumption. Under this method it is possible to bring about effective control of the temperature and to produce conditions which are satisfactory from the standpoints of humidity and circulation. Several complete changes of air are effected each hour, and the used air is forced out of the room through the gentle pressure which is constantly being exerted by the operation of the system.

The difference in work results produced by employes in well ventilated offices as contrasted with those possible of accomplishment in poorly ventilated offices is startling to the investigator. With respect to the factor of temperature alone, it may be stated that on one occasion when the temperature in an office was deliberately permitted to rise to between 75° and 80°, a reduction in output of between 35 per cent. and 50 per cent. was experienced. The cost of the investment in an artificial ventilating system is more than made up in a relatively brief period of time through the increased productivity of the workers exposed to this beneficial influence.

Finally, we have to consider briefly the subject of noise. Acoustical conditions are largely affected by three factors, namely, size, shape and materials. It is the one defect worthy of note in connection with the planning of large open offices that operating conditions are not conducive to quiet. This is of course due mainly to the fact that so much office machinery is constantly in operation and that the noise incident thereto is disseminated to all parts of the open area.

The statement is commonly made that individuals can adjust themselves to noisy conditions and that they do not mind them. In point of fact, they are obliged to use energy in combating such conditions and this energy is therefore lost as far as its effective use for working purposes is concerned. Although it is difficult to adduce scientific evidence in support of the detrimental effect of noise upon production, long experience and observation of scores of offices lead to the conclusion that the difference between noisy and reasonably quiet conditions may be expressed in

terms of about ten per cent. of the total output. Even though this figure cannot be verified, it is substantial enough when translated into terms of clerical costs to more than support the investment required to correct noisy conditions by the installation of acoustical treatment.

Such treatment, if applied at the time when the building is in course of erection, might take the form of special acoustical plaster which is substituted for the finished coat on the ceiling. After the building has been constructed and occupied, recourse for office quieting purposes may be had to a variety of materials among which felt, suitably covered, is perhaps the one thus far most frequently used. Although the use of office quieting treatment is becoming more and more an integral part of building construction, the expense connected with its provision is still substantial enough to justify business organizations in deferring its introduction until occupancy of the new building for a period of time has demonstrated the extent to which it should be applied.

To sum up what has been said with respect to the so-called physiological factors, permit me to emphasize the belief that no matter how beautiful or costly a special purpose office building may be, it cannot be expected to be successful in the accomplishment of the objectives which it is designed to meet, unless adequate provision is made for effective illumination, ventilation and noise reduction. In view of the importance of controlling the physiological factors discussed, no budget covering expenditures for a special purpose office building should be approved unless it contains proper allowances for expenditures covering installations along the lines indicated.

CONCLUSION

In bringing this discussion to a close, let me state that presentation of the subject matter which it covers has been influenced by recognition of the fact that the standardized commercial office building adapts itself chiefly to the relatively simple requirements of many small tenants and that the larger the organization, the more specialized its needs become and the more difficult it is to meet them satisfactorily in such a building. In consequence, the discussion has centered largely around the special purpose type of building, and I have endeavored, using my experience in the planning of both types of building, to justify the thesis that successful adjustment of building elements to specialized operating requirements has so beneficial a bearing on the productive capacity of the staff that savings in operating results often exceed the interest on the building investment.

As a supporting consideration, I desire to stress an intangible yet important factor which evidences itself in connection with special purpose office buildings. Management may be characterized as a dynamic force which tends to influence the tempo of performance in harmony with the quality and effectiveness of the physical setting provided. In dealing with problems of office planning over a long period of years, I have become convinced that sound adjustment of physical environment and human beings to each other may be counted upon to reflect itself in an accelerating rate of accomplishment.

Let me finally state that a constructive and enduring solution of the problems of building economics can be achieved only by proper ultimate result. The client must know how to interpret his operating requirements and to measure the development of his organization so effectively that the architect may be furnished with a comprehensive program which covers all important business factors entering into the design and execution of the building. It is in assisting business organizations to formulate such programs that the management engineer has found in recent years a field of increasing usefulness. At all times recognizing the supreme importance of the function of architecture and the centralized responsibility of the architect, the management engineer collaborates with both the client and the architect in striving for the achievement of the ultimate desideratum of blending beauty with utility.

In the last analysis, the most searching test to which a special purpose office building may be put is the extent to which it retains its effectiveness with the passage of years and the changing operating requirements of the organization which it houses. A minimum of annual expenditure for physical changes should be required and the sums actually disbursed may be regarded as an index to the quality of the planning. Beyond this, if it is definitely established that year in and year out clerical operating costs show a definite downward trend, the ability and vision, technique and experience which entered into the original planning of the building must be credited with a large share in accomplishing such a result.

With the highest possible regard for the value of beauty of design and effective treatment of materials, it must be emphasized that the special purpose office building is but a means to an end and that the end is the attainment of enhanced operating results.

INDEPENDENT INSPECTIONS AND THEIR VALUE

BY
C. STANLEY TAYLOR

BURIED in the general conditions of almost every specification for an important building are clauses calling for the independent inspection or testing of important structural materials of which reinforcing and structural steel, cement aggregates, and concrete are perhaps the most important. This practice of calling for professional inspection and tests has arisen very naturally out of the growing complexity of building operations. Its purpose is primarily to give assurance to the architect, the structural engineer and the owner that the building will actually carry the loads and resist the stresses for which it was designed. Another function, almost equally important, is to prevent costly delays incidental to the rejection of defective materials.

WHO SHOULD SELECT INSPECTION?

