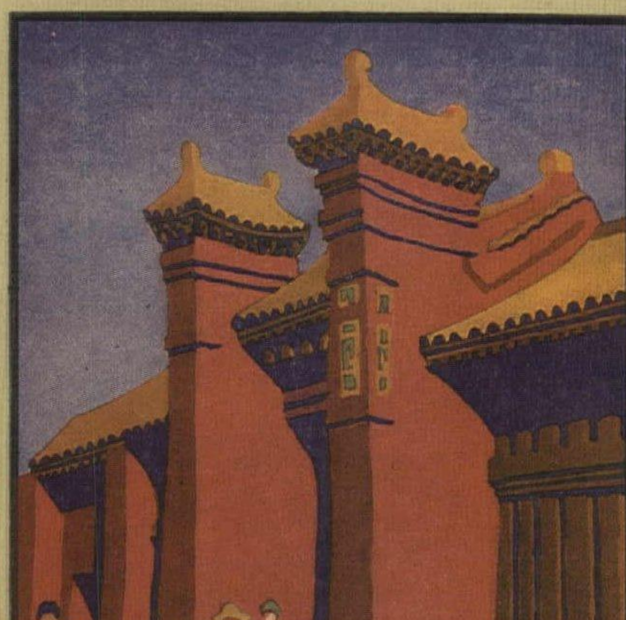
THE ARCHITECTURAL FORUM



IN TWO PARTS PART ONE

ARCHITECTURAL DESIGN

JANUARY 1930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BOOK DEPARTMENT

EARLY CHURCH ART IN NORTHERN EUROPE

A REVIEW BY

DOUGLAS WILLIAMS

A LIFETIME spent in laborious investigations of the origins of art has brought to Josef Strzygowski the distinction of being the leading authority on Byzantine architecture. A period of about 30 years devoted to a study of art as suggested by such catch-phrases as "Orient or Rome?" "Orient or Byzantium?" "Alti-Iram and the Migrations," has convinced Professor Josef Strzygowski, Professor of Art History at the University of Vienna, that the history of mediæval art rests on an unsound foundation if it looks for its origin only to Greek, Roman, early Christian and Italian sources. For the past ten years his efforts have been directed toward a demonstration that there existed a well developed art in the northern European countries about which very little is known, due to the fact that most if not all of its monuments were executed in wood and have therefore not survived. He believes that latter-day development has been profoundly influenced by this body of art and that a strong "art stream" flowing from these northern countries mingled with the current from the east and south and is responsible for much of the beauty with which we are surrounded today.

The investigations which Professor Strzygowski conducted have resulted in a great volume of material which, if published in full, would take the form of a large number of tomes of monumental size which, at the present time, it would be very difficult, if not impossible to have published. The work has therefore been summarized in the hope that enough interest in the subject will be aroused to warrant its publication later in more complete form. The condensed work deals comprehensively with the art of the more northern European countries for the most part, as exemplified in the wooden churches of that section, with particular attention to the three "landmarks" of wood architecture, beginning with the Slav movement toward the south, and the northern hinterland in the east of Europe, acquainting the reader with construction of beams placed horizontally. The second division is concerned with the development of half-timbered work, and includes that of the British Isles. The third division, perhaps most interesting because less familiar to the architectural reader, deals with a wholly different system of wood architecture, the Norwegian "mast" churches. The inquiry into the origin of this art involves an interesting discussion of early ship building.

Although it might seem that the work has resolved itself into a more or less technical study of wood construction, it actually goes much deeper than that and should help us to look upon art and culture from the point of view of the north and not, as has so long been the custom, through southern European or "humanistic" eyes. It has been the custom to consider every art not expressed in stone and naturalistic representation of the human figure as primitive, and the people practicing it as barbarians. One need only glance through the pages of the present work to realize how erroneous this opinion is and what a great amount of highly sophisticated ornament has existed in the more northern countries of Europe. In other words, Professor Strzygowski believes that the investigators and writers of books on the history of art have failed to recognize the great influence that Slavonic and other north European peoples have had indirectly in formulating what has come to be known as European art. For example, he points out that it is vain to look in the handbooks on art history for any mention of the pre-Romanesque art of the Croatians. Art historians have always taken the attitude that such art as existed in the so-called barbaric regions to the north had had its origin and was derived more or less directly from Byzantium in the east and Rome in the west. Professor Strzygowski's answer to this claim is to point out that many examples existing in remote places and attributed by the humanists to Roman influence are in reality of a much earlier date than corresponding forms in southern Europe. He cites such examples as the round stone churches near Prague and in Moravia; the Hiberno-Saxon monuments, such as the crosses of Ruthwell in Dumfriesshire and especially that of Bewcastle; and the pre-Romanesque churches in Spain with their barrel or cupola vaults in the form of the horseshoe.

Although England and Ireland present a large number of marvelous examples of the north-Europe art, it sometimes being hinted that the Christian art of Scandinavia may have had its origin in these islands, the author has decided to confine his discussion to the marginal countries of western Europe,—the Teutonic far north, and the Slavonic east. Although the territory inhabited by the Croats is located in the southern portion of Europe geographically, the author considers their early art as part of the northern European development, and in making his investigations he spent considerable time studying the rather meager remains of this branch of the art stream. The churches, although usually quite small, are important to the study of origins, and the ornament, which was carved free-hand without the aid of mechanical instruments of design, is characteristic of the primitive creative urge. The illustrations, both half-tones and line cuts, serve to strengthen the conviction that north European art was independent of and contributed to rather than being derived from that of southern Europe.

The fact that the greater part of northern church architecture was built with wood as the principal material of construction and that the buildings were therefore perishable is probably responsible for the great lack of knowledge and interest hitherto displayed in this subject by scholars and art historians. Although it is quite rea-

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"*International Airports*"

By **Stedman S. Hanks**

Lieutenant-Colonel Air Corps Reserve

THE rapid development of commercial aëronautics is presenting to American architects what bids fair to becoming an excellent opportunity for using skill in designing, constructing and equipping airports. The subject has hitherto received but little attention in the architectural press, and but few works on the subject have been published.

In this volume a highly trained and experienced aëronaut reviews the subject. He considers the problems of American airport development from a study of what has been done abroad against the background of the author's intimate knowledge of airport conditions here. In its preparation, Colonel Hanks made a prolonged tour of European airports for the purpose of learning in what ways their experience can serve as a guide for airport construction in the United States.

In making his study he received the assistance of many leaders in European aëronautics and enjoyed exceptional facilities for thorough investigation. Much information on the details of foreign airport operation is accordingly given that has never before been available in published form. The design, construction, and management of the outstanding airports is described and compared with that of the airports in America. Up to the present time, Europe has led the world in air passenger traffic. Colonel Hanks discusses passenger facilities at airports, tickets, baggage regulations, transportation of passengers to and from airports, and other details of European passenger practice. He considers also the problem of developing the transportation of freight by air and tells what has been done in Germany in the inauguration of combination air and rail service for express shipments.

The opportunities for substantial additional revenue to the airport from supplying recreational facilities and other adjuncts of the modern resort; an outline of an ideal airport combining the best features of successful American and European practice; a typical airport profit and loss statement; airport regulations; are other valuable features of this book.

195 pp., 5¾ x 8½ ins. Price $5.

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sonable to suppose that during the so-called middle or dark ages Europe was covered with such wooden churches, there now remains hardly a single example of the wooden church of that period except in Norway. Professor Strzygowski has been able, however, by careful study of more recently constructed churches, which doubtless developed directly from the early types, to form a very clear and plausible idea of what the early wooden churches were like in appearance and structure.

These churches fell into three general groups classified according to the type of construction used. There was the block type in which the side walls were built up solidly of beams placed horizontally, with the roof often in the form of a barrel vault also constructed of solid timber. This type of construction pre-supposed an unlimited supply of wood and was developed in heavily forested regions such as Finland, Galicia and certain parts of Russia. It was characterized by an appearance of ruggedness and solidity. Buildings constructed in this style depended almost entirely for architectural character on their solid proportions. Seldom if ever was any ornament used to decorate such churches. In countries where timber was less plentiful it was more often the custom to use the framed type of construction, to which group belong the half-timbered houses of the British Isles with which we are more familiar. Although the houses built in this manner have received no end of publicity and have been the subject of much adaptation, churches of this type are not often mentioned in histories of European ecclesiastical art. Here again we are greatly handicapped by the fact that none of the vast number of timbered churches that formerly clothed England, France and Germany now exist. There are a few which were built at a later date, and on these the author bases his discussion of this important class of wooden structure. The examples shown are of the true half-timbered type and are worthy of careful study. The third and perhaps the most interesting class of wooden church dealt with is the "mast" church of Norway. It is considered very remarkable that notwithstanding the humid climate of the country, these churches, unlike those in the rest of Europe, have not all perished. Many complete buildings still exist built in the period from the eleventh or twelfth century to the time of the Reformation. The construction of these churches is based on the use of vertical posts or masts, and the buildings derive a very characteristic and interesting form from the use of these masts as the chief framework. The author discusses the several variations of this form of church and particularly describes two examples, one at Borgund, Norway, because it is considered the finest example from the point of view of architecture, and the other, at Vines, as being the richest in ornamentation. The ornament of the latter is the finest remaining from the early mediæval period in Norway.

These earlier wooden ornaments are of the highest character, and the carved column caps and bases as well as the decorated panels found in this old church are marvels of design and workmanship. The carving in these decorations is based on conventionalized animal and plant forms and not on humanistic subjects. In discussing the possible origin of these churches, the author is inclined to the theory that they are an adaptation of the ship building at which the Norsemen were so proficient. This contention is strengthened by the fact that the most primitive form of these churches,—the single-masted

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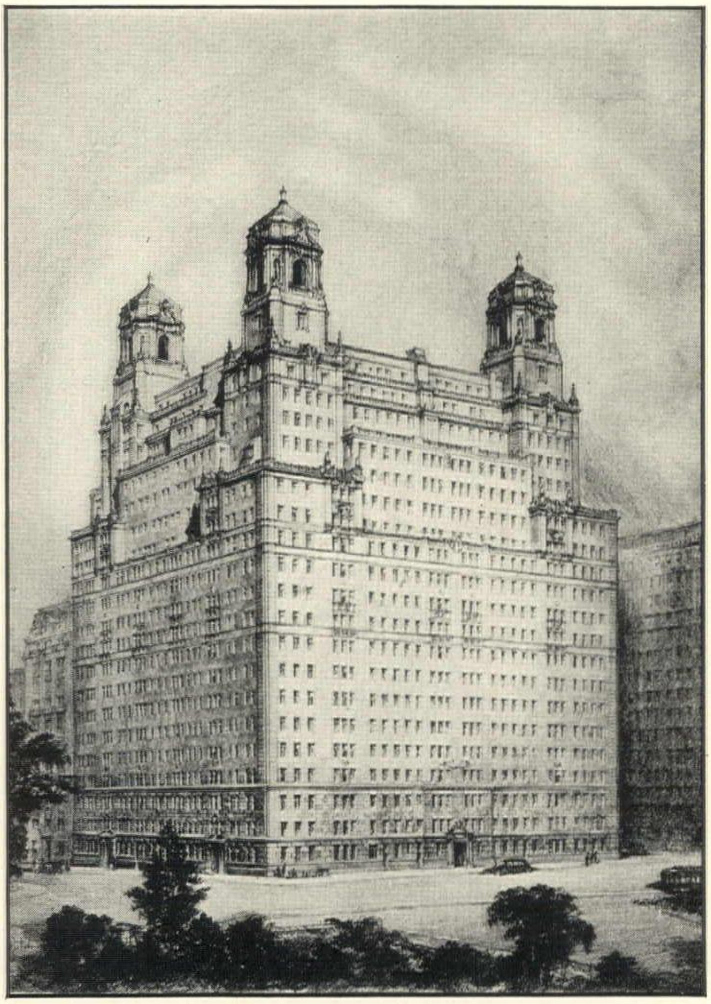

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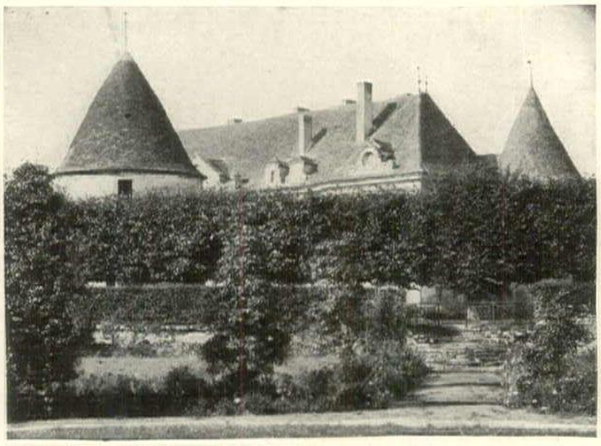
Small Manor Houses
AND
Farmsteads in France

By Harold D. Eberlein and Roger W. Ramsdell



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IN all the wide search for architectural types in which to design and plan the American home, there has been found nothing more beautiful and appropriate than what is called "French Provincial," the term applying to the better order of farm houses, *manoirs,* and even to minor chateaux. It is a type full of graceful informality along with the touch of dignity or sophistication which renders it just a trifle formal; it is expressive of eighteenth century charm, and it suits admirably the needs of the present-day builders of suburban or country homes. In the refined and slightly reticent exteriors of the old French country houses, much emphasis is placed upon excellent architectural lines, while their interiors show carefully arranged and spacious rooms with well placed chimneypieces, doors and windows.

This excellent and authoritative work should be in the library of every architect whose practice includes work of any kind of residence character. It brings to the attention of American architects a type which is fresh and new without being freakish. It includes 254 illustrations from original photographs showing subjects complete as well as in great detail, together with many measured drawings and perspective plot plans. Flat Quarto ($7\frac{1}{2}$ x 11 ins.), bound in handsome library blue buckram, stamped in gold, uncut edges with gilt tops.

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type,—is found in the region near Oslo where ship building had its greatest development in early times. In enlarging on this subject and in order to present more fully the remarkable wood ornamentation of the early Norwegians, the author has included a chapter dealing with "Royal Tombs in Scandinavia." He regrets that although the discovery of these treasures may have a bearing on our own civilization, comparatively little attention is paid by students to valuable relics found with them. These tombs consisted in many instances of ships in which the kings were buried with many of their belongings.

The chapters were originally delivered in the form of lectures. In some portions it is a trifle difficult to follow the thread of the thought, it having quite obviously been abridged from a work of vastly greater size. To get the fullest benefit from the work, one should be provided with a complete set of Professor Strzygowski's works, since he is constantly referring to them as authority for statements made in the present volume. In the main it is a very scholarly treatment of an interesting subject and should considerably broaden the horizon surrounding the subject of art origins, limited as we have always been to the humanistic viewpoint. To many of us who have become a little weary of the conventional sources of art inspiration and who yet are reluctant to take up with the more radical forms known as "modernistic" art, the field of northern Europe art as here outlined by Professor Strzygowski has great potentialities as a source of wholly fresh and original inspiration.

EARLY CHRISTIAN ART IN NORTHERN EUROPE. By Josef Strzygowski. 52 Plates, 172 Pages, 6 x $9\frac{1}{2}$ ins. Price $8.50. Harper & Brothers, 49 East 33rd Street, New York.

The Modern English House

An excellent presentation of the different forms being used in modern English domestic architecture,—particularly "small house" architecture. It includes illustrations of houses recently built, and in many instances the floor plans are given. The materials used are wood; half-timber; stone and brick; concrete; stucco over various sorts of masonry or on wood or metal lathing. The volume would be invaluable alike to the architect, builder or home owner or to anyone interested in building.

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"THE YOUNG ARCHITECTS"

A REVIEW BY

CLIFFORD WAYNE SPENCER

IT is so unusual to find a book on architecture that is not written in a dry and technical style that it is not surprising to find oneself reading through the entire length of this volume which is frankly intended for the enjoyment and edification of small children. In it we find little stories from the lives of children living in different periods of American history, written against a background of the architecture characteristic of the period in each case. Indeed it seems a very fine method of impressing on the reader's mind an outline of the development of American architecture in all its stages up to the present time, for even after one has read long and detailed accounts of the history of American architecture and has studied many examples as they exist today, one may well find an increased understanding of them in the pages of this little volume.

Any style of architecture may be much better understood if the student is able to see it from the viewpoint of those for whom and by whom it was built,—and that is exactly the purpose which these little sketches accomplish. Each gives a page from the everyday history of the people who were the builders and inhabitants of houses typifying the several styles in vogue at different times. The fact that the characters and their houses are imaginary does not in any way detract from the interest or practical value of the book, since the houses are in all cases composite examples made up of the best features taken from a large number of houses actually constructed during the period in which the characters of the stories are supposed to have lived. As for the characters themselves and their manners of living, Mrs. Stanley-Brown has reconstructed little cross sections of American life so cleverly that for a time we actually seem to be living in the romantic days of which she writes, and the architectural matter is so cleverly woven into the stories that one is hardly conscious of it, and yet all the features of the various houses are brought out quite clearly. The brief foreword preceding each sketch outlines in clear simple language the architectural development and characteristics of the period in which the story is to be placed. These show the way in which the transition occurred between the period and that preceding and how the architecture of American houses has been affected by the racial extraction of the builders as well as by their geographical location in the country.

The drawings by Rudolph Stanley-Brown illustrate the stories admirably and show that the artist is an architect of considerable ability as well. The drawings, which are mostly in pen and ink show in all cases the composite house in which the imaginary characters dwell as well as renderings of actual examples of outstanding buildings in each of the periods. The first story is laid in and about a pleasant brick house on the banks of a canal in New Amsterdam in 1660 and tells of the Dutch influence on our native American building. Then the scene shifts to the backwoods of Guilford, Conn., and there we find a Puritan family which has grown too large for its one-room log cabin moving into a larger house in the Elizabethan Colonial style with its overhanging second story and many rooms clustered about a great central chimney. The year is 1680. In Virginia in 1730 a much more pretentious house is occupied by the Carlisle family, and it is constructed in the American adaptation of the early Georgian style, being of brick and very formal and imposing. A town house in Charleston illustrates a house influenced strongly by the imported ideals of the mid-Georgian period and the climatic and social conditions of an old southern city. The region chosen to portray the prototype of the late Georgian English house is Philadelphia, and the year is 1777, while a town house in Boston built in 1795 is in the same style although somewhat different, due to its location and later date. Frankly reminiscent of Thomas Jefferson's home at Monticello is the country house near Baltimore illustrating the post-colonial or Roman revival type of house. The scene then shifts to the Far West and California in 1825, where a Spanish family is planning the construction of one of those low *haciendas* which have recently furnished so much precedent for home building in our south and southwest. The next episode occurs in Rochester, N. Y., and the Greek Revival vogue is in full swing, the year being 1840, while only eight years later the new buildings in New Orleans are decidedly French in character, although strongly influenced by Spanish taste and local conditions. That no period, whether good or bad, is entirely without its points of merit is proved by means of the "pointed Gothic" villa at Chicago, while another type which was subject to almost as great abuses is typified by a fine example of the Romanesque revival. The story in connection with this house is supposed to take place at Newport, soon after the construction of the house in 1890. The so-called romantic revival is represented by a country house in New Jersey in the Italian style with its elaborate gardens and interesting out-buildings. The newest and most fantastic episode in American life is staged in a modern Manhattan sky-scraper apartment, where a renting agent is showing some prospective tenants an apartment laid out and decorated in the most advanced modernistic manner. The contrast between the various styles of living is as marked as is the difference in the architecture itself, and the entire collection should furnish a great stimulus to interest in architecture among both children and grown up readers.

THE YOUNG ARCHITECTS. By Katherine Stanley-Brown. 259 pp., 6 x 8¼ ins. Price, $3. Harper & Brothers, 49 East Thirty-third Street, New York.

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THE EDITOR'S FORUM

THE CHICAGO WAR MEMORIAL

As secretary of the Jury of Award having in charge the judging of the designs submitted for Chicago's War Memorial, John Mead Howells announces as winners of the first prize Eric Gugler and Roger Bailey, the design contributed by Benjamin H. Marshall being awarded the second prize. Owing to the excellence of many of the 114 sets of drawings submitted, the selection of the winning designs constituted a matter of considerable difficulty. In regard to the drawings of Messrs. Gugler and Bailey, the feeling of the jury was that this solution gave a response which satisfied not only the monumental demands of the program but had a strong spiritual appeal in that it created an enclosed space in which the sarcophagus, representing those men whom the war had not left with us, had the dignity of resting in the seclusion created by the surrounding colonnade. The scheme awarded the second prize, submitted by Benjamin H. Marshall, had also been liked by the Jury from the first, but had been set aside for various reasons, one being the likelihood of its being extremely costly. It had, however, some of the qualities of the first prize, in that it would not block the view of the lake from the city, and in that it created the same seclusion for the memory of the dead. The vote for second prize for this *projet* was unanimous.

Two other designs which might unofficially be called three and four, could not, under the terms of the program, be officially placed, as only the first and second prizes were to be of official record. One of these submitted by Voorhees, Gmelin & Walker showed a magnificent progression of stone verticals, projecting into the lake in the shape of the prow of a vessel, and rising into the sky as they progress. This was rightly admired as a striking and original design. The last of the four, submitted by Nimmons, Carr & Wright, was admired by the Jury as the best of a series of solutions of the shaft type. The plan is almost irreproachable, and it is an open, well studied presentation of the subject. In making the recommendations and awards the Jury made no effort to learn the identity of the various competitors.

LE BRUN SCHOLARSHIP COMPETITION

As its chairman, Chester H. Aldrich announces, in the name of the executive committee of the New York Chapter of the American Institute of Architects as trustees of the traveling scholarship founded by Pierre L. Le Brun, a competition for the selection of a beneficiary. The program will be issued about January 15, 1930, calling for drawings to be delivered about March 15, 1930. Anyone wishing to enter the competition should arrange at once for nomination by a member of the American Institute of Architects. Nomination blanks can be obtained from the secretary of any chapter, A.I.A., or from the Le Brun Scholarship Committee. Nominations should be sent, so as to be received before January 15, 1930, to the Le Brun Scholarship Committee, Room 530, 101 Park Avenue, New York.

AMERICAN ACADEMY IN ROME

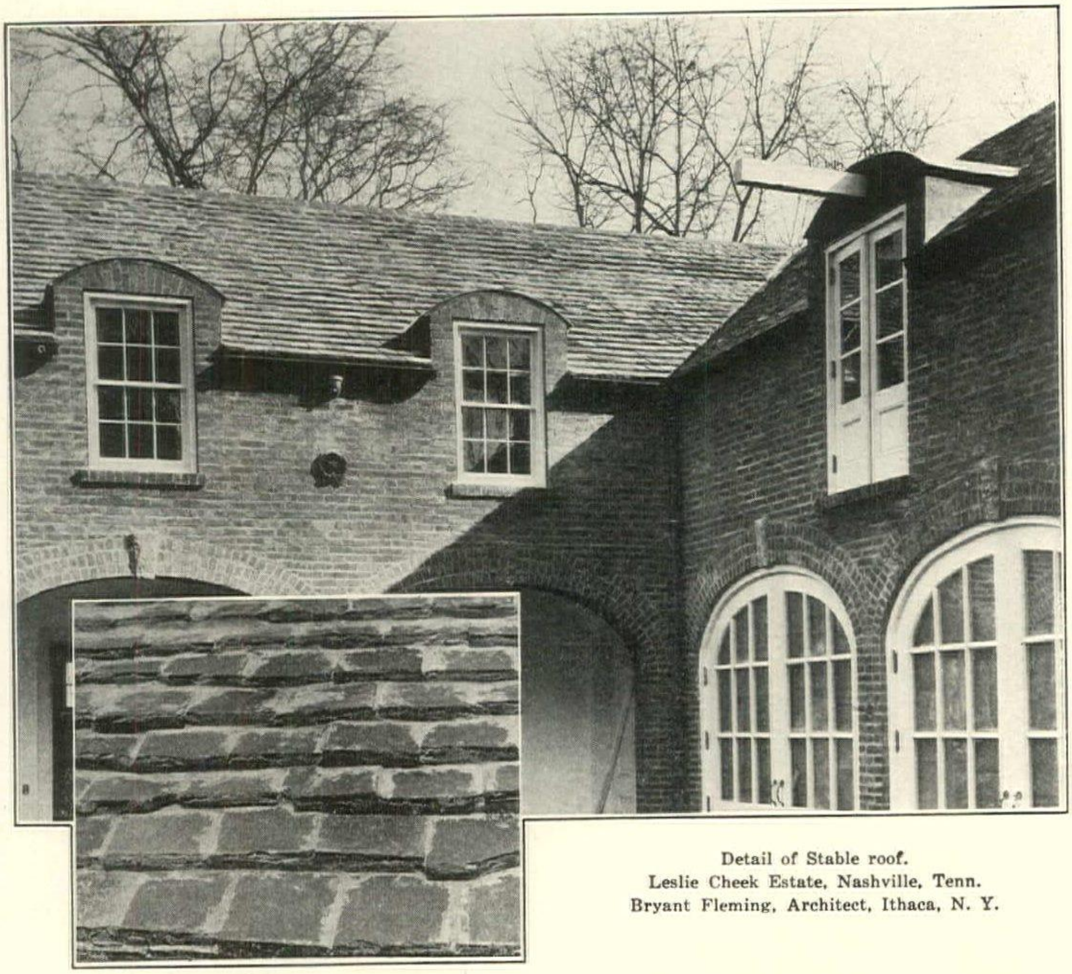
The American Academy in Rome has announced its annual competition for fellowships in architecture, landscape architecture, painting, sculpture and musical composition. This competition has become an event of national interest, for the American Academy in Rome is seeking the best talent to be found in the whole country to enter these contests. Entries for the competition will be received until March 1, 1930. Circulars of information and application blanks and any desired data may be obtained by addressing Roscoe Guernsey, Executive Secretary, 101 Park Avenue, New York.

NEW MEMBER OF NATIONAL PARK AND PLANNING COMMISSION

Appointment by President Hoover of William Adams Delano, President of the New York Chapter of the American Institute of Architects, as a member of the National Capital Park and Planning Commission was recently announced. Mr. Delano succeeds the late Milton B. Medary of Philadelphia, former President of the Institute, named to the Commission by President Coolidge in 1926.

THE JAMES HARRISON STEEDMAN MEMORIAL FELLOWSHIP COMPETITION

The governing committe of the James Harrison Steedman Memorial Fellowship announces the fifth competition for this fellowship, to be held in the spring of 1930. This fellowship represents an annual award of $1,500 to assist well qualified architectural graduates to benefit by a year of travel in the study of architecture in foreign countries as determined by the committee and under the guidance and control of the School of Architecture at Washington University. This fellowship is open on equal terms to all graduates in architecture of recognized architectural schools in the United States, but they must have had at least one year of practical work in the office of an architect practicing in St. Louis before being entitled to receive the benefits of the fellowship. Application blanks for registration can be obtained at any time upon written request addressed to the head of the School of Architecture of Washington University, St. Louis. The application blanks must be sent in not later than January 25, 1930.



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THE ARCHITECTURAL FORUM

NUMBER ONE

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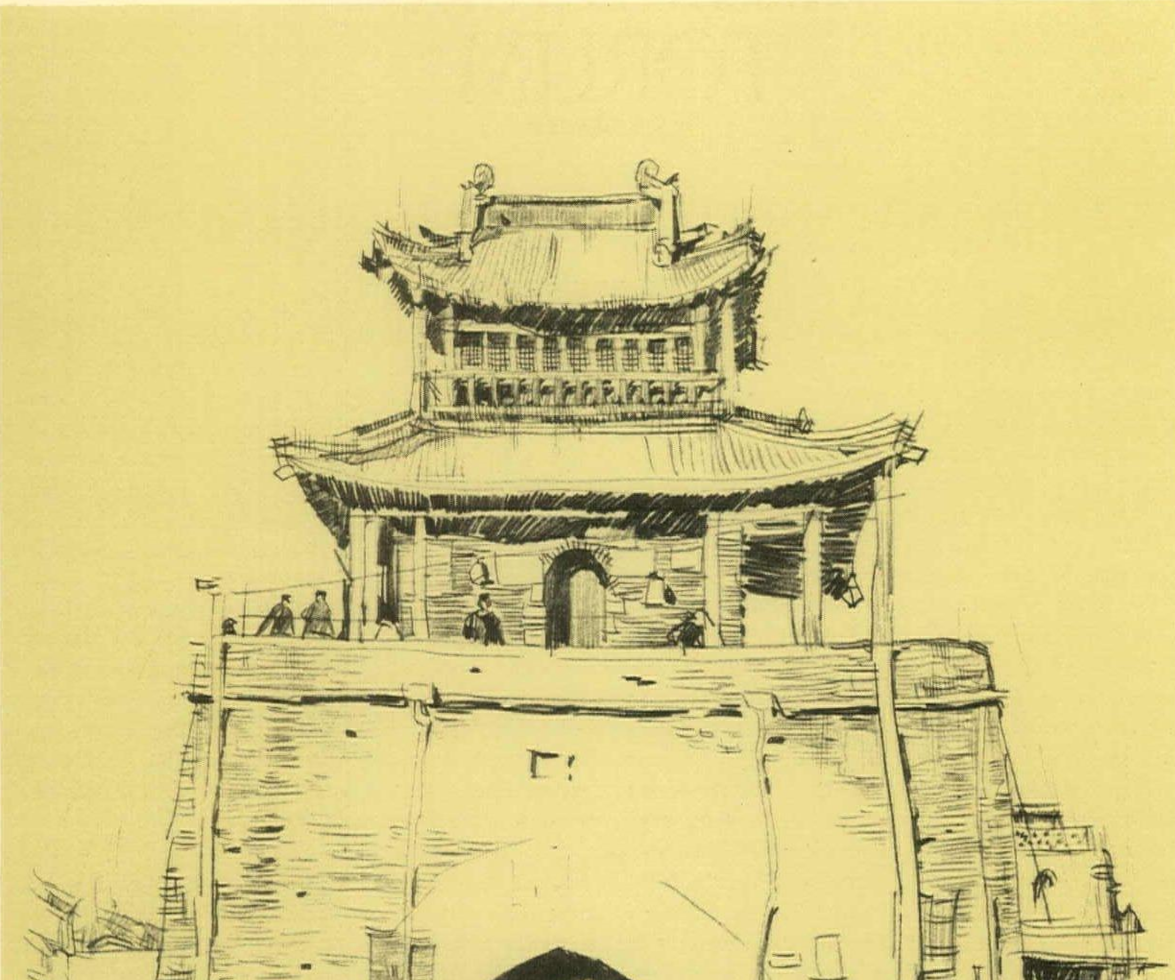
Beginning with this issue, THE FORUM inaugurates the constructive policy of a close relationship between the architectural and the engineering and economic descriptions of the buildings featured in each issue. The phases of architectural plan and design, ornamentation, decoration and finish are considered in the Architectural Design section of THE FORUM, and in the Architectural Engineering and Business section the structural design and the mechanical plant and equipment, and the economic phases of the feature building are taken up in detail.

The two articles about the *Chicago Daily News* Building, therefore, complement each other and form a complete and useful whole. The illustrations are carefully chosen and logically arranged in each article. In future issues this policy will be continued in order that architects may have the essential information regarding outstanding buildings throughout the country. It is believed that this arrangement will prove to be the most effective and useful presentation of the distinguished architectural accomplishments that are featured in THE ARCHITECTURAL FORUM throughout the year.

The Editors



CITY GATE, TIENTSIN
From a Pencil Sketch by A. L. Wilson

THE
ARCHITECTURAL
FORUM

VOLUME LII — NUMBER ONE

JANUARY 1930

A. L. WILSON'S CHINESE SKETCHES

BY

MYRON BEMENT SMITH

JUDGING from the sketches he has brought back, Mr. Wilson is a master of both the art of pencil drawing and the even rarer art of knowing what to draw. Coming from the office of York & Sawyer, that has specialized in Romanesque banks and Italian Renaissance hospitals, one is the more amazed that this draftsman chose for the locale of his hard earned holiday some place east of Suez rather than the dusty stones of San Michele at Pavia or the sun-baked palace at Pienza. Just what influenced him to hit on the Orient, I do not know,—and thankfully, for that negative sets the fancy free. Perhaps a copy of Osvald Siren's "Chinese Architecture" fell to his hands, heating and poisoning his blood with promises of exotic poems and luscious colors. Whatever the philter, it worked its way into the marrow until in a tremble of anticipation, we may imagine his taking one day a fond leave of the finger-marked pages of de Dartien and von Geymuller; and quieting his conscience with the thought that after all the best way to prove his affection for them would be by looking over what else the world might offer.

Once ashore in China, Mr. Wilson's talent for artistic traveling seems to have taken charge of both his time and his itinerary. What the peculiar languor of the Orient is, I regret I cannot say, my actual experience in the Far East being limited to an hour in the Japanese Garden of the Ritz where the presence of the natives almost completely distracted my attention from the architecture. But whatever the mood, Mr. Wilson seems to have yielded to it with the abandon of a round-the-world sailor set ashore in Hong Kong. He cultivated an environment of leisure. He was content to take his fun wherever it was found, with a nice contempt for the possibly greater excitement awaiting 'round the corner.

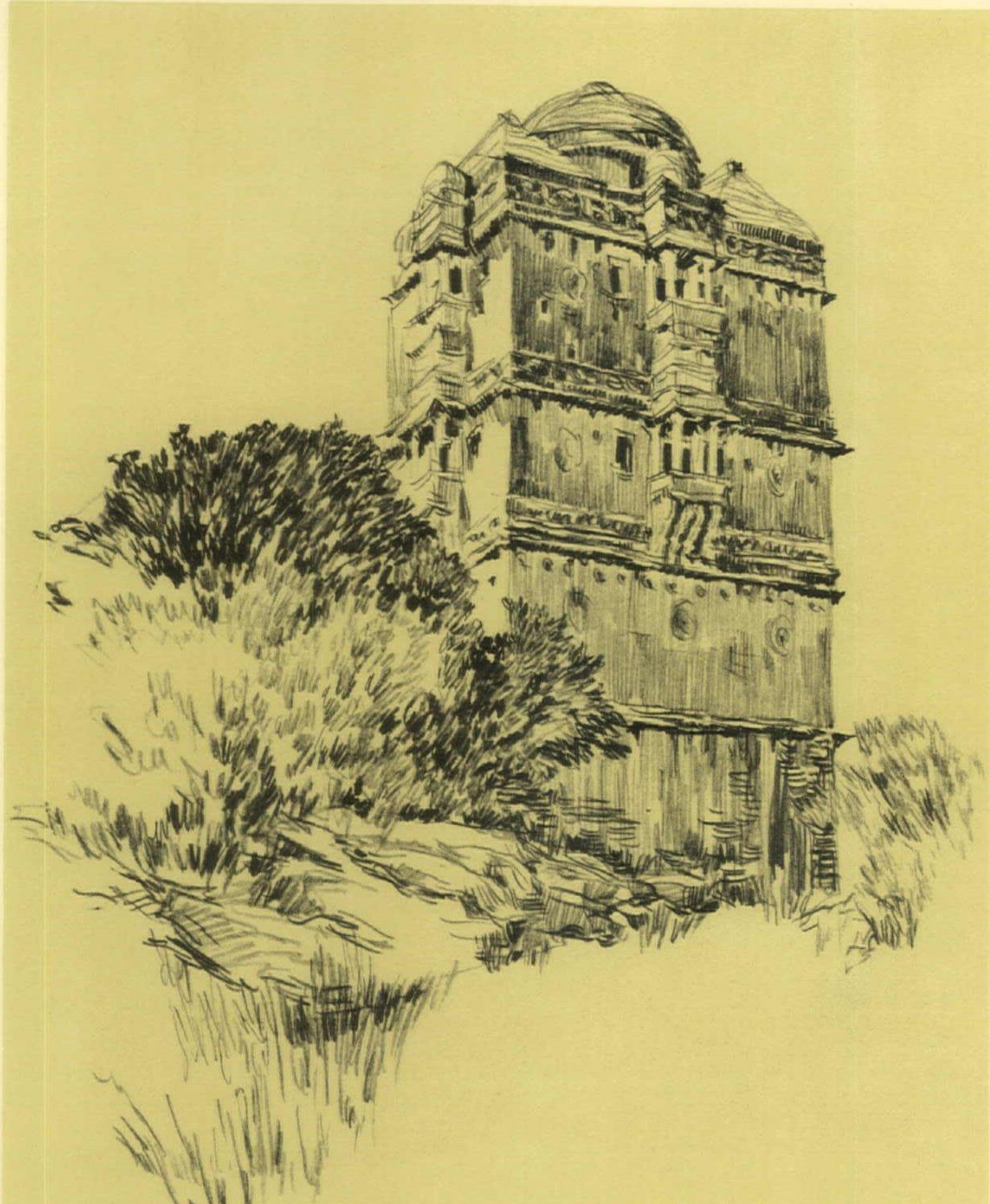
Perhaps the reader will permit me to say a syllable about these sketches. Of recent years there has sprung up a school of sketching which, for identification, may be called the "self-conscious" style. The technique of this school is as ingenious as one might imagine. A field sketch is first prepared,—or a photograph will do if the day be too wet or too hot or too cold or if one just doesn't feel that way. Over this sketch are piled up layers of tracing paper studies,—eliminating, correcting, vignetting, spotting, composing, diddling with lines, dots, masses. Mistakes in perspective are easily set right, for the drafting board is large enough to take all possible vanishing points,—but not set too right, since little variations, consciously introduced, help to give freshness and charm. Finally, a last tracing is made, a perfect jewel of ingenious creation. This is floated on board, matted to cover the border, titled carelessly in exactly the right spot. The result is about as spontaneous as a well drilled debutante,—and equally despairing to most architectural undergraduates.

Mr. Wilson's sketches flow out over the paper with a joyous abandon that must have been a graphic expression of his creative mood. Knowingly or not, he has realized the intellectual and emotional limitations of the sketch as an art form. An analysis of his varying technique will bear out this idea. His most successful examples seem to be those in which his pencil line has the free, careless down stroke of a pointed brush, in which the vignette is left to take care of itself or is loosely aided by an anything-but-rectangular border line. These sketches have vitality. Others show a preoccupation with structural and decorative details that is natural to an architect but which would be unforgivable in a professional artist. Mr. Wilson likes to make boards look like boards, brick look like brick, tiles to appear like tiles. He is an exponent, as every true architect must be, of Mr. Berenson's principle of "tactile values". But how Mr. Wilson succeeds in suggesting the dazzling colors of roofs and terra-cotta revetments, the brilliance of polychromatic under-painted cornices, the dusty blue coats of coolies that pass endlessly through the squat arches of age-old brick gates, —how he puts this color into lead pencil drawings, I do not know. Perhaps, as Sir Joseph Duveen recently remarked, "It's all in the eye!"