Architects are held morally and often legally responsible for the security of the buildings they design and supervise. They are equally responsible to the owners for seeing that the structures are erected in accordance with the specifications which the owner has approved. The great care exercised by reputable architects in the preparation of specifications evidences the acceptance of this responsibility. And yet, it is almost physically impossible for an architect and his supervisor to determine whether steel, cement, lime, and many other basic building products delivered at the site meet the specified requirements. How can an architect tell, for example, whether re-rolled rail steel reinforcing bars have not been substituted for new billet steel bars unless he can check back through the manufacturer of the reinforcing steel delivered to his particular job? How can he tell upon inspection that the cement supplied by the contractor meets the A. S. T. M. standards which are written into his specifications unless the cement has actually been subjected to tests?

Out of this situation there have arisen a number of independent inspection and testing organizations. They are presumed to be independent of any bias and to make impartial examinations of the materials delivered to the building by the seller, and to report to the architect, or through the architect to the owner, as to the actual quality, quantity, dimensions, or other characteristics of the products they have examined. They are in effect divisions of the architect's own professional organization and they function for his protection; but, strangely enough, architects have fallen into the common habit of placing responsibility for these inspections upon the contractor whose work is the subject of the inspector's examination and possible criticism. The reason for this strange situation is not difficult to find. Few owners appreciate the importance of thorough testing and inspection of structural materials. They dislike exceedingly to pay extra charges beyond the contractor's price and the architect's fee.

Architects have too often found it difficult to get their clients' approval for the expense of testing. They have passed the buck to the contractor and, by calling for the tests in their specifications, they have made the contractor figure the cost in his estimates. But they have lost sight of the fact that there are all sorts of good, bad and indifferent inspection and testing services, and that the contractor, if left alone, will very naturally engage that one whose services cost the least. So many abuses and unsound practices have developed in the field of independent inspections through the practice of placing the burden of inspection upon the manufacturer or contractor whose materials or workmanship are the subject of critical examination that architects who are indifferent to this matter are no longer safeguarded by the clauses they so carefully copy into each new specification. There can be no question that the architect should not only specify independent inspection, but should select for himself the inspection and testing laboratory or agency to be used, even if it is necessary for tactical reasons to have the contractor include the cost of inspection in his bid. It is equally important that a cost allowance be made with additions or reductions to be paid by or credited to the owner, so that the contractor cannot profit through the employment of inadequate or incompetent inspection service. How large should this allowance be?

COST OF INDEPENDENT INSPECTIONS

Two or three cents a barrel for cement or a dollar more or less a ton for fabricated steel represents the usual charges for independent inspection. If these inspections are adequate, the materials do what is expected of them, but if there are no tests, or if these operations have been slighted, there may be delays while rivet holes are re-reamed, or while an improperly dimensioned structural member is sent back to the shop and a replacement is delivered. Or there may be an even more serious delay to other trades while a section of concrete work is torn out and rebuilt. Defects such as these may cost far more than the entire inspection bill. The daily interest charges on a $10,000,000 building investment at 6 per cent are approximately $1,600. A few days' delay caused by faulty material not only runs up

Shop inspection of fabricated steel saves delays

staggering losses in carrying charges, but may affect the schedules of a dozen other trades and delay completion beyond a critical renting date.

If we examine for a moment the proper methods of inspecting cement and steel, it will become quickly apparent that good inspection cannot be had at cut-rate prices, and it will be equally apparent that inadequate inspection is worth nothing whatever.

CEMENT INSPECTION

The usual specification clause for inspection is: "All tests shall be made in accordance with current standard methods of the American Society for Testing Materials governing the materials tested." Without going into precise details, let us see what this means. The standard specifications require one set of physical tests for each 200 barrels in the storage bin. Assuming that the work uses 10,000 barrels, this would mean that 50 complete sets of tests should be made. To make these tests, there must be 50 sampling operations from different parts of the bin and 50 test samples made up, sacked and marked for identification and transported to the laboratory. Here they are opened, identified, and prepared for testing. To comply with the A. S. T. M. requirements, 300 tensile briquettes will have to be made, stored and broken at their proper ages. There will be 50 complete sets of tests for fineness, normal consistency, soundness, and time of setting, or a total of 500 complete tests of one kind or another representing the cement used. Further, to comply with testing standards, the laboratory conditions where the tests are made must be carefully controlled as to temperature and moisture. The apparatus used must be frequently and carefully calibrated in order to keep within standard tolerances.

In spite of careful organization, great expertness on the part of the laboratory men and the best of equipment for minimizing labor, it is perfectly obvious that these tests cannot be made for the prices sometimes quoted. Obviously a lower fee must involve a sacrifice of legitimate profits by the reputable laboratory or eliminating the required standard procedure by the "short cut" laboratory.

STEEL INSPECTION

A similar story can be told about the inspection of structural steel. This falls into three classes,—mill, shop and erection inspection. Mill inspection is for the purpose of securing adequate independent proof of the quality of steel used. The independent inspector must witness the tests made in the rolling mill by the mill metallurgist. He also inspects the shapes and plates as they are rolled and checks them for section, for surface, and for other defects incidental to the rolling process. The proper place,—in fact, the only place,—to do this work is in the mill itself, because after the steel gets to the fabricating shop, its rejection may hold up building operations while replacement is being effected.

Shop inspection takes place at the fabricating shop. To be of any value, it must be thorough, and it should cover both workmanship and dimensions. Two ends are thus served,—first, to see that the material is properly fabricated and, second, to see that the various connections are correct so that the steel will go together without loss of time in the field. The operations include examination of the steel for section to see that the proper sizes and shapes have been built into the structure; a careful check against the detailed drawings for dimensions, including all field connections; inspection of workmanship, such as milling of column ends, fitting, reaming where specified, riveting and finally, painting.

Erection inspection is the third stage, and it is just what its name implies. It is performed on the site while the framework is in process of erection. It includes determination that the columns are plumb within specified tolerances (particularly important at elevator columns); inspection to see that every piece of steel goes into its proper place and is not interchanged with other parts; and examination of every joint to see that rivets are tight and that all loose or badly formed rivets are cut out or replaced. *There has been so much change in conservative factors*

of safety during recent years that it is becoming increasingly important to see that workmanship and materials are the best obtainable.

Clearly such cement and steel inspection cannot be done competently for a mere trifle. Before establishing an allowance to cover the cost of inspections, the architect is well advised to first consult with the president of one of the testing agencies of highest standing. If the allowance is thus made sufficient to provide test in strict accordance with A. S. T. M. standards and the final selection of the laboratory made on a basis of performance and reputation rather than cost, there is little danger that the architect's and the owner's interests will be neglected.

ABUSES OF INDEPENDENT INSPECTIONS

There are many other materials that are subject to inspection or testing by professional testing laboratories, but these two examples will suffice to show that in almost every phase of this work, very great importance attaches to a thorough inspection service, while at the same time there are many ways by which inspection service may be cheapened and neglected to lower costs, or to make it more profitable to the inspector.

"Good inspection service is welcomed by steel men," said an officer of one of the largest steel fabricating organizations in the country, a few days ago, "but good inspection service is quite rare. Practically every day there are from six to ten or more inspectors in our mills and fabricating shops besides the inspectors who are following our erection work. The bald truth of the matter is that about one in five of these inspectors never sees the stuff going through the mill or the shop. He sits in the office, making a nuisance of himself, until our own shop reports come through and then does a 'paper inspection' by checking and approving our own reports."

Again in the testing laboratory it is altogether too easy for cement tests or aggregate tests to be slighted. Unless the inspectors are entirely trustworthy, one cannot say whether or not they take 50 samples from different parts of a 10,000-barrel bin. What architect ever sees the 300 briquettes that are exactly made and broken? Thirty actual tests will suffice to give the inspector a foundation for filling in the intermediate 270 spaces on his report sheet with figures that are merely guessed at to indicate slight variations from the test samples. In short, independent inspections demand the highest type of professional integrity and competence to make them real safeguards to the architect and building owner. Such service cannot be bought cheaply; nor can the selection of the testing laboratory be left to the contractor who is concerned only with its cost.

Testing rivets for tightness is part of the field inspection

SPECIFYING INDEPENDENT INSPECTIONS

The most common practice among architects is to call for independent inspection at the expense of the contractor by laboratories "approved" by the architect. The contractor thereupon undertakes negotiations with the various laboratories or inspection services, and after getting bids will obviously seek the architect's approval for the service which costs the least. If the architect himself does not know the qualifications of the inspection laboratory submitted by the contractor, his "approval" is a mere rubber-stamp acceptance. The architect is throwing away the safeguards he has erected for the protection of himself and his client, and is actually approving a useless disbursement of funds.

The responsibility for the selection of inspection service is wholly the architect's. It may be convenient to have the contractor pay the bills so that the owner's lump sum price is inclusive of items that would otherwise appear as extras, but the contractor should not be allowed to influence the selection in any way, nor to make a profit through cheapening the cost of inspection service. It is even better, however, if the inspection agency be both designated and employed by the architect or engineer.

An alternative method is to have the inspection agency designated by the contractor subject to the approval of the architect or engineer with these provisos:

(1) That a definite sum be allowed by the

architect or engineer for the various services required,—that allowance to be defined in the specifications covering such required services.

(2) That any savings effected below such estimates by the contractor in the employment of the inspector shall revert to the credit of the owner, and that any costs above the allowance approved by the architect shall be paid by the owner.

This alternative method is employed in "Stevens Master Specifications" from which a typical extract is quoted. "All tests shall be made in a laboratory approved by the (Architects, Engineers); and the contractor shall allow in his proposal the sum of (give amount) for all inspection and tests and special engineering services in connection with the work. The (Architects, Engineers) will select the testing laboratory and the contractor shall employ it and pay all charges in connection therewith. Should the total charges be more or less than the amount allowed, there shall be a corresponding adjustment in the contractor's price. All tests shall be made in accordance with the current standard methods of the American Society for Testing Materials governing the materials tested."

A similar provision is incorporated in the Standard Specifications of the New York Building Congress. Typical excerpts are quoted:

"When so specified under Part A of Trade Divisions, all cement for use on the work shall be tested before being accepted for use by a competent testing laboratory approved by the architect. The cost of such tests shall be paid out of the cash allowance approved in Part A of Trade Divisions."

And in another place, "Where, under Part A, special tests of materials furnished for work in this Division are specified, this contractor shall provide in his estimate the sums stated under Part A. These sums will be expended at the architect's discretion; any unexpended balance shall revert to the owner. All such tests shall be made in accordance with the standard method of test covering the particular material under consideration of the American Society for Testing Materials or of the Purchase Specifications for Concrete Materials of the American Concrete Institute."

While these specification clauses are carefully worded to give the architect control over the quality of the inspection service rendered, and while they are vastly superior to the apparently common practice of leaving the matter entirely in the contractor's hands, it would seem more logical and simple for the architect or engineer to specify by name the particular testing laboratory in whose work he has entire confidence. A clause such as this might be used: "All laboratory, mill, shop and field inspections called for in other divisions of this specification shall be made by (name of selected testing laboratory), and all reports thereof shall be delivered to the architect. The contractor shall incorporate in his proposal an allowance of (give amount) to cover the costs of these independent inspections and tests. These sums shall be expended at the architect's discretion; any unexpended balance shall revert to the owner, and any additional costs incurred at the architect's order shall be paid by the owner."