STONE GATEWAY, PROVINCE OF SHANTUNG
From a Pencil Sketch by A. L. Wilson

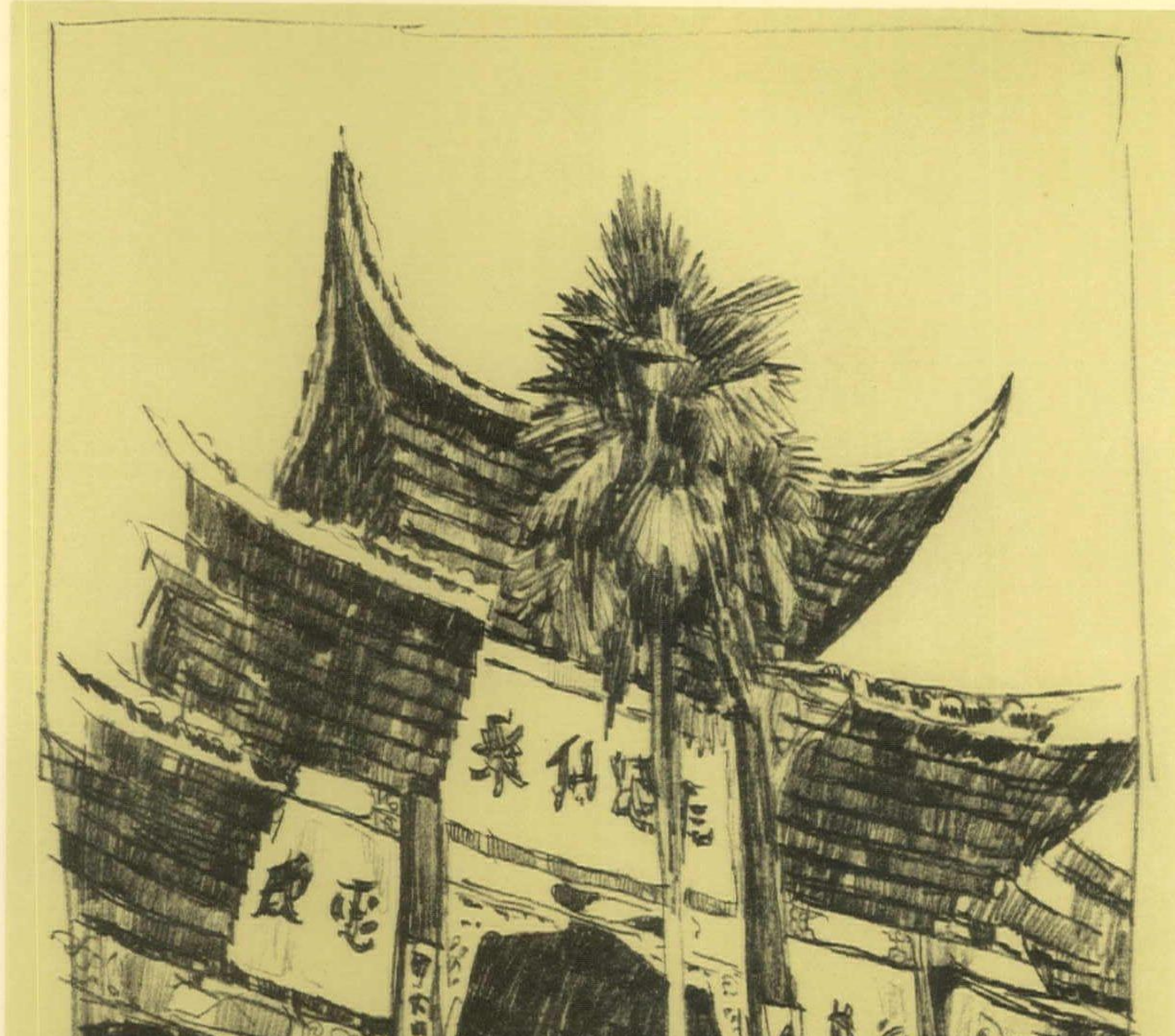
ENTRANCE TO A COUNTRY RESIDENCE, JEHA
From a Pencil Sketch by A. L. Wilson

INDIAN TEMPLE GATEWAY, BALI
From a Pencil Sketch by A. L. Wilson



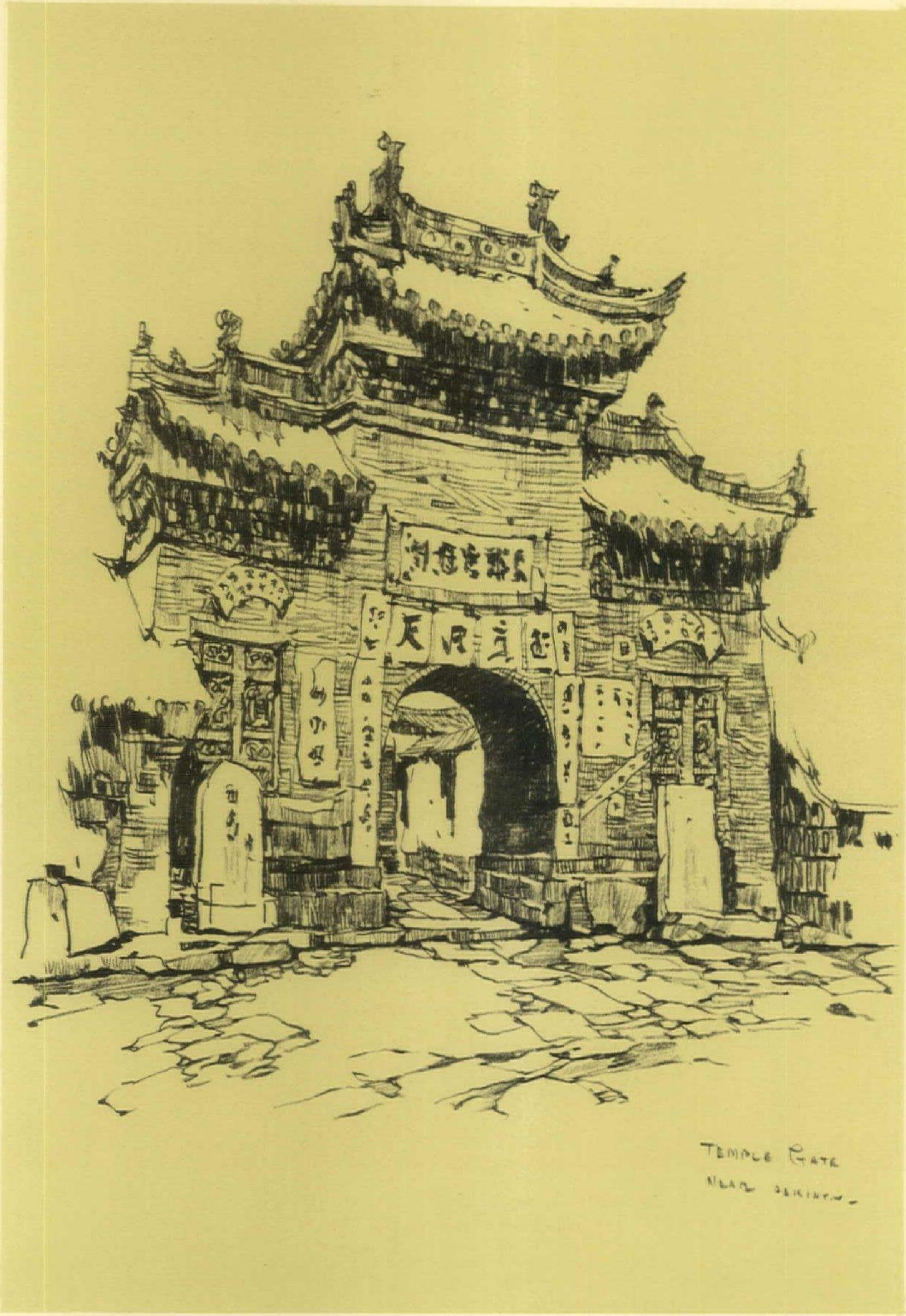
AN INDO-CHINA SKYSCRAPER
From a Pencil Sketch by A. L. Wilson

TEMPLE, PROVINCE OF SHANSI
From a Pencil Sketch by A. L. Wilson

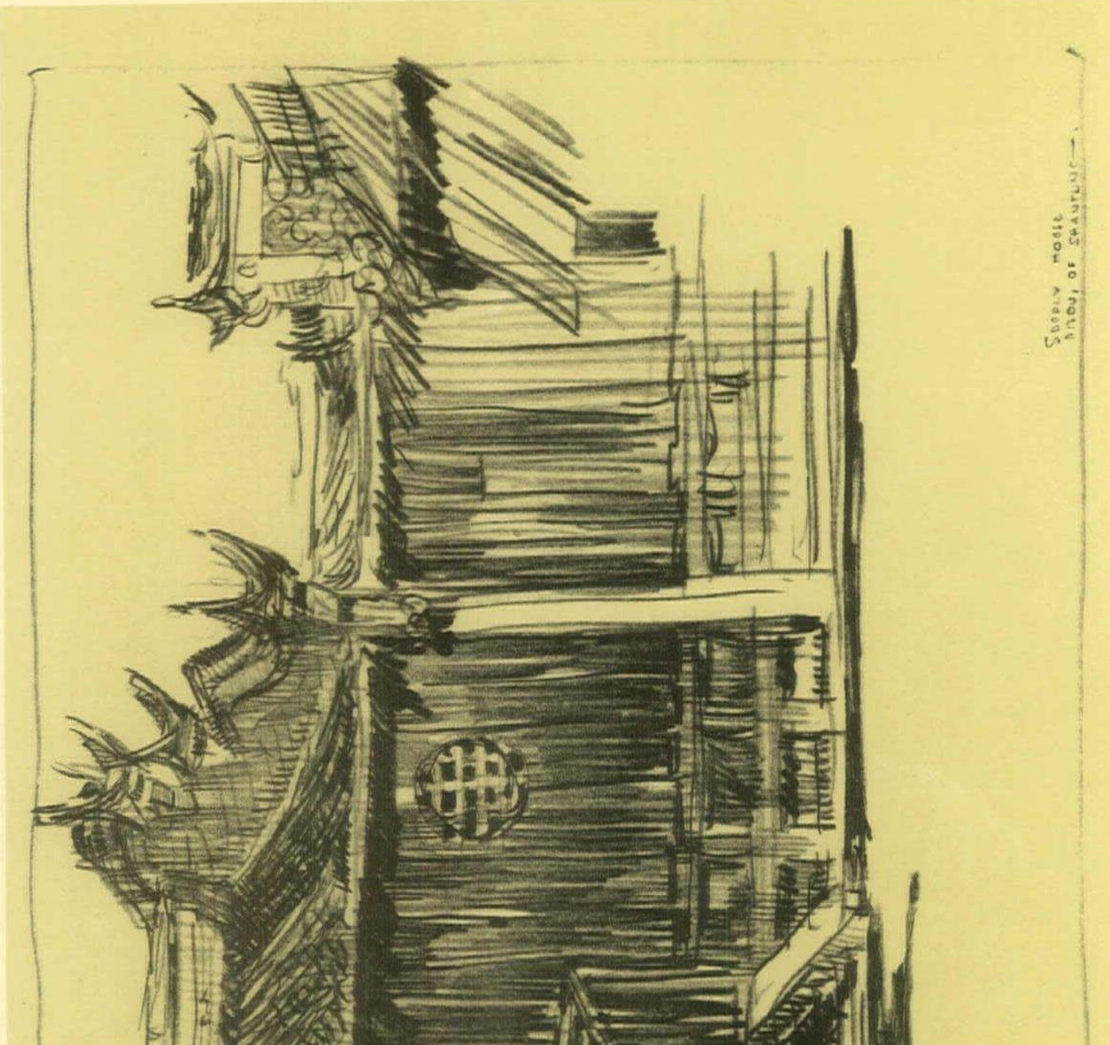


DOORWAY NEAR PEKING
From a Pencil Sketch by A. L. Wilson

BRICK DOORWAY, PROVINCE OF SHANSI
From a Pencil Sketch by A. L. Wilson



TEMPLE GATE NEAR PEKING
From a Pencil Sketch by A. L. Wilson

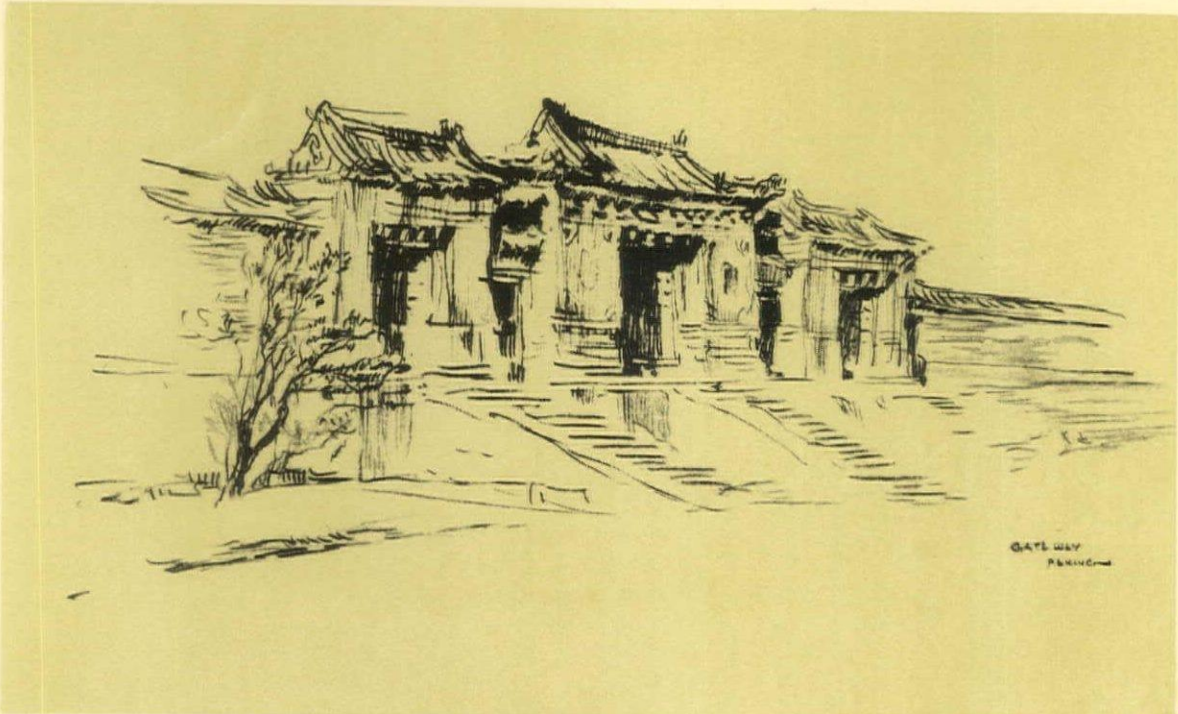


SUPPLY HOUSE, PROVINCE OF SHANTUNG
From a Pencil Sketch by A. L. Wilson

OLD TEMPLE IN INDO-CHINA
From a Pencil Sketch by A. L. Wilson

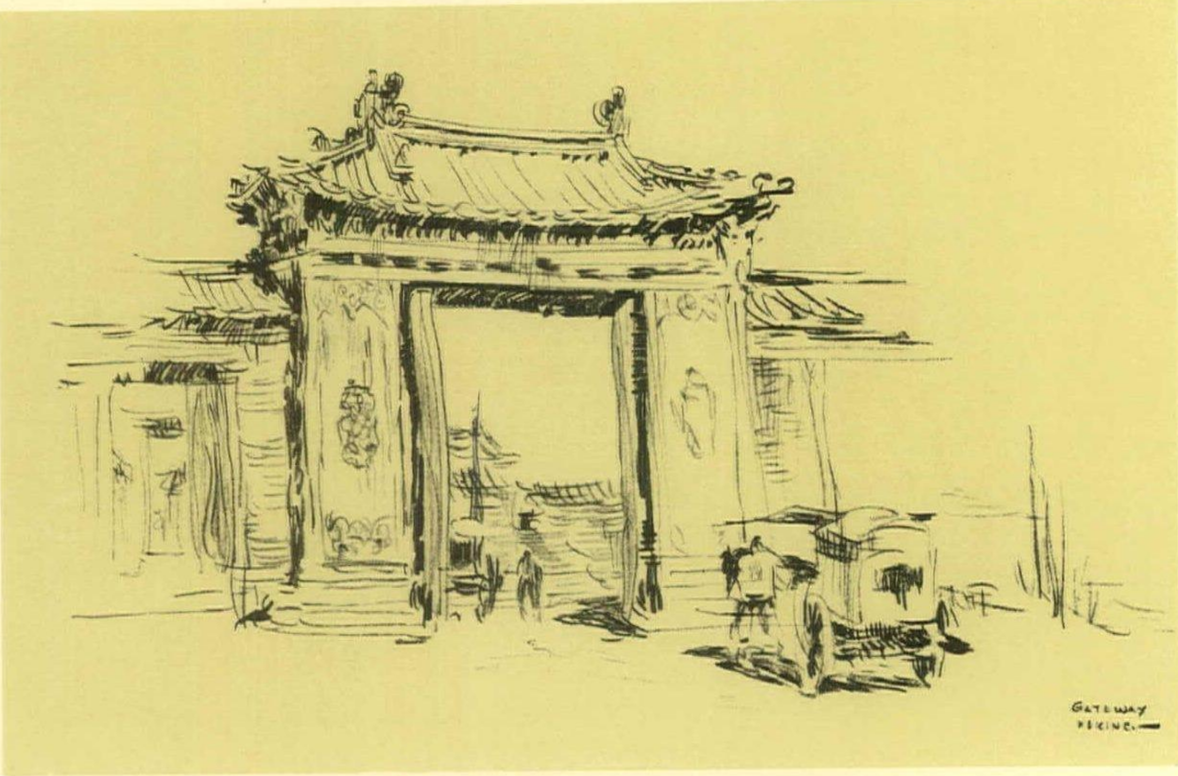
CITY GATE, PROVINCE OF SHANTUNG

BRICK HOUSE NEAR PEKING
From Pencil Sketches by A. L. Wilson

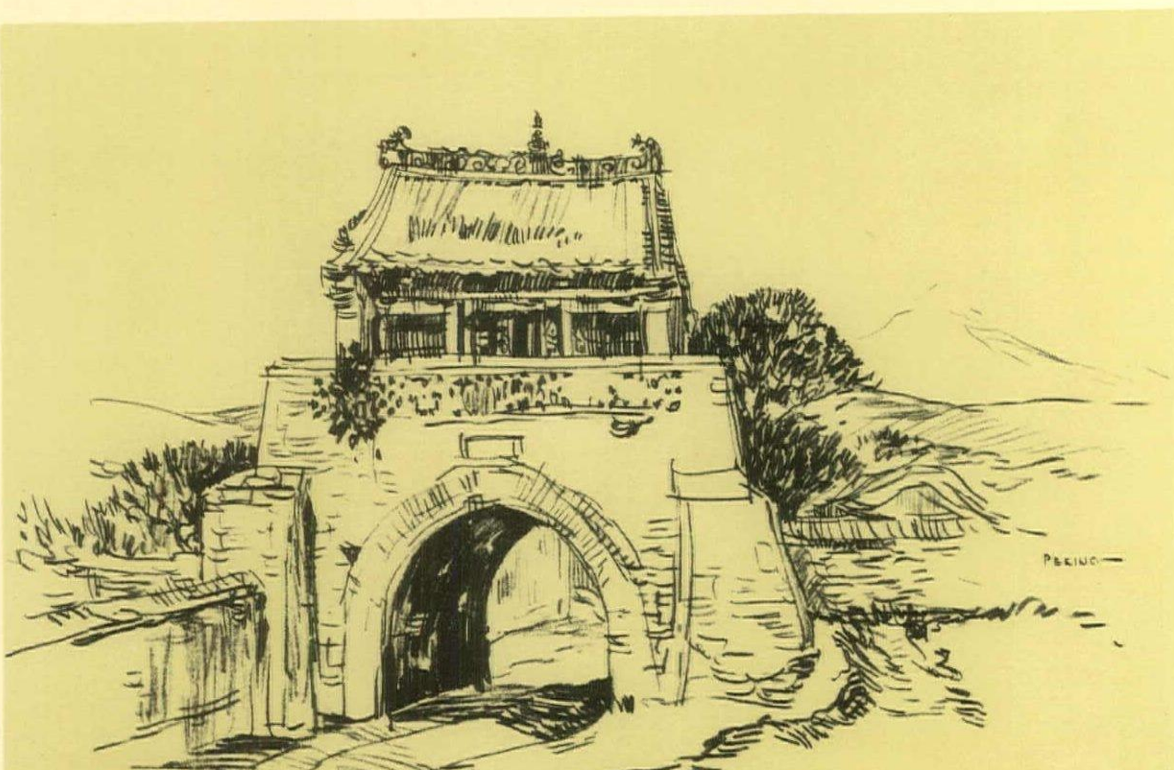


GATEWAY, PEKING

SHRINE, PROVINCE OF SHANSI
From Pencil Sketches by A. L. Wilson

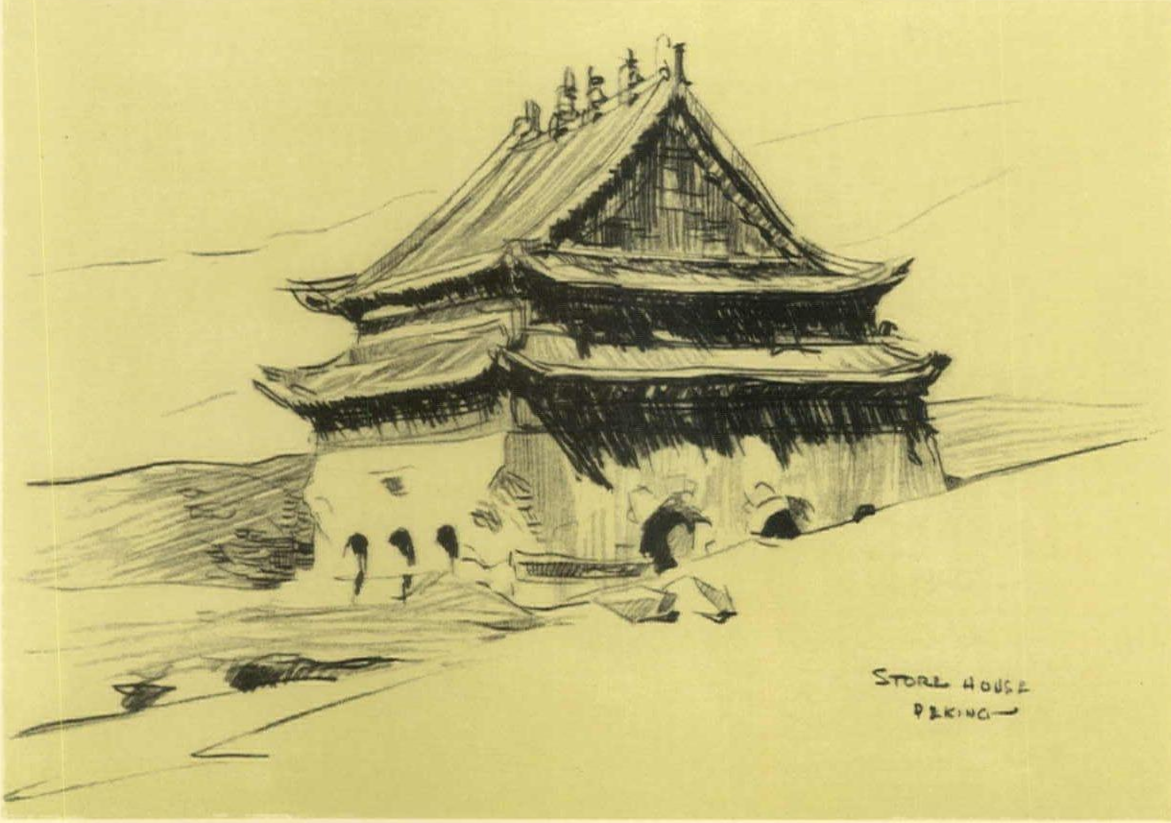


GATEWAY, PEKING

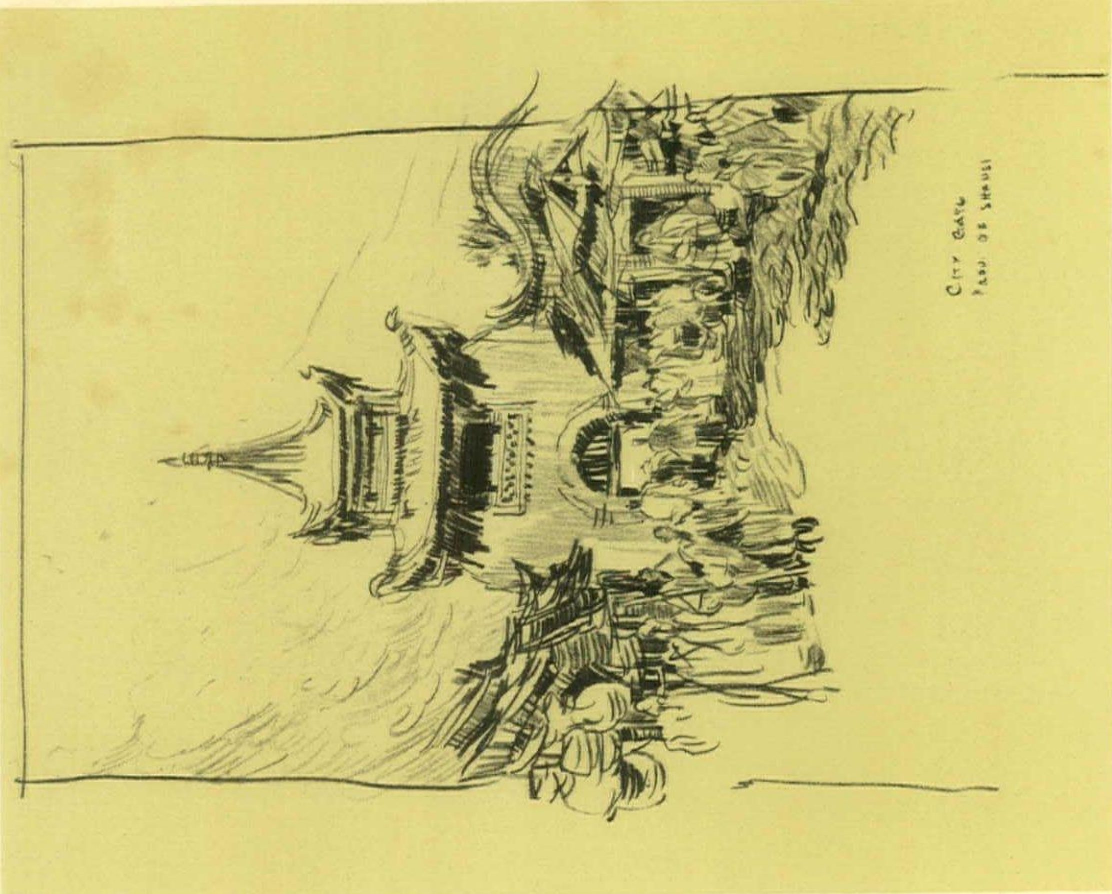


GATEWAY NEAR PEKING
From Pencil Sketches by A. L. Wilson

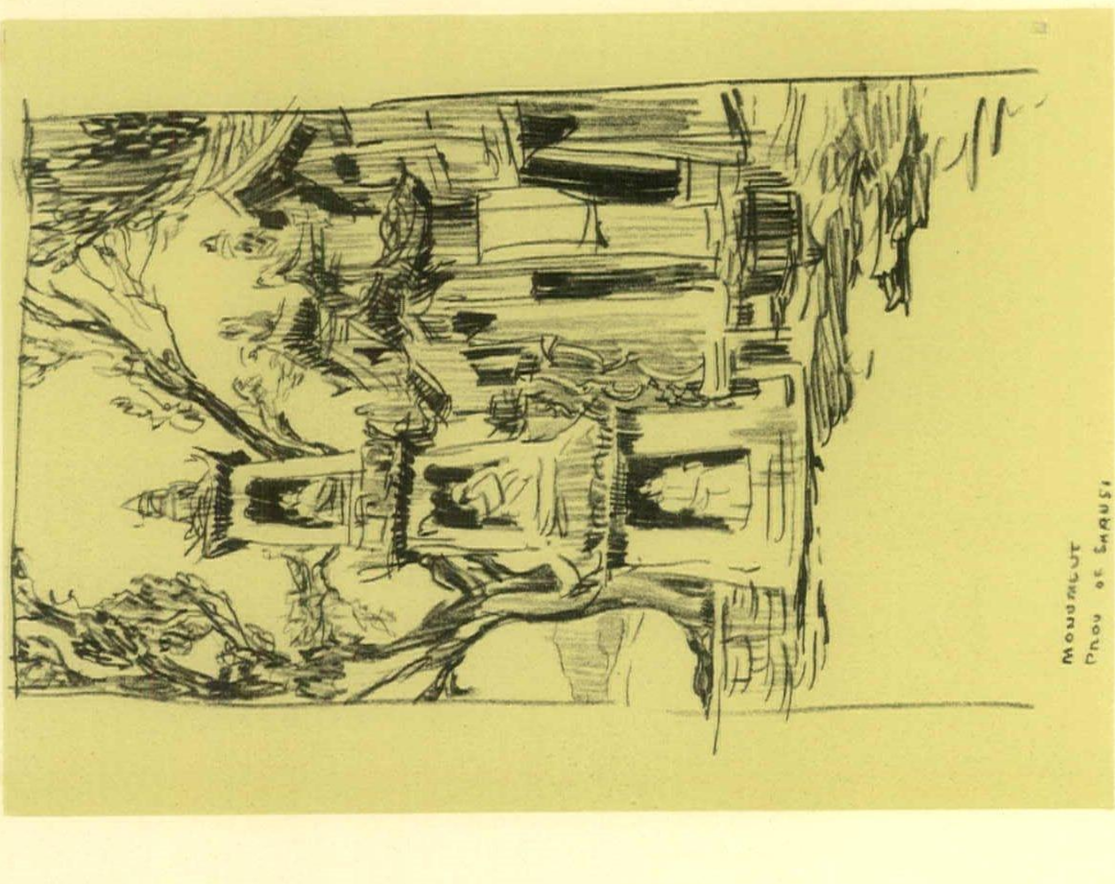
SHRINE, BALI



STORE HOUSE, PEKING
From Pencil Sketches by A. L. Wilson



CITY GATE, PROVINCE OF SHANSI



MONUMENT, PROVINCE OF SHANSI

From Pencil Sketches by A. L. Wilson

"ROSEWELL," GLOUCESTER COUNTY, VIRGINIA

BY

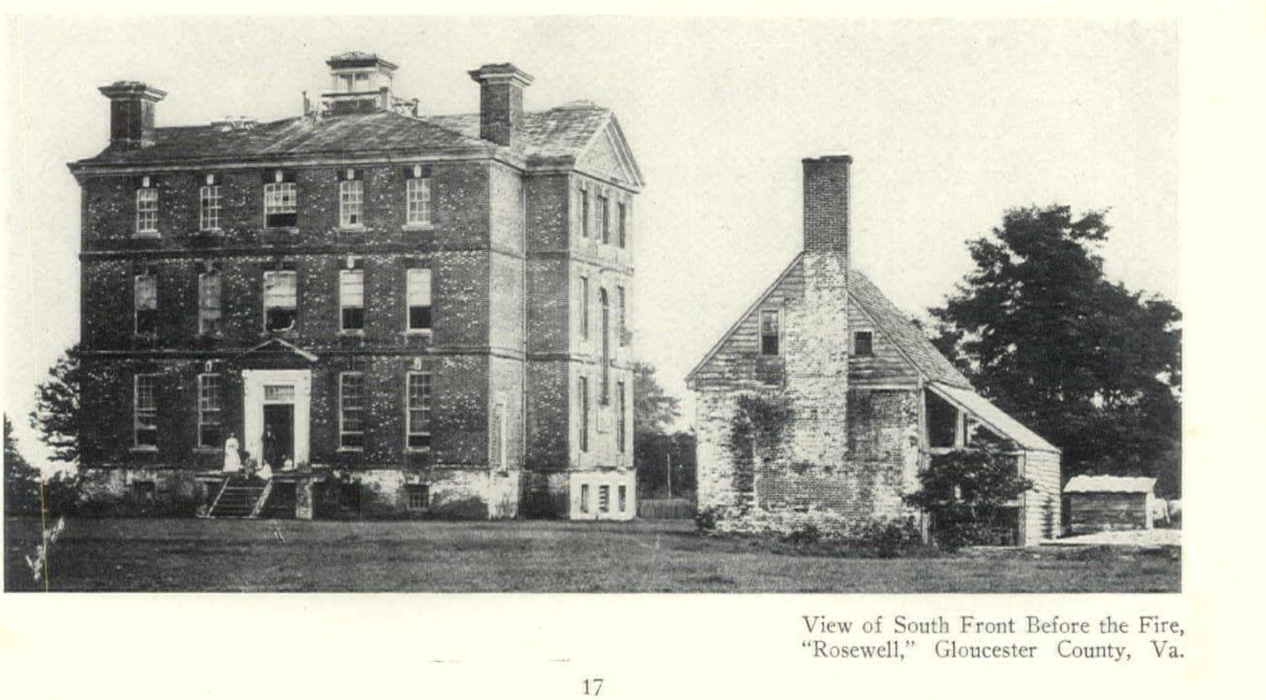
THOMAS T. WATERMAN

IN all the history of American architecture there is probably no more striking instance of neglect than that which has been meted out to "Rosewell" in Gloucester County, Va., a surviving great house of the colonial period. Other houses inferior to it are regarded as standards in architecture,— Westover, Shirley, and Brandon, — but "Rosewell" itself rises preëminently above all the domestic architecture of the colonies by sheer force of its scale, elaboration and magnificent craftsmanship. It is unfair to criticize the design in its present ruined state, but with proper research to establish the disposition of the dependencies and connections, a restoration would be possible that would place it as one of the greatest designs of the colonial period.

"Rosewell" was built between 1720 and 1730 by Mann Page, on a scale probably never attempted before in this country. The main block of the house is 71 feet long and nearly 60 feet deep, the central part, excluding the pavilions, being almost an exact square. The forecourt has now entirely disappeared, but from the still remaining foundations of one of the terminal buildings, it must have exceeded 200 feet in width. This is an extreme in enclosed courts, although at Stratford, where the dependencies are detached, the forecourt attains a width of 306 feet. That connections existed at "Rosewell' there seems no doubt, as racking remains around the side doorways. Future excavation may determine their exact form. The building has seen many vicissitudes, including despoliation shortly before the Civil War which robbed it of its paneling and lead roof, and a devastating fire that gutted the interior in 1917. The great walls still stand, though mutilated.

The general style of the house is rather unfamiliar to eyes accustomed to vernacular Colonial. The design is so English and so sophisticated that there is no reasonable doubt that it was created by some English architect. When the walls are carefully examined it becomes evident that, considering the limited use of brickwork in Virginia before 1720, an American master builder would have been unequal to the decorative uses it is put to here. The silhouette of the building is distinctly horizontal, but in actuality the strong, vertical accents of the bright vermilion dressings at the corners and in the window tiers prevent the heaviness that photographs suggest. The squareness of the plan is not apparent in the elevations, as it is at Shirley, the end pavilions adding to the apparent length of the north and south fronts while diminishing the apparent depth of the building. The effectiveness of the pavilions is increased by the broad pylons of unbroken brickwork which flank them, and although with the pediments they unfortunately dominate the architectural fronts, there is no doubt that the pediments are not original but innovations of the nineteenth century.

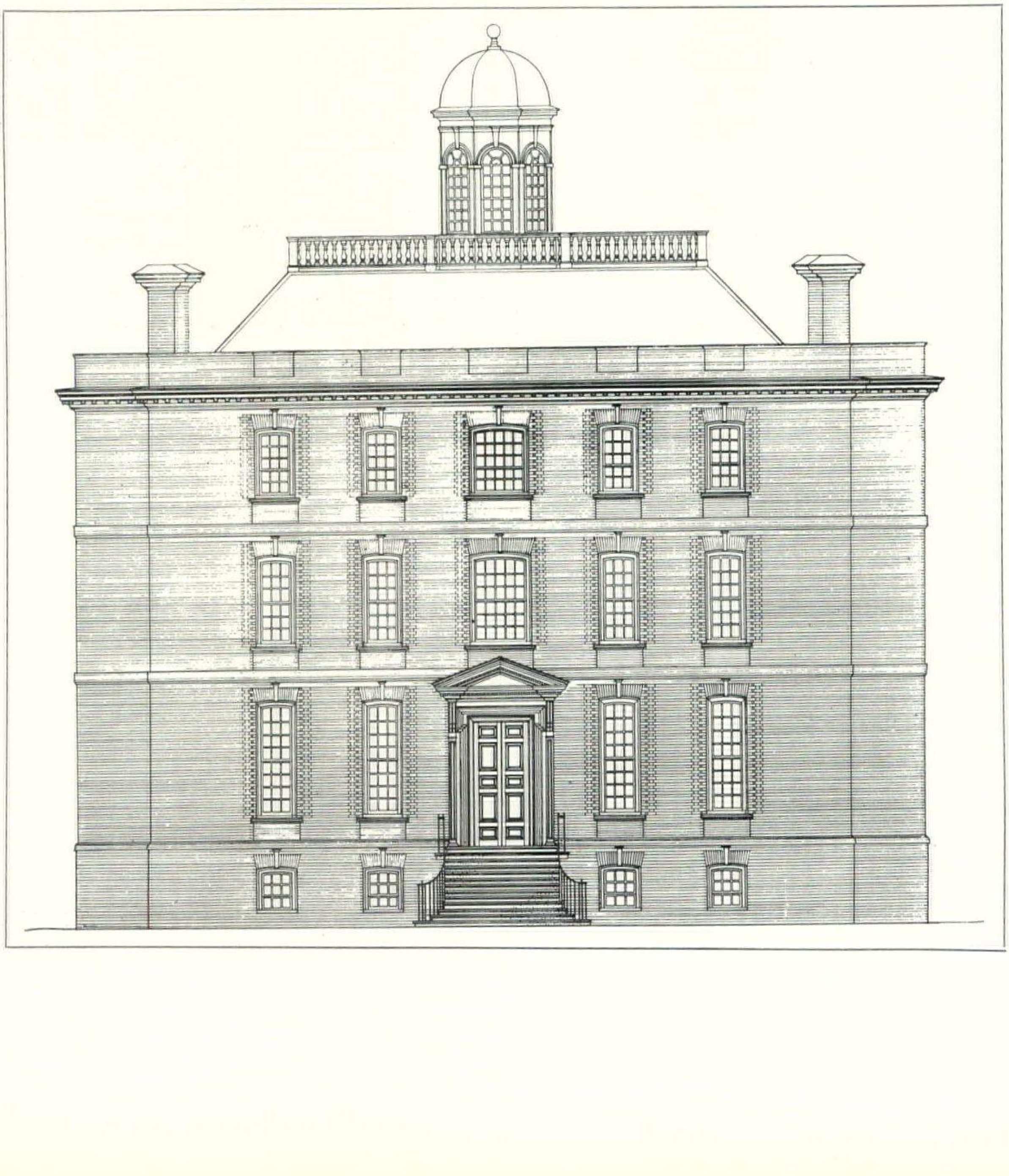
The photograph taken before the fire shows the main cornice to have a neo-Classic profile, and

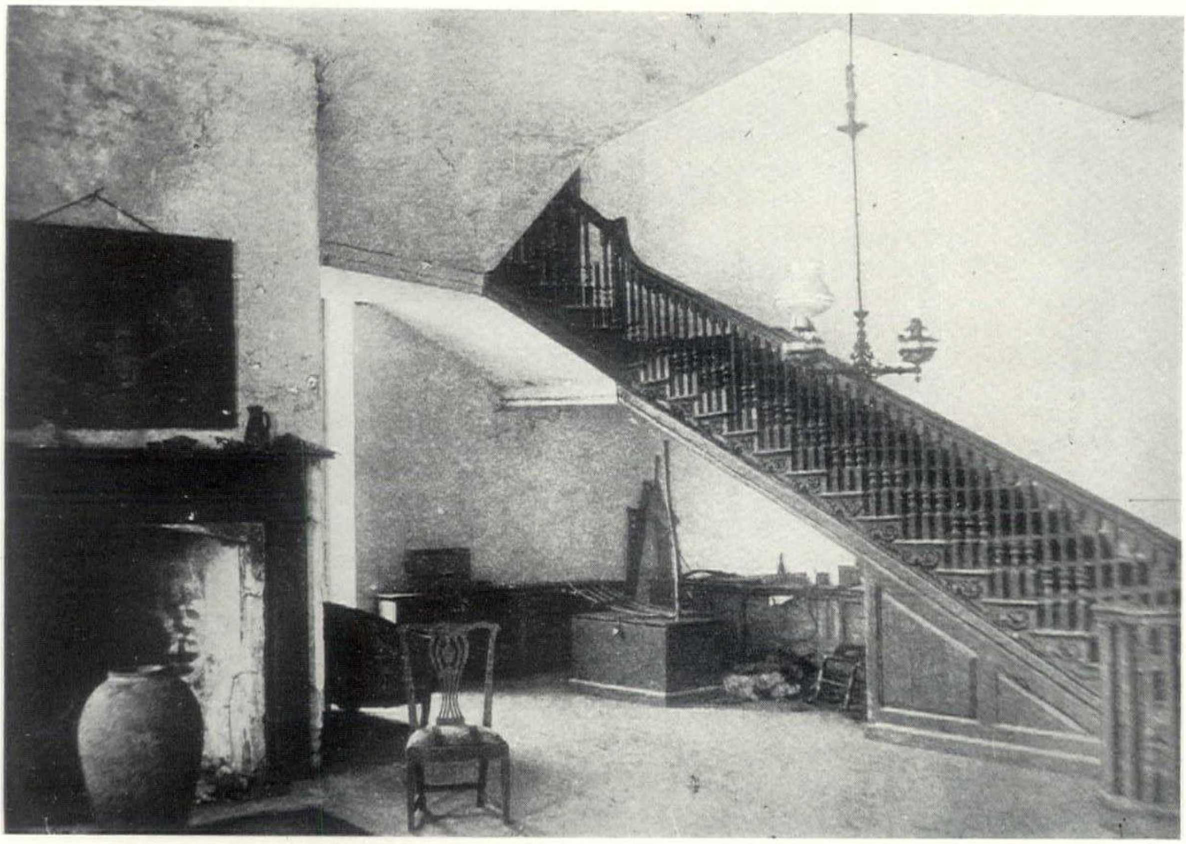


View of South Front Before the Fire, "Rosewell," Gloucester County, Va.

this extends up the rake of the pediments, the tympana of which are seen to be laid in a careless bond, utterly out of character with the rest of the brickwork. The fact that both pediments fell in the fire would indicate that they were built on the old timber plates and fell when the plates were burned. Undoubtedly the parapet, or balustrade, which is indicated by the fragments of cap stones remaining in the chimney stacks, carried completely around the building and enclosed, not a flat roof, as tradition has it, but a modified mansard below a deck, such as is found in England at Coleshill, Belton, and originally at Melton Constable. Bishop Meade's "Old Churches, Ministers, and Families of Virginia" shows "Rosewell," in an execrable engraving, as having two belvederes, but in view of the inaccuracy of the rest of the drawing, this eccentric arrangement may safely be assumed never to have existed. It seems reasonably sure, however, that the building possessed a cupola during the Revolution, as Thomas Jeffer-

"Rosewell," Gloucester County, Va.
Measured and Drawn by T. T. Waterman





Interior View Showing the Stairway, "Rosewell," Gloucester County, Va.

son is traditionally said to have read the first drafts of the Declaration of Independence to Mann Page, in the privacy of the belvedere on the roof of "Rosewell."

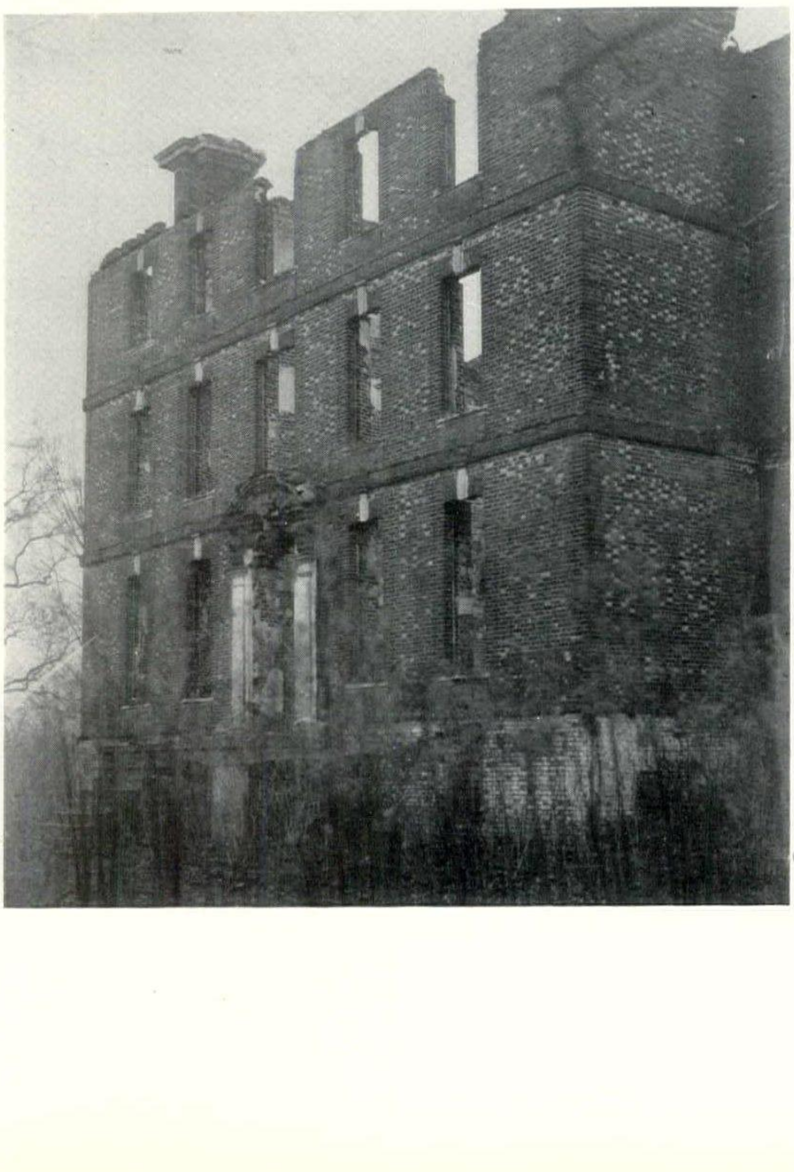
Below the cornice the only restorations, on the accompanying drawing, are the sash, window frames, door proper and stair. In the old photograph the sash seen on the first and second floors is obviously recent. That on the third floor may possibly be considered original, not only because it conforms to the arched heads, but because of the proportions of its lights, although the trim hardly amounts to more than a bead, an unusual condition in an early house. The accompanying restoration drawing has been based on a 5-inch trim, a section of which was found at the base of the wall, not the typical architrave, but a roll moulding, run out of a solid piece, plain on two sides, to be received in a jamb, rebated on one side and moulded on the face.