VALUE OF COMPETENT INSPECTIONS

In thus recommending that the selection of an inspection service be taken from the hands of the contractor, there is no implication intended that the contractor prefers a testing service which he can control in order to get by with substandard materials or workmanship. On the contrary, any contracting organization with an eye to the preservation of its reputation and with a desire to complete its work in accordance with predetermined schedules will prefer to select the best inspection laboratory available if the architect's allowance is sufficient to pay its charges.

Similar benefits accrue to the manufacturer of the material subjected to tests and inspection. Every reputable producer must jealously guard his own reputation.

Because so little attention has been given to this subject in recent years, independent inspections have somewhat fallen into disrepute. When conditions are such that a professional service is bought on a price basis, as a mere commodity, it is bound to degenerate in its quality; it is still further degraded by price competition in its own field until literally the cut-rate price is too high because the service is worthless. Then there follows the general belief on the part of architects and engineers that inspection service is a necessary evil instead of a constructive force working toward lower costs and better results. Under these conditions, the highly ethical and strictly professional service is at a grave disadvantage. It cannot permanently exist at cut-rate prices. It cannot compete with those who slight their work. But there are, fortunately, enough architects and engineers who have learned the value of professional inspection services to keep a group of these laboratories alive and staffed with experienced field and laboratory men. The architect must make some independent investigations on his own account that he may discriminate wisely in his recommendations or approvals. If this practice is continued, independent inspections will be restored in dignity and importance to their proper place as invaluable adjuncts and safeguards to architects, engineers, and building owners.

EQUITABLE COMPENSATION FOR ARCHITECTS

BY
MORTON C. TUTTLE
PRESIDENT MORTON C. TUTTLE COMPANY, ENGINEERS

PROFESSIONAL men, in general, are inclined to be reticent as to their compensation. Architects have rather conspicuously avoided a topic which, to them, doubtless seems too commercial for frequent or for general discussion. In spite of our personal preferences, however, problems of ethics and of conscience are considerably influenced by necessity. We must earn our daily bread and sometimes a little cake besides. To accomplish that minimum we must take pretty careful account not only of the value of our services to others, but of their cost to ourselves. This troublesome question of compensation cannot be avoided. As for the architects and their bread and cake, we may note that members of the profession have commonly adopted the custom of charging for their services a percentage of the cost of the building designed. These percentages have been established by the American Institute of Architects and though listed as minimum, are, with few exceptions, operative as standard fees.

IS PERCENTAGE LOGICAL? Is this sufficient, or too little, or too much? While it is impossible to offer more than vague generalizations as to the earnings of any profession, or of any industry, we are safe in saying that the net return of an architectural firm from its 6 per cent charge seldom exceeds 1½ per cent; though it, of course, varies tremendously with the scale of operations. Thus no one conversant with the operating costs of an active engineering or architectural office will need to be told that a 6 per cent compensation for services for anything but very large undertakings is insufficient to permit exhaustive studies, carried out with the exactitude of detail essential to producing the best and most economical structure devised. On the other hand, a payment of 6 per cent for the architectural services involved in the design of huge, simple structures, calling for heavy expenditures and in many cases repeating the same unit detail, constitutes an overpayment for the time and ability demanded.

In short, complicated and difficult design which is costly to the architect is more frequently characteristic of smaller than of larger structures, whereas the larger the structure, the more likely it is to repeat certain fixed units, the cost of which in terms of engineering time and thought is relatively small. Except as a matter of convenience in reckoning, it is therefore difficult to find a logical reason why a percentage of the cost of brick, mortar, metal and labor involved in erecting a building should be accepted as a measure of the value of the creative work of the designer. It would seem as reasonable to pay a Michelangelo for his statues on a basis of so much per pound!

THE LEGAL PARALLEL. If, on the other hand, a lawyer is asked to write an opinion on an important and intricate matter, he assumes, and his client knows, that the formulation of a correct opinion involves an exhaustive study of cases. In charging for such an opinion the lawyer takes at least two facts into consideration: first, the time involved in looking up the law; secondly, the reasonable compensation for the professional skill and judgment which he has exercised, and no reputable lawyer would consider limiting the expenditures necessary to determining the nature of the precedents governing the case in hand; nor would any client view as anything but suicidal an agreement which limited the scope of his adviser's research. The parallel in case of the architect's services is this: whatever the basis of the compensation, the client pays for two things,—first for the professional ability of the architect, as for the professional ability of the lawyer or for the surgeon; secondly, for the making of plans and specifications.

COMMODITY OR SERVICE? Now the making of plans and specifications may be designated as a semi-mechanical operation closely resembling a manufacturing process. Such plans and specifications simply embody in fixed form the ideas evolved by the architect or engineer. As such plans are drawn and re-drawn they serve as an aid to the designer's thinking, for they are a translation of his conception into a medium which may be discussed, criticised, altered and improved. The work of the drafting room must be done in order to present the problem completely, and to reconcile the requirements of the client with technical and artistic necessities. I consider that the routine work of the drafting room, for doing which men are paid moderate salaries, is only the mechanical aid of the profession, bearing much the same relation to the creative services of the architect as a stenographer's notes bear to the product of the great legal authority.

It seems beyond argument that the cost of this factory process of making plans and specifications should be completely separated from the compensation for professional services. The architect or engineer should be free adequately to study, without penalty, the various ways which may occur to him as possible for the solution of his client's problem. In order to insure accomplishment of the best and most economical results, he

should be free to make for drafting and study whatever expenditures are necessary without in so doing penalizing himself for his thoroughness. Anyone who has had intimate contact with building affairs can cite many cases where the right line of attack has been discerned only after several experiments and false starts. Often the best idea has not occurred until considerable time and money have been spent upon studies continually thrown into the discard. That this occurs and that the cost of it is uncomplainingly borne by the architect,—even to the extent of actual financial loss,—is to the honor of the profession.

PAYING FOR EFFICIENCY. The wise builder, however, who wishes the best that can be obtained, will not care to subject the consciences of his designers to many strains of this sort. He will recognize that it is often,—indeed always,—profitable to him to pay the cost of exceedingly careful planning. In my own experience I have seen fully 7 per cent of the cost of a building expended upon meticulously prepared plans and specifications, but, in the upshot, the owner was the gainer in final cost, as well as in value.

But disregarding possible effect upon the disinterestedness of the designer, the percentage contract is further objectionable in that it increases compensation with increase in the cost of the structure. Logically, within certain bounds, the reverse should be true. The greater the saving which the architect can insure to his client the larger should be his reward. The present method places a premium upon extravagance, and while the ethics of the profession prevent taking advantage of the circumstances, there is no reason why a premium upon economy should not work rather better for all the parties concerned.

CLIENT'S UNDERSTANDING. A friendly observer may well raise the question as to whether architects have devoted sufficient thought and effort to enlightening their clients concerning the problems affecting their mutual relationships. But no doubt architects realize the abysmal ignorance of their clients as to the architect's responsibility. A bunch of blue prints weighing a few pounds, a set of typewritten specifications, some friendly chats with an attractive individual who is interested in determining the best sort of house or the most effective arrangement of office space, form about the picture an average client has of an architect's service.

Just what it costs to make these few pounds of plans, what it costs to write the specifications, and how heavy a drain upon the architect is made by an organization which must receive its weekly wages, supported in good times and in bad, all are matters that seldom occur to most clients. Their cheerful assumption seems to be that art is not a business, that it "comes easy," and that the architect pockets his whole commission without any deductions of consequence. Did this average client but know the facts, he would realize how the present percentage method of payment works not only to the disadvantage of the architect but to his own disadvantage as well. He would then be only too glad to see reparation made, return the professional's fee and the professional's costs,—in short to insist upon a fee-plus-cost arrangement.

EQUITABLE FEE-PLUS-COST. Nevertheless, in order to make such a fee-plus-cost arrangement equitable, an accurate knowledge of the overhead involved in architectural offices must be obtained. The common understanding that the overhead of an architectural office is represented by from 80 to 120 per cent of the drafting payroll is too loose for practical application. As a working principle, a number of our great engineering offices have determined that under normal conditions the overhead of their drafting rooms, including items of rent, heat, light, tracing paper, supplies, and a proportionate share of the supervision of the officers of the company, will approximate 100 per cent of the drafting room payrolls. This percentage will of course vary with the volume of work carried on and with the conditions and with the method of organization incorporated, but it is accurate enough to be fair, and definite enough to be convenient.

Accepting this figure, then, the charge for an architect's services on the mechanical side should be 200 per cent of the actual time consumed in drafting and re-drafting plans. For his services on the professional side, that is to say for his specialized skill and judgment based on the length and nature of his experience, his standing as an expert, and his prestige in his profession, the charge should be quite independently determined. Where the new charges are lumped under the head of a single fixed percentage, neither professional nor client is quite sure what it is all about. The application of sound logic to such a situation becomes increasingly imperative.

THE LOGICAL AGREEMENT. If the preceding reasoning is sound, then it is logical to conclude that the most effective form of agreement is one similar to that outlined by the American Institute of Architects on the "fee-plus-cost system." It is by no means suggested that this form of contract will be as readily accepted by the average client as the conventional percentage form. From experience in the field of engineering, I can give the assurance that, with adequate explanation of the principles outlined in the paragraphs preceding, the most desirable type of clients will accept this form and that both client and architect will benefit from the logical relationships thereby established.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 16 (*Continued*)

TERRA COTTA, CUT STONE AND PRE-CAST STONE

EDITOR'S NOTE. The setting of cut stone and the duties of the superintendent in this work, were discussed to some extent in the April issue of THE ARCHITECTURAL FORUM, and these topics are here resumed.

INASMUCH as the limestone quarrymen have declared against the application of waterproof paint to the unexposed surfaces of their stone, such a specification requirement is going out of vogue. Where such waterproofing is deemed essential, recourse is had to the use of non-staining waterproof cement mortar, applied to all such surfaces. Whether this or the paint is called for, one must make sure that all parts of the stone which might come into contact with other mortar (waterproof or ordinary) are completely covered. Unless waterproof paint is most carefully applied, it may leave minute spots or streaks exposed, and hence be of little value. This is especially true if painting is permitted in cold or damp weather or on stone not perfectly clean or thoroughly dry. If done before shipment, the painted surfaces should be washed at the site, as otherwise inspection may be considered only perfunctory. All pinholes and other bare spots must, of course, be retouched, if these are unduly plentiful, and the inspector is justified in demanding a full second coat. One must be sure, too, that the paint used is of an approved brand, known as a good bonding medium, as well as being waterproof. Especial care is demanded both in anchoring and waterproofing all cut stone against the back of which concrete is to be poured. If such surfaces are plastered with non-staining mortar, it must be allowed sufficient time to set to preclude the possibility of acids penetrating (by way of the water in the mortar) or of its being damaged by the spading of the flux.