The brickwork at "Rosewell' reaches a perfection that is not equaled in any other building in what was the colonies. The use of rubbed dressings here reaches its epitome, the corners, jambs and window plinths being a header, closer and stretcher deep. The dressings give by their bright color the needed vertical emphasis, which is further strengthened by tying the windows into tiers by projecting panels between the sills and the string courses and water table. The common brick of the walls is laid in Flemish bond with casual glazed headers. Below the first floor line only the arches of the basement windows are gauged, the dressings above being received by the water table. This is formed by three moulded and rubbed courses, which comprise a very flat cyma on the top, a projecting half round on a filet. This is probably the richest base course in Virginia, a state where the great brick houses possess an extraordinary variety of beautiful moulded brick courses. This sets the standard for the north doorway, which easily outclasses any other brick detail of the colonial period. The old photograph shows a transom, but inasmuch as the door opening would be decreased thereby to 8 feet, it seems reasonable that the entire opening was originally used, as at Carter's Grove. This would give a 10-foot door, no doubt tremendous, but comparing with a door of 9 feet, 2 inches used on an average house in James City County. The door was framed by, successively, a wood and a brick architrave, the latter fully moulded and "eared" at the sides, the head being laid in a flat arch. This is flanked by pilasters supporting consoles and a pediment, all in brick. The pilasters are received on moulded cyma bases, are paneled their full height, and receive boldly corbeled brackets moulded on their outer faces and ornamented with strap carving on both lateral faces. These consoles enclose a pulvinated frieze which caps the architrave but swings back to the face of the wall at the under side of the pediment, the break in the cornice being only nominal.

A large part of the pediment of this doorway has, unfortunately, fallen, but the south doorway remains in almost perfect condition. It is far inferior to the north door, but retains considerable interest. It is flanked by pilasters, supporting a fully moulded architrave, a pulvinated frieze, and a segmental pediment. The pilasters have stone bases and caps, and one of them is fluted in the brickwork under a plaster rendering. Both the architrave and frieze are exaggerated in height, and the cornice is much simplified, giving a rather unsatisfactory result.

"Rosewell" probably presented as magnificent an interior as it did an exterior, as old photographs exist that show the great stairway before the fire. This is the only feature of the interior of which we have any knowledge, and it easily outclasses any other stair of the period.

Even in its ruinous condition "Rosewell" preserves a fund of information for the student of Colonial architecture, and it is to be hoped that some kind fate will save it from continued decay and will restore it to the condition of its heyday.



"Rosewell," Gloucester County, Va. Burned, 1917

THE CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

BY

ANNE LEE

THE *Chicago Daily News* Building, designed by Holabird & Root of that city, merits attention for several reasons. As an example of modern American architecture, it is a structure of exceptional interest. The architects' interpretation of modern design presents a striking mass-on-mass formation, impressive because of its simplicity and because of its honest construction, devoid of superfluous embellishments. In its expression of solidity and permanence, the building reflects the solid character of the *Chicago Daily News* during the 50 odd years of its existence.

In two respects the structure is a pioneer. It is the city's first building to incorporate a public plaza, demonstrating the potentialities for such river-front beautification. It is, likewise, Chicago's first air-right structure. Air-right construction in that city assumes added significance due to the presence of a serious smoke problem. Railroads there are operated by steam, not by electricity as they are in New York. A solution of this smoke problem, which has hampered air-right development in the mid-west metropolis, is a feature of the *Chicago Daily News* Building. Its utilization of space above a considerable area of railroad tracks is looked upon as the beginning of a development which may not only parallel New York's air-right construction in the Grand Central zone, but which is likely to rival if not surpass it in scope and importance, inasmuch as Chicago has a vast section of valuable downtown property that is now devoted to railroad uses.

Weight requirements of a newspaper printing plant with its heavy paper rolls, presses and machinery, imposed a further problem in planning an air-right structure. But it occurs to the writer that the full importance of this particular air-right development is apparent when it is realized that of the area represented by the first floor level of the building and the adjoining plaza, approximately only one fifth rests on the customary foundations built into the building lot, the remaining four fifths, the air-right portion, being supported by piers that straddle eight railroad tracks and a 10-foot shipping dock.

The building site, situated on the west bank of the Chicago River, just across the water from the Chicago Civic Opera Building, which was recently completed, directly opposite the C. &. N. W. Station and adjacent to the Union Station, has frontages of 394 feet on the river and on Canal Street, with a depth of 269 feet on Washington Street and 240 feet on Madison Street. Of this area, the building lot, running the full length of the Canal Street frontage, has a depth of only 100 feet, approximately half of which (divided almost diagonally from the northeast corner to the southwest corner) represents an easement granted to the Union Station Company. This easement, along with the area for which air rights were acquired by a 99-year lease, is used by the Union Station Company for a railroad right of way. Thus, if one were to look down through the building from the first floor level, it would be apparent that the ground floor, basement and sub-basement occupy approximately only one-half the building lot; that the other half of the lot and the remainder of the site, for which air rights were leased, are utilized for railroad tracks and a shipping dock with air-right construction that permits a first floor (the street floor level on the Madison Street side) having an area three times the ground floor area and, in addition thereto, a plaza with an area more than equivalent to the ground floor area.

For the main portion of the structure 100 caissons were sunk to bedrock (approximately 90 feet below the surface of the river), and for the remainder, including the plaza, 59 caissons were sunk 60 feet to hardpan. Throughout this operation there was no interference with the railroad right of way. Without slowing up a single train, the work was completed. Caissons were sunk between the tracks, operations having been carried on from platforms built above the tracks high enough to permit the passage of locomotives. Excavated earth was raised to the platforms, emptied into dump carts, hauled over a system of connecting viaducts, and dumped into river barges tied at the dock.

The method employed for the handling of smoke and gas fumes from the locomotives was

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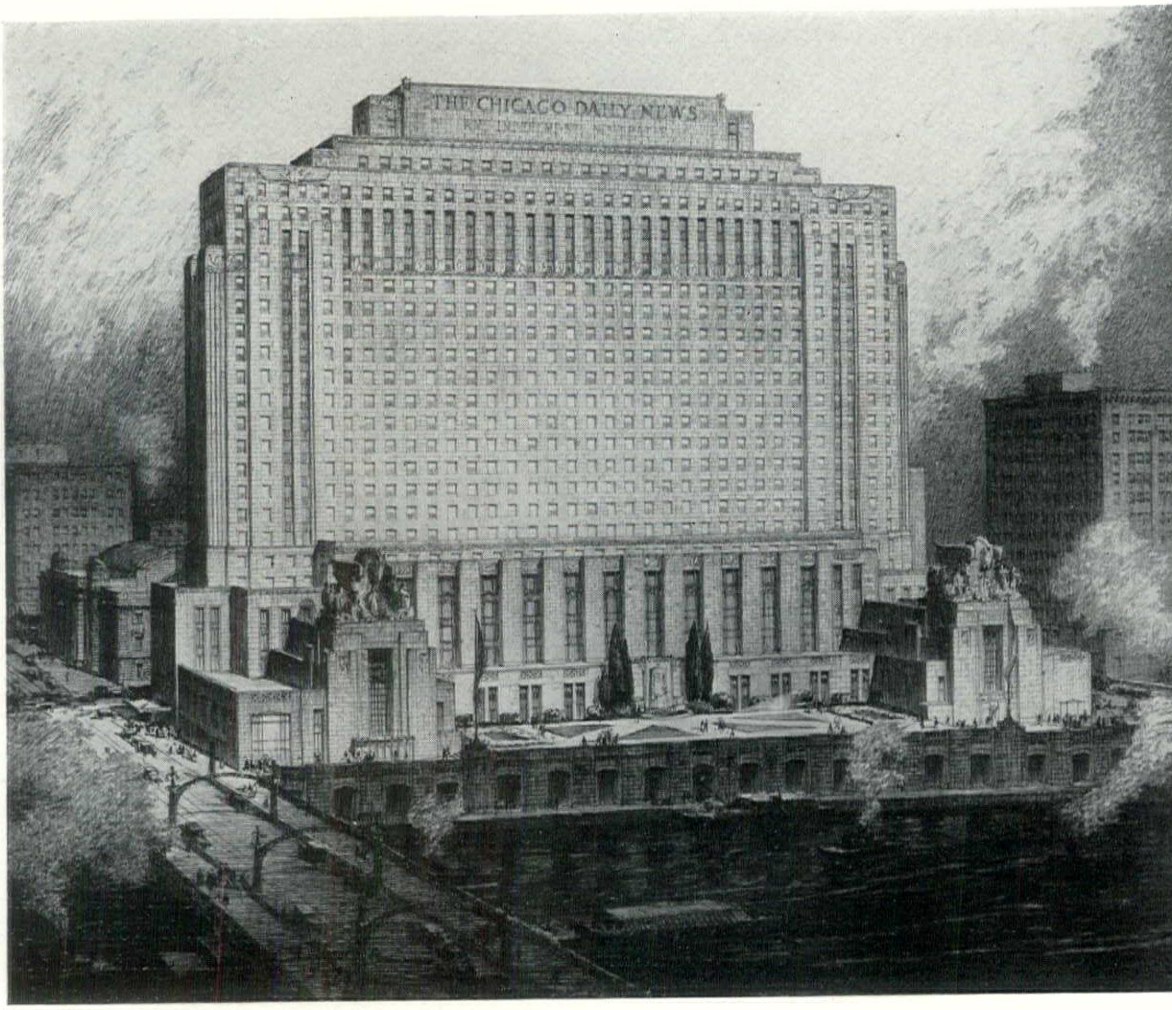
Many of the most interesting features of the Chicago Daily News Building are those described in the architectural engineering section of this issue. In that article the structural features,—the interesting smoke disposal system, the highly developed vibration insulation, the heating, ventilating, plumbing, electrical systems, including lighting, and the sound installation,—are described in detail and illustrated.



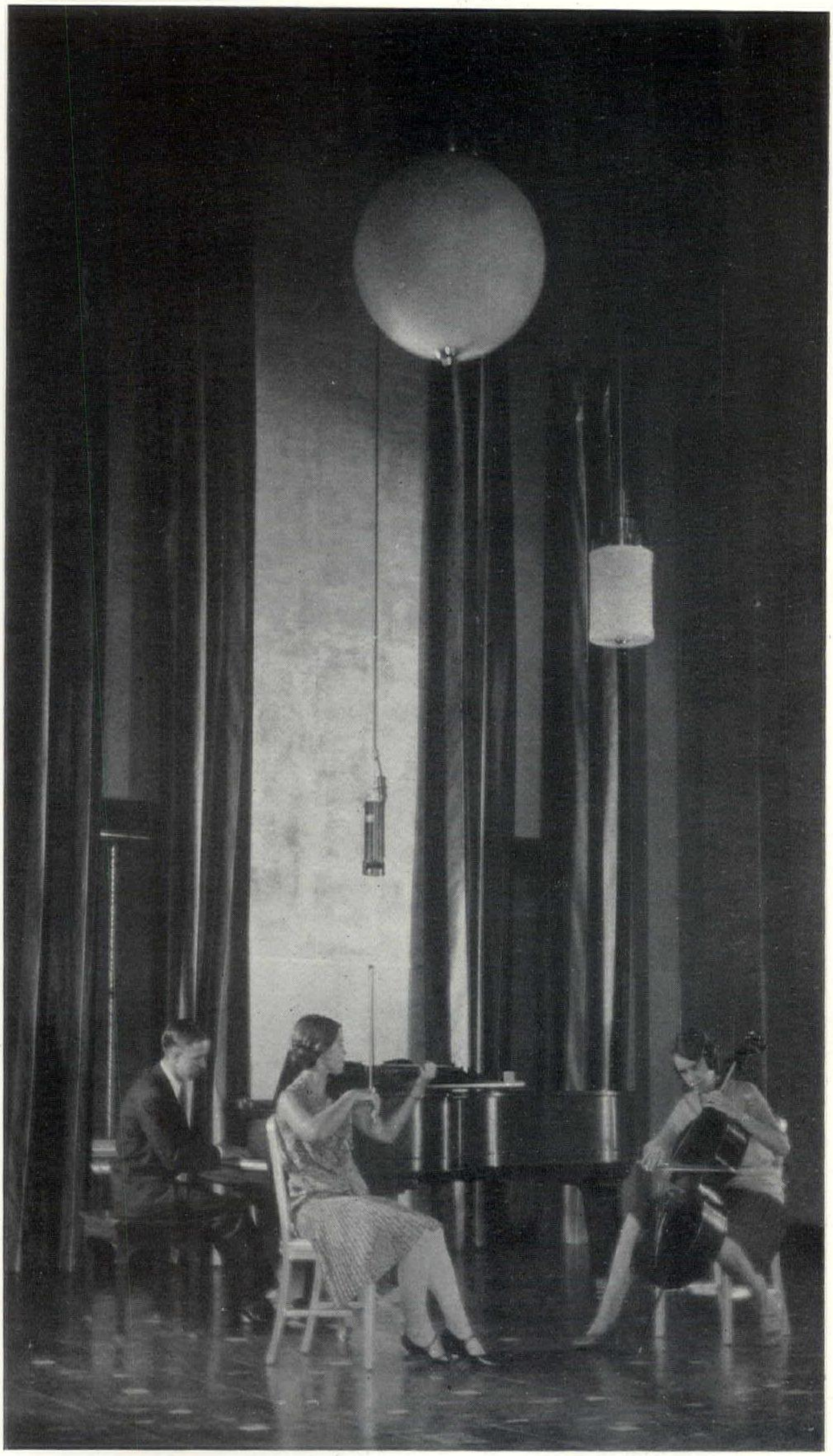
Chicago Daily News Building
Holabird & Root, Architects
From a Sketch by Chester B. Price

perfected by Joshua D'Esposito, consulting engineer for the Chicago Union Station Company and for the *Daily News*. Through experiments in the railroad yards over a period of years he arrived at a solution of the problem. In a shack built over a small section of tracks, he constructed certain chambers, passageways and stacks, and perfected his method whereby smoke and fumes are collected in chambers, expanded, and then dispersed. Directly underneath the plaza, over the entire track area on the *Daily News* site, is the smoke chamber, about 5 feet deep, into which smoke is discharged. The ceiling above the tracks consists of a series of arched rows separated by continuous openings or slots, one over the center of each track running parallel thereto. These slots, arranged so that they are just high enough to permit passage of the locomotive smokestacks, are built wider than the smokestacks at the bottoms and narrower at the tops, slanting inward, with the result that smoke enters the expansion chamber in two slanting streams. This construction of the slots was arranged to prevent the possibility of smoke's hovering over the opening and escaping downward. With ample room for expansion

Photos. John Wallace Gillies, Inc.

SOUTH WING, EAST TERRACE AND
MADISON STREET ENTRANCE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

NORTH END AND WEST ELEVATION
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



RADIO BROADCASTING STUDIO
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

Ramp in Concourse, Chicago Daily News Building
Holabird & Root, Architects

in the large smoke chamber, the density is decreased. The chamber, which with its partitions really consists of several chambers, might be referred to as the base of the large double shaft or smokestack that runs through the full height of the building, where the smoke, decreased in density and quantity, is discharged into the air. Smoke is forced up this stack by means of two methods used simultaneously,—by gravity and by exhaust fans. This highly ingenious solution of the smoke problem is considered entirely successful.

The building is of steel and concrete construction, 26 stories in height, built of Indiana limestone except for the first floor Madison Street shop fronts, where wall surfaces are a rich, dark, polished granite with bronze window and door surrounds. Cost of erection is estimated at approximately $7,000,000 exclusive of land and air rights.

For its effectiveness, the design depends upon unusual set-backs, upon block-like masses, upon contrasts produced by interesting shadows, and

Main Concourse, Chicago Daily News Building
Holabird & Root, Architects

upon a repetition of vertical lines introduced into the wall surfaces. Vertical lines in the buttressed ends are carried out in the treatment of the lower and upper horizontal links of the building, — in the broad base formed by the river and street levels and in the upper floors of the main structure, the vertical effect being again introduced in the topmost set-back section, above a strong horizontal line, with an interesting combination of vertical and horizontal effects at the top of the structure.

From the arcaded embankment at the river edge, the retaining wall for the plaza, the structure rises naturally in a series of set-backs that apply both to width and length, governed largely by the conditions which had to be met. The design is expressive of the purposes to which the building is devoted. The massive base, comprising seven floors, with its several set-backs and its extending wings, represents the portion devoted to the publishing plant and the editorial and business departments of the *Daily News*. At the third floor level, except for the wings, the width of the building is reduced to 100 feet (the width of the building lot).

Set-backs, beginning at the fifth floor level at the ends and at the seventh floor level on the river front facade, result in a 60-foot width for the remainder of the 16 floors in the main structure. These floors represent rentable office area, the first eight floors being occupied by offices of the Chicago & North Western Railway, whose station is directly opposite the building. The upper three floors contained in the double penthouse arrangement are used by the *Daily News* for large and luxurious lounges, each with a spacious terrace, for women and men employes and for all the rooms pertaining to the paper's radio broadcasting station WMAQ, including offices, control rooms, reception and audition rooms, three broadcasting studios (one very large and two smaller), and a special studio for television broadcasting. These rooms are considered examples of acoustical perfection. They are well designed and attractively decorated, the large studio having cork walls painted bright blue and silver, a black composition floor, and hangings of silver and black.

The radio station and the plaza are the two departments over which the public concerns itself most perhaps. As a public recreation space, the plaza was acclaimed by Chicagoans during the past summer when the *Daily News* provided nightly band concerts there. A temporary band stand was erected over the fountains, and chairs for thousands of people gave the public an opportunity to really enjoy its river front. Until recently, when the construction of a double-decked waterfront drive, as part of the "Chicago Plan," reclaimed one section of the bank, Chicago had made no attempt to beautify its river shores. The plaza affords breathing space in a congested district. It also serves as a thoroughfare between Madison and Washington Streets.

From the plaza the beauty of the architectural and sculptural detail of the building may be studied at close range. The extending wings or pylons, wherein sharp angles make for an arresting design, dominate the scene with their effective piled-up masses. In their original rendering, Holabird & Root depicted these pylons, surmounted by massive sculptures, and it is likely that such groups may be added later.

Ornament occurs only at focal points in the structure. Consisting largely of panels carved in low relief on blocks of limestone (the same as that used for the building), the ornament is subordinate to the architectural design,—a definite part of the structure itself, wholly in keeping with it in scale and character. It is the work of Alvin W. Meyer, a New York sculptor, who designed the reliefs as well as the conventionalized griffins which flank the Victor F. Lawson Memorial Fountain in the plaza. Reliefs on the pylon facades portray the history of writing and printing. Panels in the one wing depict the writer of the Stone Age at work with chisel and hammer, with the inscription "The First Writing," and an old scholar writing on parchment with a quill, entitled "An Ancient Scribe." In the other wing, panels inscribed "The First Press" and "The Linotype Man" similarly illustrate the history of printing. In eight panels across the inner court of the plaza, the human side of American newspaper history is portrayed. Symbolic reliefs, arranged in pairs and alternated with panels of decorative foilage motifs, commemorate the achievements of Pulitzer, Bowes, Medill, Franklin, Lawson, Greeley, Bennett and Dana, whose names are inscribed thereon. The Greeley panel shows a figure with a scale of justice, indicative of the publisher's passion for fairness. Franklin's contains a lamp, suggestive of his scientific mind, whereas the panel inscribed "Lawson," in honor of the late editor and publisher of the *Daily News* who was for many years the guiding spirit not only of his own paper but of the American publishing field as a whole, shows a figure bearing a laurel wreath to symbolize success and victory. Old printers' marks appear in the reliefs used at the top of the first set-back. The sculptor ingeniously adapted for his design the quaint rooster, snake, bull and boat motifs of certain mediæval seals, the permits issued to printers to conduct their trade in early times. Sculptured ornament which occurs elsewhere on the exterior is carried out in the same key as an integral part of the structure itself. A horizontal relief occurs on the angle between the clock and the top of the enormous window in one of the pylons, where interesting play of light and shade enhances the effect.

There are two main entrances to the *Daily News* Building, one at the river front level through the Madison Street wing, and the other the street (first) floor entrance just east of the corner at Madison and Canal Streets. The first floor lobby, referred to as the "arcade," contains shops and three sections of elevators; seven low-rise elevators for the Chicago & North Western Railway offices, six high-rise elevators for the office floors above, and three elevators serving the floors occupied by the newspaper. Walls of Botticino marble with Belgian black trim, a marble floor, also with black trim, and elaborate ornamental metal work in silver tones contribute to the general effect. Shop windows and doorways show unusual details, such as a recessed and vaulted black marble doorway with display cases built into the walls, and a large shop window designed with a shallow bay effect. All the frames are of white, polished metal. Handsome elevator doors of hand-chased silver-toned metal are effectively framed in black marble, the elevator cab interiors being dark English oak and carved in simple designs. White metal is likewise used for radiator grilles and other metal trim throughout the arcade lobby and the public spaces on the second floor, the public concourse, and the large concourse lobby adjoining it.

Entered from the plaza by a gradual ramp, the concourse connects the Madison Street bridge, via the plaza, with a covered pedestrian bridge leading to the Chicago & North Western Railway Station. Polished white metal, applied to the exterior in an interesting manner, gives the bridge a modern feeling that is in keeping with the architecture of the *Daily News* Building.

Used by thousands of commuters daily, besides other visitors, the concourse is an example of the second-story thoroughfare advocated by many modern architects to relieve street level traffic congestion. Massive, rectangular piers divide the concourse into three corridors,—a 17-foot center aisle is between two 7-foot side aisles, that on the street side leading to attractive shops (very desirable spaces from a rental standpoint), whereas along the other aisle various departments of the newspaper have space, among them the "Want Ad" and "Personal Service" departments. Besides their attractive show windows, the shops have additional display space in large cases built into the piers, each case having windows on two aisles.

Occupying the full height of three floors (second, third and fourth), with a depth of 180 feet, the concourse utilizes the entire Madison Street width. Its walls are of Roman travertine, cement-filled; its floor, gray Tennessee marble, with an art marble, non-slip treated, for the ramp.

Two unusual decorative features, both highly expressive of the publication of a newspaper, arrest the attention,—one, ultra-modern and a product of the Machine Age, the other a very modern

Decoration by John W. Norton. Concourse Ceiling, Chicago Daily News Building
Holabird & Root, Architects

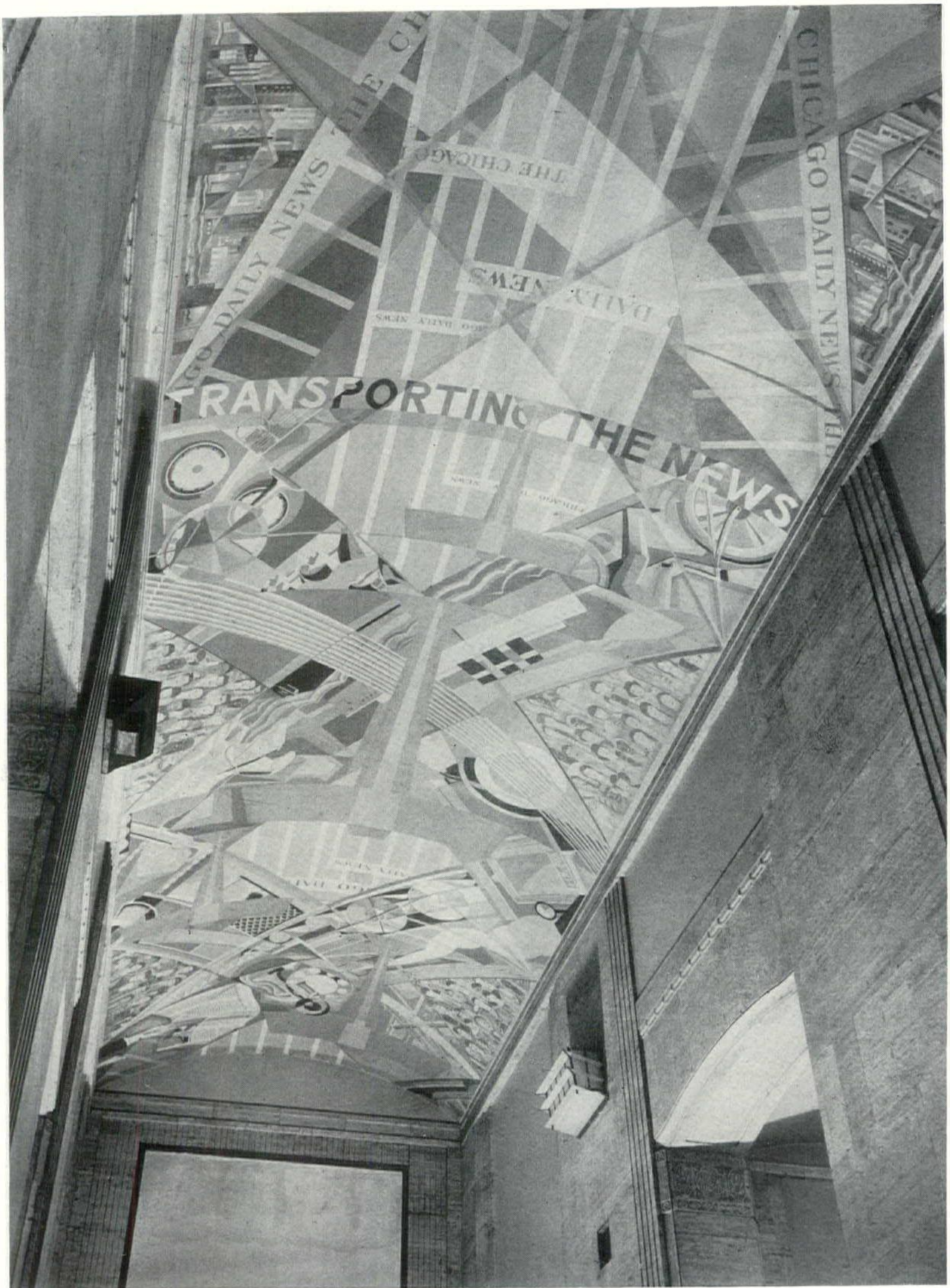
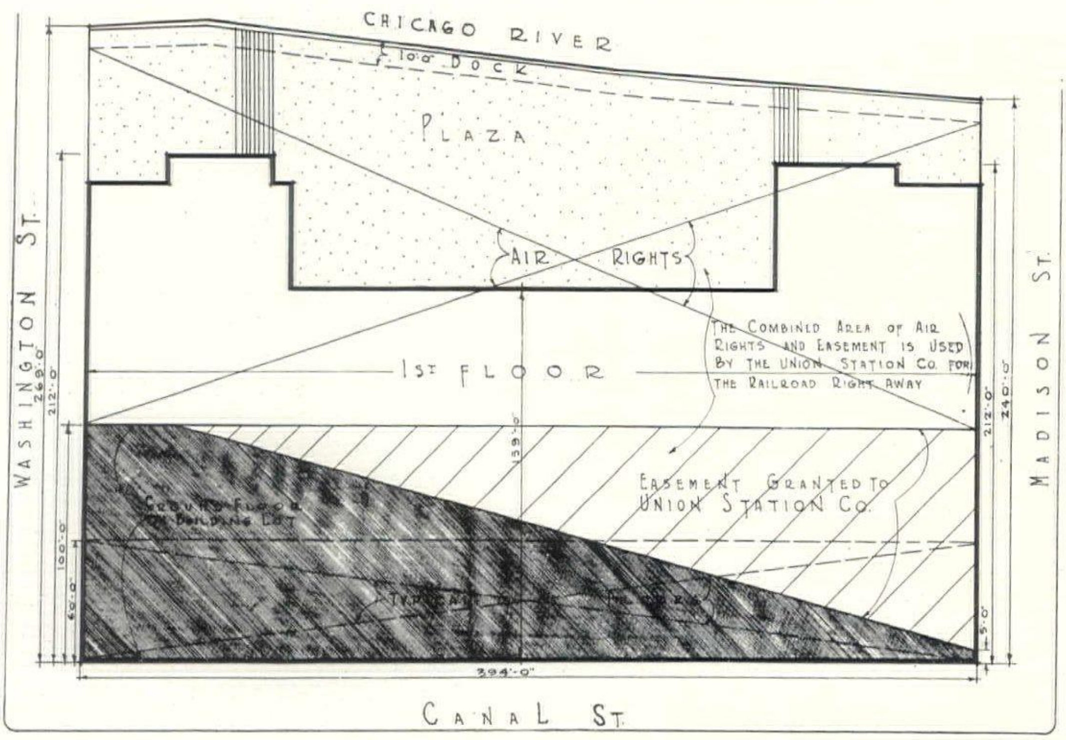


Photo. Sigurd Fischer

CEILING IN CONCOURSE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



Plot Diagram Showing Combined Area of Air Rights and Easement Used by the Union Station Company

representation of that most ancient art, mural painting. These two features have attracted much comment. The former, a silver screen about 14 x 18 feet in size, placed directly above the entrance to the bridge, gives the hurrying suburbanite a glimpse at the headlines, as the first page of each edition of the *Daily News* is flashed above his path. No fleeting view of the mural would suffice, however, to satisfy the curiosity aroused by the colorful decoration, unique in conception and design, which covers the entire length of the 180-foot vaulted ceiling. In strong colors, — reds, greens, blues and grays, — John W. Norton, a Chicago artist, has achieved a decoration that is at once daring in its application of geometrical patterns and still sufficiently suggestive of the realistic elements of the business of publishing a newspaper to arouse the interest of both modern and conservative groups.

In three main panels, the artist has attempted to tell the story of the newspaper by means of forms and symbols representing both the human and mechanistic elements. "Gathering the News," the first panel, shows editors, round copy desk, proof sheets, ticker tapes and such other details as typewriters, ink bottles, cameras, telephone dials, reporters' notes and the microphone to express the activities of the news room; in "The Printing of the News," the decorative motifs show "make-up" men at the forms in the composing room, linotype operators at work, great cylinders, rolls of paper, and folded newspapers on traveling belts, and there are suggestions of newsboys shouldering stacks of the latest editions; whereas in the third, "Distribution of the News," the composition includes railroads, automobiles, airplanes, telegraph wires and the outstretched hands of newsboys holding folded papers, illustrating the various modern means employed for the distribution and transportation of news. Between these three panels there are two smaller panels in which are geometrical forms representative of the newspaper sheet and columns, with strips of standing heads, and triangles of rows of heads representative of the readers of newspapers.

For the benefit of those wishing to study the design carefully, the artist's original sketch, in color, with a key to the symbolism, will hang in the newspaper's public reception room just off the concourse, facing the lobby. Incidentally, the design for the metal doorway of this reception room is illustrative of the interesting detail to be found in stair rails, grilles and other metal work, bright silver in tone, throughout the concourse and concourse lobby. The same metal is used for the elaborate elevator doors and indicator trims, and strips of it on the marble wall give the effect of fluted pilasters. Ornamental cornices, 18 inches wide, on flat ceilings, Botticino marble walls, terrazzo flooring and Belgian black trim complete the lobby.

Just as the public spaces of the building were planned to conform to the requirements of the newspaper for which the structure was designed, so was the entire floor area planned to facilitate the various activities that contribute to newspaper publication. Shipments of paper, by truck, rail or water, are received directly in the paper storage room in the basements, from two Canal Street trucking areas under the first floor, from the *Daily News'* private track alongside the building, or by means of the conveyor operated through the tunnel under the rows of tracks which connects the room with the shipping dock. A great deal of the Canadian paper used by the *Daily News* is shipped by water during the summer months. A network of narrow tracks with low platforms on wheels facilitates the handling of the paper rolls.

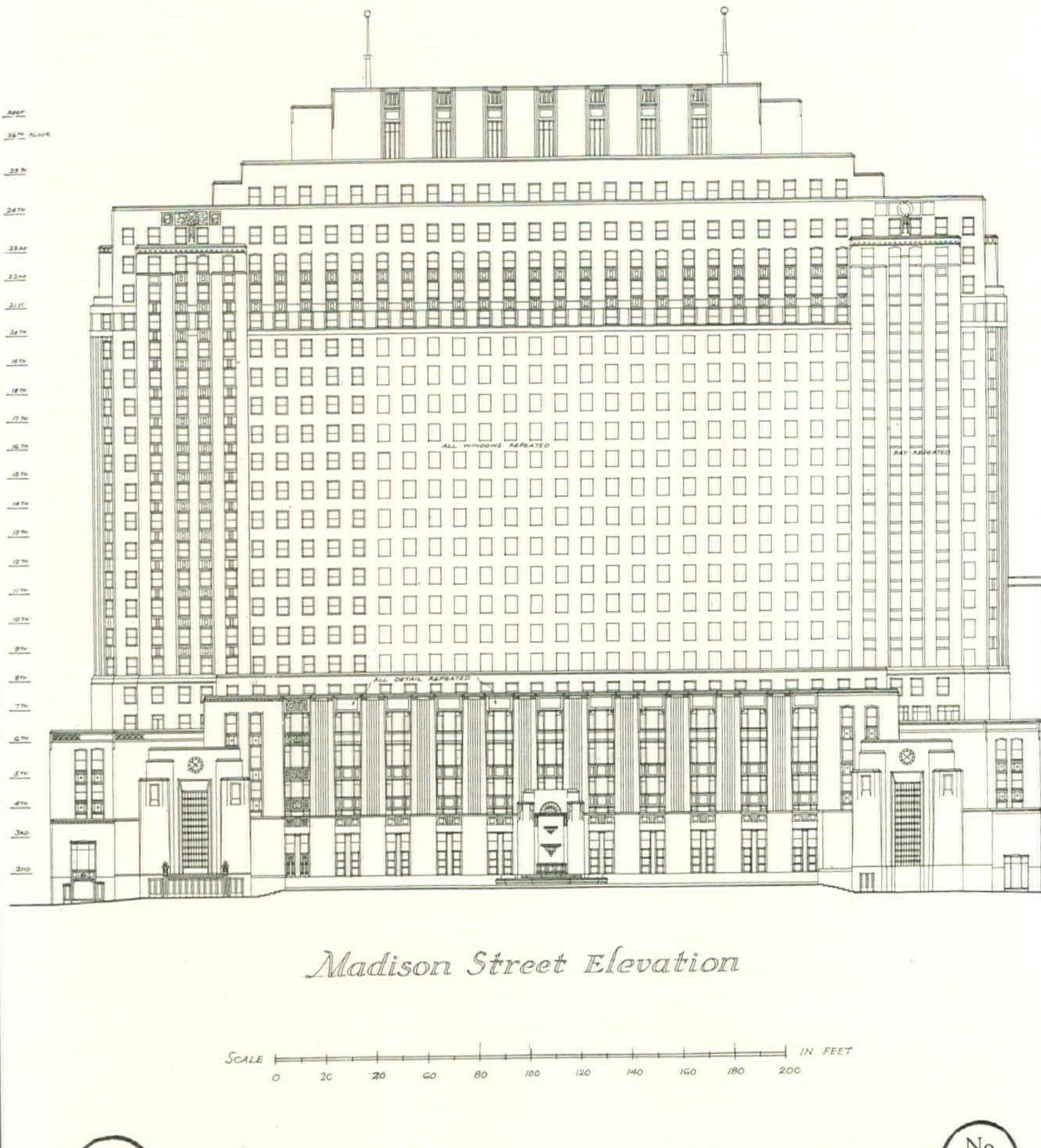
The lower three floors were built to fit and accommodate the presses. They are equipped with elevators and conveyors to carry the paper rolls to the presses and with a system of traveling belts by means of which plates are carried to the presses and finished papers are carried to the shipping and mailing room for bundling and wrapping. From there the papers are sent down chutes to platforms on either side of the 50-foot driveway which runs through the building between the ground floor Washington Street level and the first floor Madison Street level. The east platform, for out-of-town papers, located above the railroad area, expedites shipments, and trucks for city delivery are loaded at the city platform on the west side of the driveway. Ink tanks are located on the ground floor. The main switchboard room for the entire building is situated on the ground floor, the control room for the presses being located on the second floor. Two street shops and garage space, off the driveway, are provided by the north wing, the remainder of which is utilized for the very attractive cafeteria maintained for employes. Two stories in height, with a balcony on three sides, this cafeteria, with rose colored walls, white metal trim, tables of black, rose and silver, white metal chairs, with rose leather seats, and its complete kitchen, is decidedly attractive.

Advertising and business departments occupy the fourth floor, and on the fifth are the various departments of the composing room; the engraving department with its etching, developing, camera and dark rooms; syndicate room; linotype machine repair room; metal storage and re-melting room, matrix department; job stereotyping room; monotype casting room; service room; almanac room; dispatch room; stock, ticket and proofreading departments. Covering more than 18,000 square feet, the layout of the department provides for progressive steps toward a common center. The same is true of the floor above, occupied by the editorial departments. The city room, around which center the activities of "getting out the paper," occupies the east central part of the floor, with scores of desks to accommodate the city editor, copy, telegraph and picture editors, re-write staff and reporters. A large copy desk with composition top from which pencil jottings may be readily wiped off, and several commodious telephone booths, lighted and ventilated, are features. Here are the literary editor, the editorial commissioner, the foreign news editor, the make-up editor, the *Daily News* Syndicate, the *Daily News Almanac,* the mid-week features sections, and the automobile editor, only the first three having private offices, the remainder being separated by 6-foot partitions of wood and glass. The sixth floor also provides space for the sporting department, art department, financial department and telegraph room, in which the pneumatic tube terminal station is located. Besides this system for Associated Press and city news service, the entire building is equipped with a pneumatic tube system to facilitate the handling of advertising copy and records.

Beyond a large, oak-paneled reception room are the private offices of the publisher, Walter A. Strong, the vice-president, the treasurer and the business manager. There is a modern note in the decorations of Mr. Strong's office, particularly in the wood paneling wherein a striped effect has been secured by using different sawings of the oak. This room, which opens upon a paved terrace, communicates with the Victor F. Lawson Memorial Room, a handsome room built especially to accommodate the elaborately carved, French Circassian walnut paneling and the white, Italian marble hearth which decorated the library of the old Lawson home, recently demolished. It was the favorite room of the late publisher, and the sentimental value attached thereto makes it a particularly fitting place for meetings of the board of directors carrying on the work and the policies of the man who was responsible for the *Daily News* for many years. Two stories in height, the room, 23 x 42 feet, with four broad, recessed windows, occupies the south end of the sixth and seventh floors, with access to a spacious, vari-colored slate-paved terrace. The ceiling is a deep ivory, early Georgian in design, from which there are suspended two large, old brass chandeliers. The entire floor space above the sixth floor is rentable area, modern office space, the double pent-house at the top of the building being devoted exclusively to the purposes of the *Daily News,* as already described.

Photos. James Wallace Gillies, Inc.

CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

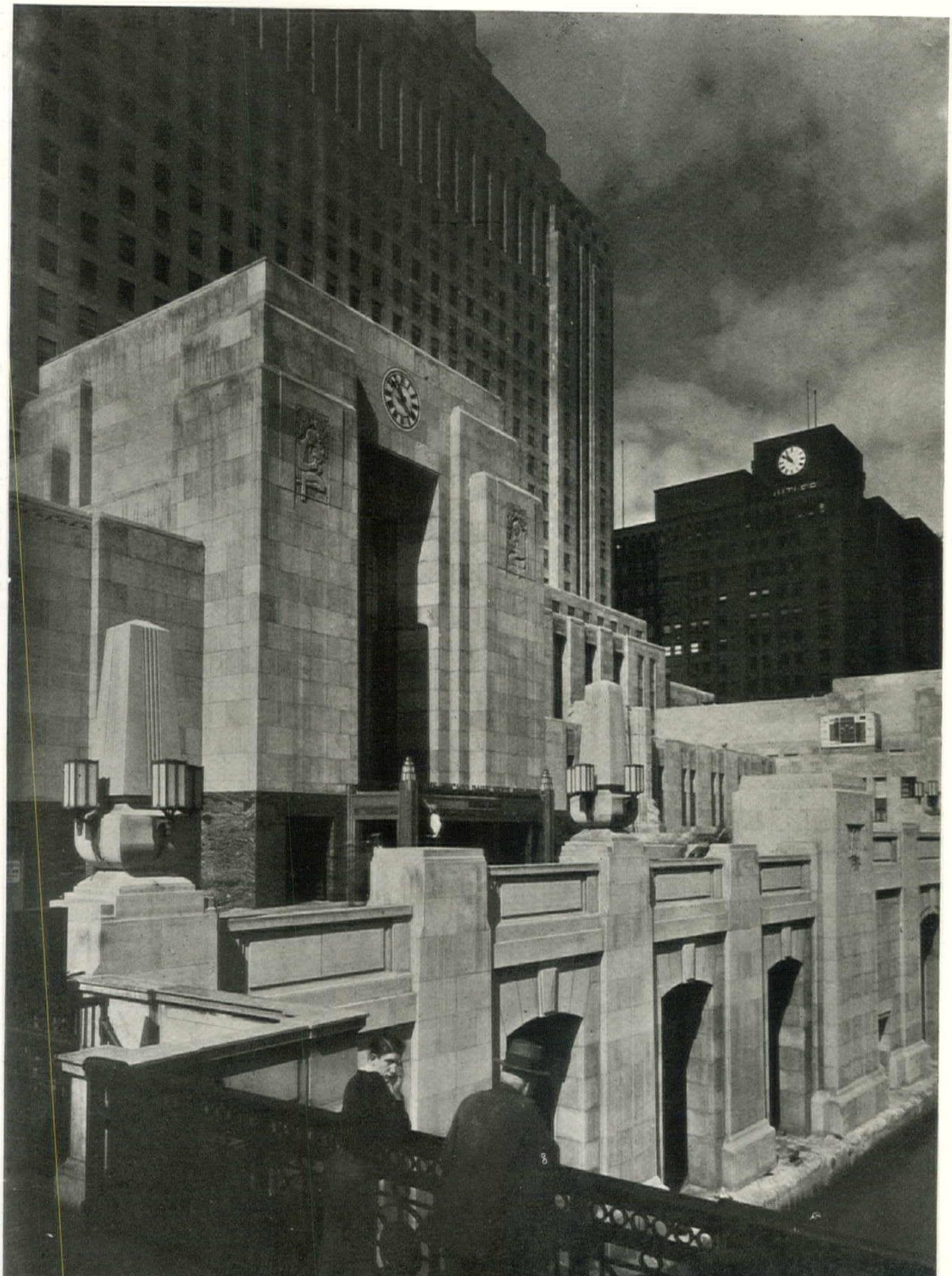


JAN. 1930

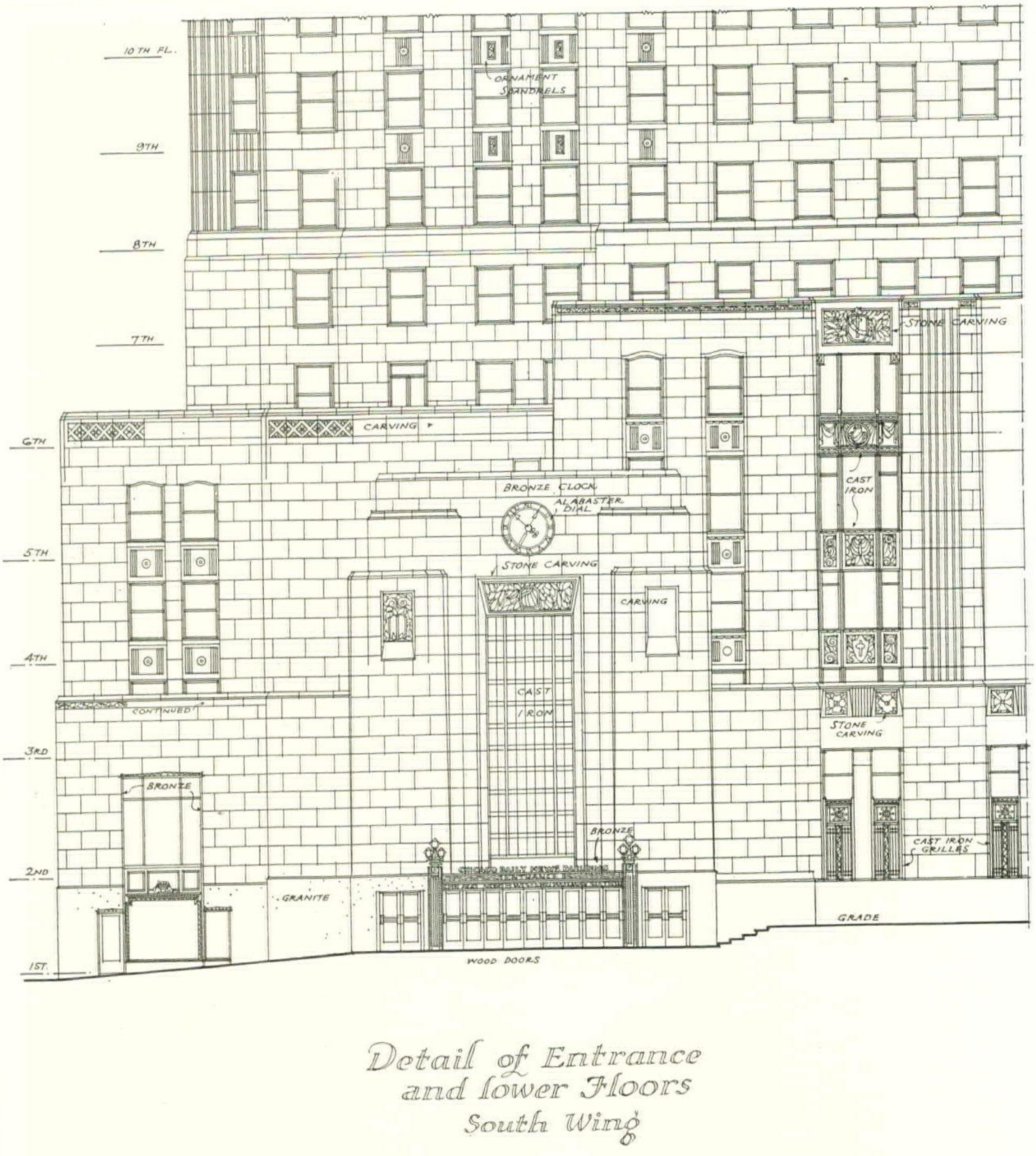
No. 1

The ARCHITECTURAL FORUM DETAILS

CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



DETAIL OF TERRACE ENTRANCE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



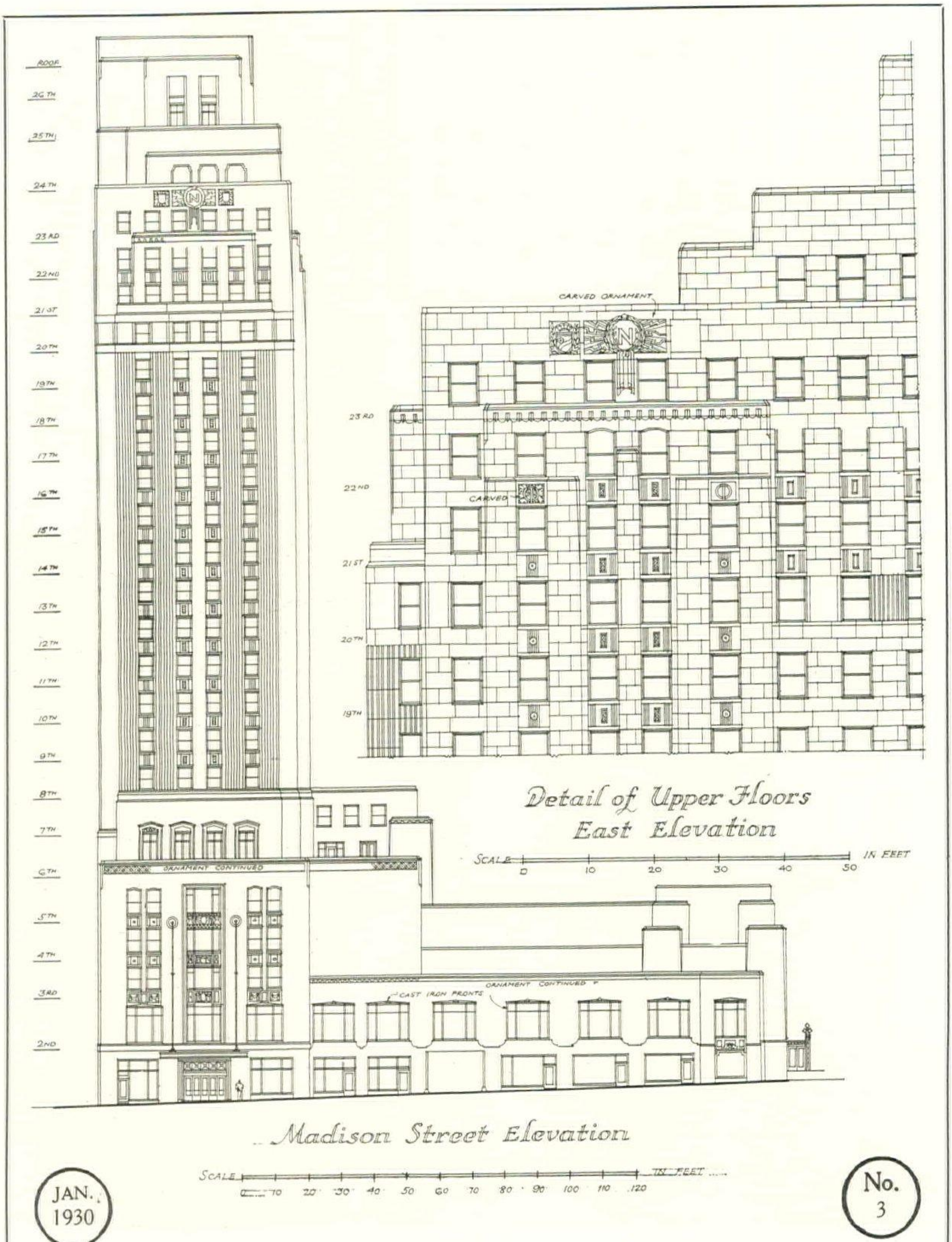
JAN. 1930

No. 2

The ARCHITECTURAL FORUM DETAILS

CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

TERRACE CONCEALING RAILROAD
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

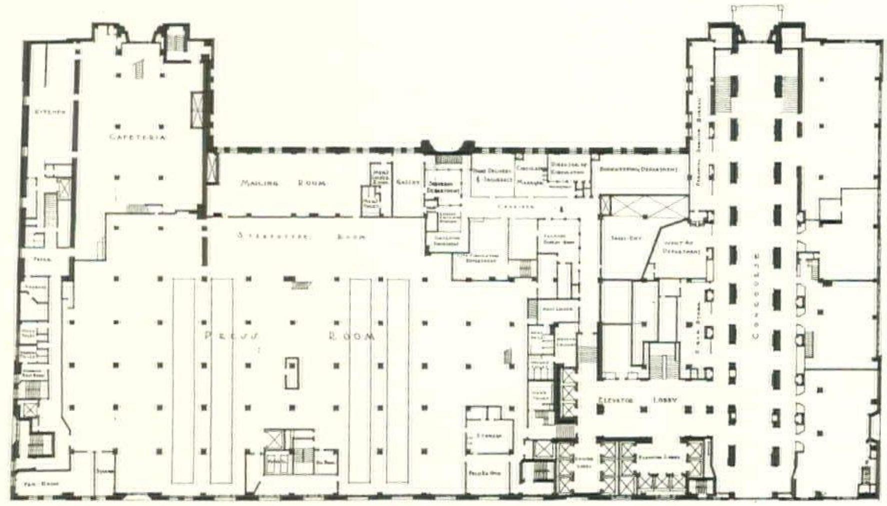


The ARCHITECTURAL FORUM DETAILS

CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

DETAIL, NORTHEAST WING
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



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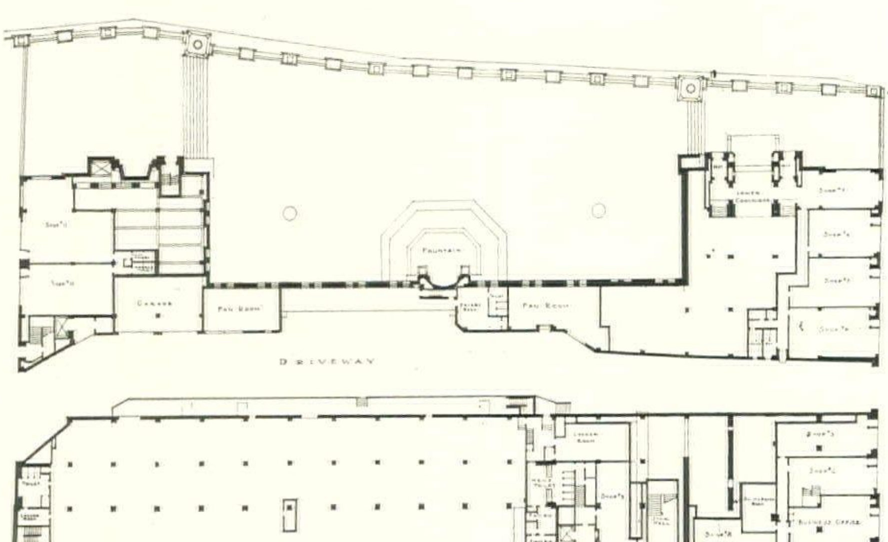


FIRST FLOOR

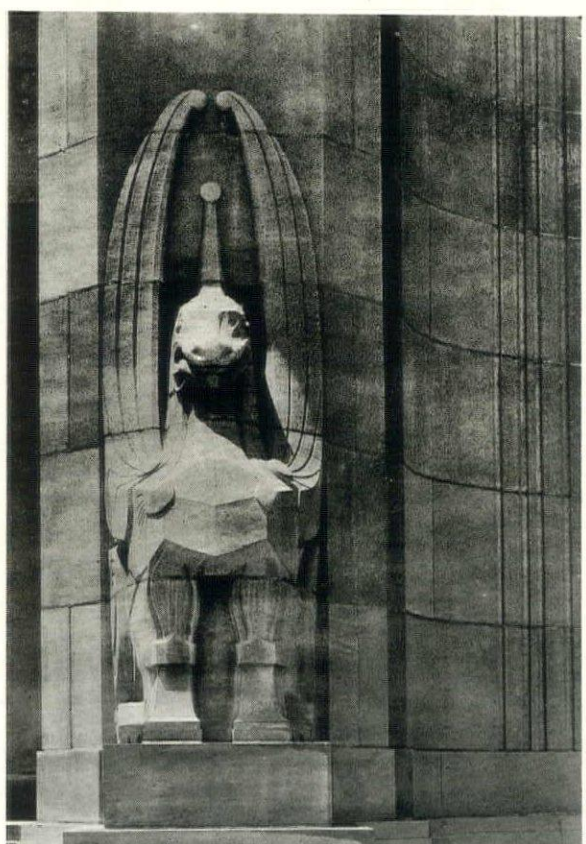
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

EAST TERRACE AND WALL FOUNTAIN
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

DETAIL, LOWER STORIES, EAST FRONT
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

DETAIL OF SCULPTURED RELIEFS
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

INNER COURT OF THE PLAZA
SHOWING VICTOR F. LAWSON
MEMORIAL FOUNTAIN AT CENTER



SCULPTURE BY ALVIN W. MEYER
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

Photo, Sigurd Fischer

INTERIOR, SHOWING CONCOURSE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

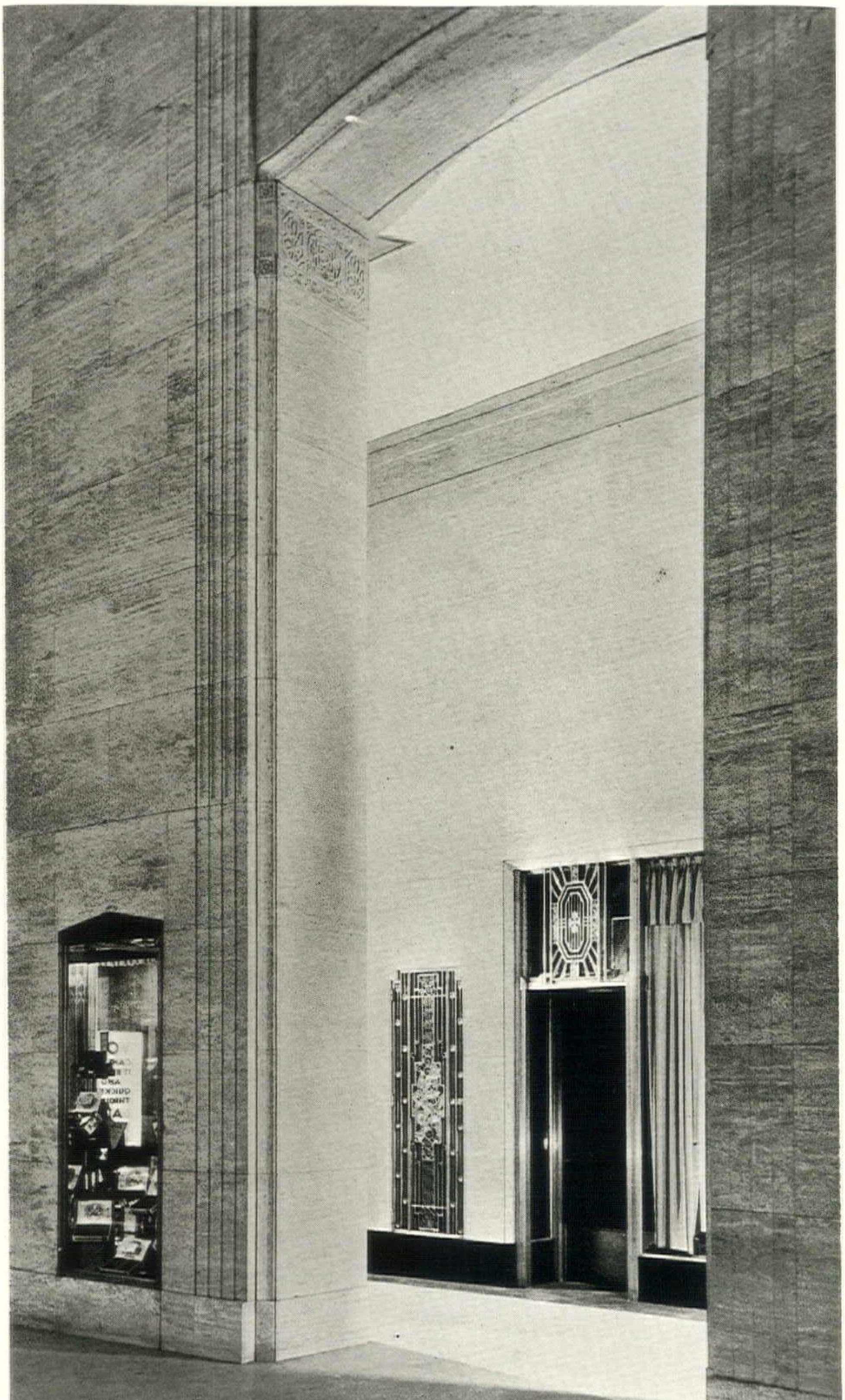
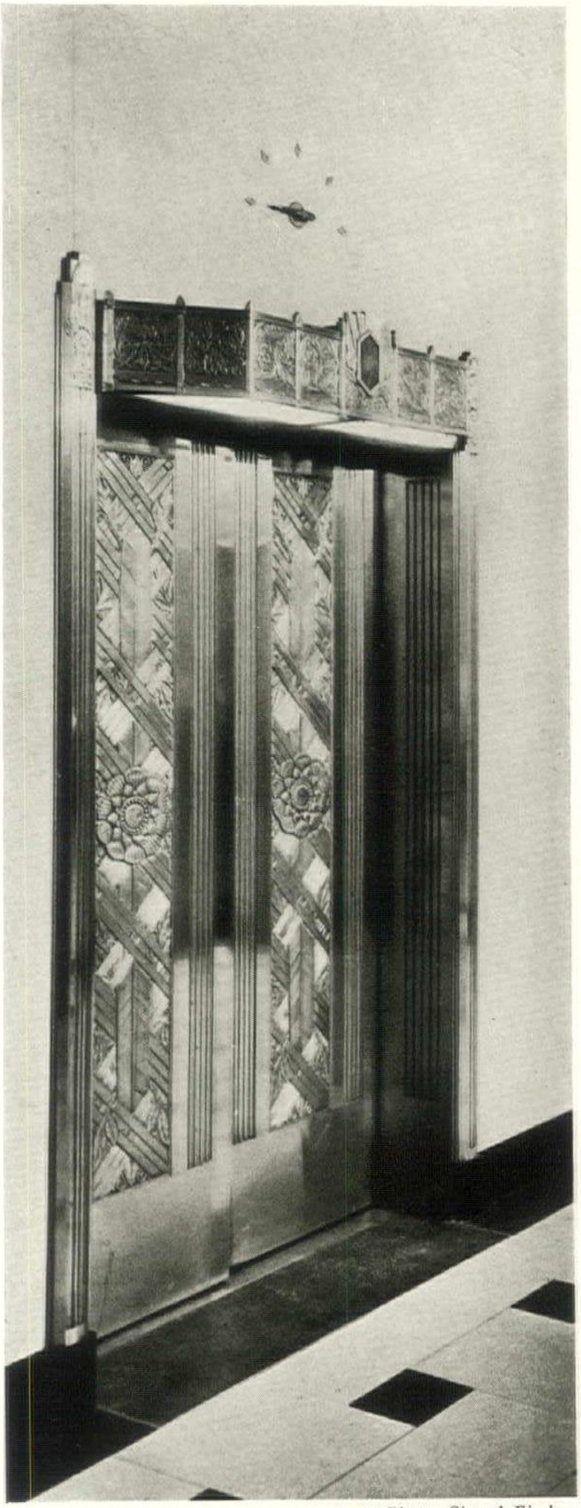


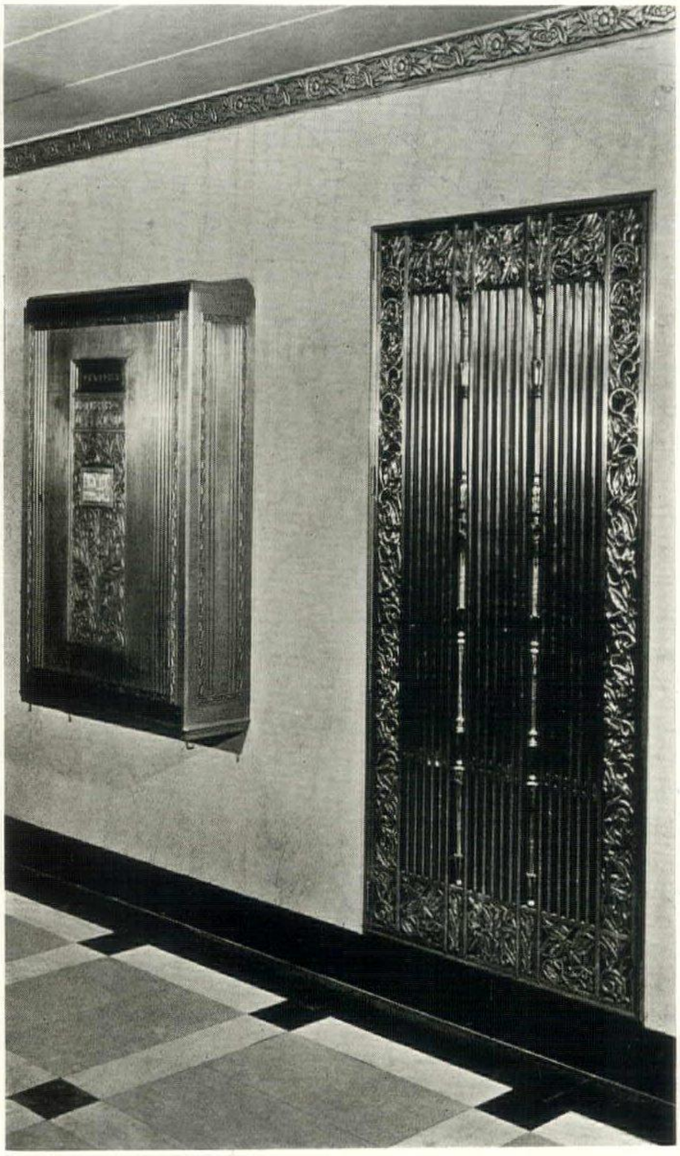
Photo. Sigurd Fischer

ENTRANCE TO AISLE FROM CONCOURSE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

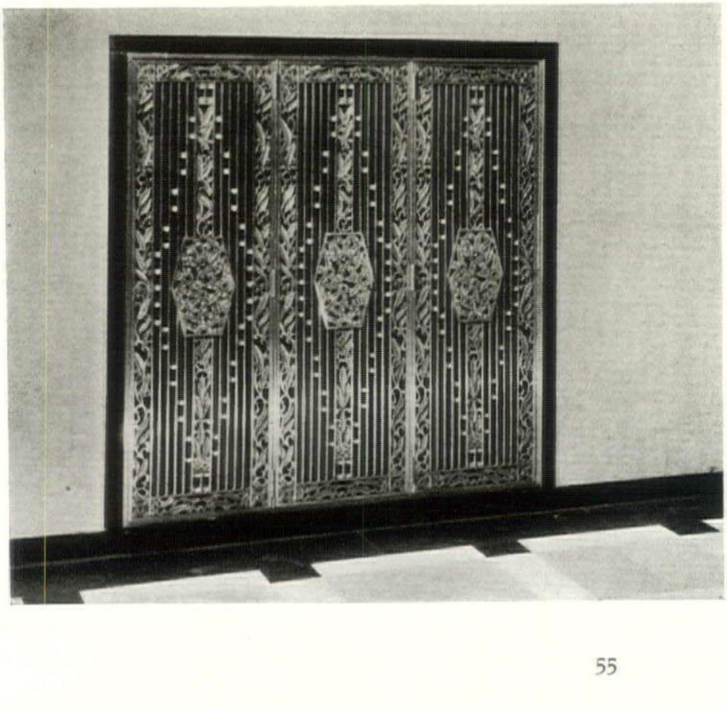


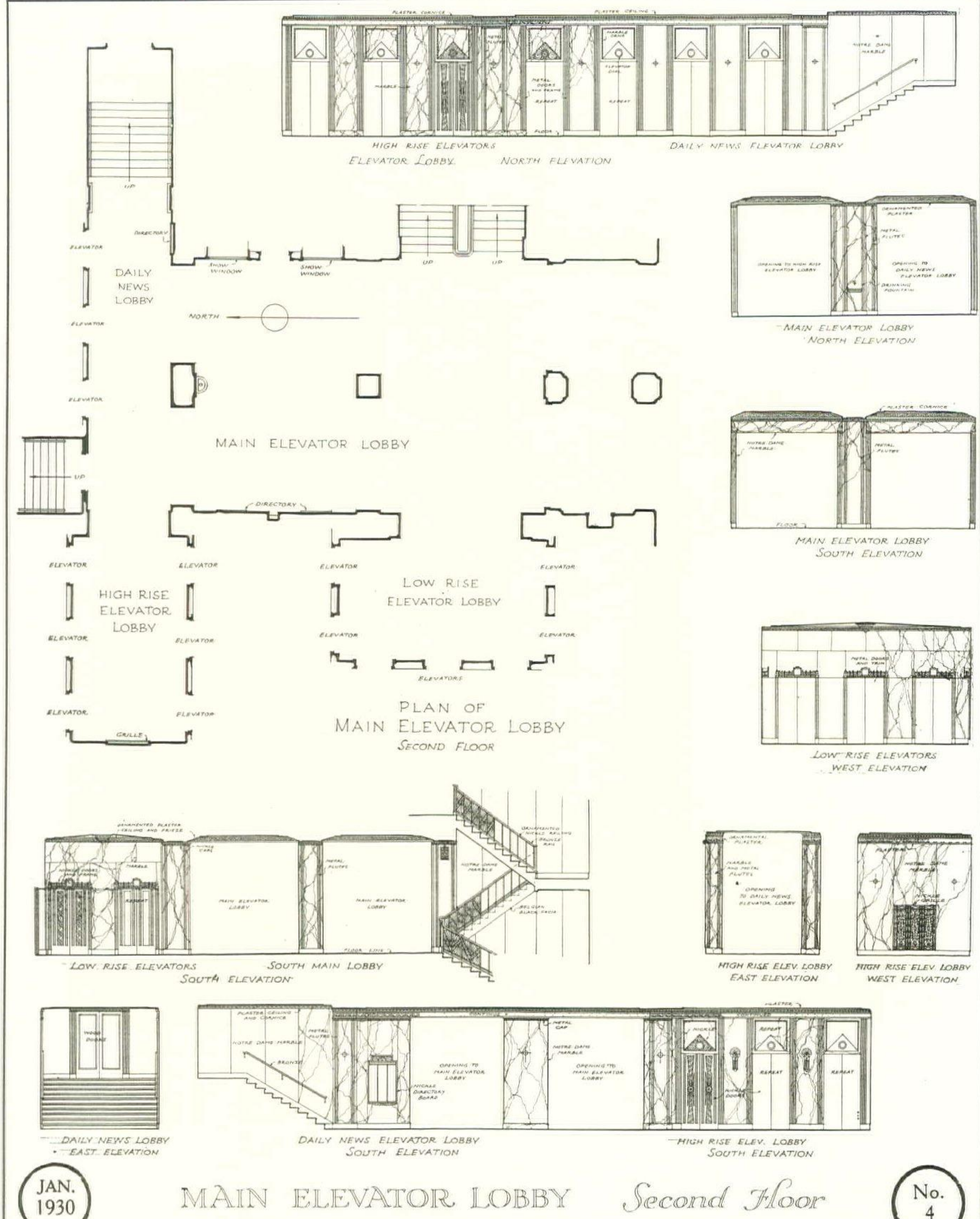
Photo, Sigurd Fischer

ELEVATOR DOORS IN MAIN LOBBY
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS



RADIATOR GRILLES AND MAIL BOX
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS





JAN. 1930

MAIN ELEVATOR LOBBY *Second Floor*

No. 4

SCALE 0 10 20 30 40 50 60 IN FEET

The ARCHITECTURAL FORUM DETAILS

CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

SILVER TONED METAL IS USED
FOR ELEVATOR DOORS AND TRIM
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

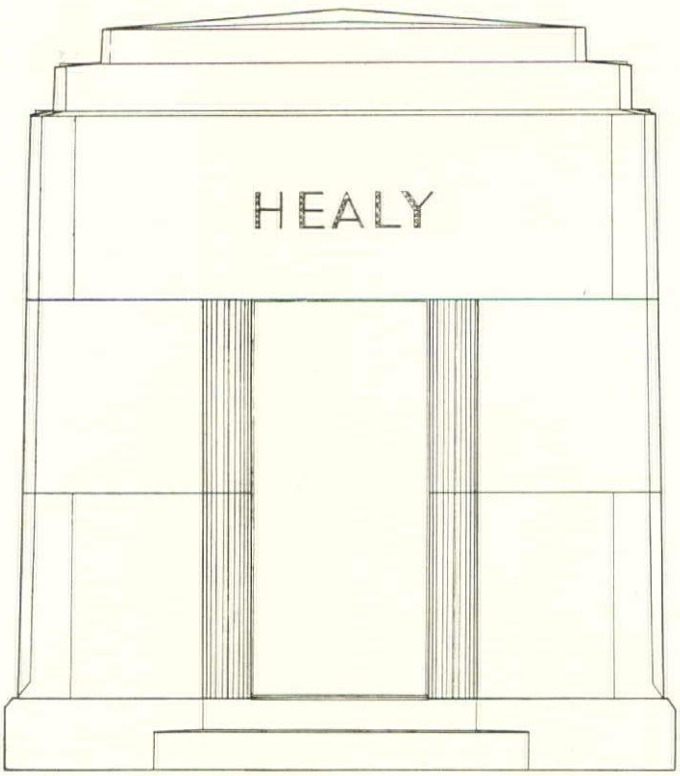
Photo. Sigurd Fischer

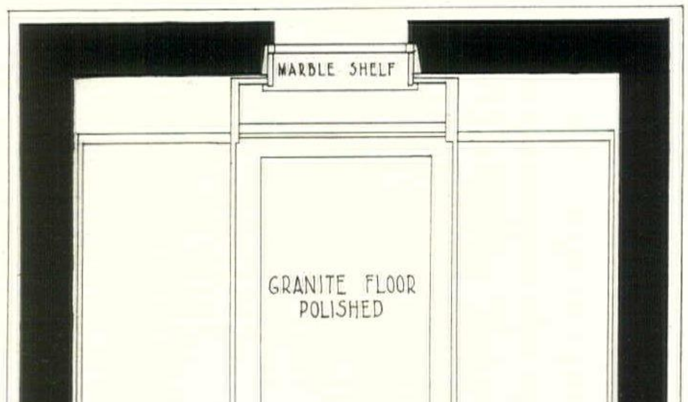
STAIRWAY AND METAL GRILLE
CHICAGO DAILY NEWS BUILDING
HOLABIRD & ROOT, ARCHITECTS

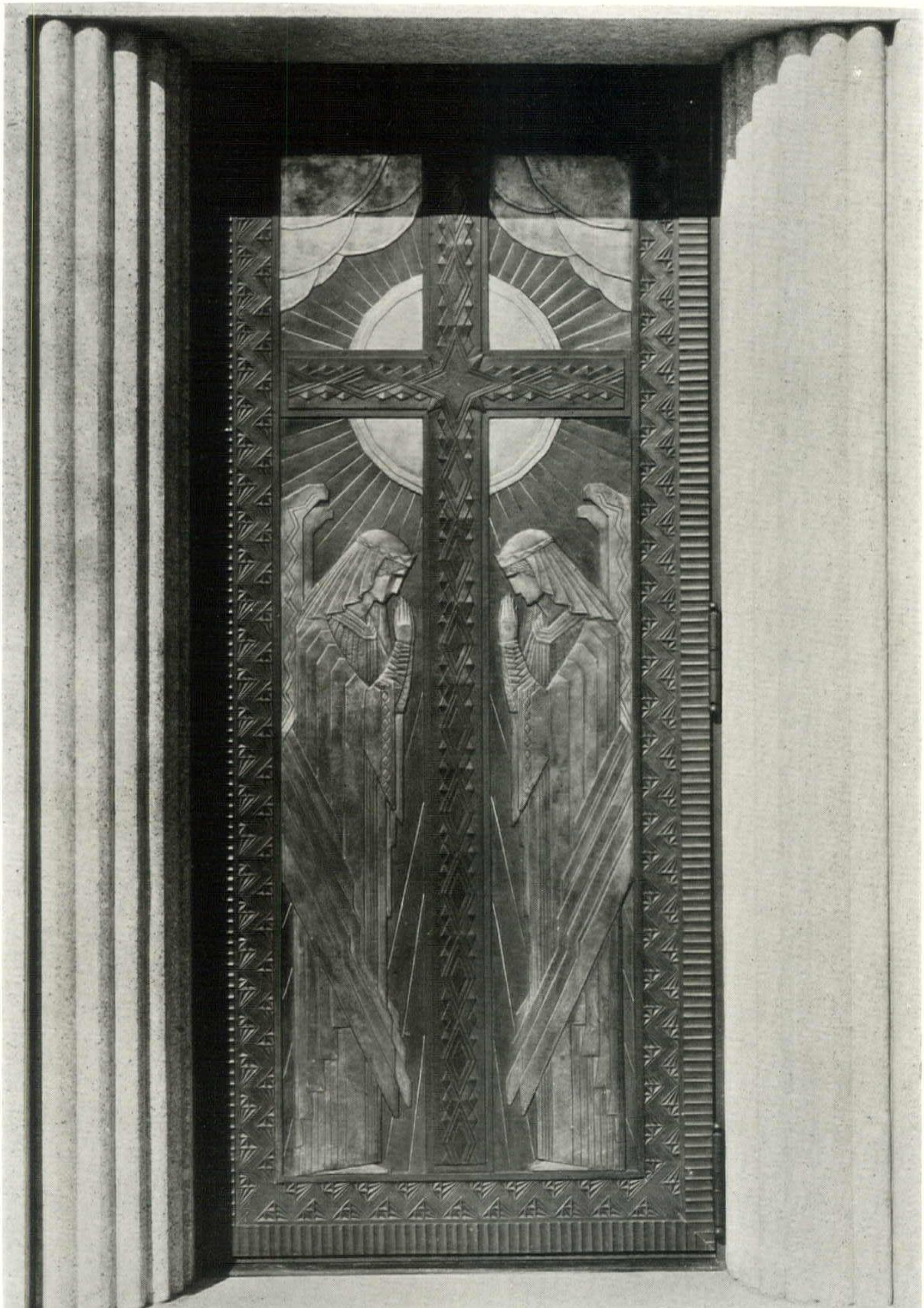
Plans on Back

MAUSOLEUM AT
VALHALLA, N. Y.
DESIGNED BY
ARTHUR K. HEALY

ELEVATION AND PLAN
MAUSOLEUM, VALHALLA, N. Y.
ARTHUR K. HEALY, ARCHITECT





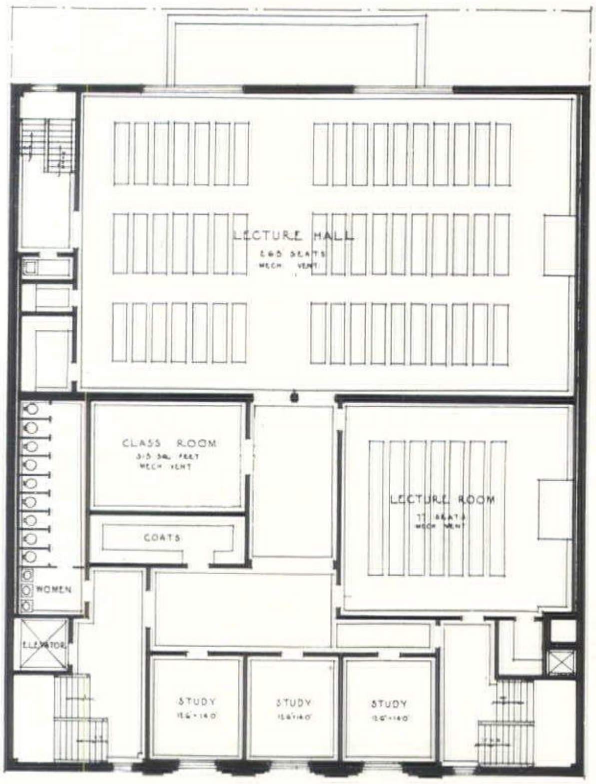


CROSS AND BORDER, BLACK BRONZE; FIELD, GREEN ANTIQUE BRONZE
FIGURES AND CLOUDS, ANTIQUE GOLD; NIMBUS, BRIGHT GOLD
MAUSOLEUM, VALHALLA, N. Y.
ARTHUR K. HEALY, ARCHITECT

PROPOSED BUILDING FOR A SCHOOL

THOMPSON & CHURCHILL, ARCHITECTS

From a Rendering by Chesley Bonestell



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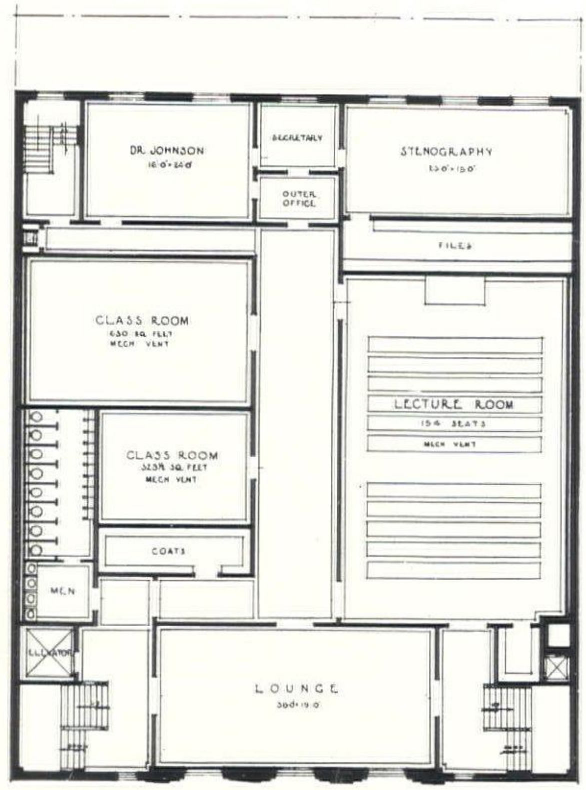
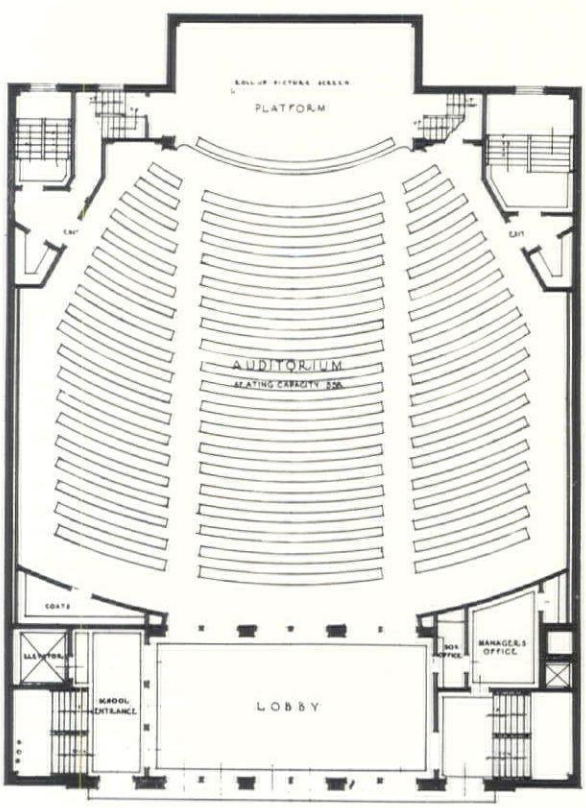
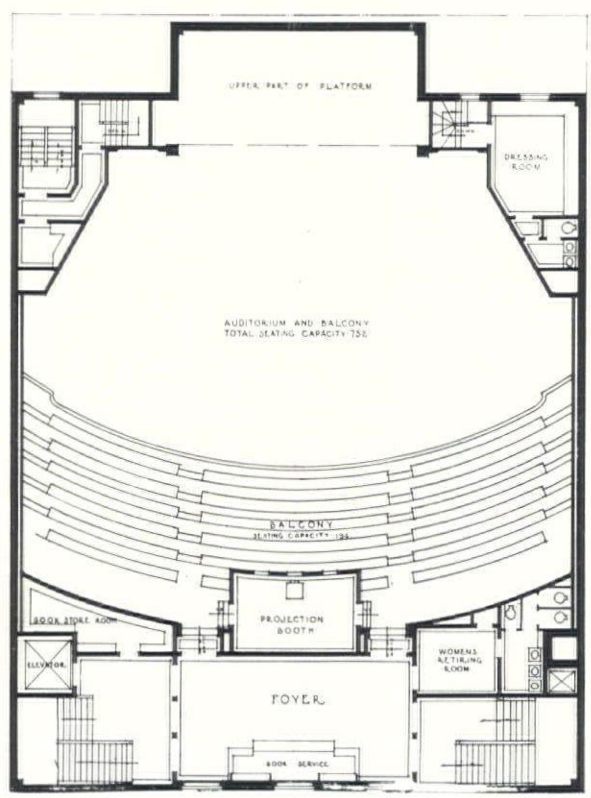