This dissertation on setting is applicable in general, not only to cut stone and terra cotta, but to all forms of pre-cast (artificial) stone as well. Although cement- and sand-lime brick technically belong under this latter head, they are not so considered, but are classed as brick substitutes. Neither these nor hollow concrete blocks often find place in the specifications of better class architects, for obvious reasons. In the early days of the Portland cement industry, the material was sold indiscriminately, little or no attention being paid by the manufacturers as to the character of the product into which the cement entered, nor to the methods employed by its users. As a result, architects and engineers were forced to rely solely upon the skill and character of those engaged in the cement block or cement brick industry for the production of a usable and uniformly dependable product. This was frequently defeated by ignorance, carelessness or the stress of competition. Thus, the experience of most of those in the construction professions was not conducive to prejudice in favor of either material; quite the contrary. More recently, however, the Portland Cement Association has lent its influence to the assistance of the makers of cement products, to the marked improvement thereof,—though scarcely to the entire elimination of architects' disfavor. In the last analysis, the personal element in the making of any concrete is so essentially the most important consideration that any concern essaying the manufacture of pre-cast units must rely upon the building up of a reputation sufficient to warrant its being patronized by both architects and builders. It is considered axiomatic that no architect or engineer knows the kind of concrete entering into his construction unless he has had it adequately inspected during process. To extend such inspection to the overseeing of the production of each piece turned out by a manufacturing plant is manifestly expensive, and hence is more or less out of the question. Consequently, architects who see possibilities in the use of this material, either because of economy or any other reason, have learned to accredit certain makers and to accept their material at the site, subject to inspection similar to that accorded cut stone. Sometimes, however, one may find oneself mistaken, as in one instance where the entire order was unfit, due to insufficient curing before shipment. The arrises were not sharp and crumbled easily, and projecting members spalled unavoidably in the handling. But time did not permit rejection and replacement. The owner, who had originally favored its use for reasons of economy (urged by an importunate salesman), intervened and insisted upon its retention, though he refused to pay more than half the purchase price. He was not sued for the remainder.

Nevertheless, good pre-cast concrete possesses certain advantages over that poured on the site. It is better protected during inclement weather, and better attention can be given to the surface finish of each block. If well made, it can be

sand-blasted, cut or ground to remove surface crazing and other minor imperfections; it can even be honed or polished to produce an appearance nearly equal to that of the cut stone or granite which it may have been intended to imitate. Again must the sample be resorted to for comparison.

The pointing of terra cotta, cut stone or precast stone is usually deferred until completion of the mason's work. Then, all surfaces are required to be washed, as has been described for brickwork (Chapter 15), except that the use of acid or strong soap or similar washing compounds is prohibited on stone susceptible to stain. After washing (generally from the same scaffold), all exposed joints are raked out clean to a depth of from ¾ inch to 1 inch, and filled with pointing mortar, well compacted, the surface of which is struck off or tooled to match an approved sample. If the pointing mortar is to be colored, it is important to know that the pigment used is unfading, and that it is so mixed as to be uniform throughout all wall areas. Unless each batch is exactly measured, there are likely to be noticeable differences, and the walls will look blotchy. Our superintendent foresaw this and had the foreman prepare samples to be submitted to the architect. It developed that the latter desired a tone so strong as to cause the contractor to demur, claiming that it would cost him more than twice what he had allowed for this material. Learning that this meant a total outlay of more than $600 for mortar color, the architect decided that it would be a good place to save that amount and issued an order to that effect (Change Order No. 6), thus terminating the contention.

The pointing of joints in the wash surfaces of copings, sills, etc., and of slabs of stone or concrete forming roofs, demands more care than need be expended upon joints in vertical areas. Those in roof slabs are generally raked out from 2 to 4 inches deep, calked with oakum, and filled with approved elastic cement; sometimes with molten lead. Stone coping members in good work are not only securely anchored to the wall but are tied together longitudinally by means of bronze (or other non-rusting metal) clamps, countersunk enough to be covered by the joint filler, either elastic cement or a rich cement mortar. Washes on terra cotta members are generally raised at the joints, which are either squarely "butted" or have the edge of one side made with a half-round member (known as a "roll") which covers the joint. All joints on terra cotta washes should be filled to a depth of at least 1 inch with Portland cement mortar (1:2 or richer), well packed in, and either raised, or struck off even with the terra cotta,—never concave.

The calking of frames or similar members in contact with masonry, in order that such joints will be weatherproof, may be attended to by either masons or carpenters or by calking experts specially equipped for the service. If frames are of wood, the calking material may be lightly tamped in between the staffbead and the masonry jambs, care being taken not to spring the beads out of line and to fully and neatly seal all joints with waterproof cement or calking compound; or the specifications may call for the removal of the staffbead (or other outer member) and the thorough tamping of oakum or calking compound to fill the crevices behind it. In this latter event, it should be required that these outer members should be fitted at the mill and temporarily tacked in place, to be removed when the calking is begun and to be permanently nailed in place after it is completed. If frames are of metal, they should be calked at the time they are grouted in, with whatever material is specified, and neatly finished.

All cut stone and terra cotta likely to be damaged should be adequately protected as soon as possible after being put in place. This is sometimes called for in the mason's specifications, but, being essentially carpenter's work, is generally so specified, and hence will be treated later in these articles under "Structural Carpentry."

CHAPTER 17

STRUCTURAL STEEL

INSPECTION of structural steel is subject to many of the limitations, insofar as the duties of the field superintendent are concerned, that are characteristic of reinforcing steel. (See Chapter 10. "Reinforcement and Other Built-in Members" in THE FORUM for October, 1929.) If the specifications call for certain chemical compositions of the metal and limit the method of manufacture as set forth, for instance, in the standard specifications of the American Society for Testing Materials, it is then up to the architect to specify or to determine whether or not he will have the owner assessed for the services of a testing laboratory of recognized standing to investigate and report on these requirements. This service may or may not include inspection of prepara-

tion of materials in the fabricating plant. It may even include supervision of field operations, though this latter is generally supposed to be embraced in the ordinary superintendence of architect, engineer, or clerk-of-the-works.

The committee appointed by the American Institute of Steel Construction to "prepare a standard specification for the design, fabrication and erection of structural steel for buildings" has compiled a specification that has apparently been accepted by a majority of architects and structural engineers. This specification is given in full in the handbook, "Steel Construction," published by the Institute (285 Madison Avenue, New York), and is preceded by a statement to the effect that there are five major requirements that must be fulfilled in order to obtain a satisfactory (steel) structure. Two of these five are of primary interest to the field superintendent:

"(a) The material used must be suitable, of uniform quality, and without defects affecting the strength or service of the structure.

"(d) The workmanship must be good, so that defects or injuries are not produced in the manufacture."

As to the specification itself, it is quite obviously premised by the supposition that inspection shall be undertaken only by experienced men, thoroughly competent. It is for this reason that shop inspection and chemical analyses are assigned to experts. Inspection of material at the building site, while no less important, is concerned more with externals, and hence can be done by the ordinary superintendent who is willing to apply himself with the diligence that may lead to efficiency.

In addition to the general clauses on materials and workmanship, such a superintendent is most concerned in the five stipulations in the aforesaid specification under the subject of "Erection." These require in a general way that the structure shall be (a) truly aligned and sufficiently braced; (b) provided with adequate temporary bolting; (c) supplied with proper supports for carrying temporary loads; (d) not riveted until properly aligned; and (e) that all rivets shall be as specified for shop work. It is evident that the adequacy of the temporary bracing, bolting and reinforcing contemplated in items a, b and c is intended to devolve upon the contractor for steel erection, he to assume all responsibility for such performance, thus affording the superintendent only indirect interest in these matters. If he should take occasion to make a recommendation or to issue a warning on any such subject, he must, therefore, be extremely careful not to so act as to affect the liability of a contractor one iota. Thus, a superintendent may advise a foreman to place additional struts under a temporarily overloaded beam, but he should under no condition be led to say, "Yes, that ought to do," or "I believe that will carry it," or even, "There, that's better." He should give no such expression of approval or satisfaction. His attitude in such matters should always be reflected by such remarks as, "It's entirely up to you, and really none of my business. I merely cautioned you." In addition to knowing his specifications, the superintendent should also familiarize himself with the "Code of Standard Practice as adopted by the American Institute of Steel Construction," also published in the handbook already mentioned. This has much additional material on the subject of field work.

On minor work, in which class our school building belongs, insofar as its consumption of structural steel is concerned, it is not unusual for the architect to save the owner the expense of the services of a testing laboratory, relying upon his allowed factor of safety, the general excellence of rolled steel members, and the stipulation that no second hand material shall be accepted. Such specifications permit shop inspection during fabrication, but even this is often waived, as entailing unwarranted expense. Sometimes, however, the field man may be called upon to make a trip to the shop to see how the work is progressing, which task fell to the superintendent in the case we are discussing.

Shop drawings were received at the building site in due season and were thoroughly digested by the superintendent in time to permit him to call the foreman's attention to certain beam bearings that were to rest 16 inches lower in the concrete than other first floor members, and the forms were corrected accordingly, ahead of the pouring. He also took it upon himself to question the home office regarding the riveting of certain knee bracing under the ends of girders over the gymnasium, as a result of which, these were investigated and the number of rivets increased. The clause in the specifications governing this matter read: "Connection members and their riveting shall, in every case, develop the maximum strength of the minor member framed." The superintendent had merely happened to notice that this point, as concerned these particular braces, had evidently escaped the attention of the checker, as well as that of the detailer. Rarely is such criticism expected of the man in the field. Nevertheless, his employer is entitled to the best that is in him. If he is fairly certain that a matter such as this needs correction, he should not hesitate to make mention of it. Officiousness in such things will, however, tend to make him most unpopular in the home office.

A case pertinent to the foregoing is that of a

church building, the central dome of which sprang from a masonry drum carried on steel work, which included important knee braces. Their insufficient riveting escaped the attention of everyone concerned. The steel deflected during construction, as the superimposed load increased, and the resultant repairs were quite expensive. Incidentally, the question of financial liability for the failure involved that of responsibility for shop drawings that had received the architect's approval. In this instance, the general contractor and the subcontractor who supplied and erected the steel (and prepared shop drawings) took the stand that, when the architect approved the shop drawings, he thereby made himself responsible for everything on them, including the contractor's undetected errors. Fortunately, custom does not substantiate this contention. An architect or engineer is not supposed, by virtue of his review and approval, to sanction or assume responsibility for errors emanating from the contractor. This is set forth in Art. 5 of the A. I. A. General Conditions of the Contract: "The Architect's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Architect's attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules."* A more direct wording would be, "The Architect's approval of such instruments does not make him or the Owner responsible for errors nor for any other unauthorized deviation from the terms of the contract." The chief points sought to be covered are the elimination of all informality regarding changes shown by shop drawings, and of all uncertainty regarding responsibility for errors in them. This substitute clause serves both ends most clearly. A similar statement made by a rubber stamp impressed plainly upon each shop drawing returned to a contractor quite effectually establishes a point which is otherwise lacking in prominence. It may likewise save the architect the inconvenience of an appearance in court.