THIRD FLOOR



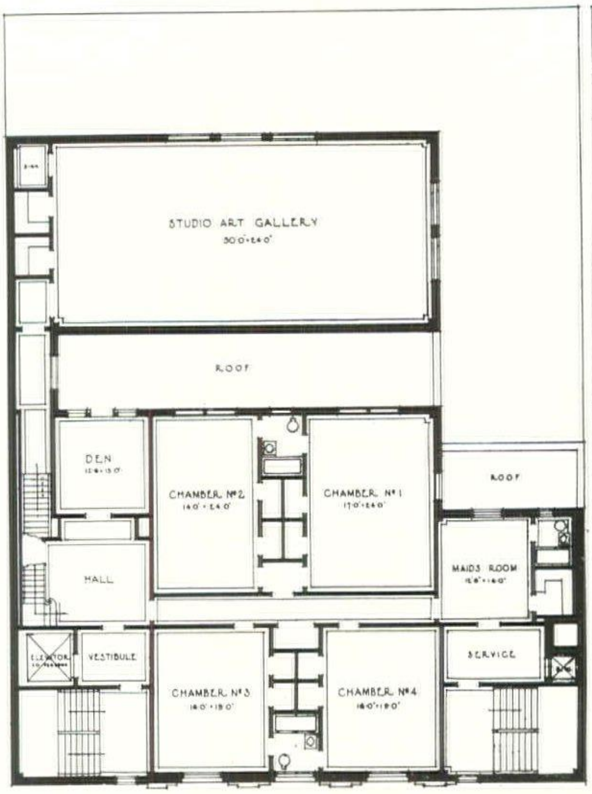
FIRST FLOOR



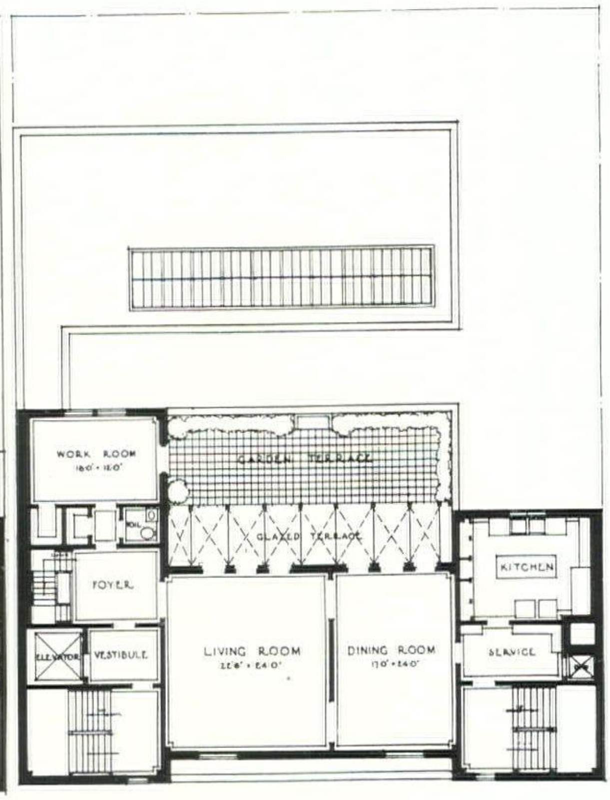
BALCONY FLOOR

PROPOSED BUILDING FOR A SCHOOL

THOMPSON & CHURCHILL, ARCHITECTS



SIXTH FLOOR



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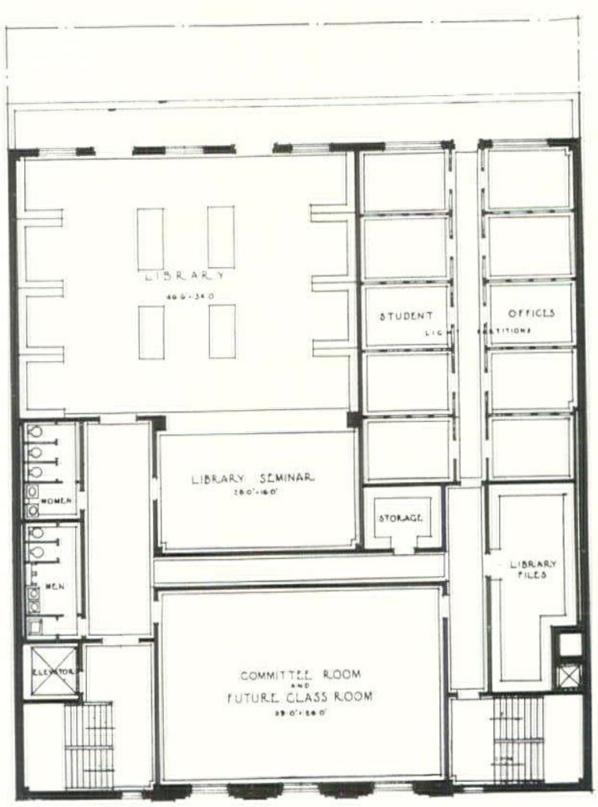
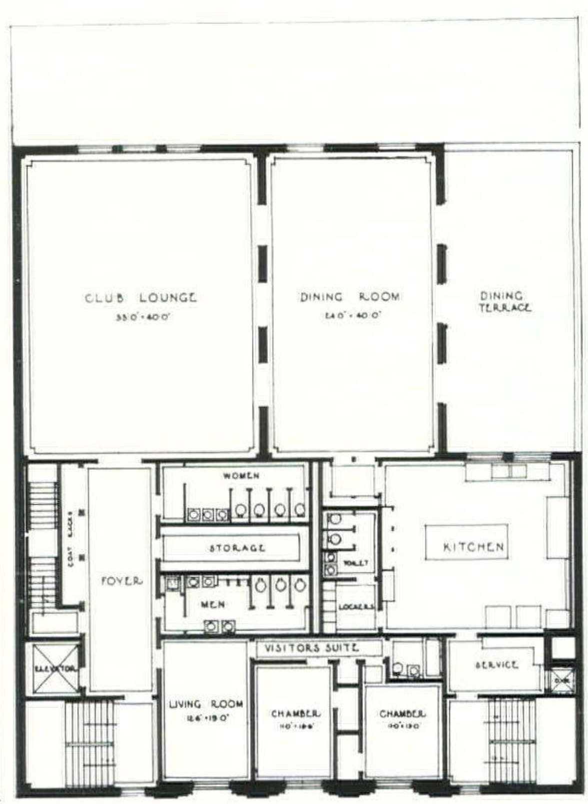


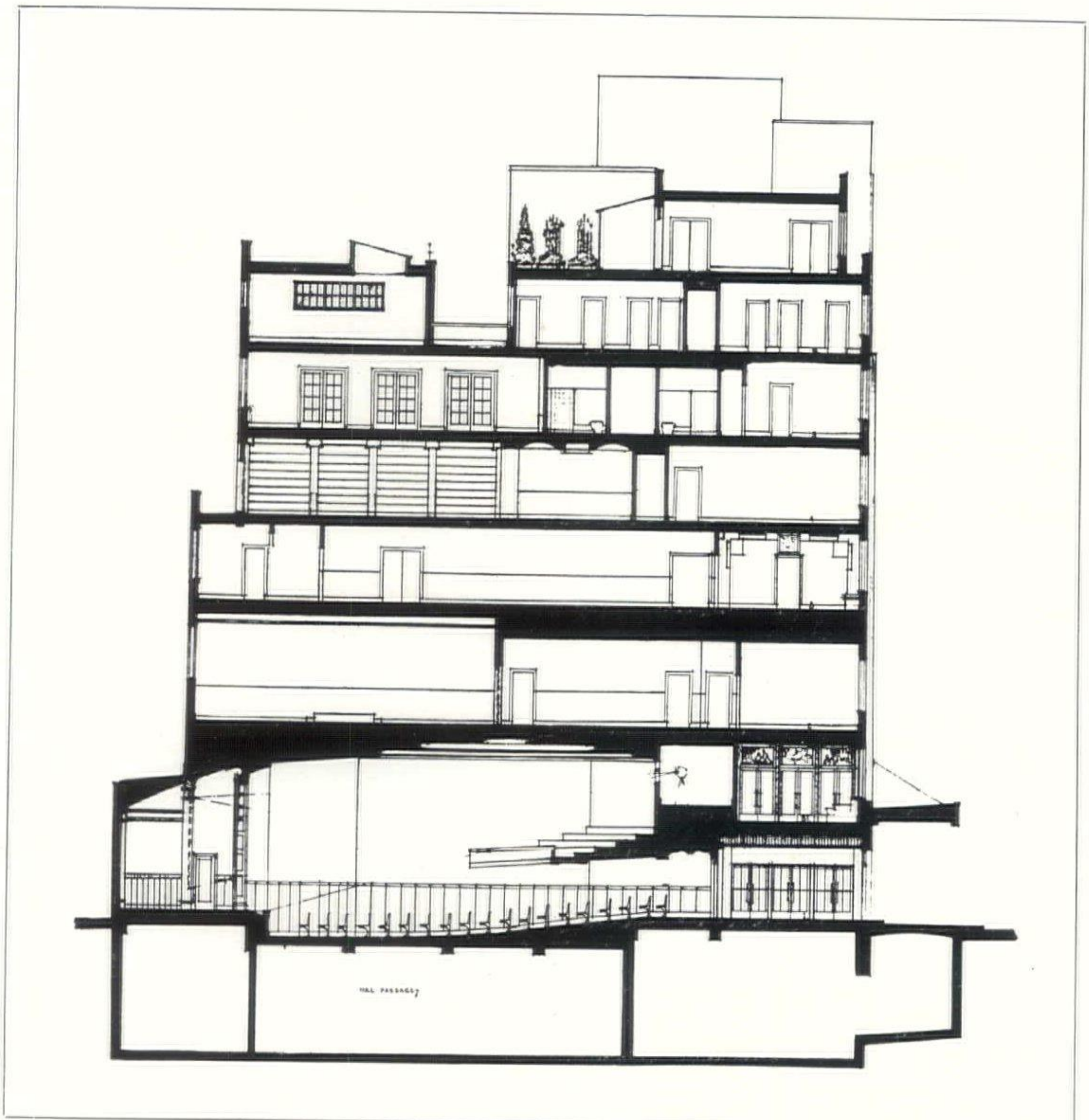
FOURTH FLOOR



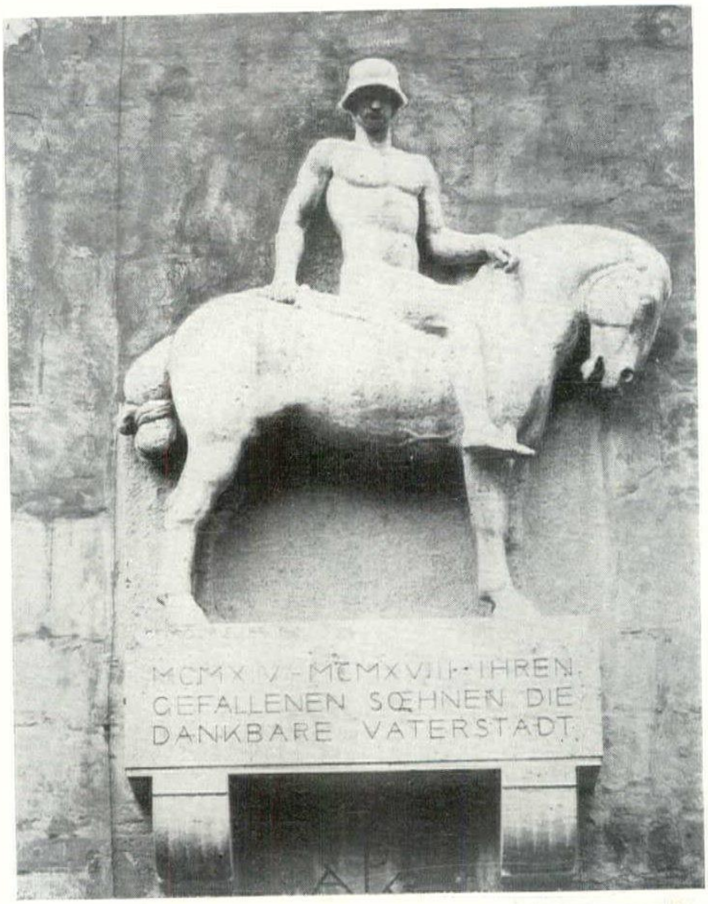
FIFTH FLOOR

PROPOSED BUILDING FOR A SCHOOL

THOMPSON & CHURCHILL, ARCHITECTS



LONGITUDINAL SECTION THROUGH
PROPOSED BUILDING FOR A SCHOOL
THOMPSON & CHURCHILL, ARCHITECTS



THIS UNUSUALLY FINE WAR MEMORIAL HAS BEEN PLACED AT ANSBACH, GERMANY. GEORGE MUELLER WAS THE SCULPTOR

"FLORA AND DIANA," BY ADOLPH BLOCK, SCULPTOR. INCLUDED IN THE WINTER EXHIBIT, NATIONAL ACADEMY OF DESIGN

THE AIRPORT OF THE FUTURE

BY

HARVEY WILEY CORBETT

THE greatest obstacle on a landing field is, paradoxically enough, one of its greatest assets,—the hangar. It waves its conical air cone to the pilot as a toreador's red flag is waved before a bull, demanding that skill, caution and often every known safety factor be brought into the picture to effect a safe landing. There are stories of crashes enough to fill a book of accidents which can be traced to the pilots' efforts to avoid hitting the hangar when approaching a landing.

The present-day hangar is nothing more than a take-off from the barn that housed our grandfather's horse and buggy,—yet we have made no radical efforts to adapt our winged housing problems to flying conditions. Four walls, with two of them made to open, stand out like sore thumbs on the flying field as our monuments to the progress of aviation. Not only is the hangar an impediment to the field, but a line drawn on a tangent from top of hangar to the field covers area wasted, so far as taking off and landing are concerned.

All But Field Underground. As a member of the architectural profession who has not submerged himself too deeply in an aëronautical trench to look over the top, it is my belief that a better landing field would be one which is absolutely free of any and all obstacles. To arrive at this condition, the hangar and repair shops, waiting rooms, the pneumatic mail tubes, rail and motor approaches, hotels and all mechanical necessities should be sunken. And they should be sunk not on a flat field, where draining conditions are not always controlled, but beneath the apex of a conical-shaped field rising on about a 2 per cent

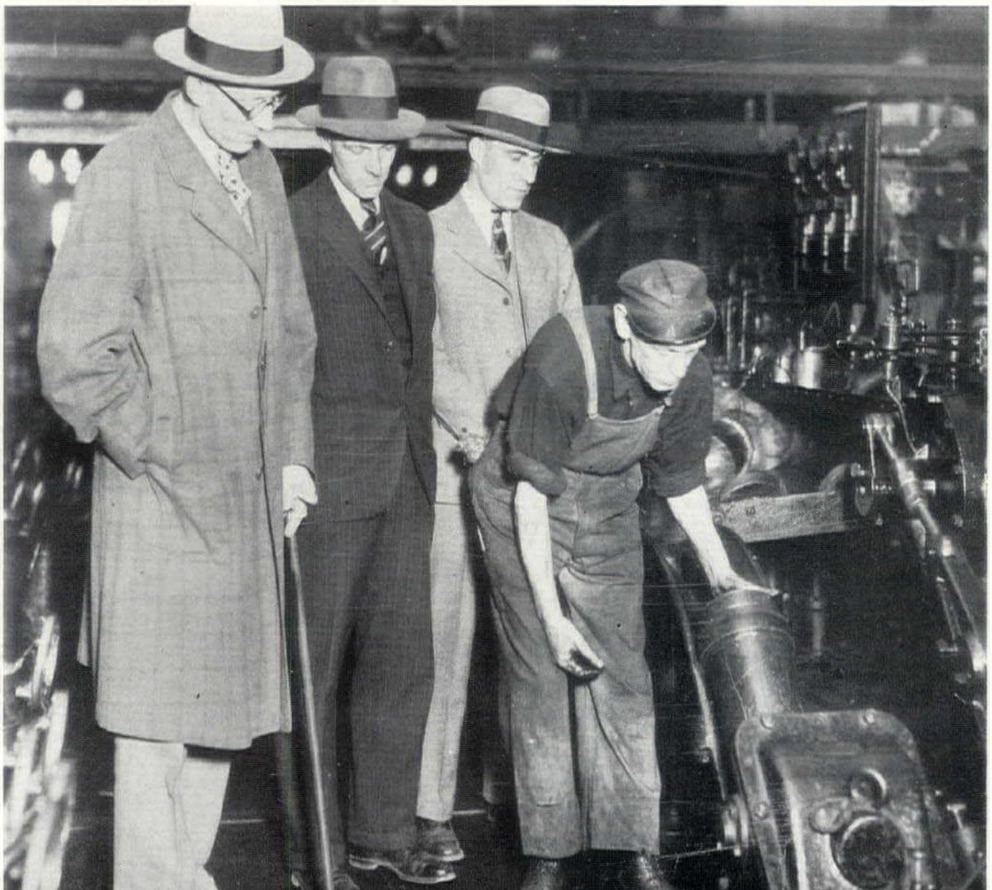
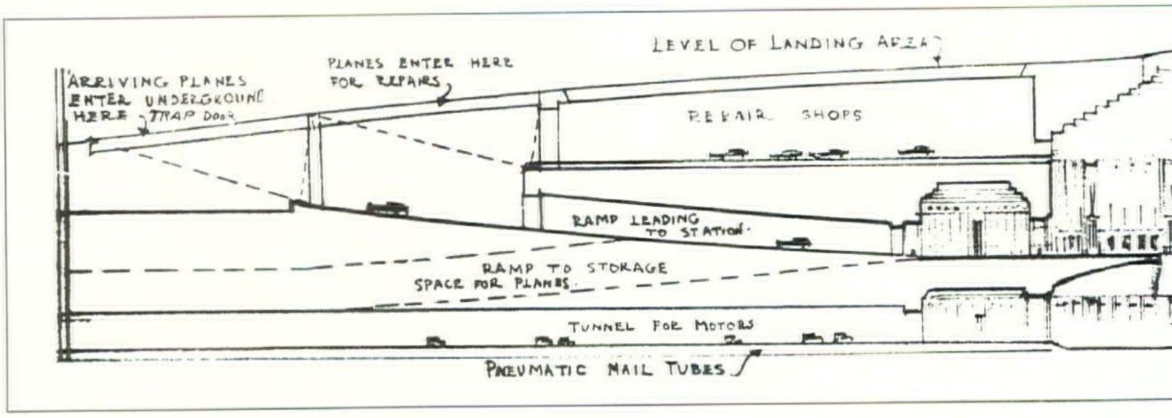


Photo. Hamilton Wright

Harvey Wiley Corbett Inspecting Pneumatic Mail Tubes Now in Use in General Post Office, New York, Relative to Their Use from Airports to Cities



Section Through Underground Air Terminal Showing Three-level Plan. Right Half of Design Continued on the Opposite Page

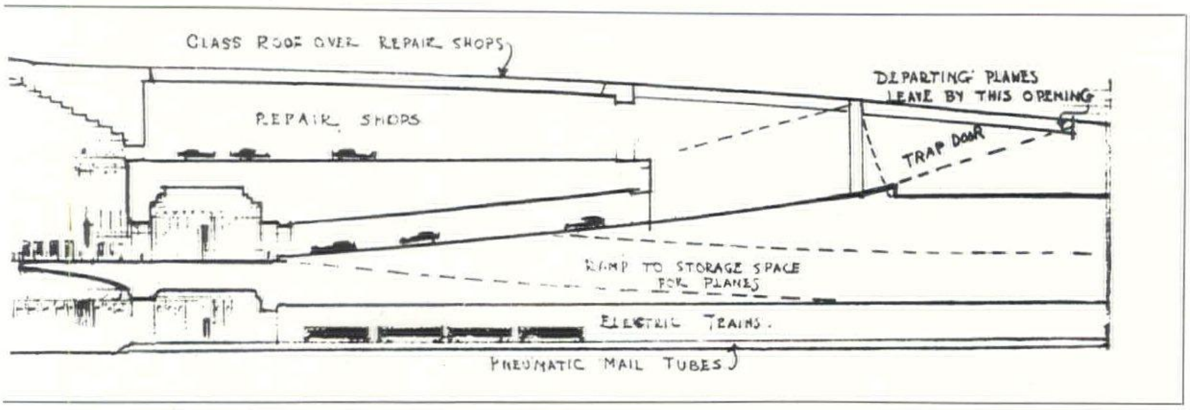
grade from its outer circumference to its center.

Under this plan everything would be off the field. Drainage would follow the best laws of nature. Every foot of the field would be available for taking off and landing. Planes arriving or leaving would fly off in opposite directions, avoiding all known causes of air crashes. No matter from what direction the wind were coming, the plane could head directly into it. There would be no other planes on the field, for the reason that the Gargantuan hangar, sunk directly beneath the cone, would afford plenty of space to house all craft making use of the commercial airport. Entry into the hangar would be made through a score or more of trap door arrangements operated by an observer stationed at the apex of the cone, who would first make sure that the plane had landed safely and that the pilot did not wish to take off again. The 2 per cent grade would accelerate a plane's take off and afford a shorter stopping place after the plane had touched the field.

All buildings radiating from the edge of the field would be constructed in zoned-tier formation, the first few buildings back being one story high; a block farther back the height would be increased proportionately. Such a plan would afford no obstacles to the approach of the field, and would provide for close contact with factories and buildings which desired adjacent locations. This too would leave clear a sweeping path for a clean, level, head-on wind hitting the field.

While such a field would require about half again as much space as the present-day airport, it would afford a greater number of safety factors and would provide for an incoming and outgoing flow of both air and land traffic that cannot possibly be equaled by present fields. Upon this low cone, with its almost imperceptible rise, a dozen planes could land simultaneously, all headed into the wind; and when piloting has reached the point where the average and not the expert flyer can land in a slight cross wind, the number of planes arriving at one time can be increased to around 25.

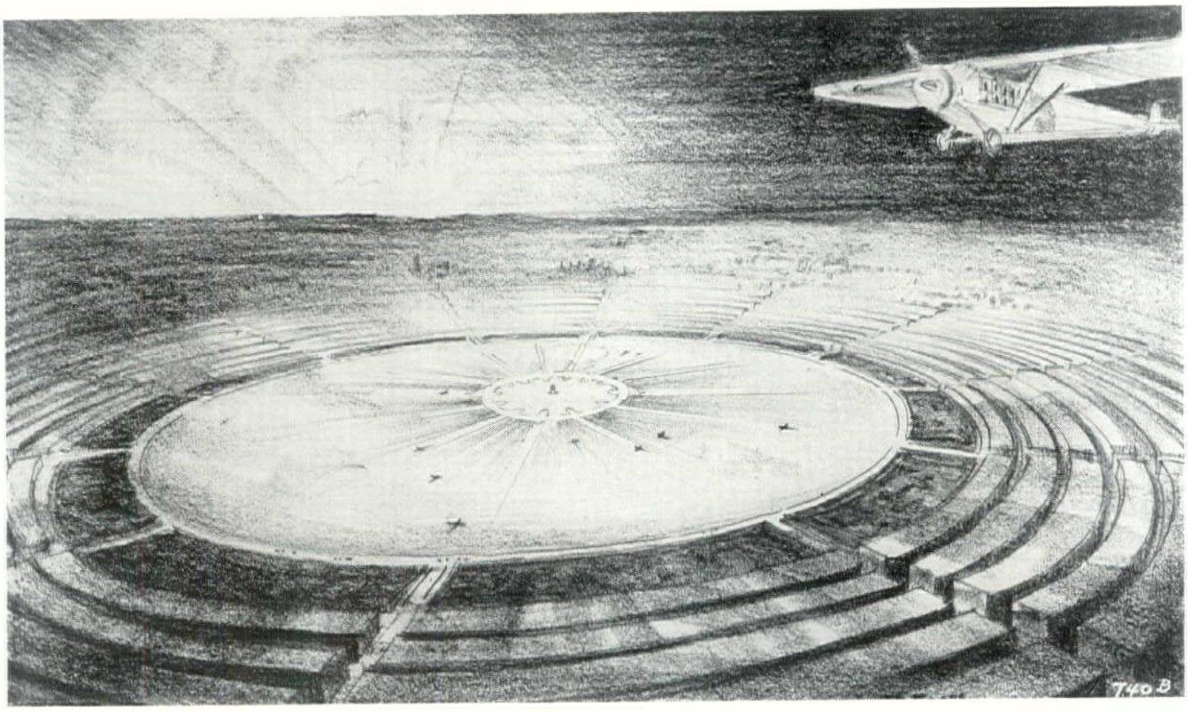
Future Airport at Center of City. One hundred years from today the center of the average city will fall close to the center of its main air-



Air Terminal on Upper Level; Rail and Motor on Lower Levels
Harvey Wiley Corbett, Architect
Sketch by Francis Keally

port. Unlike the shipping centers of the factory district, which are now located on the outskirts of the metropolis close to the waterways and railway terminals, the airport will attract to a universal shipping room, — the hangar. Railway tracks, truck lanes and lanes for high speed pleasure and commercial cars will burrow their way through the bowels of the future airport, where freight and passengers will be taken on and discharged. Hotels, restaurants, stores, show rooms and warehouses where merchants can display their goods to air-traveling buyers for hurried inspection will be built in this underground hangar.

Pneumatic Mail Tubes Biggest Asset. Like elevators in a skyscraper, the pneumatic mail tube, which already has emblazoned its speed and modern efficiency (though it is nearly 50 years old) in the postal departments of some of our great cities, will shoot mail in a hundred directions, from the airport to the central post office stations throughout a city. Be it an airport of the foregoing description or not, the fact that air mail can be shot to the post offices from the airports and be on its way to delivery in a few minutes and not a few hours after the plane has landed, is evidence enough that the pneumatic tube will be one of the many new and improved developments throughout the future city built to parallel the speed of the mail plane. In less than five minutes after a mail plane has touched the landing field, its mail will have arrived at the central post offices. Mail clerks will assort mail in flight in much the same manner as do the railway mail clerks aboard a fast moving train. And where large corporations have installed their private pneumatic tubes directly from the landing fields to their own buildings, they too will receive mail in five minutes after the plane has reached the field. The New York Life Insurance Building, towering 33 stories over the old Madison Square Garden site, has a magnificent tube installation costing $500,000 running to nearly 150 offices of the company in the building. Inter-office communication such as is required for valuable documents, statements and signatures can be had from any department in the building in about two minutes. Thus air



An Underground Airport Designed
By Harvey Wiley Corbett, Architect

A Rendering by Francis Keally
of the Corbett Airport Design

mail, shot through pneumatic tubes to huge office buildings, would arrive at its final destination and be read about ten minutes after the plane has landed. Contrast this with the two to three hours that are lost today by mail trucks weaving their way through heavy city traffic for 15 miles between the landing field and the post office, and one will begin to realize what folly it is for the mail pilot to risk his neck flying 150 miles an hour to make the landing field on time, only to be obliged to sit down and watch a clumsy mail truck plod along at a 15 m.p.h. rate for two hours to reach the post office!

Tube's Save New York Nearly Million. Clarence Chamberlain, the great aviator, and several engineers and architects including the writer were recently invited to inspect the pneumatic tubes at the General Post Office in New York. These tubes shoot cans about the size of an ordinary ice cream freezer, having a capacity of up to 500 letters, to uptown, downtown and crosstown post office stations at 12-second intervals, and their total number of carrier miles averages about 140,000 daily. They make a speed of about 30 miles an hour, and are driven by compressed air. More than $100,000 in clerks' salaries, and a cost of from $200,000 to $300,000 in operating mail trucks is saved annually for the New York Post Office by these tubes. Mr. Chamberlain said he had recommended to Mayor Walker the installation of pneumatic mail tubes from the city's airport on Barren Island.

No Taxiing for Wind Position. Another feature which has not been mentioned, and yet one which is of vital importance in expediting incoming and outgoing planes, is the through service available in this conical shaped airport. A plane arriving enters the station, discharges its passengers, and if the next hop is short and does not require the plane to be serviced, moves straight ahead to the opposite side of the hangar, where it takes on its passengers and zooms down the incline to take off. There is no turning around or taxiing from one end of the field to the other to get set in a head-on wind position. By simply continuing in the same direction from which he landed, the pilot is all set to take off. Much has been said about airports. Much more will be said, and much will be accomplished, but it does not seem inherently correct to believe that a hangar or any building or construction of any kind which in the final analysis cannot but prove itself an obstacle to an airplane should remain above ground.

THE LEHIGH AIRPORTS COMPETITION

REPORT OF THE JURY OF AWARDS

DURING December the winning designs in the Lehigh Airports Competition, the first American contest for designs of modern airports, were selected by a Jury of Awards from 257 designs. Prizes totaling $10,200 were awarded by the Lehigh Portland Cement Company, sponsors of this competition.

The Jury of Awards, headed by Raymond M. Hood, architect, consisted of three groups of experts. The aëronautics group included Dr. George W. Lewis, Director of Research of the National Advisory Committee for Aëronautics; Charles S. ("Casey") Jones, President of the Curtis Flying Service, Inc.; and Major John W. Berry, Manager of the Cleveland Municipal Airport. In the engineering and city planning group were George B. Ford, Air Field Planner to the War Department; Colonel Willard Chevalier, Publishing Director of the *Engineering News-Record*; and E. P. Goodrich, Consulting Engineer and Airport Adviser to the Chinese National Government. The architectural group, in addition to Mr. Hood, included Professor William A. Boring, Dean of the School of Architecture of Columbia University, and Parker Morse Hooper, editor of THE ARCHITECTURAL FORUM. Francis Keally, architect, was professional adviser. The awards were:

First prize, of $5,000, to A. C. Zimmerman and William H. Harrison, Los Angeles.

Second prize, of $2,500, to C. Gifford Rich, Chicago.

Third prize, of $1,000, to Odd Nansen, East Orange, N. J., and Latham C. Squire, New York.

Fourth prize, of $500, to Will Rice Amon, New York.

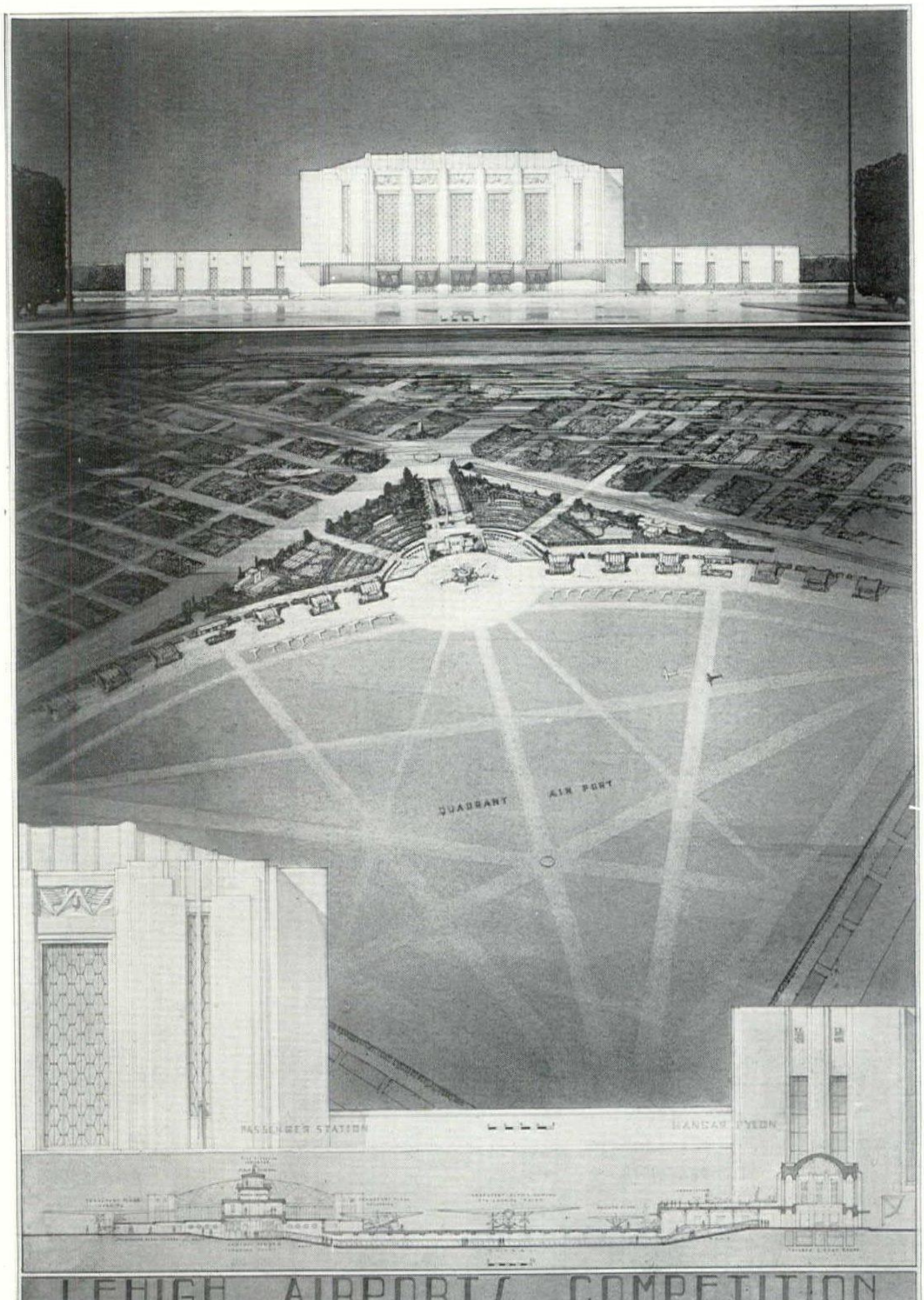
There were 12 honorable mentions instead of ten as originally planned, the Jury of Awards having requested the Lehigh Portland Cement Company to grant extra awards to two particularly meritorious designs. Those receiving honorable mentions,—each carrying a $100 prize,—are, W. Frank Bower, Jr., Henry L. Sandlass and Alfred A. Rothmann, East Orange, N. J.; H. Roy Kelley, Los Angeles; Edward C. Remson, New York; James S. Nussear, Jr., and William N. S. Pugh, Baltimore; George A. Robbins, Philadelphia; Robert Paul Schweikher, Denver; Lloyd N. F. Spicer, Bayside, N.Y.; Edwin M. Stitt, Pittsburgh; Charles A. Stone and U. Floyd Rible, Los Angeles; Robert D. Stott, Howard Hutchinson and Lansing C. Holden, Jr., New York; Virgil Westbrook, San Clemente, Cal.; Fred E. Sloan and Elmer A. Johnson, Chicago.

The first prize design of A. C. Zimmerman and William H. Harrison, of Los Angeles, was particularly commended by the Jury because of its very logical and ingenious use of all elements for the comfort and convenience of passengers and flyers. Visitors and passengers reach the airport through a broad plaza at the junction of two important boulevards where provision has also been made for underground approach by subway or railway. The approach plaza is developed as a dignified park and is provided with ample parking spaces for automobiles arranged in a great semi-circle. This building has a waiting room very similar to that of a railroad station, with ticket and information booths, baggage rooms, a large restaurant and lunch counter, news-stands and similar facilities. Provision has been made for mail, express, and freight handling with offices for immigration, customs and public health officials controlling all incoming passengers from foreign ports. The passengers go down separate ramps to an underground passage leading to a star-shaped structure at the edge of the flying field, where telescopic steel tunnels may be extended out on short tracks to reach the doors of arriving or departing planes. The purpose of this arrangement is to keep the passengers protected from the weather at all times, and also to keep them away from revolving propellers on the planes and to absolutely control their access to the flying field itself. Thus provision has been made for the safety of passengers and planes, which is further enhanced by arranging the runways on the flying field so that planes may take off in the proper direction under any wind condition. These runways are joined by narrower taxi strips and a broad semi-circular apron, which give access to either end of each runway, thus preventing any interference with planes that are arriving or departing. The hangars, service shops, fire station and other field facilities are grouped along the semi-circular edge of the field. The triangular parking area on either side of the approach plaza is developed for the benefit of visitors, patrons and the neighboring community, with a small hotel, playground, swimming pool, stores, shops and room for such other features as many subsequently prove desirable. Care has been taken to make the entire port attractive from the air as well as from the ground.

The second prize design, submitted by C. Gifford Rich, of Chicago, makes similar provision for the comfort and protection of passengers and visitors to the port. The main passenger terminal, of modernistic design, has great shed-like wings under which arriving and departing planes may stop and where passengers are protected during inclement weather. An entrance plaza with appropriate public buildings, including a hotel, stores, salesrooms for airplanes and automobiles, and recreational facilities, connects the passenger terminal with the main highways intersecting near the airport. The field itself is equipped with four landing runways crossing one another near the terminal buildings and connected near their ends by a narrower taxi runway of circular shape.

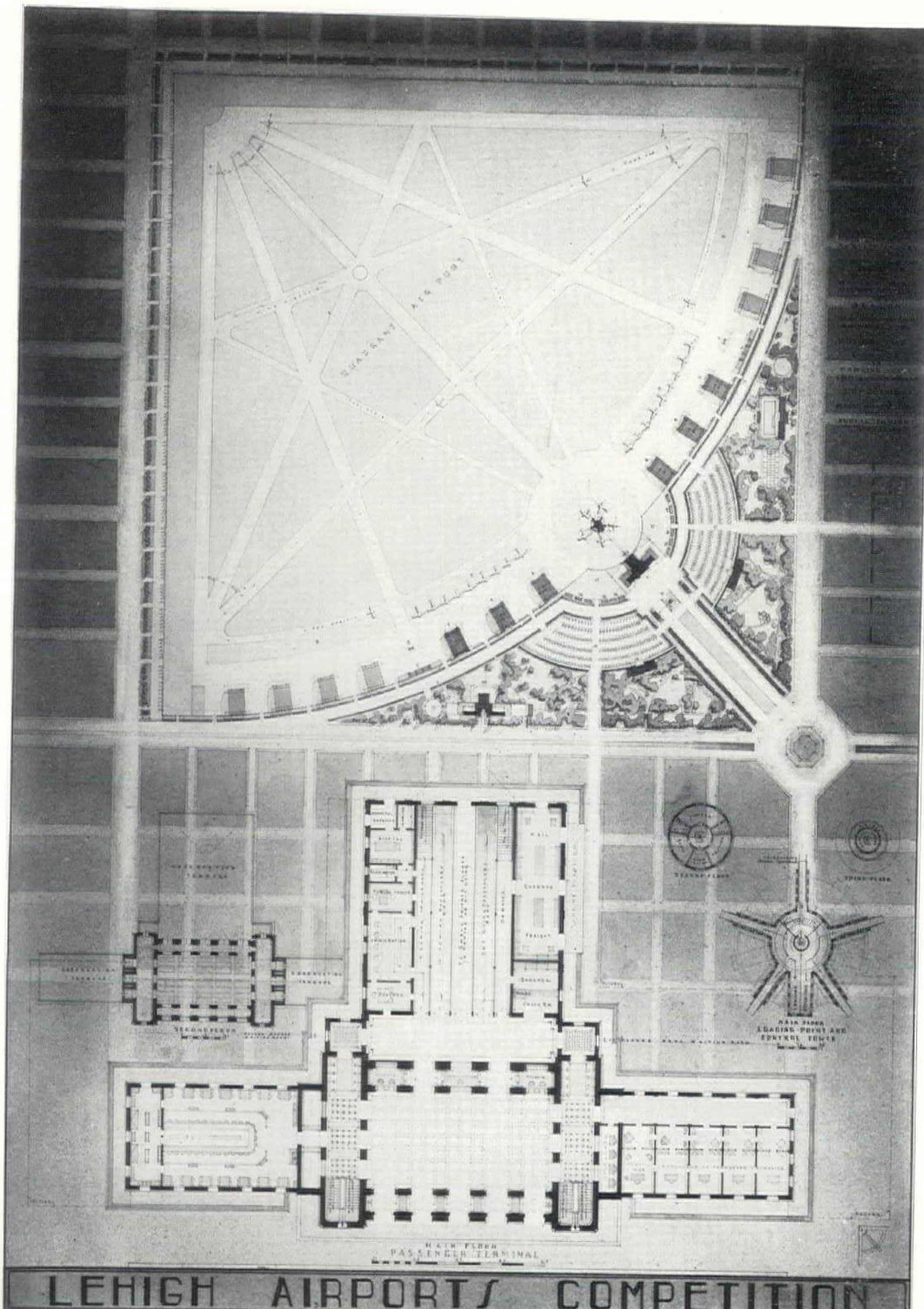
The third prize design, submitted by Odd Nansen of East Orange, N. J., and Latham C. Squire of New York, employs a rectangular flying field with the major terminal buildings arranged along one side adjacent to a future park and plaza, which would be developed as traffic and business conditions may require. The plaza would contain its own railway terminal with underground approaches, a hotel, fair grounds, grand stand, stores, shops and other appropriate business and recreational facilities.

The fourth prize design, by Will Rice Amon of New York, is based on a circular flying field with parallel runways crossing the field in four directions and separating incoming and departing planes. A modernistic main terminal building, with covered wings for loading and unloading passengers, is placed at the edge of the field and facing a plaza surrounded by stores, shops and a hotel.