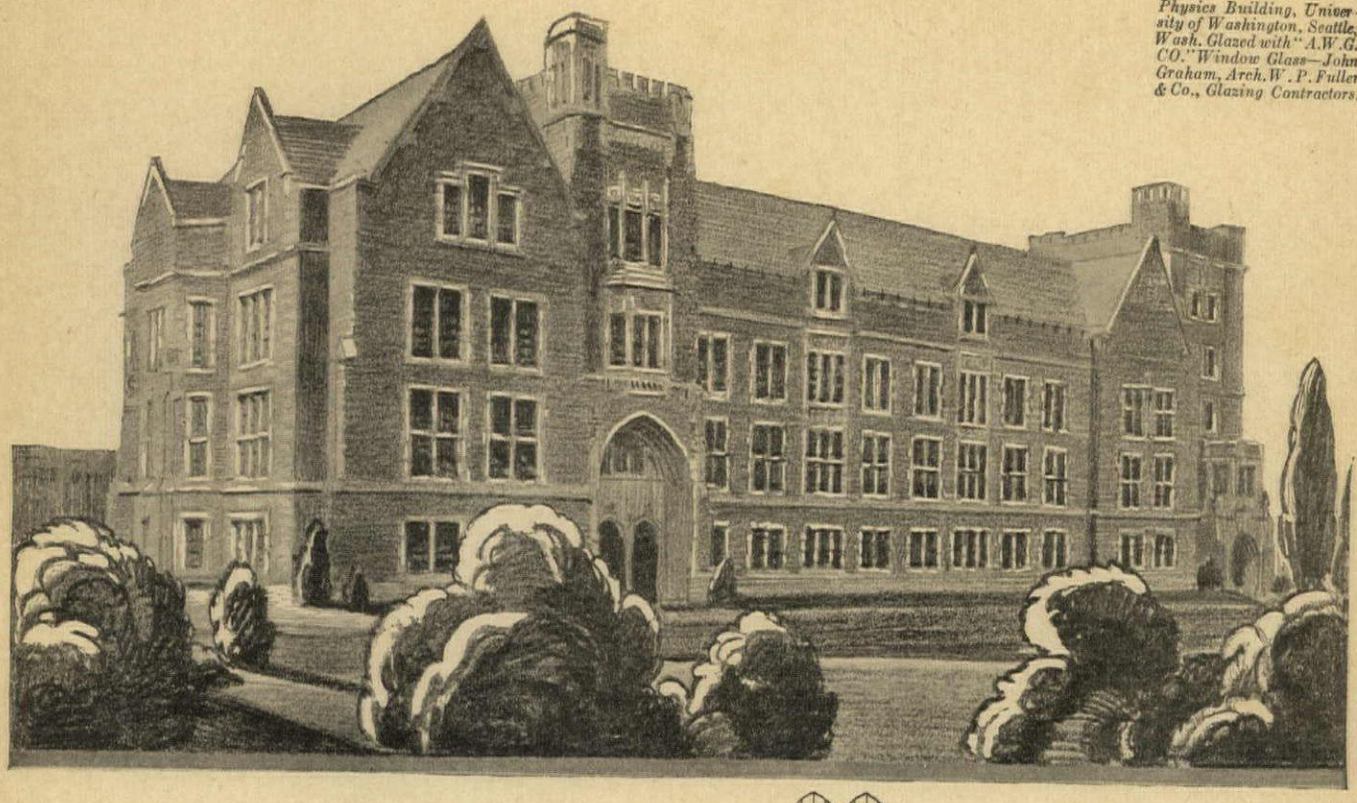
As some of us have learned with regret, such an incident may not be so remote as one is inclined to suppose. There are shyster lawyers who are well aware of what uncertain material is the composite mind of the average American jury. Such lawyers know that it is not impossible to persuade each of the 12 that a "poor abused contractor" should not be penalized by an "overbearing plutocratic owner" (supported by his minion, the architect), only because an obscure paragraph in a set of printed general conditions (which no one reads) may distinctly provide that the aforsaid contractor may be held responsible for this or that. Such a lawyer has even been known to allege that the standardized printed matter in an architect's specification should not be held as binding because, forsooth, there is evidence that coercion was employed in forcing such a contract upon the "innocent, needy, unsuspecting builder." A well defined safety-first policy is the only protection against such allegations.

Before the concreting was started, the superintendent advised the foreman to ascertain, if possible, just when the steel might be expected. The reply was unsatisfactory, and the superintendent so said in his daily report. He was thereupon told to take the first opportunity to visit the fabricating shop and see what was going on there. This he did on a Saturday, when no concrete was to be poured. His visit being unannounced, he found conditions worse than he had anticipated. It was a large shop in which his work was receiving less than secondary attention, which meant that it had gotten no further than scheduling. It was explained that the basement columns and first floor beams could be gotten out any time on a day's notice, but that the foreman was waiting for the arrival of a shipment that included certain needed sizes of which they were short. Car tracers were consulted but gave no assurance of prompt receipt, and hence the superintendent demanded that they either pick up these members locally, or substitute the next larger stock sizes, This was agreed upon, and shipment of the first car was promised the middle of the following week. The superintendent then took a trip through the plant and satisfied himself that it was up-to-date and could be counted upon to turn out high class work.

One does not discriminate against small shops for work of medium quantity, and yet it is essential that such a shop shall be of a class equipped to do the sort of work required for the particular case. For a certain school, about the size of this we are discussing, the structural steel was sublet to a small concern accustomed to doing only minor work, but intent upon enlarging its capacity. New equipment was purchased on the strength of obtaining this school contract, but the delay in its arrival caused a corresponding delay of three weeks in delivery of the first shipment. Such a subcontractor should be investigated in advance and then ruled against before the harm is done.

(To be continued in the July issue)

*There has been much discussion of this clause, especially on account of its implication that the architect *is* responsible for deviations when notified. Some architects change this to so read as to place the burden on the contractor to prove by a letter sanction by the architect.



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