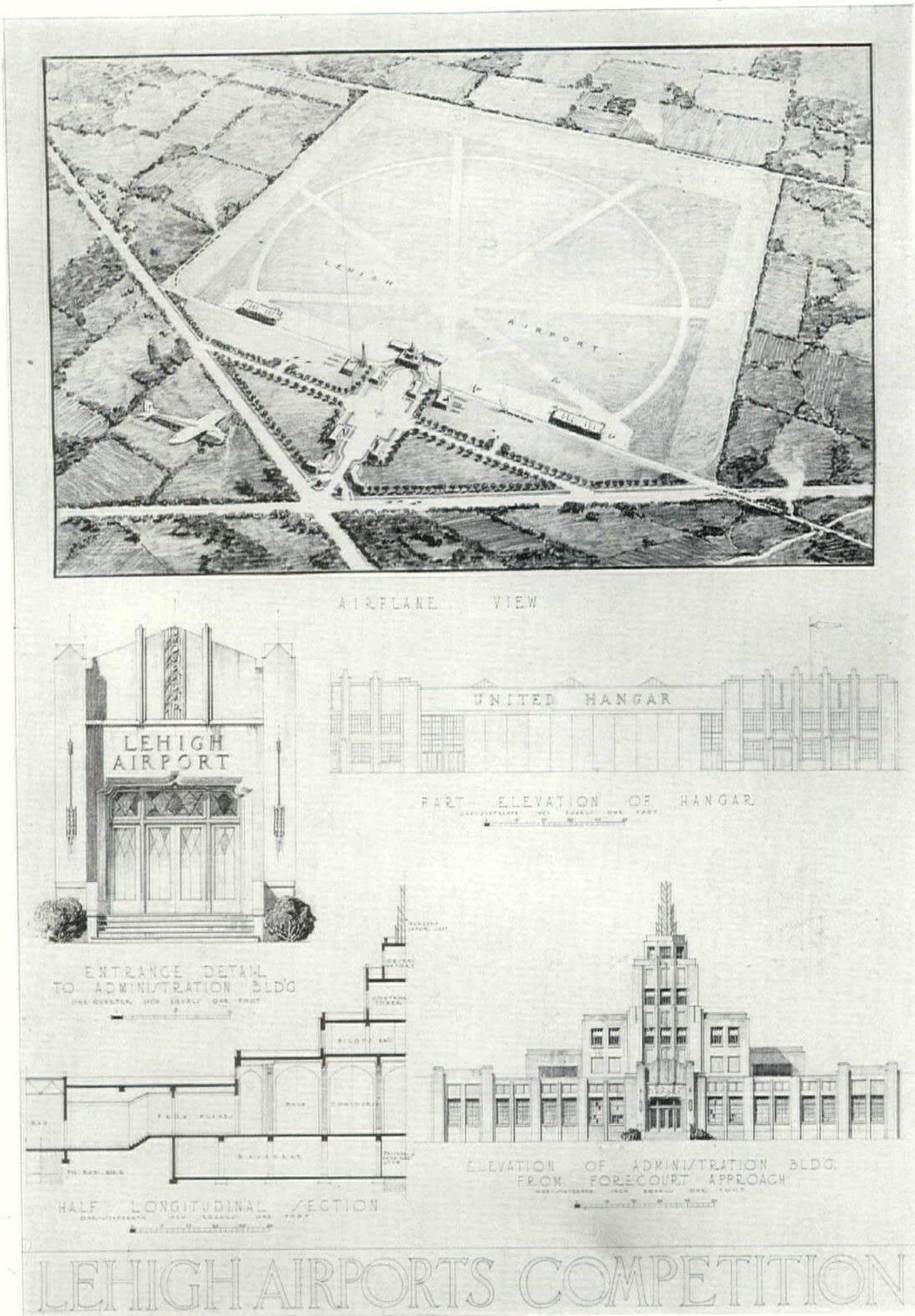


FIRST PRIZE, AWARDED TO A. C. ZIMMERMAN AND WILLIAM H. HARRISON, ARCHITECTS, LOS ANGELES

This design concentrates all of the buildings at one corner of a rectangular field, leaving a quadrant-shaped flying area with appropriate runways andtaxi strips. A fine passenger terminal building with underground access to loading and unloading points is flanked by hangars at the edge of the flying area, with automobile parking spaces, a hotel, recreation building, shops, and amusement concessions arranged in a triangular park

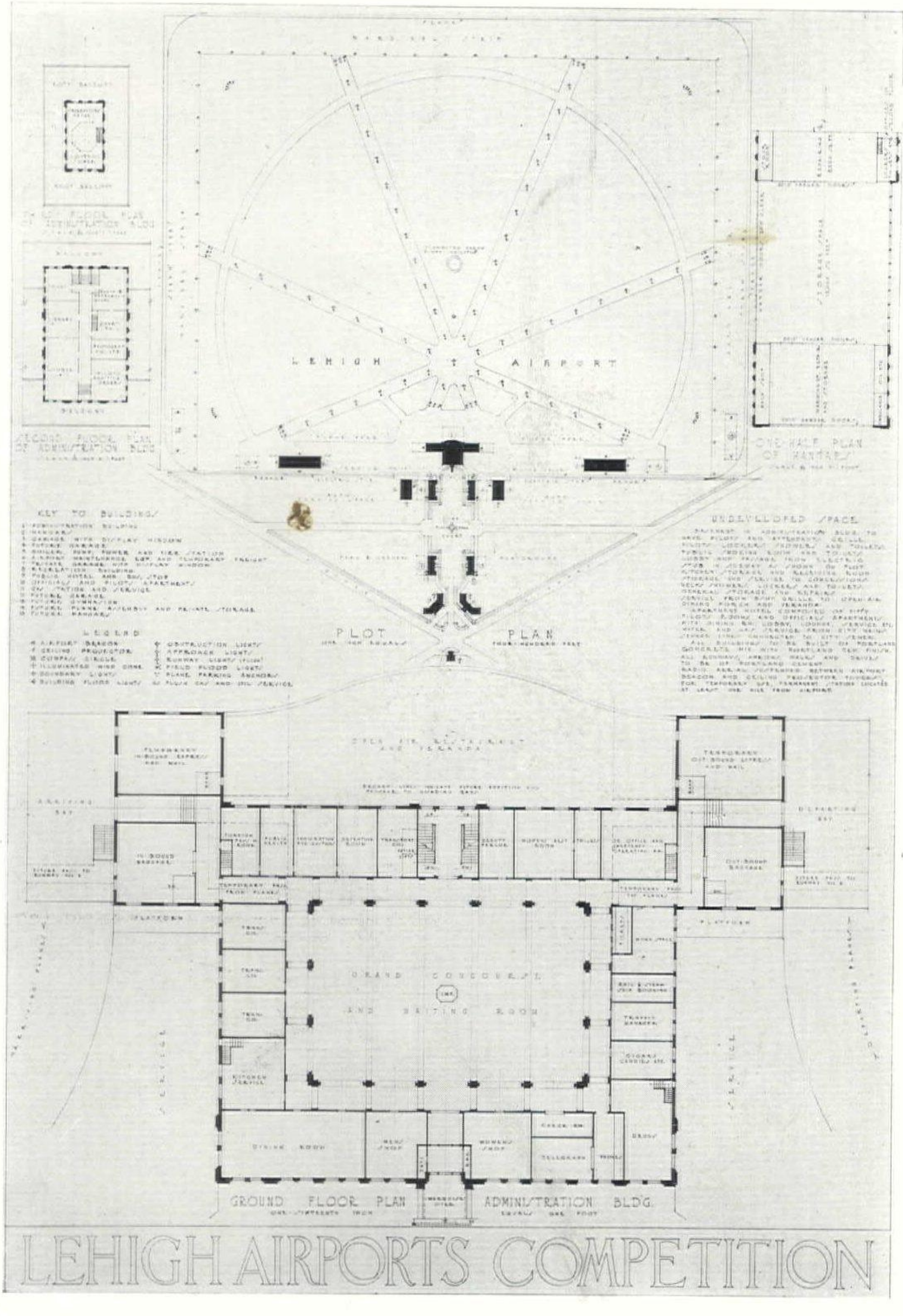


Plan of the first prize design, submitted by A. C. Zimmerman and William H. Harrison, Architects, Los Angeles. Special features are the quadrant shape of the flying field and the arrangement of the runways and taxi strips; the star-shaped loading and unloading point and control tower with underground access for passengers from the main terminal building, and the well studied layout of the passenger terminal itself with every facility for the care of passengers, officials and pilots

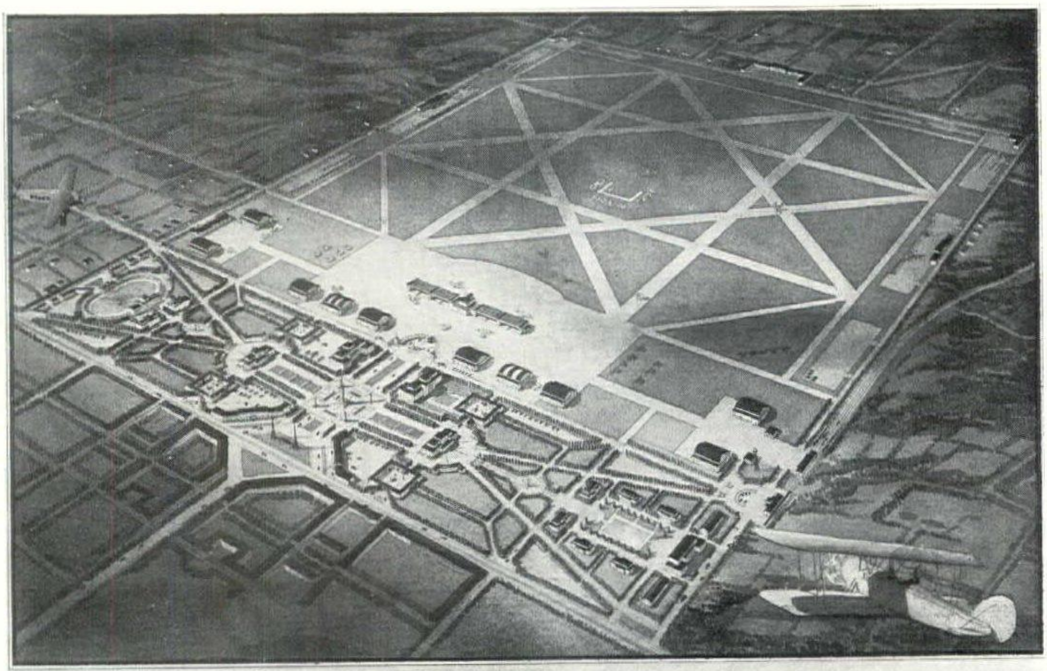


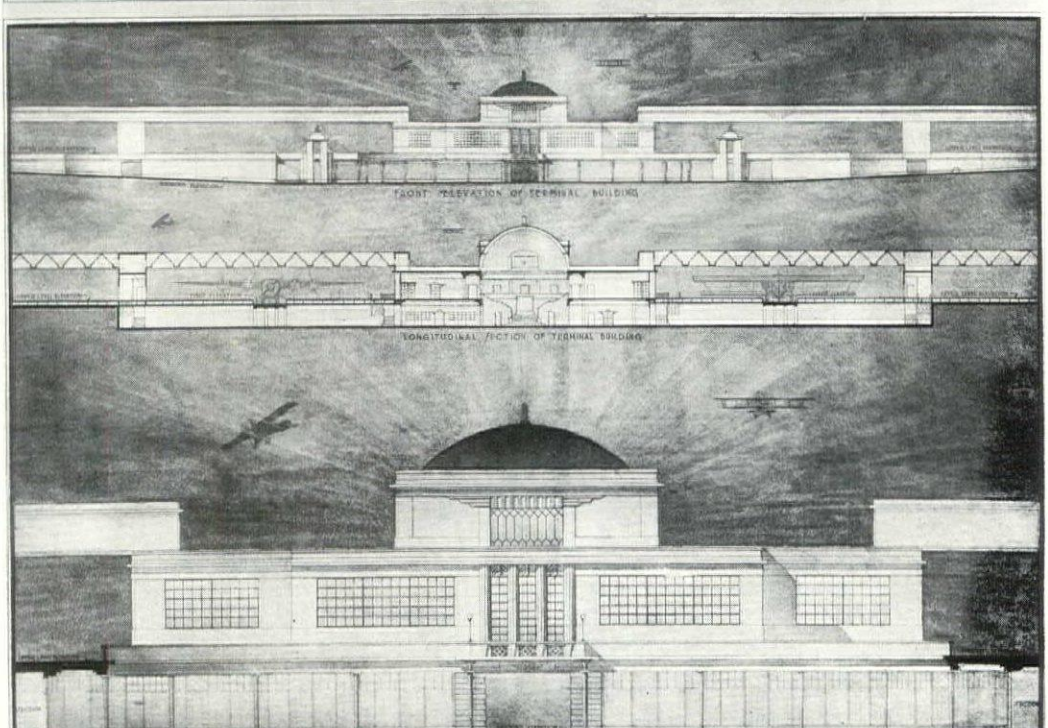
SECOND PRIZE, AWARDED TO C. GIFFORD RICH, CHICAGO

The plan calls for a rectangular flying field with all buildings grouped along one side in a triangular area formed by adjacent boulevards. The runways of the flying field are connected near their ends by a circular taxiing strip. The passenger terminal building has wing-shaped, covered loading and unloading platforms at either side and is crowned with a lighted pinnacle of modernistic design. Other essential buildings include a small hotel, stores, shops, a recreation building, and concessions. These are arranged around a plaza with ample parking space for automobiles



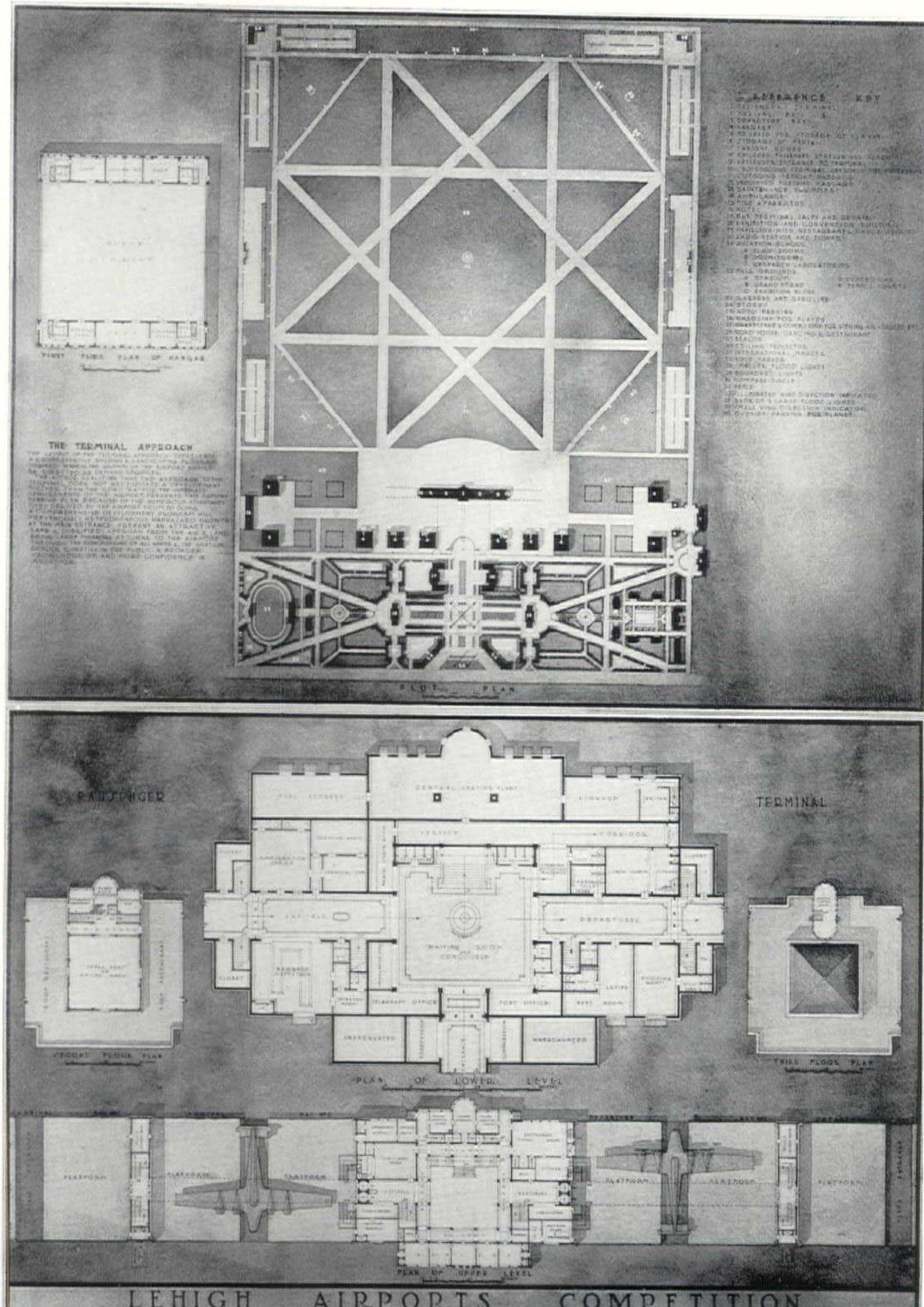
Plan of the second prize design, submitted by C. Gifford Rich, of Chicago. Radial runways with submerged lights along their center lines and a circular taxi strip feature the layout of the flying field. A passenger terminal contains all facilities of a modern railroad station on the ground floor, rooms for pilots, radio and meteorological station on the second floor, with observation room and control tower above. Hangars are arranged in two groups of three units, each with a continuous roof covering space between units to provide extra covered storage area



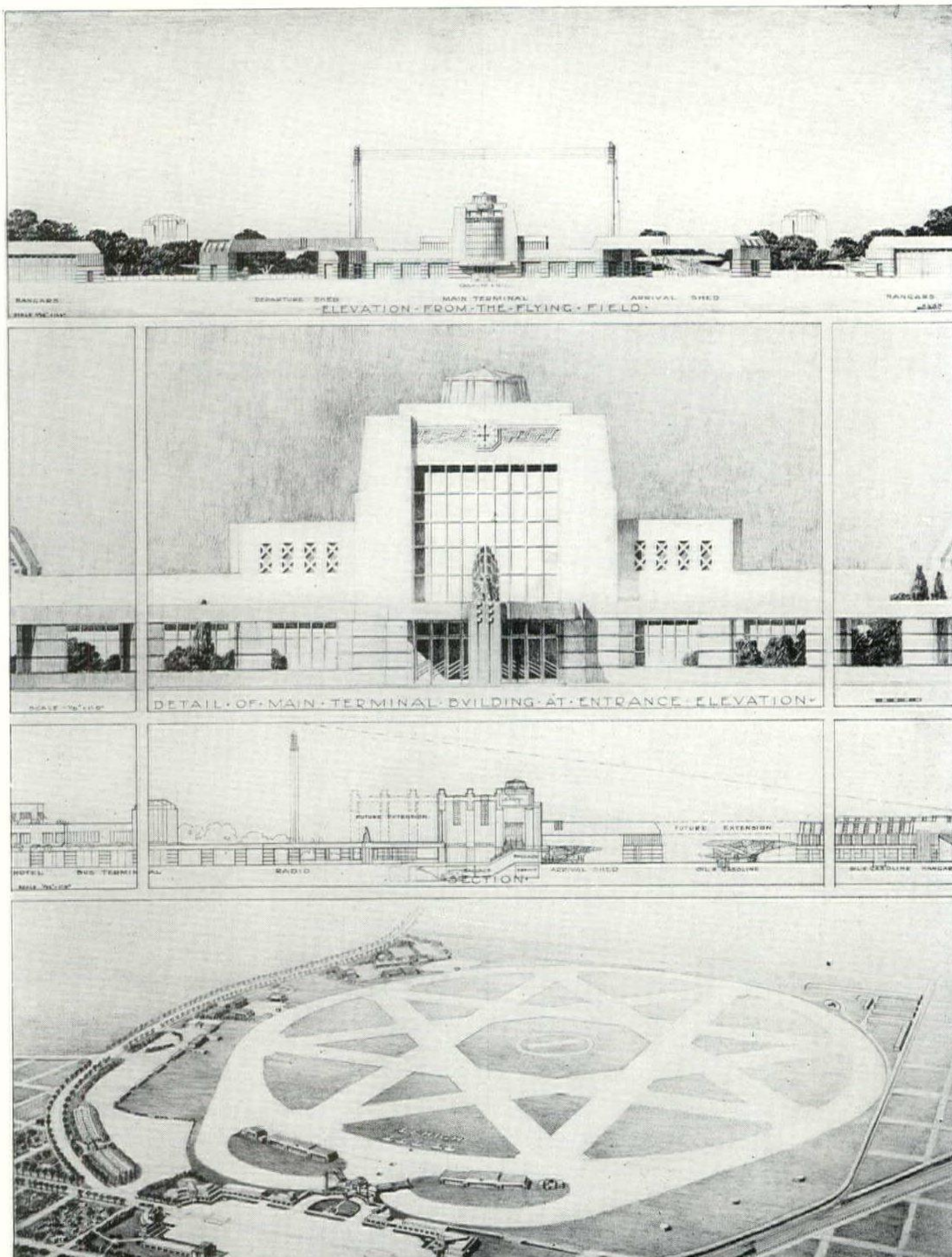


THIRD PRIZE, AWARDED JOINTLY TO ODD NANSEN, EAST ORANGE, N. J., AND LATHAM C. SQUIRE, NEW YORK

This plan employs a rectangular flying field with the major terminal buildings arranged along one side adjacent to a future park and plaza which will be developed as traffic and business conditions require. The plaza will contain its own railway terminal with underground approaches, a hotel, fair grounds, grand stand, stores, shops, and other appropriate business and recreational facilities. The airport passenger terminal has two sets of covered docks for incoming and outgoing planes which flank either side of the central waiting rooms

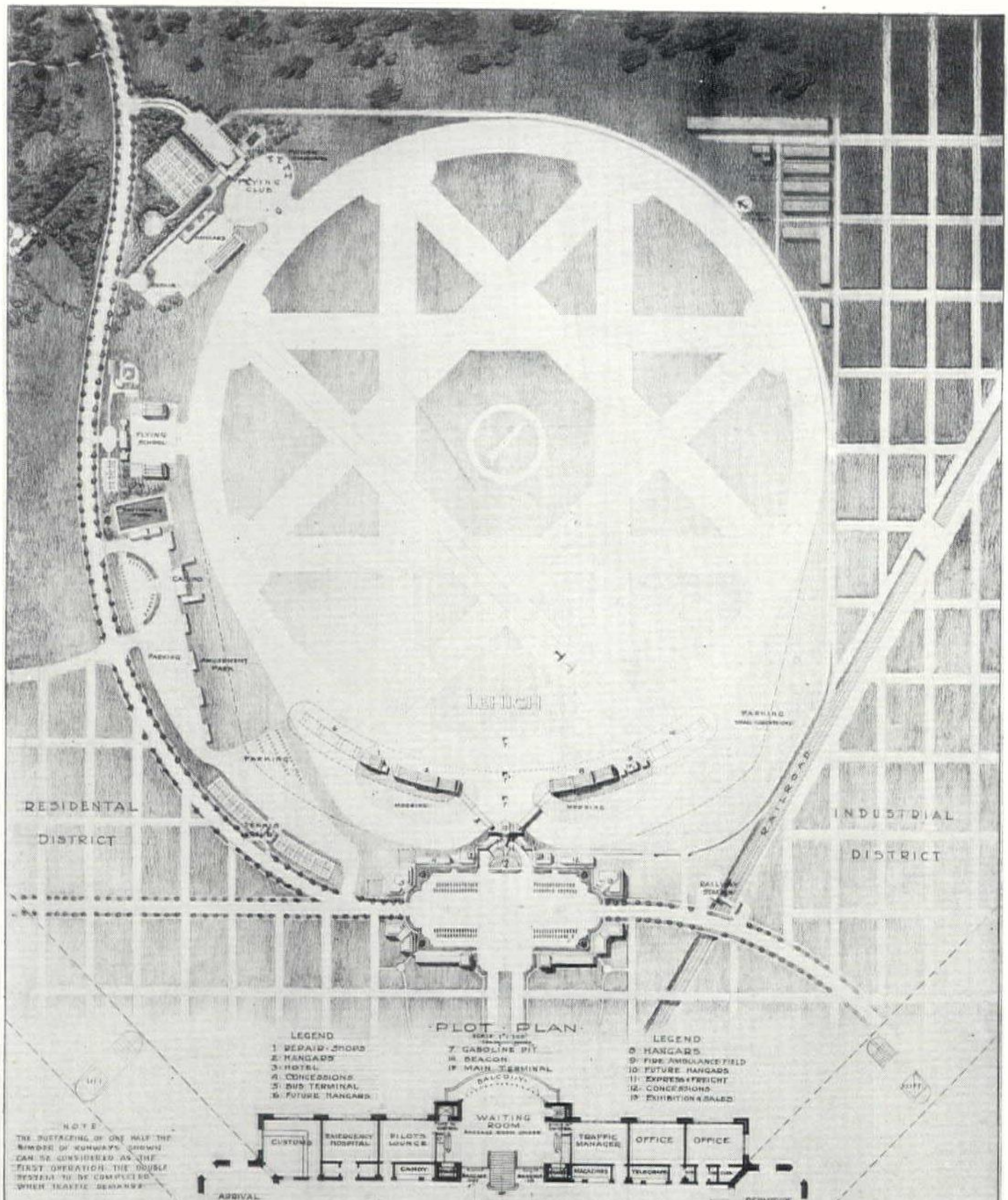


Plan of the third prize design, submitted by Odd Nansen, East Orange, N. J., and Latham C. Squire, New York. Features double runways to segregate planes landing and taking off. Approach to the passenger terminal is underground from the entrance plaza, while loading and unloading docks are at the field level, giving positive control of passengers to the flying area. Third floor provides an observation waiting room with roof restaurant. The designers have planned the development of the entrance plaza so that it may be made a subsequent development as conditions require

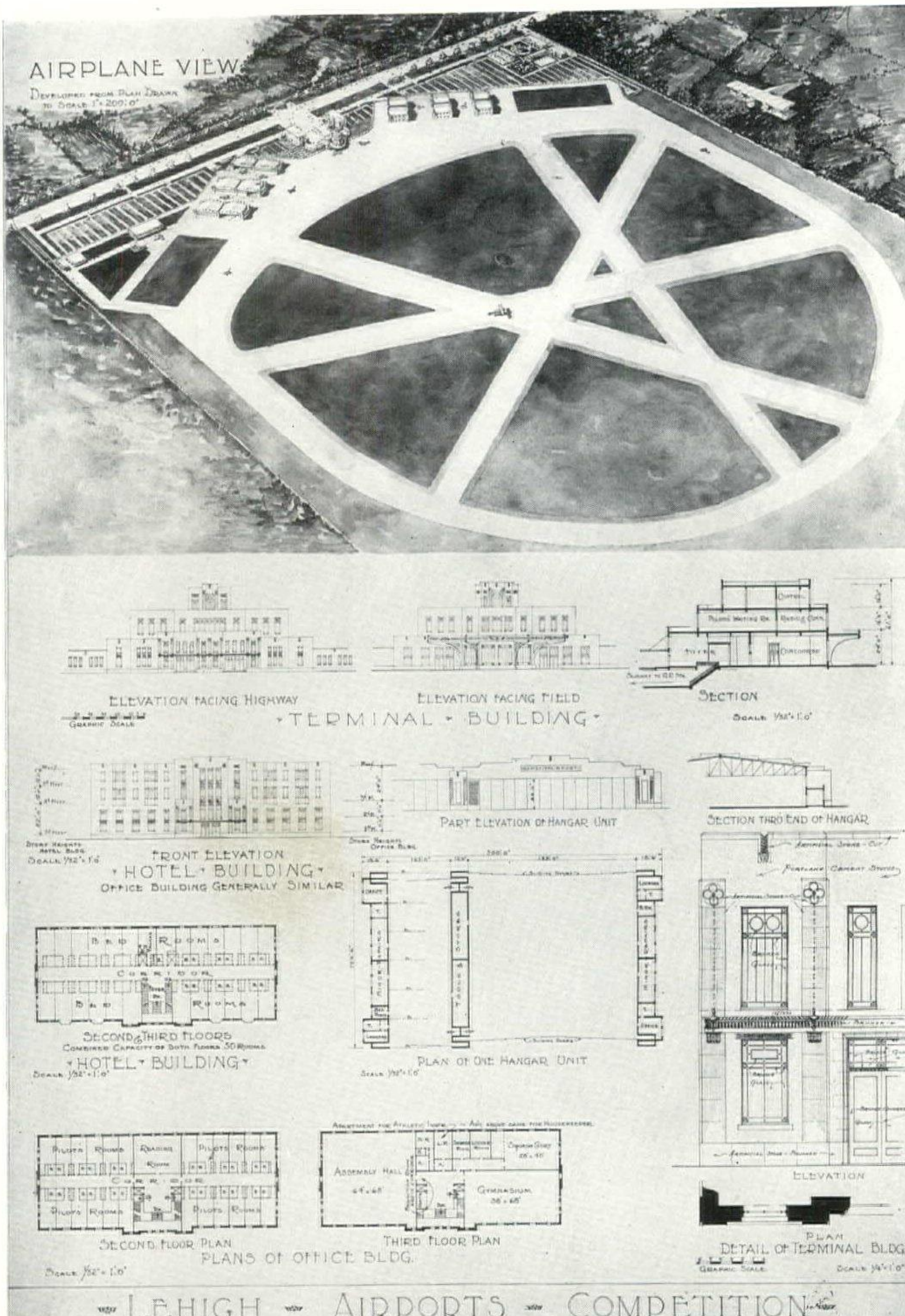


FOURTH PRIZE, AWARDED TO WILL RICE AMON, ARCHITECT, NEW YORK

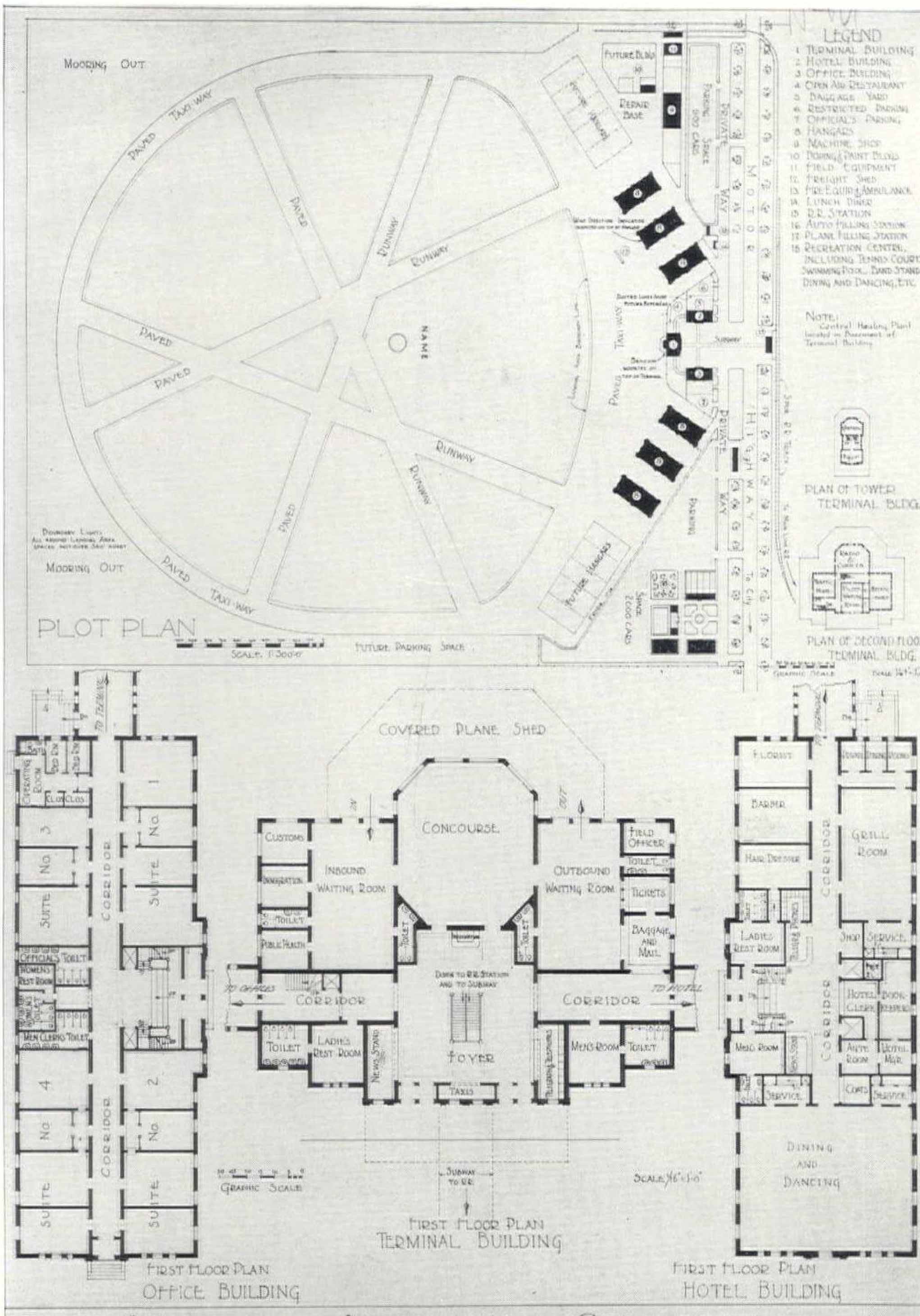
The designer has adopted a circular flying field with parallel runways crossing the field in four directions and separating incoming and departing planes. A modernistic main terminal building, with covered wings for loading and unloading passengers, is placed at the edge of the field facing a plaza surrounded by stores, shops, a hotel, and other structures serving the needs of a busy airport



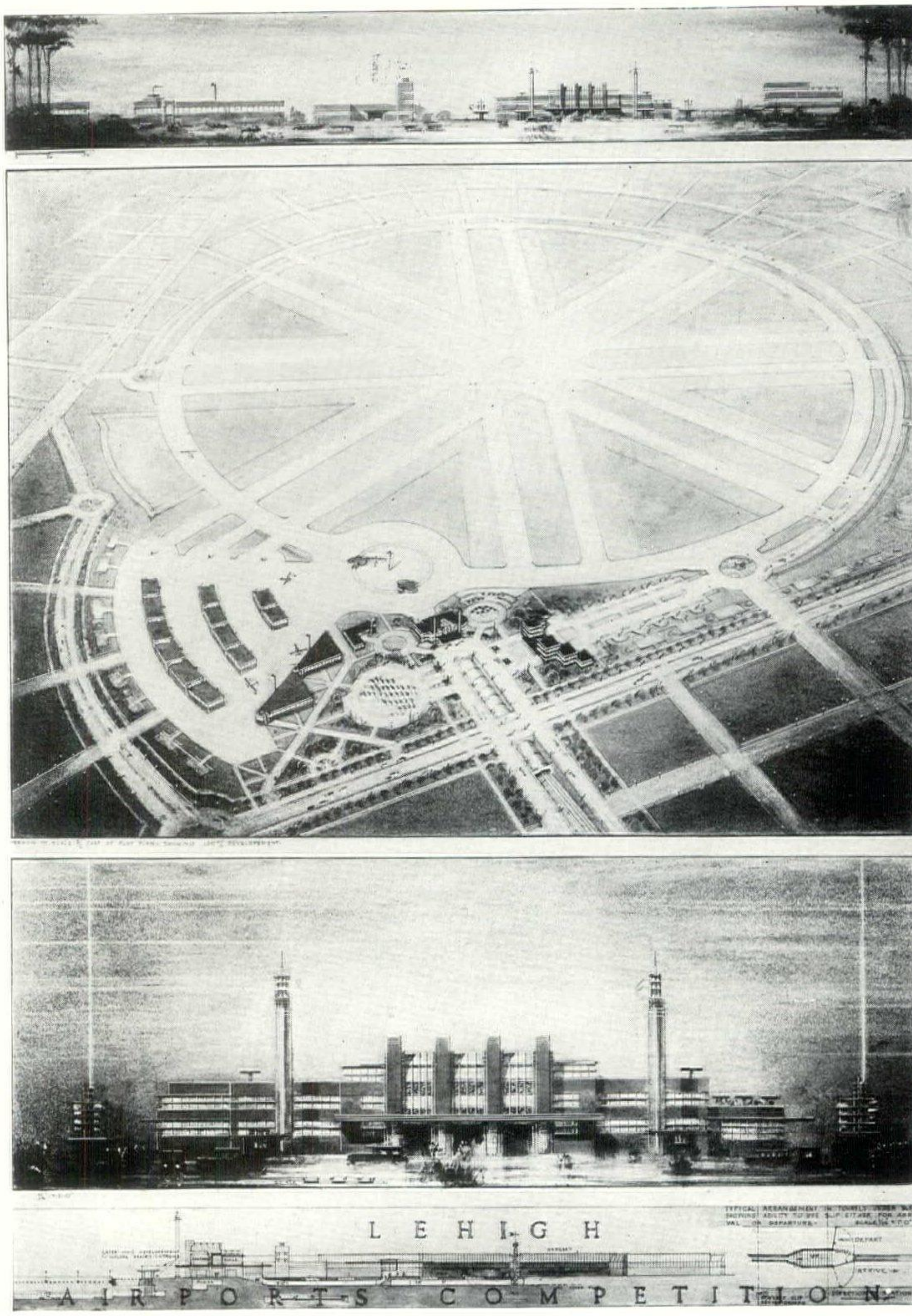
Plan of fourth prize design, submitted by Will Rice Amon, Architect, New York. The main flying field is of circular shape with parallel runways in four directions to segregate arriving and departing planes. Border of field paved as a broad taxi strip. Space around edges of field devoted to a separate flying club, flying school, amusement park and industrial group. Diagonal wings from the passenger terminal building provide covered approaches to arriving and departing planes. Public plaza in front of passenger terminal provides parking area for automobiles and is surrounded by public buildings, including a hotel, exhibition and sales building, stores, shops and related structures



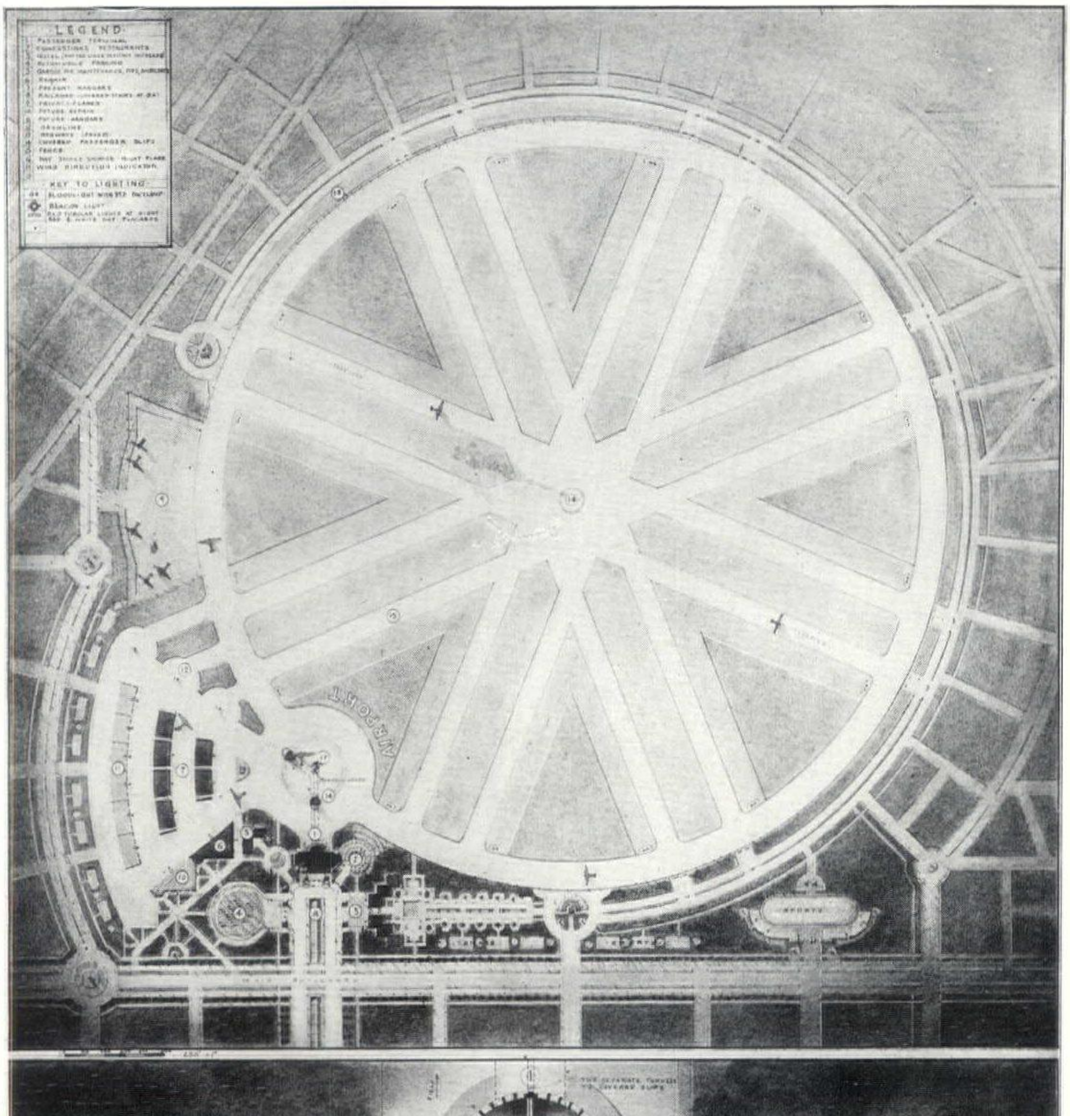
Honorable mention awarded to James S. Nussear, Jr., Architect, and William N. S. Pugh, Associate, of Baltimore. The flying field, with its irregularly disposed runways, is bordered by a broad taxi strip by means of which the planes reach the terminal building. This structure, of modernistic design, has a covered loading and unloading shed and is flanked on either side by hangars so arranged that planes may use doors on either side of each building



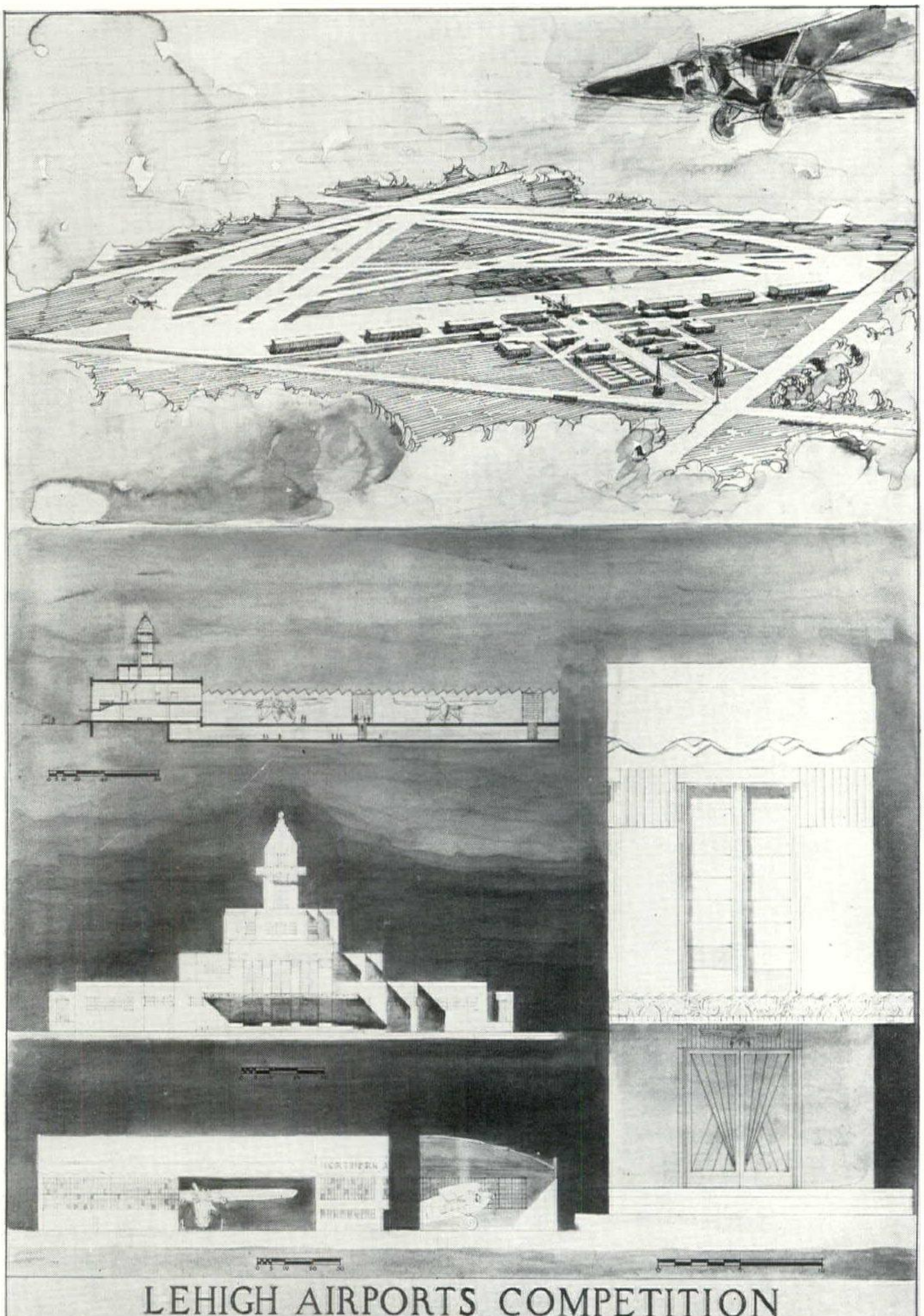
This design, submitted by James S. Nussear, Jr., Architect, and William N. S. Pugh, Associate, of Baltimore, shows that ample provision is made for parking several thousand automobiles, and there is an underground approach to an adjacent railroad station



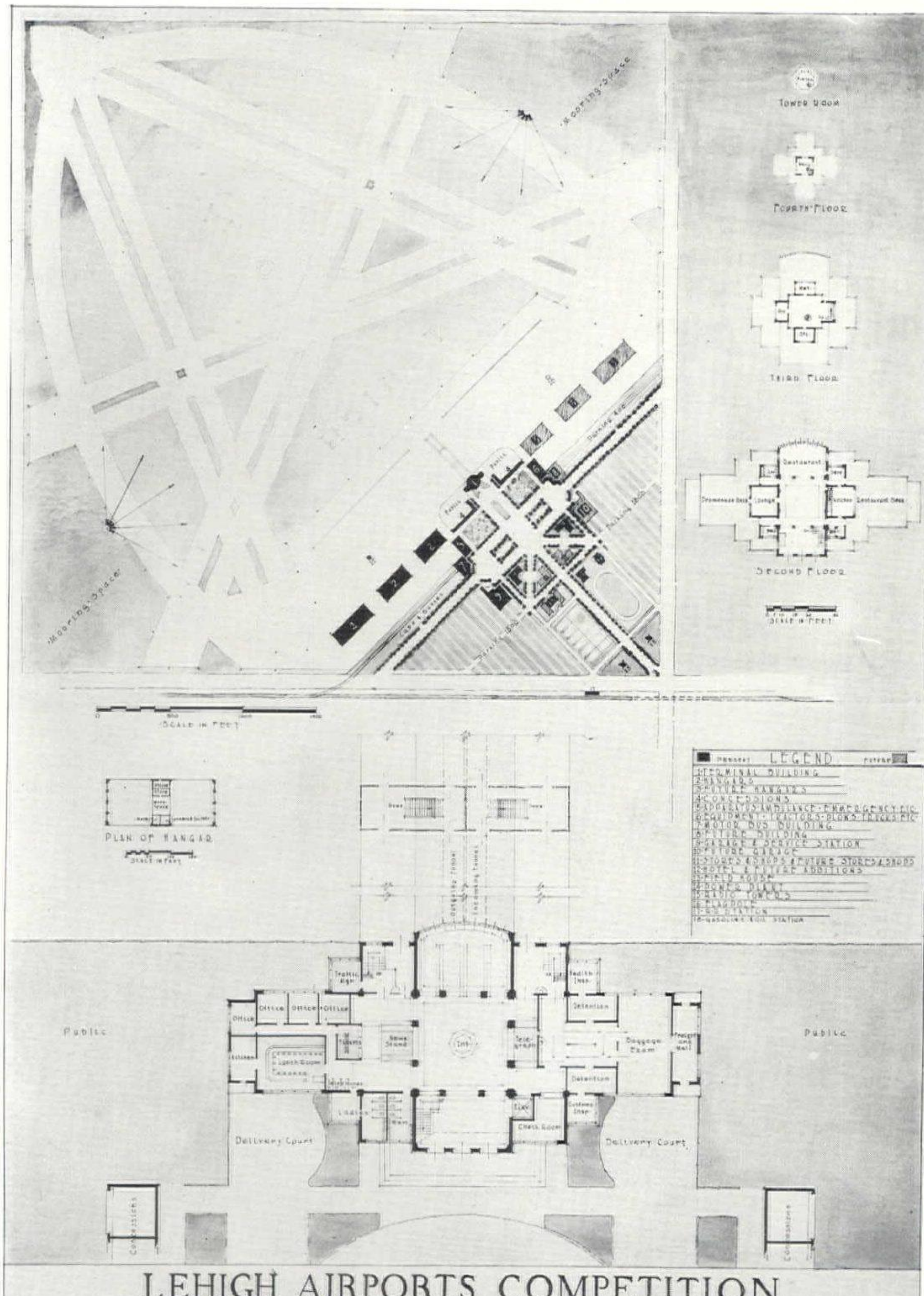
Honorable mention awarded to Robert Paul Schweikher, of Denver, for this design of an ideal airport to serve a typical American city. The design employs a circular flying area having parallel runways for segregating arriving and departing planes with a separate roadway bordering the field which gives the public access to the rim, but not to the field itself



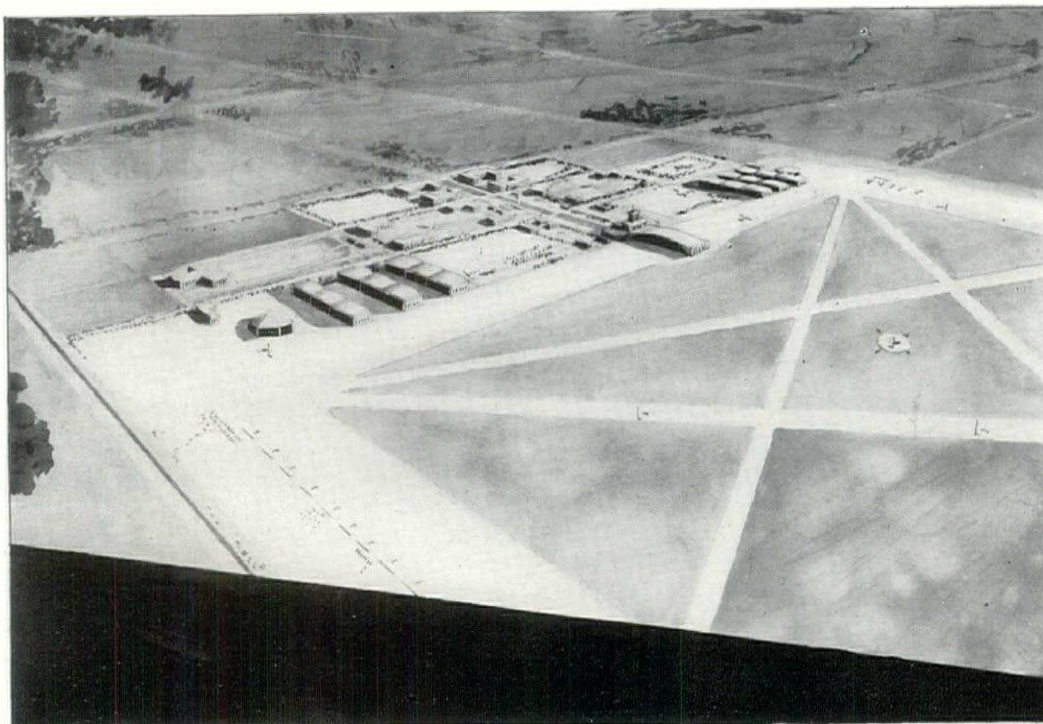
This design, submitted by Robert Paul Schweikher, Denver, shows a circular flying field. The main passenger terminal of modernistic design, provides underground passage ways to loading and unloading slips which are so located as to give easy access for the planes to a large group of hangars. The radio and signal towers adjacent to the terminal are so placed as not to interfere with the use of any runway. Other buildings include a hotel with its private gardens and outdoor restaurant, public playground and stadium, and a group of service buildings for the maintenance and care of transport planes

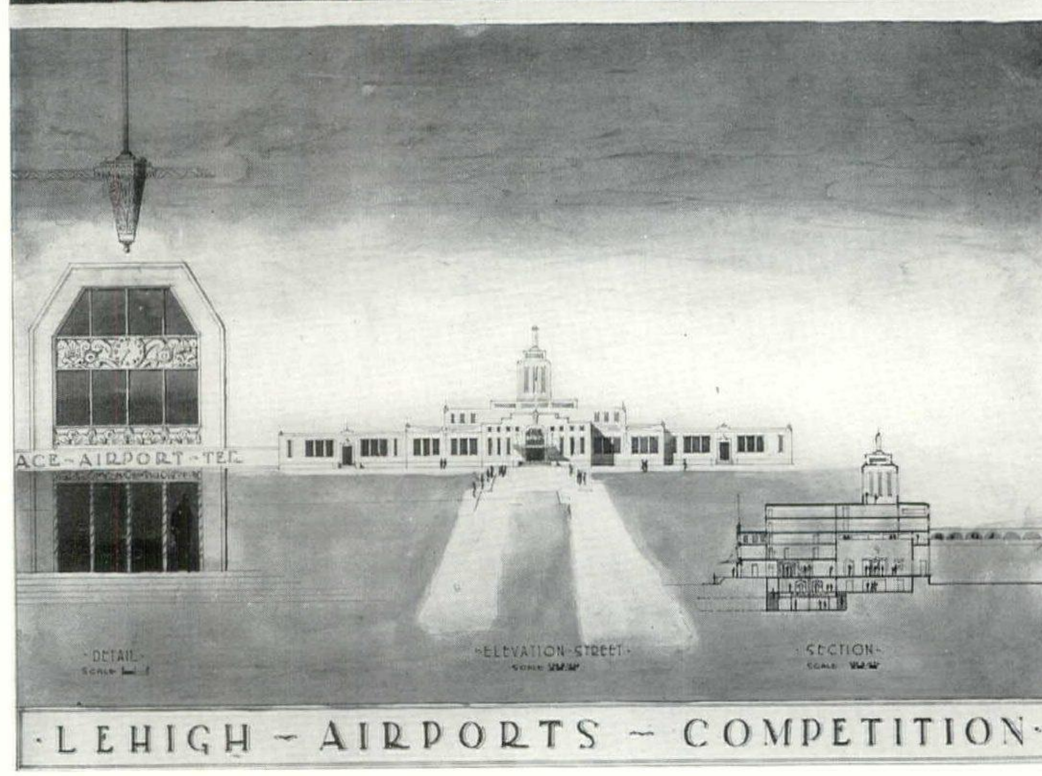


Honorable mention awarded jointly to Fred E. Sloan and Elmer A. Johnson, of Chicago, for this design which features a simple arrangement of a passenger terminal flanked by hangars on either side. These buildings are grouped at one corner of the field where there is an imposing entrance plaza and parking spaces for several thousand automobiles

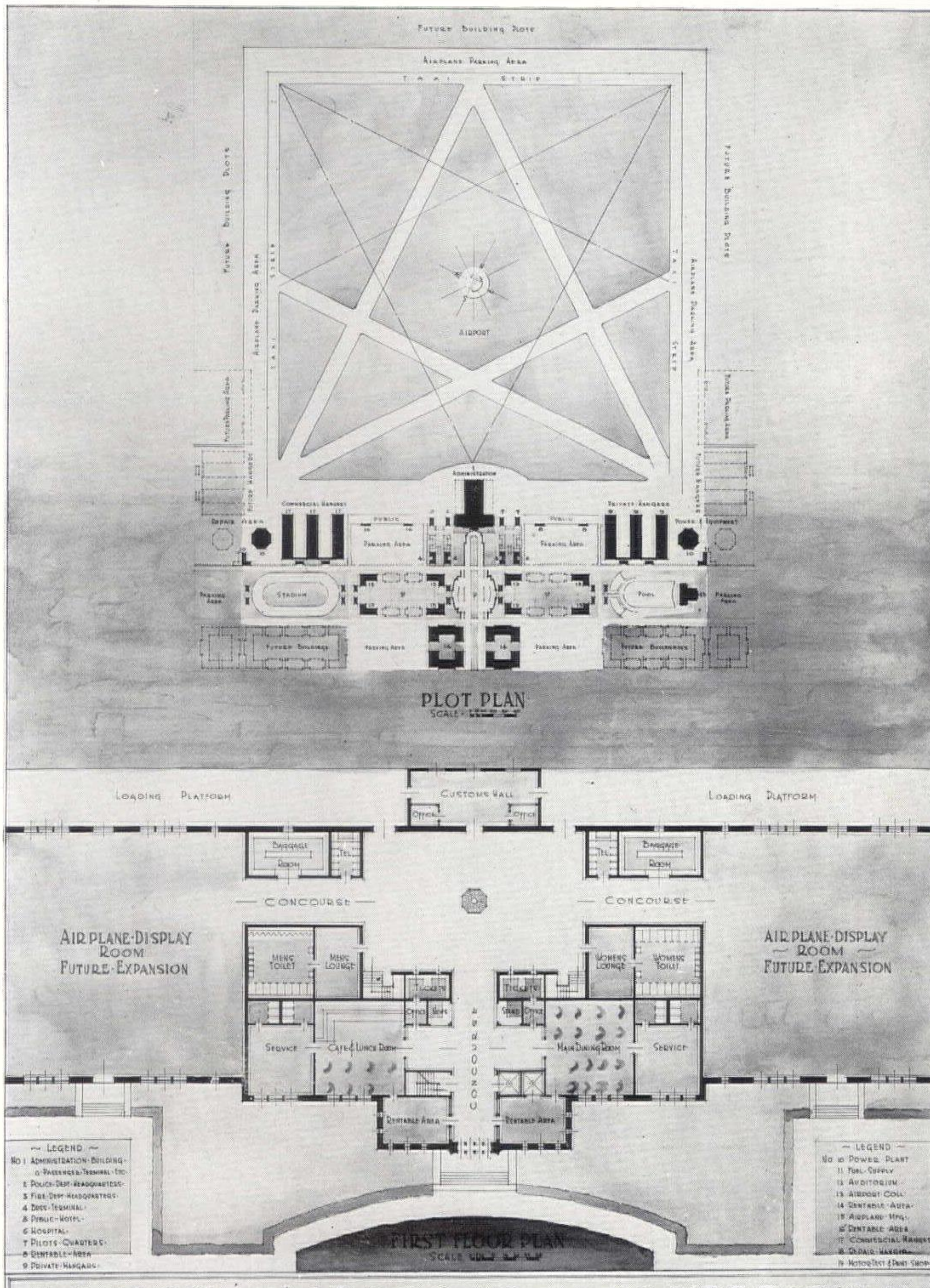


This design, submitted by Fred F. Sloan and Elmer A. Johnson, of Chicago, shows a layout of the flying field which provides four double runways joined near their ends by curved taxi strips

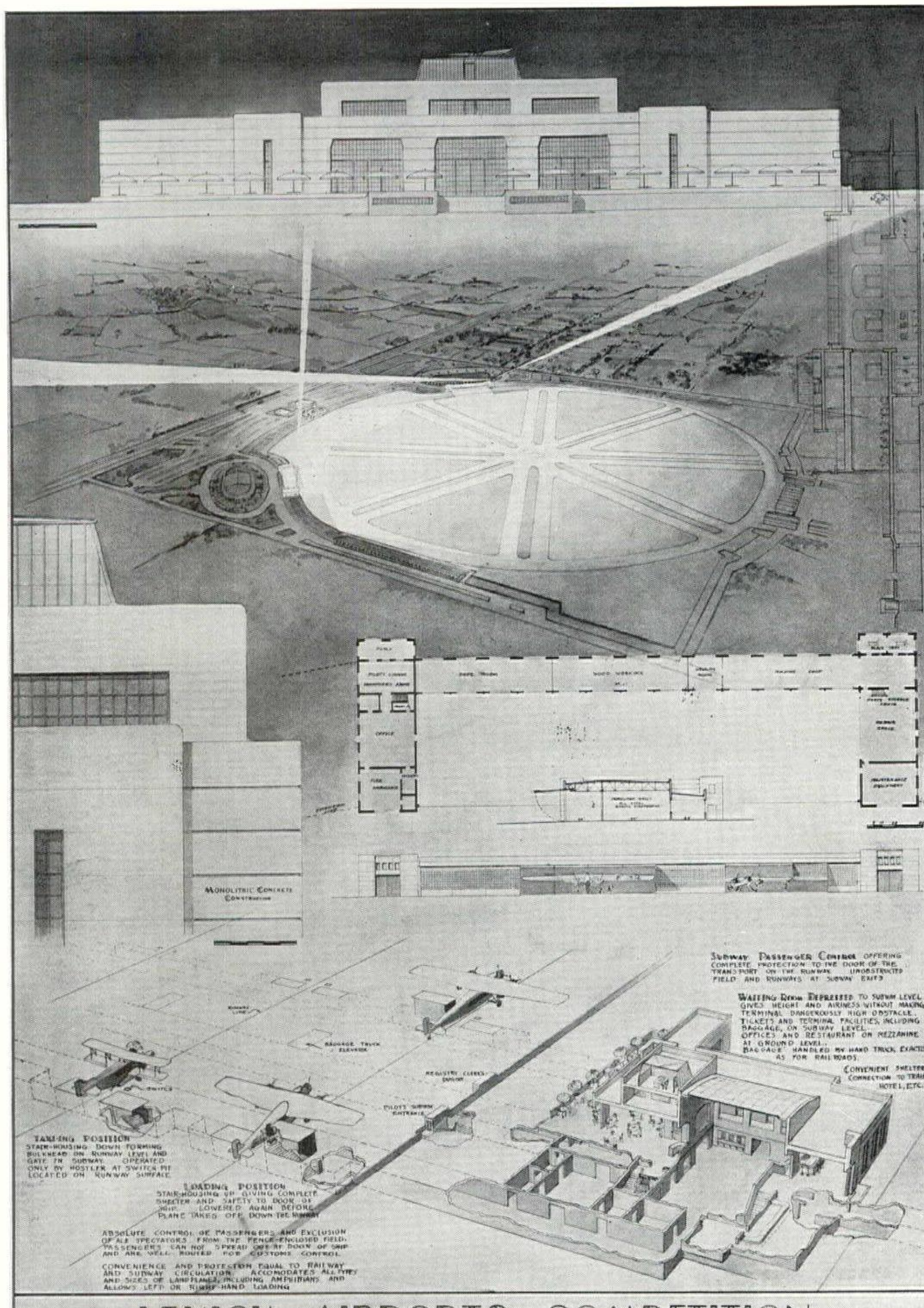




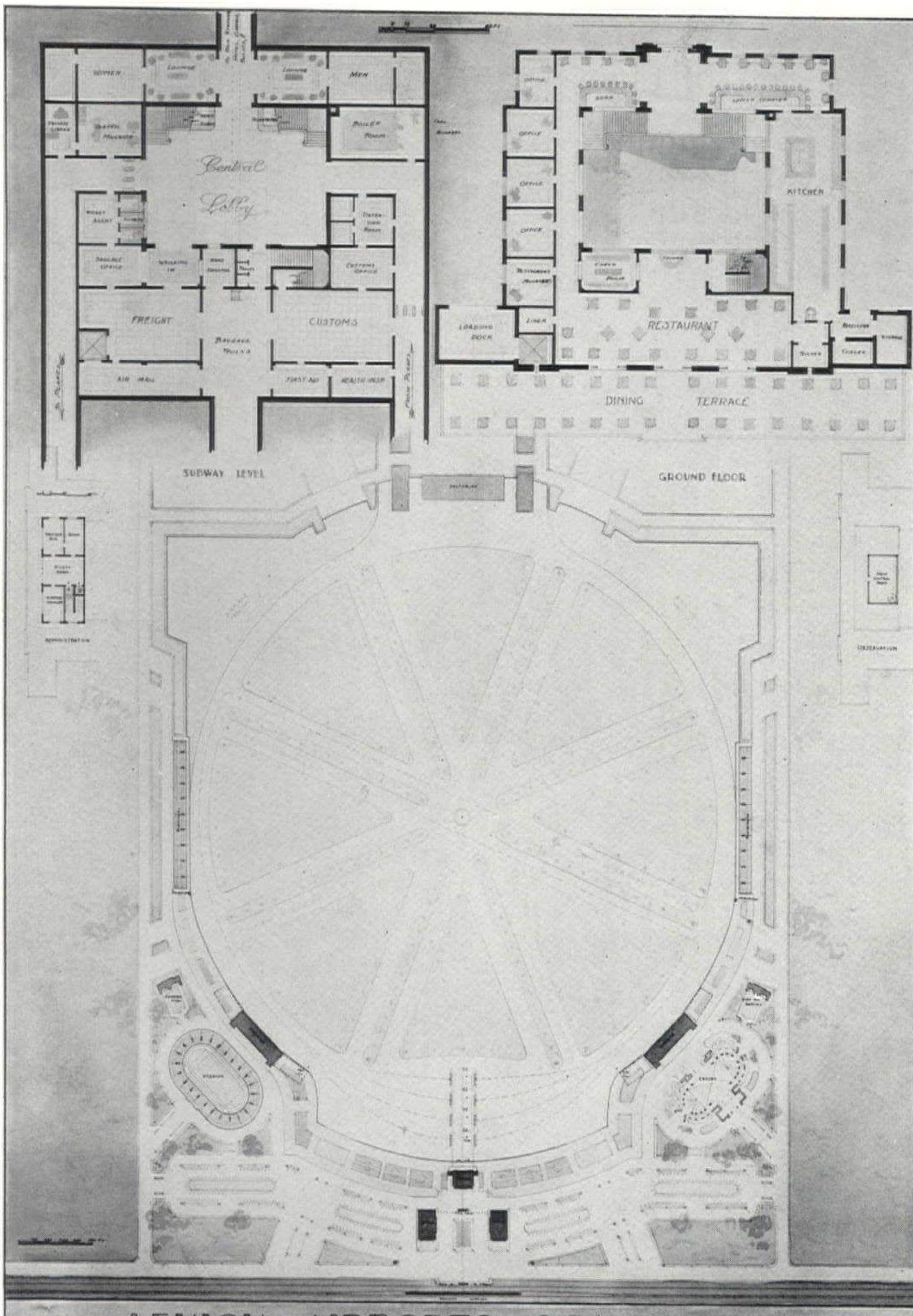
Honorable mention awarded to Lloyd N. F. Spicer, of Bayside, N. Y., for this design of a modern airport which features a rectangular field in which special provision has been made for automobile parking and public observation of flying activities. The runways indicated in the design are for take-off purposes only, and by reversing the pattern of the field, additional runways can be added which parallel the original group



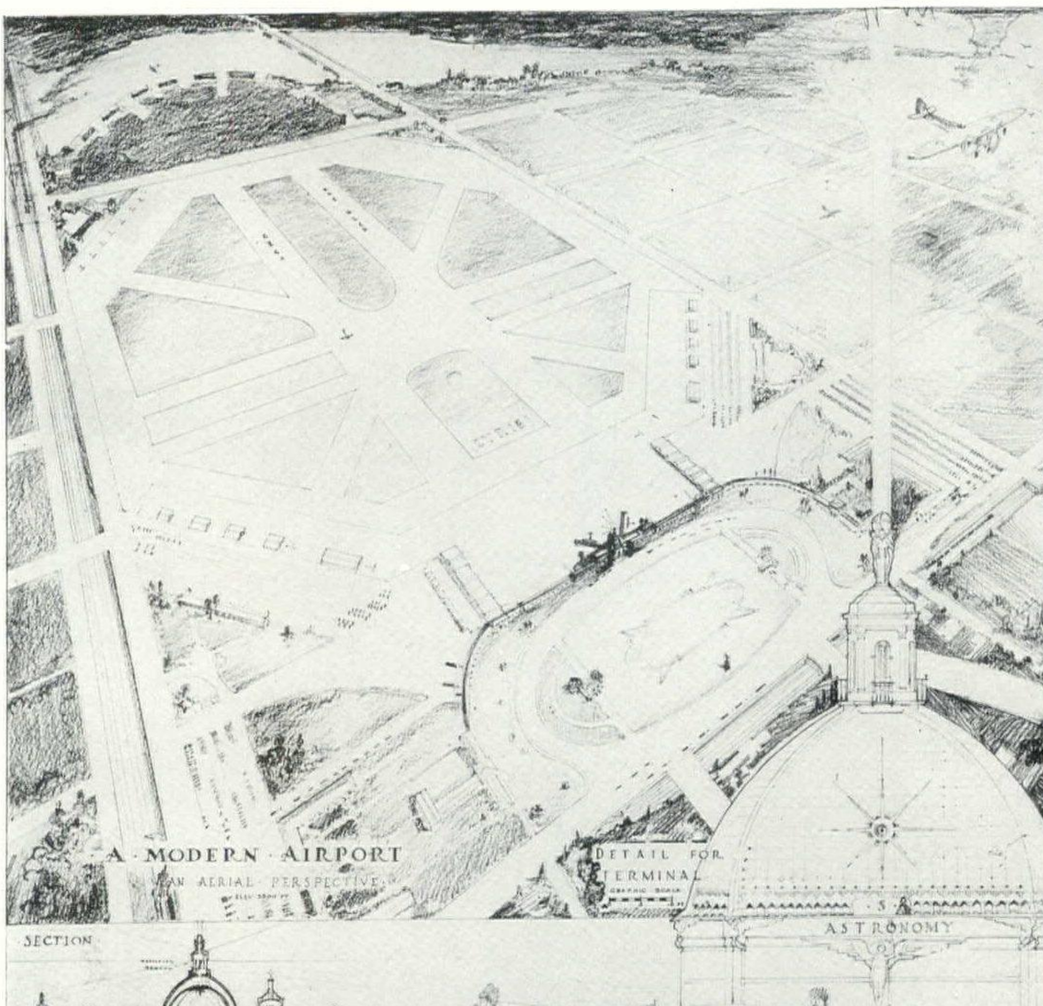
Plan submitted by Lloyd N. F. Spicer, Bayside, N. Y. The passenger terminal and administration building provide a great covered loading and unloading station which spans the marginal apron. Private and commercial hangars are grouped at a considerable distance at either side of the terminal with large public parking area between. Similarly, the border of the field is paved for parking of automobiles and aëroplanes to care for the great crowds that daily visit active airports. All other buildings are grouped around an approach plaza outside of the main flying field



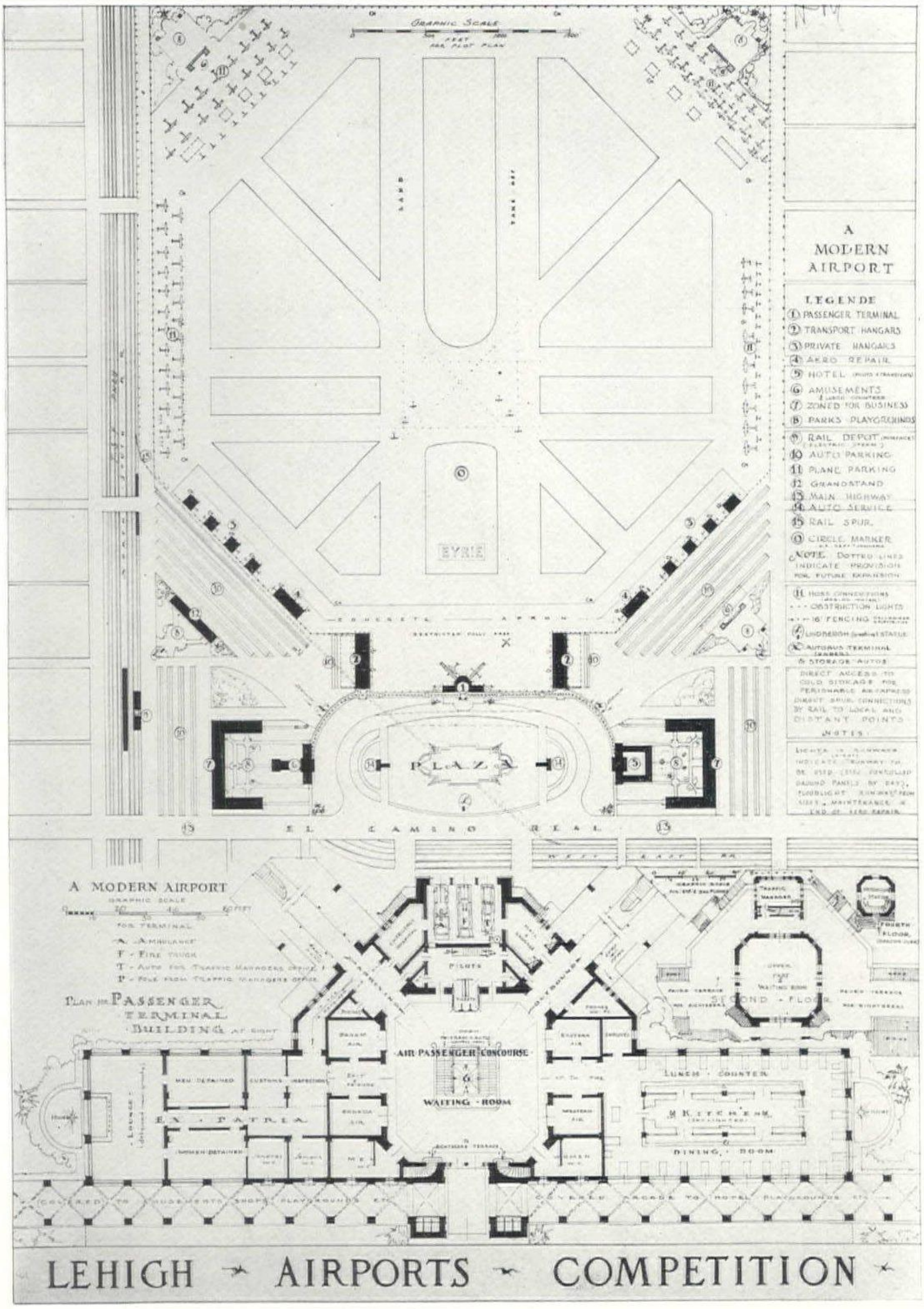
Honorable mention awarded to Edwin M. Stitt, of Pittsburgh, shows this highly developed airport plan which suggests some totally new methods of safeguarding passengers and planes, for which patent applications are being made. The circular flying area with its double runways to segregate arriving and departing planes has a very broad strip adjacent to the passenger terminal with underground access from the terminal to the planes. At each loading and unloading point canopies, that are normally flush with the field surface, are lifted by elevator mechanism to reveal staircases leading directly to the plane doors



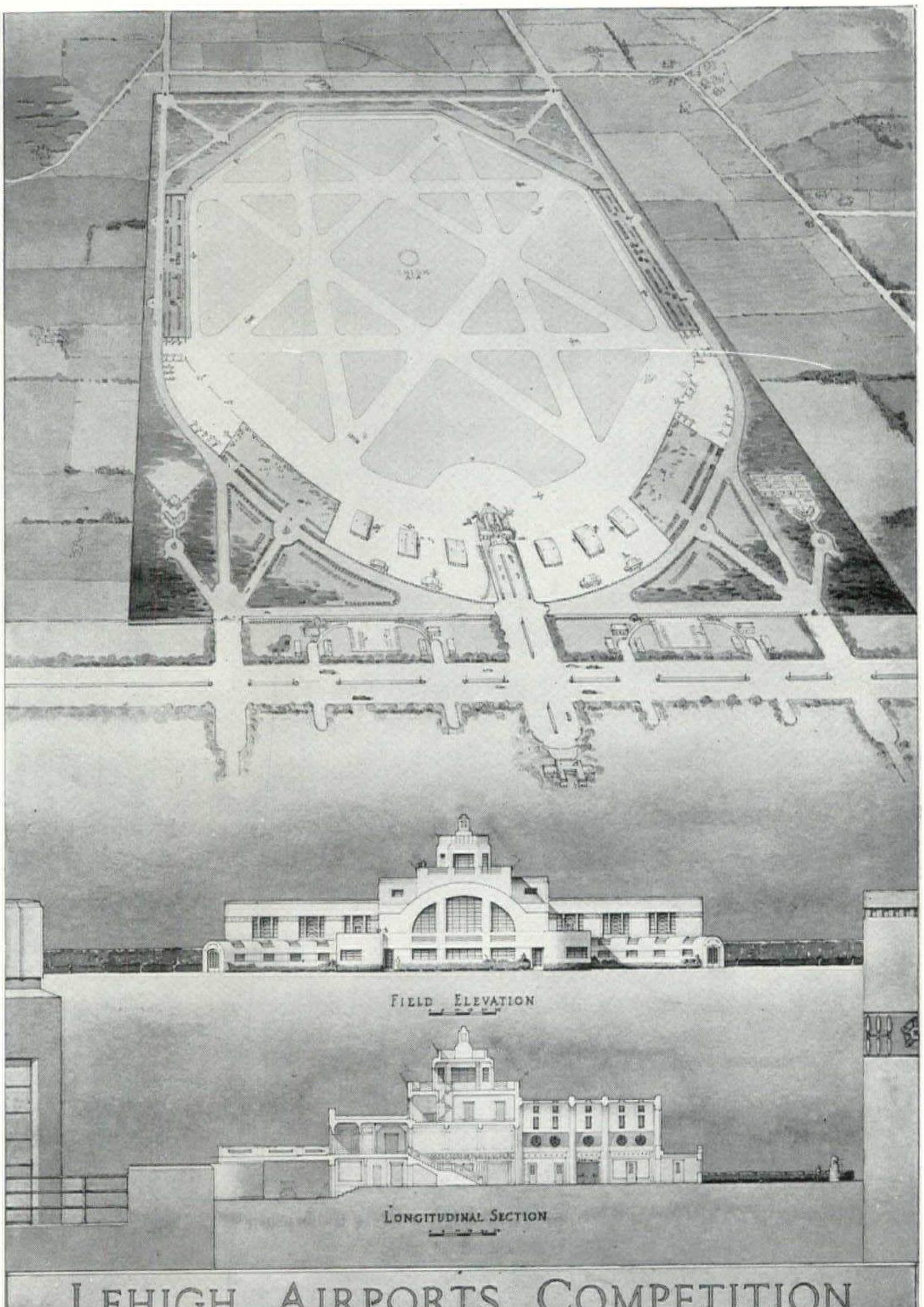
This design was submitted by Edwin M. Stitt, Pittsburgh. The main passenger concourse is on the lower level, giving added height without requiring a tall building that would obstruct flying. Restaurant facilities and other concessions are at ground level where broad terraces overlook flying activities. An amusement park occupies one corner of the airport, with a stadium and recreation field in the other



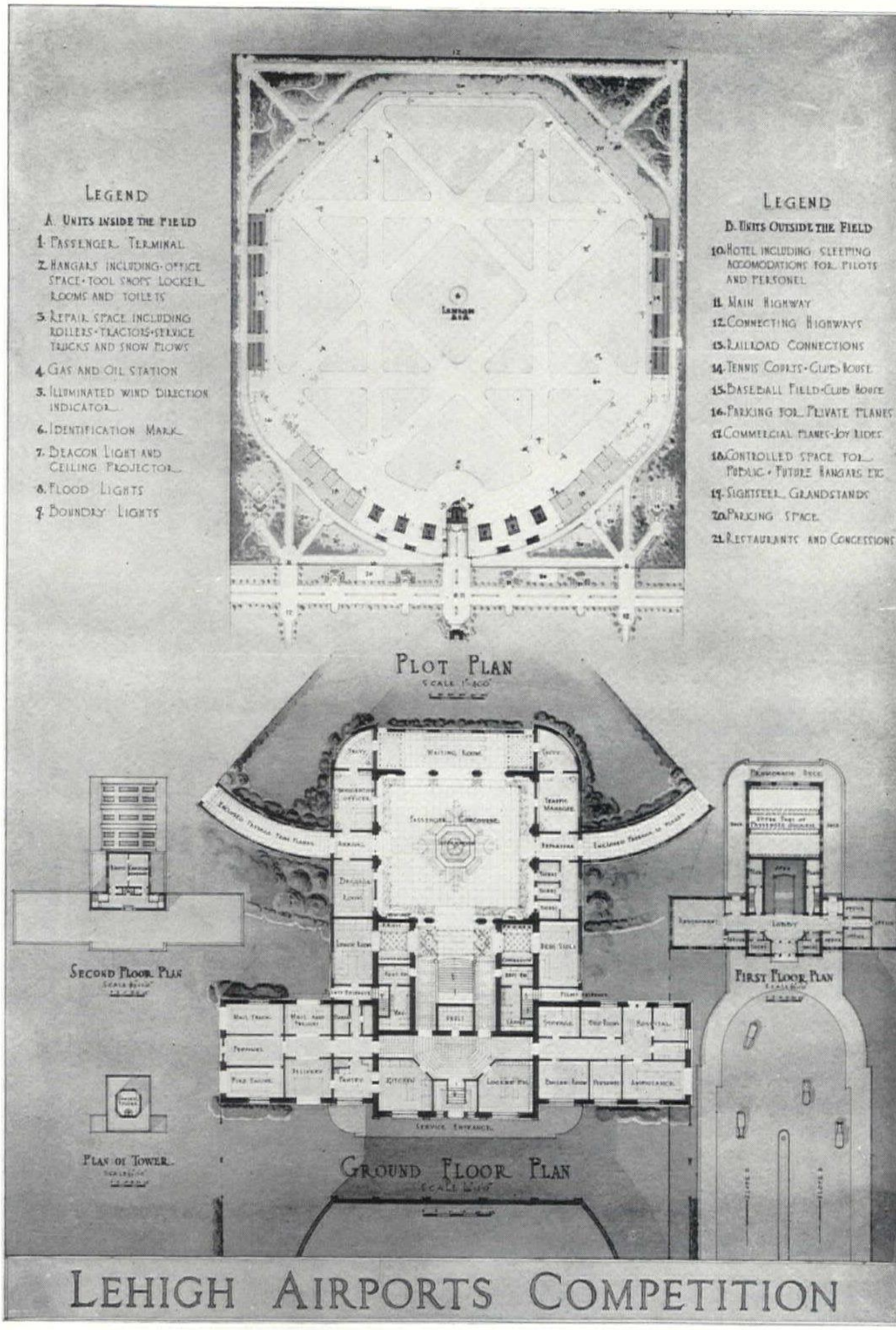
Honorable mention awarded to Virgil Westbrook, San Clemente, Cal., for this development of a typical rectangular field in which special attention has been paid to the handling of large crowds of visitors and patrons. The buildings are developed in typical California architecture, surrounding a great oval plaza



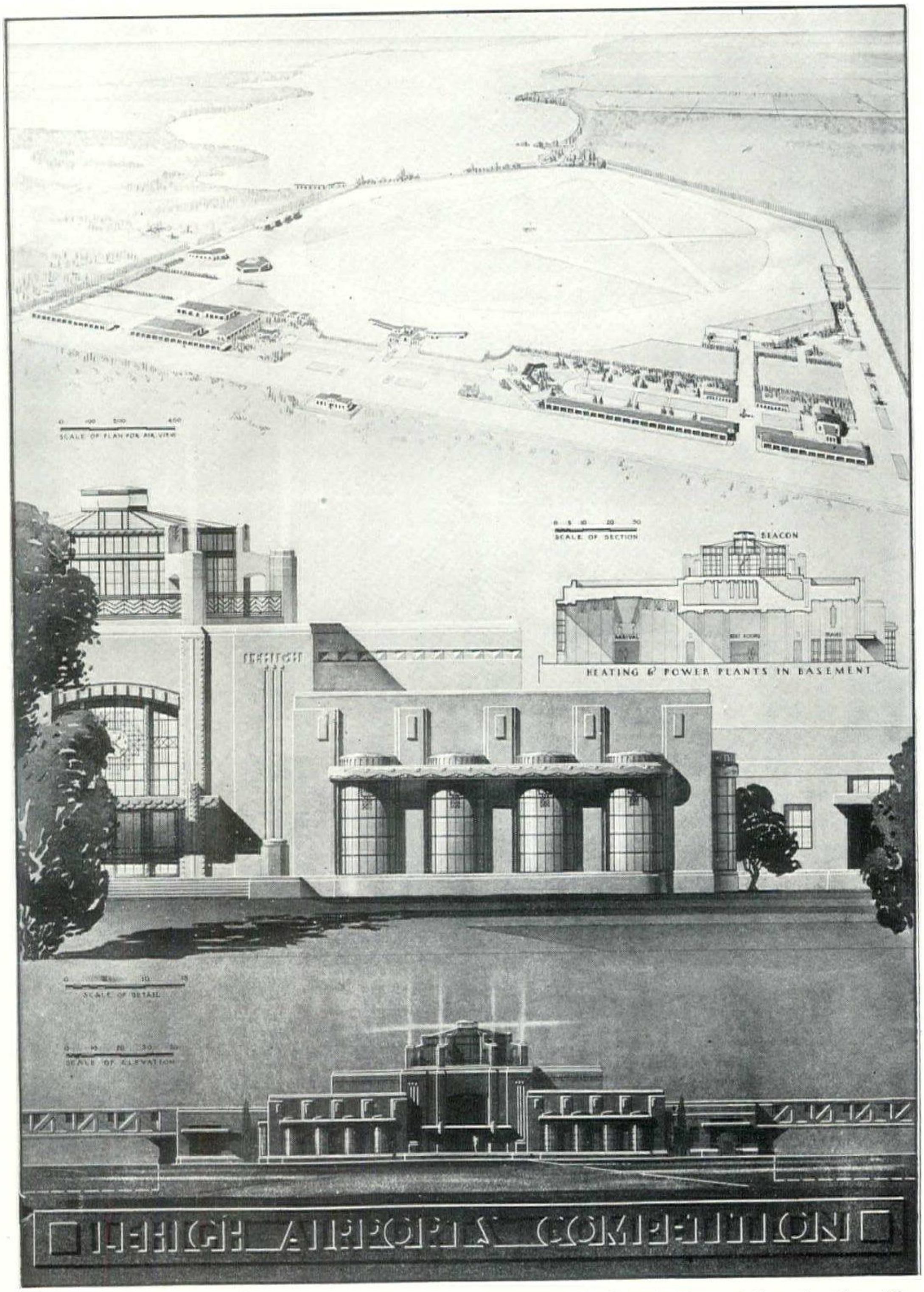
In this design, submitted by Virgil Westbrook, San Clemente, Cal., the flying field has double runways in the two directions of prevailing winds, with secondary diagonals for less frequent use



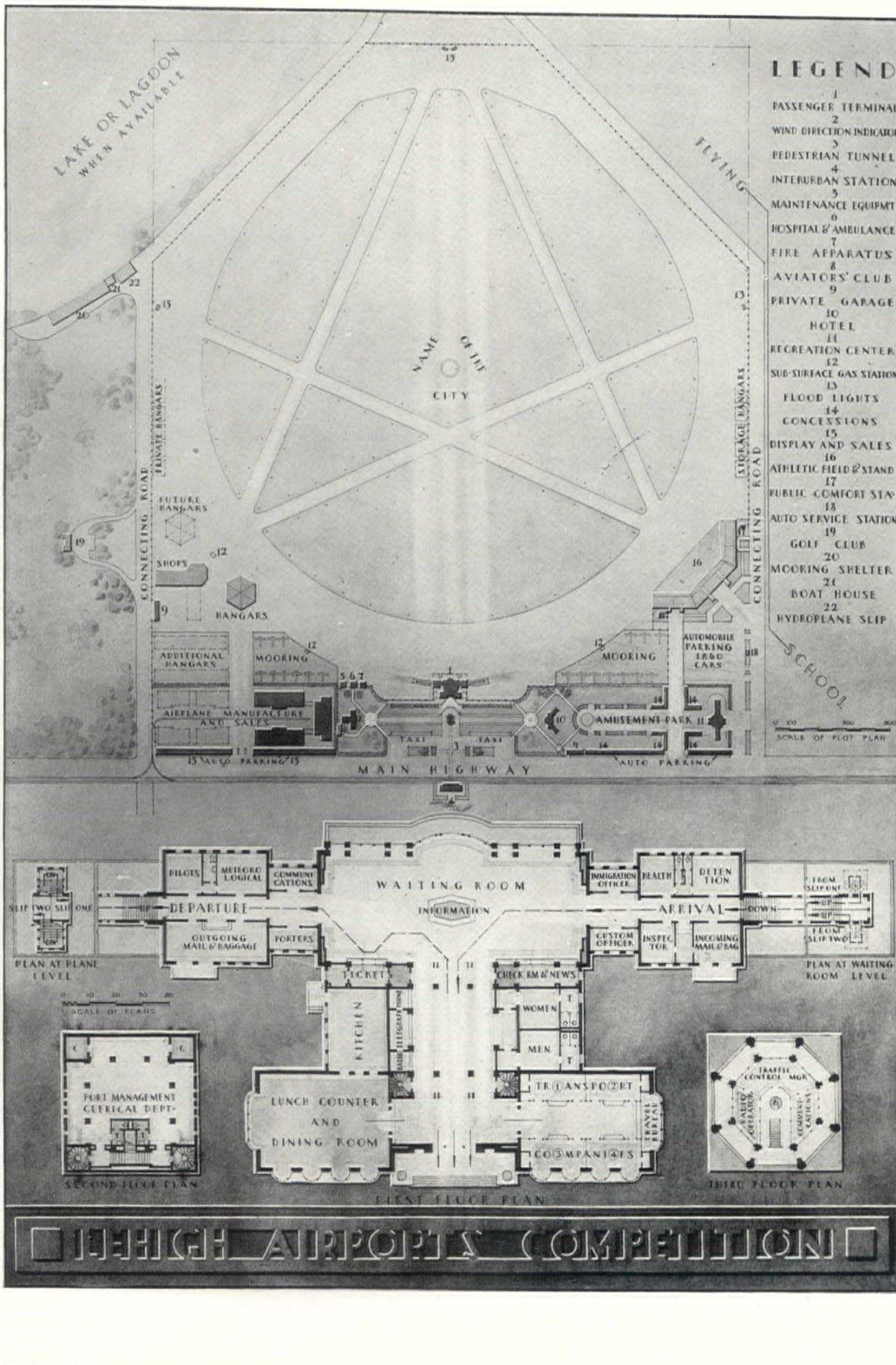
Honorable mention awarded to George A. Robbins, of Philadelphia, for this design featuring parallel runways crossing an octagonal field with a main passenger terminal and hangars so arranged as to obstruct none of the flying area. A considerable area of land at each corner of the field is reserved for park and recreational use, and for the parking of automobiles



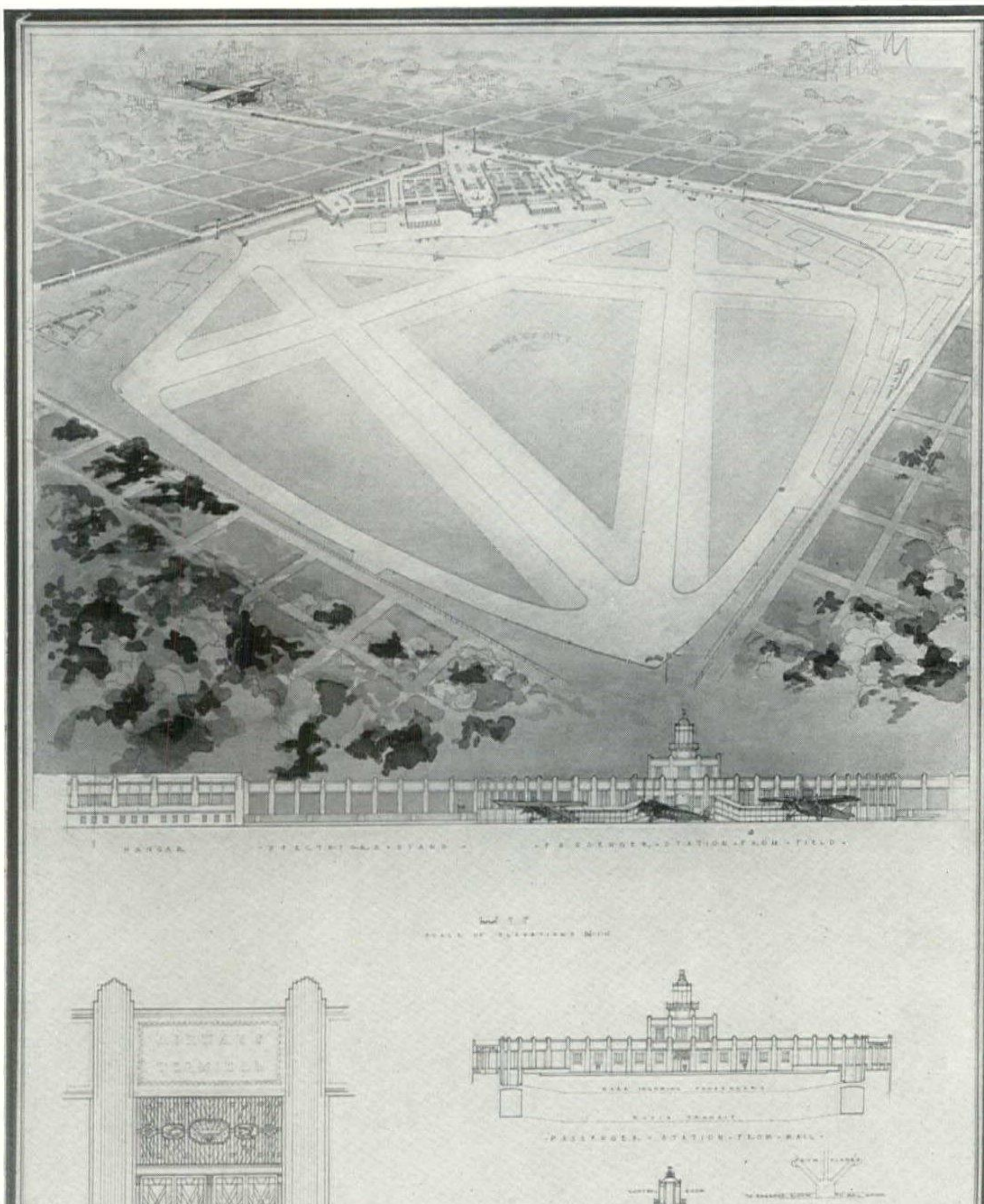
Design submitted by George A. Robbins, Philadelphia. The entrance plaza is exceedingly simple and approaches the passenger terminal directly from an adjoining boulevard, where land is reserved for the subsequent development of a hotel, stores, and other business structures. The passenger building is of solid, sturdy design to suggest the safety, stability and permanency of air transportation



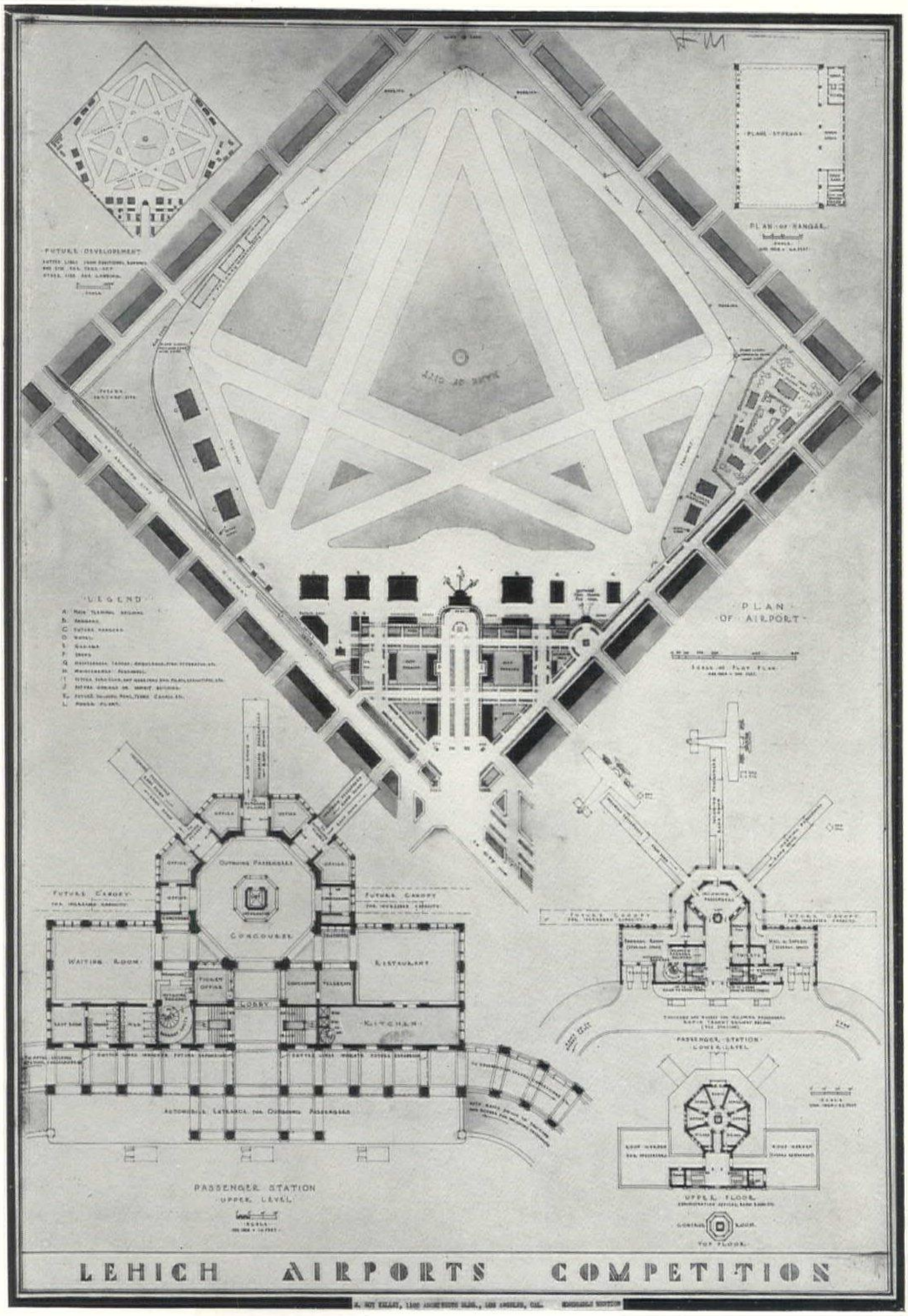
Honorable mention awarded jointly to Charles A. Stone and U. Floyd Rible, of Los Angeles. The design features a massive passenger terminal structure of modernistic design with large covered loading and unloading slips extending like wings from the passenger waiting room. Around the edges of the field, space is devoted to aëroplane manufacturing and sales rooms, and to an amusement park and recreation field with provision for outdoor mooring of visiting planes and parking of automobiles



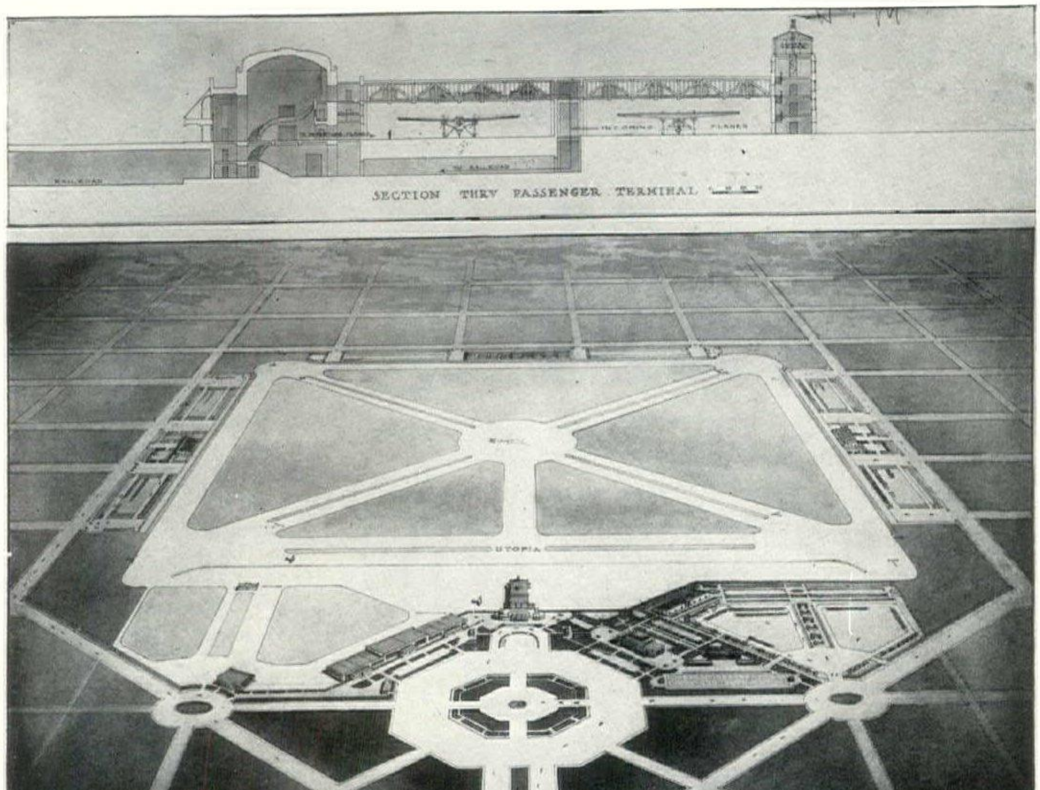
This design submitted by Charles A. Stone and U. Floyd Rible, of Los Angeles, shows a flying field elliptical in shape with runways disposed so as not to approach the structures of high elevation



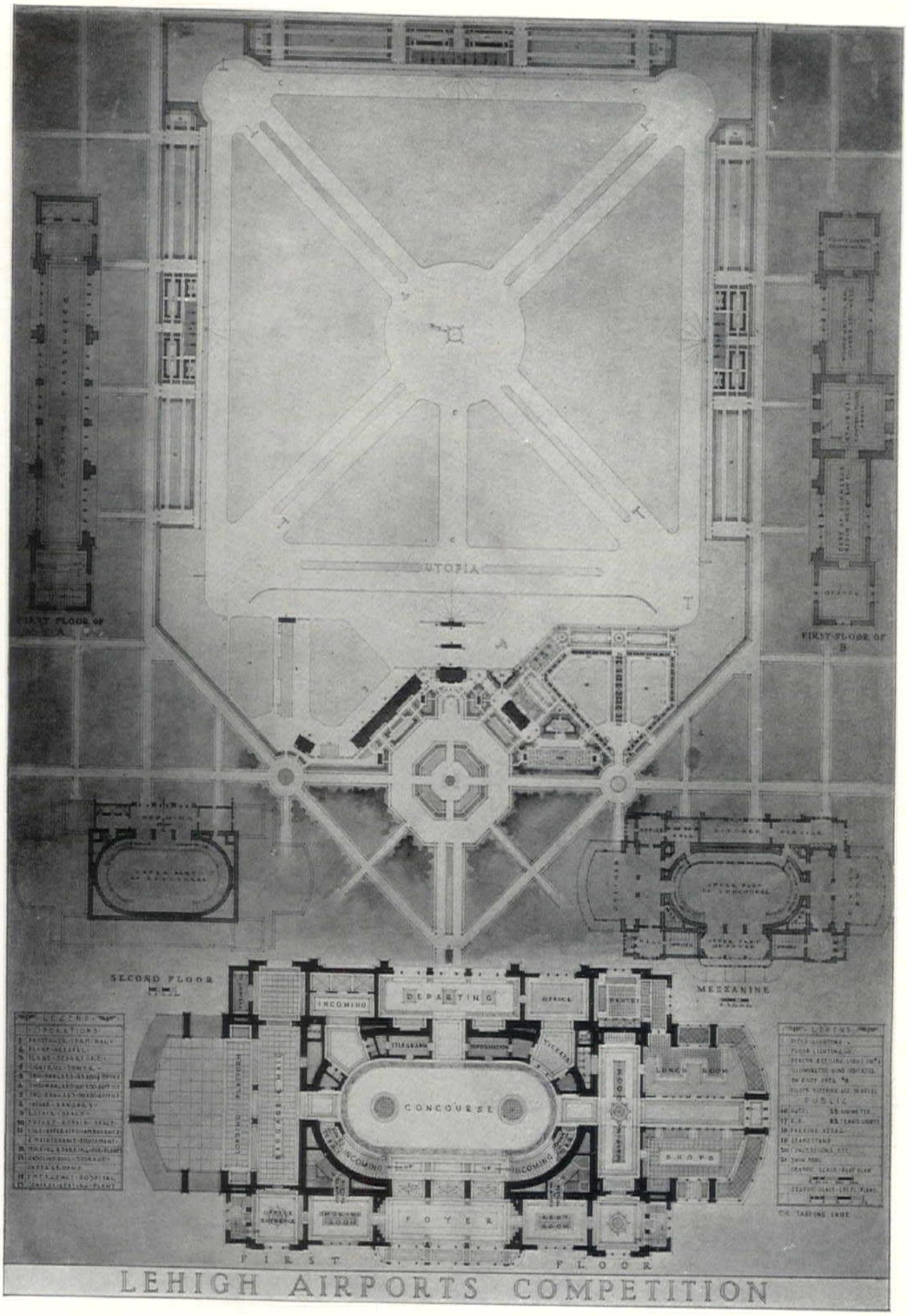
Honorable mention awarded to H. Roy Kelley, of Los Angeles. All buildings are grouped at one corner of a rectangular field. The runways of the flying area are arranged so that none directly approach the buildings, with the principal lanes converging at the corner of the field most distant from the terminal. Provision, however, is made for expanding the runway system to double their number, providing separate parallel runways for landing and taking off



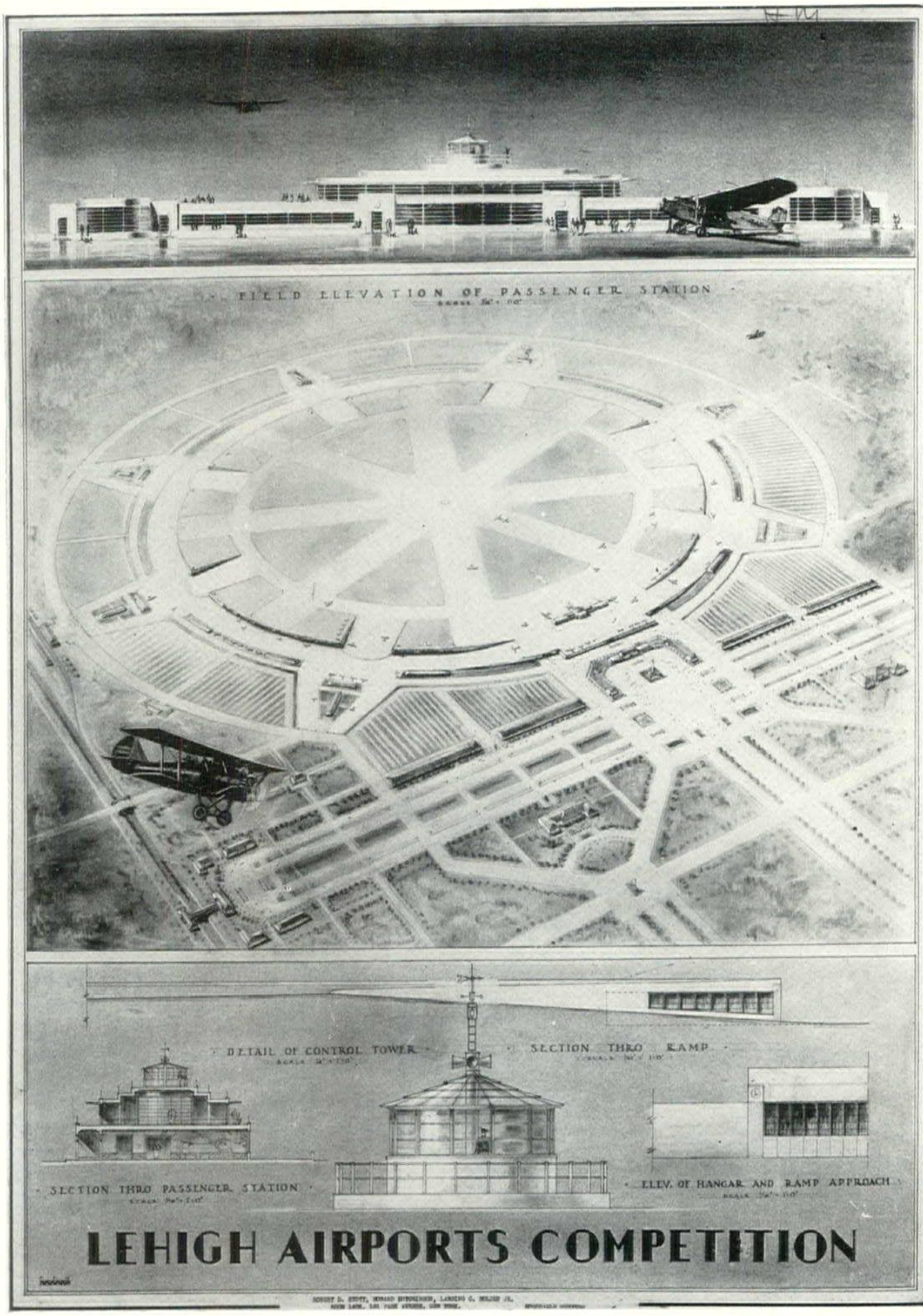
Plan submitted by H. Roy Kelley, Los Angeles. The passenger terminal provides telescoping canopies for the protection of passengers going to and from the planes. The structure is situated at the head of a broad approach plaza flanked by a hotel, stores and recreational buildings



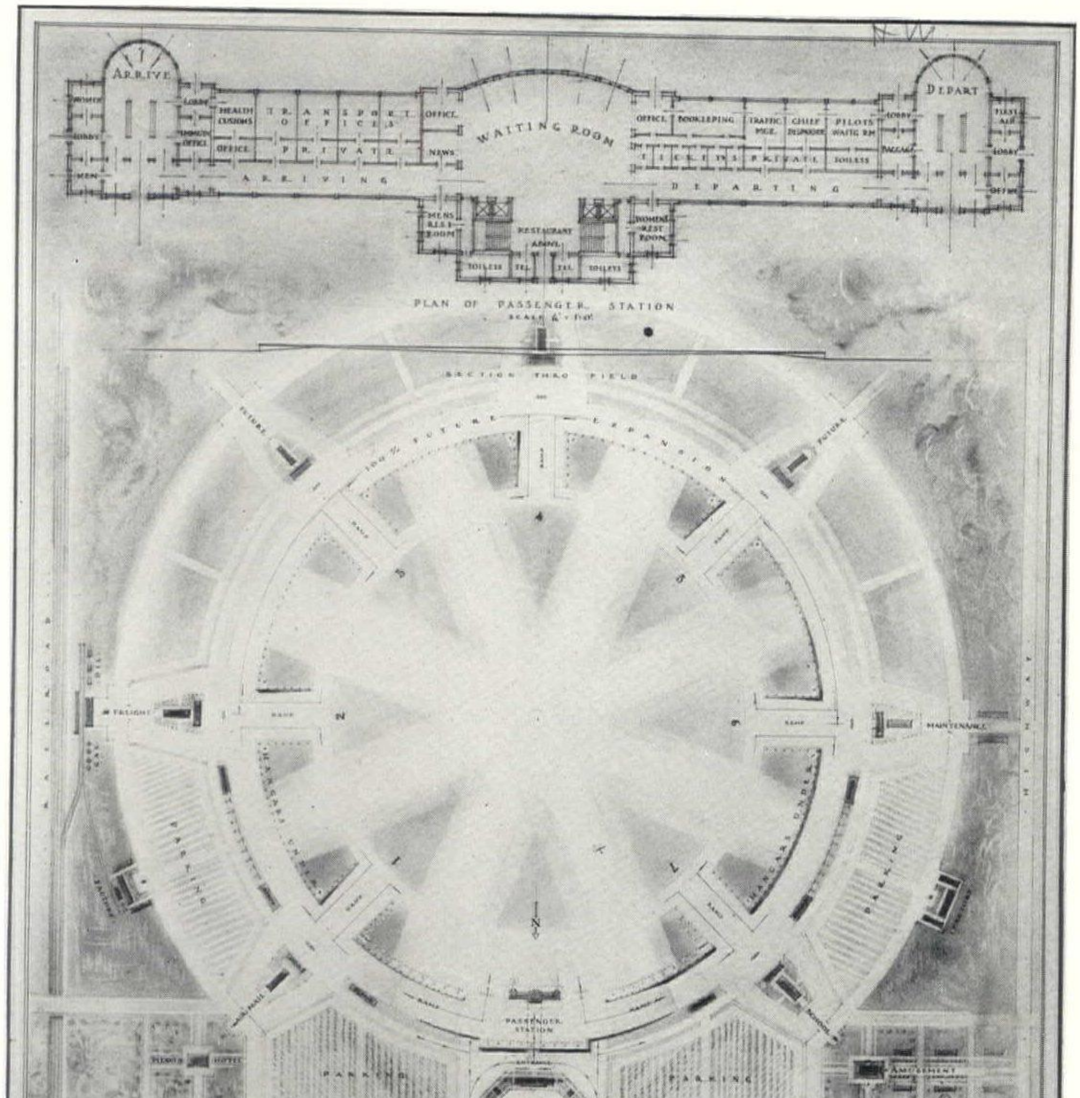
Honorable mention awarded jointly to W. Frank Bower, Jr., Henry L. Sandlass and Alfred A. Rothmann, of East Orange, N. J. and New York, for this design in which special effort was made to coördinate land and air transportation. The flying field has double diagonal runways, while the border of the field itself is paved for take-off and landing purposes. All runways terminate at the corners of the field which are not obstructed by any buildings



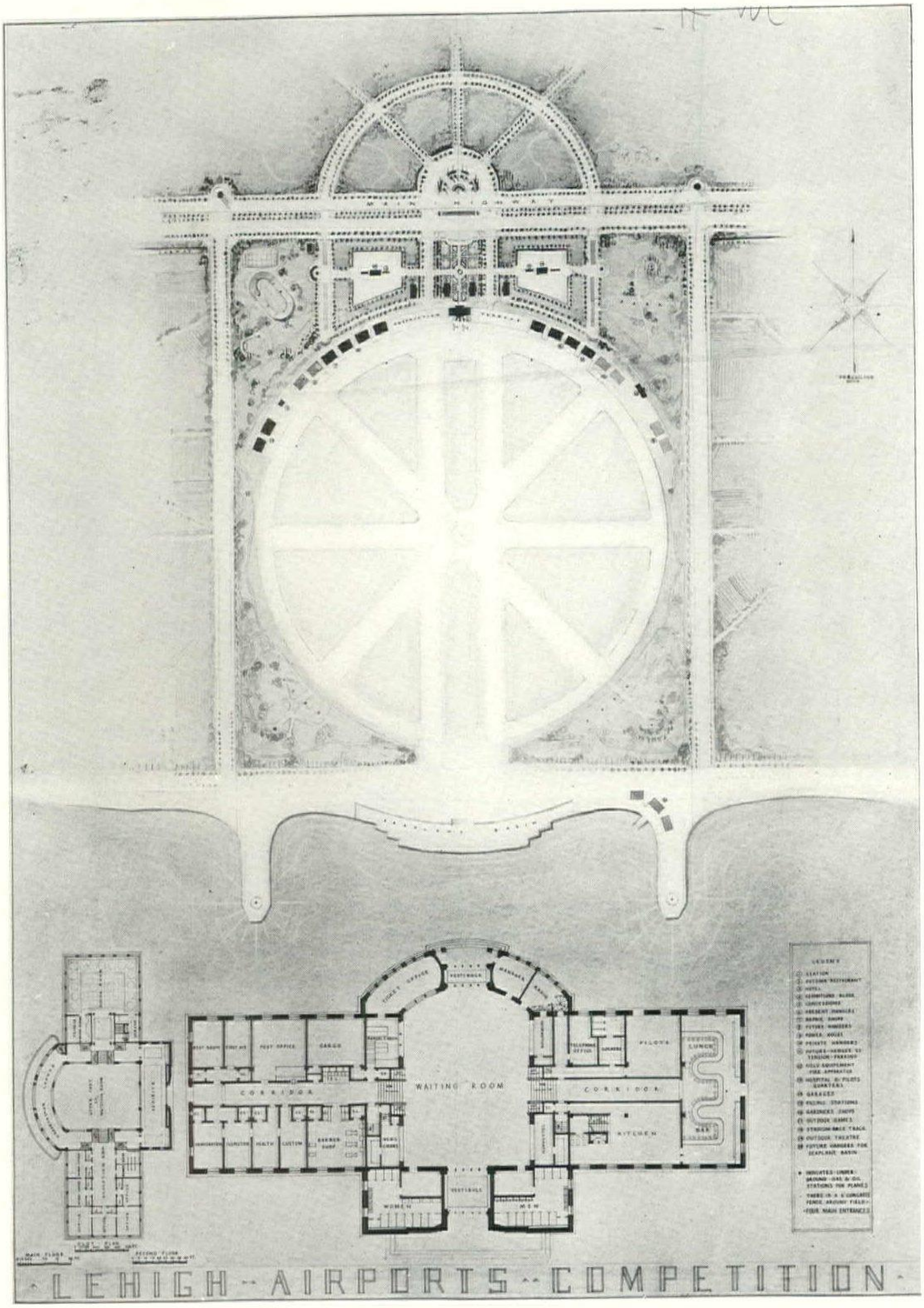
Plan submitted by W. Frank Bower, Jr., Henry L. Sandlass and Alfred A. Rothmann, of East Orange, N. J. and New York. The main passenger terminal shows strong modernistic tendencies and is provided with covered doors for loading and unloading passengers. Other buildings include a grand stand, a hotel, the usual hangars, and a spacious plaza and park for public convenience



Honorable mention awarded to Robert D. Stott, Howard Hutchinson and Lansing C. Holden, Jr., of New York, for this development of a circular flying field containing many unique ideas. The principal hangars are below the level of the runways which actually extend over their roof surfaces. Ramps lead to these hangars from the passenger terminal building, and other ramps bring the planes to the circular taxi strip which connects with all runways



Design submitted by Robert D. Stott, Howard Hutchinson and Lansing C. Holden, Jr., New York. Separate sections of the field are developed as freight and air mail stations, and provision is made for segregation of school work, maintenance activities and separate air transport companies. The passenger terminal building expresses modernistic tendencies in broad horizontal lines and flat roofs that are available for use as observation decks



Honorable mention awarded to Edward C. Remson, of New York, for this design of a circular field adjoining a seaplane base. Care was taken in this design to avoid placing buildings opposite the ends of the diagonal runways and to provide double runways in the direction of the prevailing winds. The designer has placed his circular flying area in a rectangular field, reserving all of the marginal land for park and recreational purposes. The main passenger terminal and the hangars are arranged in the shape of an arc at one side of the field adjacent to an approach plaza which provides space for various public buildings and for the parking of automobiles

BOOK DEPARTMENT

THE LAW OF BUILDING CONTRACTS AND MECHANICS' LIENS

A REVIEW BY

ARTHUR L. H. STREET

"WHAT Every Owner, Contractor and Subcontractor, Engineer and Architect, Mason, Plumber, Carpenter and Materialman Should Know About the Law of Building Contracts and Mechanics Liens," is the comprehensive title of a 98-page work compiled and just published by Myron H. Lewis, professional engineer and attorney, New York.

Accompanying the book, the text of which is mimeographed, is an 8-page supplement containing an "analysis and digest of the changes in the revised mechanics' lien law of the state of New York." That all parties concerned in building operations should have a more intimate knowledge of the principles of law governing everyday dealings in their field than is usually possessed by architects, builders, etc., is not to be doubted. The law reports teem with cases showing how often members of the building professions have expensively taken hindsight, instead of inexpensive foresight, views of the law. Therefore, it requires no argument to demonstrate that there is a good field for Mr. Lewis' book and others of its general kind previously published. Nor should it require any extended argument to show that no one can be quite so well qualified to prepare a work of this nature as one who has had practical experience both as an architect, engineer, or builder and as an attorney at law experienced in the settling of controversies arising over building contracts, etc. Hence the appropriateness of Mr. Lewis' having undertaken the preparation of the volume here under review.

Although there is much in the book that may be read with profit by architects and their brothers-in-building throughout the country, the volume is especially adapted for use in New York. And its appearance is particularly timely, because of the changes effective October 1, 1929, in the New York mechanics' lien law. The preface shows that the material for the work was gathered in the course of the author's own experience "in building and adjusting mechanics' lien claims." That commends the practicality of the work, which is further promoted by the fact that Mr. Lewis has wisely chosen to write in the language of the layman, rather than to use legal terminology without explaining its meaning.

The author no doubt had in mind the saying that "the man who is his own lawyer has a fool for a client," because the preface emphasizes a disavowal that the book is intended to make the reader his own lawyer. Obviously, what Mr. Lewis aims at is merely to give members of the building trades and professions the benefit of his own experience, and the experience of others, in meeting and settling controversies, with a view minimizing the chances of the reader's running into similar difficulties. Part I, comprising 64 pages, deals with various aspects of contracts, while Part II, covering the remaining 33 pages of the volume proper, deals with phases of the mechanics' lien law. The first section deals with such fundamentally important matters as the importance of entering into a valid contract, considering the necessity for distinct and complete mutual understanding, the necessity for reducing certain agreements to writing and having them signed, etc. Fifteen important points to be observed by engineers and architects, to discharge their duties to owners and contractors as go-betweens, are set forth. One page shows how conflicts between plans and specifications should be adjusted. Another page specifies 20 essentials of a good set of specifications. There is a concise outline of rights and liabilities arising under defects in plans and specifications, and a statement of the extent to which a contractor may be held to have guaranteed the soundness of work constructed by him. Various suggestions are made on how to avoid misunderstandings concerning the amounts of payments to be made contractors, etc. and the times when they are to fall due. Three pages deal with the rights and liabilities of sureties on building bonds, showing grounds on which sureties may or may not insist upon release from responsibility.

A particularly important summary of the legal effect of architects' and engineers' certificates is presented, appropriately followed by a brief reference to the law of arbitration. Then there follows an explanation of vital phases of contract performance, with reference to waiver of rights, excuse for non-performance, etc. Fifteen common grounds on which builders have been held by the courts not to have been excused from liability for delayed completion of work are set forth, followed by 18 excuses that have been judicially sustained. Several pages deal with the assessment of damages for violating contractual obligations, etc.

In view of the frequency with which controversies arise over what constitute extras in the performance of building contracts, Mr. Lewis' exposition of the law on phases of this subject adds value to the work. There is a clear explanation of the functions of judges and juries in deciding litigated cases, and some wholesome advice on resorting to a lawsuit only when attempts to adjust differences by conferences, arbitration, etc., have definitely failed. There are given nine particulars that should be observed in preserving records of the progress of work, with a view to being able to prove important facts relating to work in case litigation should arise. Part II shows the purpose of lien laws, what claims are lienable, how liens are to be preserved and enforced, etc.

Those who are given to judging a man according to whether or not he wears tailor-made clothes may condemn Mr. Lewis' volume at first glance, because only the

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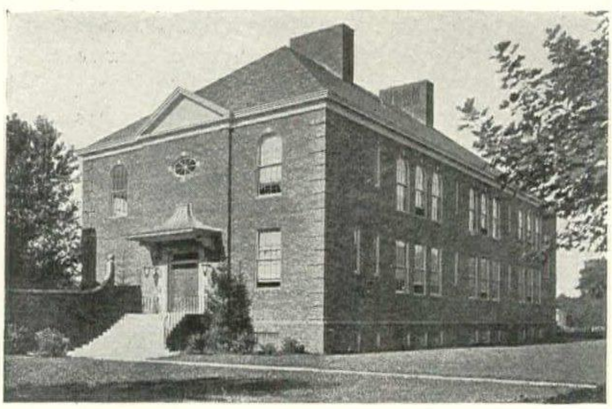
GRADE SCHOOL BUILDINGS; BOOK II

IN no department of architecture have the last ten years seen quite the progress which has been made with schoolhouses, a class of buildings of the first importance, since they exert a strong influence upon their communities, and by their architectural excellence or the lack of excellence they elevate or lower the architectural standards of entire districts. Study of school structures, particularly at the hands of a group of well known architects, has resulted in their being given a high degree of architectural distinction and dignity in the way of design, while study directed toward their planning and equipment has led to their being practical and convenient far beyond what was regarded as an advanced standard of efficiency anywhere in America even a few years ago.



Kensington Schoolhouse, Great Neck, N. Y.
Wesley Sherwood Bessell, *Architect*

THIS volume, a companion to another published in 1914, records the results of endless study and experiment in different parts of the country, summed up and presented. By illustrations of exteriors and interiors, by floor plans and carefully written descriptions and articles by well known architects and educators, the present high standard of schoolhouse design is made plain, and these results which have been achieved by a few architects and school boards are thus made possible to all architects who are interested in schoolhouse design. The compiler has selected from almost 1000 exteriors and floor plans the school buildings to be illustrated, and the volume records "a process of innovation and elimination, namely, the introduction from time to time of features which have been deemed desirable and practical, and the elimination of things which, owing to changed school methods, are no longer required."

400 pages; 7¾ x 10½ inches
Profusely Illustrated; Price $10

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cover is printed, the text being mimeographed. But those who are not too fastidious to glean knowledge from the face of typewriter type will find this volume an extremely valuable aid to the avoidance of legal disputes. The book, being for laymen, does not give court decision citations.

THE LAW OF BUILDING CONTRACTS AND MECHANICS' LIENS. By Myron H. Lewis, C.E. 98 mimeographed pages, 8½x11 ins. Price $2. M. H. Lewis, 507 Fifth Avenue, New York.

THE OLD COTTAGES AND FARMHOUSES OF NORFOLK. By Claude J. W. Messent, A.R I.B.A. With more than 100 full-page illustrations from pen and ink drawings. 10½ x 7½ ins.; handsomely bound in full cloth. Limited Edition, 10s Net. H. W. Hunt, 14 Orford Hill, Norfolk. To be ordered directly from the publisher.

IT is not only in the older cities of America that structures of architectural beauty and character and of historic interest fall before the march of what we like to consider progress. Travelers in Europe, particularly in England and France, bring back pathetic reports of destruction proceeding apace in both countries, and of what is nearly as bad and perhaps even more pathetic, the decay or even ruin into which fine old buildings are permitted to fall and the ugly and slovenly means (if any) taken to keep them habitable at all. Students of English architecture find that each of many sections in England has its characteristic historic architecture, and the types which were developed in Norfolk during centuries possess charm, virility and character in a high degree. The same is true of the materials which were used for building, and in Norfolk, although brick and flint are generally supposed to be the materials chiefly used, the old buildings show the wide use of half-timber, weatherboarding, clay lump, carstone, clunch (hard chalk lump), and wattle and daub, often used in ways which seem to be confined to Norfolk. The old villages and towns and even the remote rural districts of Norfolk, therefore, constitute a rich mine for the present-day architect.

In this volume a well known English architect, a member of the Royal Institute of British Architects, deals with quite a number of the old cottages, farm houses and manor houses which still exist in Norfolk, and he deals as well with some farm buildings and such minor structures as dove cotes and pigeon houses and likewise with a few interesting old Georgian shop fronts in the Norfolk villages and small towns. All these subjects possess interest for the present-day architect, whether in England or America, for along with the interest given by the excellence of planning and economy of material and construction, there is the interest inherent in beauty and simplicity of design, and architects are fully awake to the necessity of securing beauty and architectural character in buildings of any kind.

In preparing his excellent sketches of these old Norfolk buildings, Mr. Messent has very wisely restricted himself to buildings which are little known and which might be easily overlooked by the traveler, and it has apparently not been difficult in a country as rich as Norfolk to find architectural character of a high order in places where the architecturally-minded traveler might not go. The value of this excellent work should secure for it a place in the library of every architect interested in the important matter of design, particularly for structures of a domestic nature. It abounds in suggestions.

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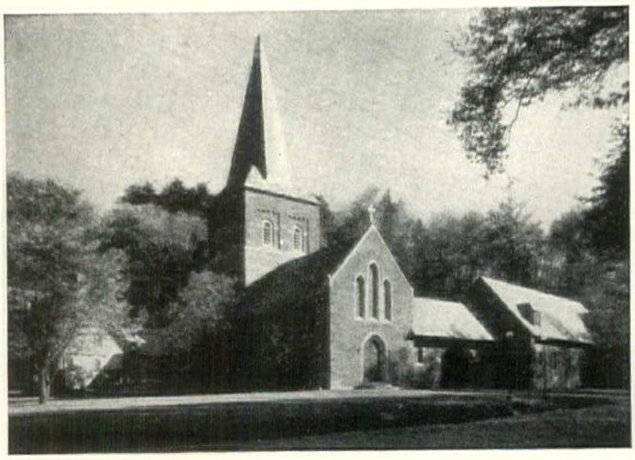
THE improvement which has accompanied the progress of American architecture during recent years has been no more marked in any department than in that of an ecclesiastical nature. This has been due primarily to the rise of a few architects who by travel and study have acquired much of the point of view from which worked the builders of the beautiful structures which during the fourteenth century and the fifteenth were being built over all of Europe.



These architects have closely studied the churches, chapels, convents and other similar buildings in England, France, Spain and elsewhere, and the result has been a number of American churches of an excellence so marked that they have influenced ecclesiastical architecture in general and have led a distinct advance toward a vastly better standard. This improvement has not been exclusively in the matter of design, for plans of older buildings have been adapted to present-day needs, and old forms have been applied to purposes which are wholly new.

THE appearance of a new and revised edition of a work which is by far the best in its field records this progress. Mr. Cram, being perhaps the leader among the architects who have led this advance, is himself the one individual best qualified to write regarding the betterment of ecclesiastical architecture. The editions of this work of 1900 and 1914, which have for some time been out of print, have now been considerably revised and much entirely new matter has been added, which in view of the change which has come over ecclesiastical building of every nature is both significant and helpful.

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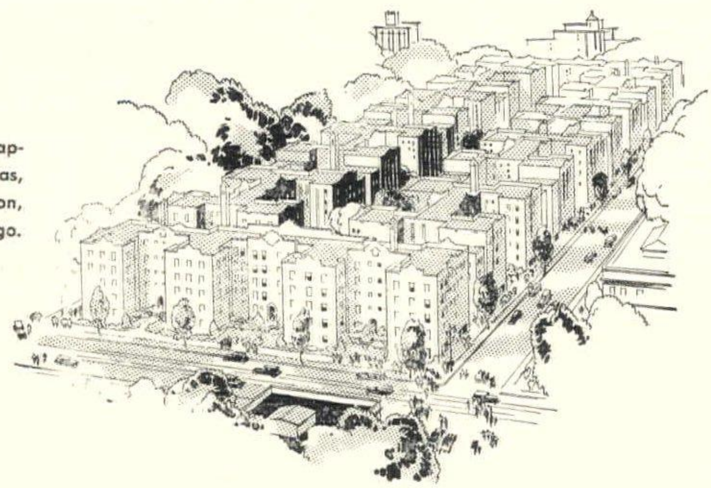

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INTRODUCTORY HANDBOOK TO THE STYLES OF ENGLISH ARCHITECTURE. Part II. Tudor and Renaissance. By Arthur Stratton. 32 pp., $5\frac{1}{2}$ x $8\frac{1}{4}$ ins. Price $1. J. B. Lippincott Company. Washington Square, Philadelphia.

PLANNED as a companion to a series of large scale comparative diagrams, this little volume has been prepared for the use of schools, teachers, students and the like. Another volume of the same scope dealt with the earlier architectural forms from which were evolved the styles which followed, this particular volume treating of the Tudor type, dealing in what is necessarily a much condensed form with the influence of the Renaissance which wrought considerable change in developing the Tudor into the forms associated with the reigns of Queen Elizabeth, the Stuart sovereigns, and the Georges.

In America at least, taste in architecture seems to be largely a matter of vogue or fashion. Many will remember the whim for what in the eighties and the nineties was known as "Queen Anne,"—which had no relation whatever to anything known in England during the reign of that sovereign,—and later there prevailed taste for other types, one by one, followed within late years by a wide vogue of the Italian and Spanish types which were sadly mis-used and overworked or else used in localities for which they were wholly unsuited. Today what is being called "modern" occupies the center of the stage, though it seems to be a somewhat timid or tentative following, for even our most advanced examples fall far short of reaching the extremes which, according to the publications which deal with architecture are engaging the attention of the French and Germans.

But in all this strange medley or welter, the most staple, permanent architectural type in America,—the type which always has been and always will be acceptable,—is that founded on historic English precedent. A building designed according to conservative English tradition, be it Elizabethan, Queen Anne, or Georgian, "holds its own" with a tenacity wholly British; it is never obsolete or out of date, and architects, interior decorators and home furnishers know that the type constitutes the foundation as well as the cornerstone of everything which relates to the subject. For this reason works on architecture of this era have high value and deserve wide and careful study, and the volumes written or edited by Mr. Stratton occupy high rank in their field, one reason being that unlike many writers he does not deal exclusively with great town houses or vast country mansions which are, after all, of but little practical value, but devotes considerable space and not a little effort to dealing with architecture of a much more moderate scope and of considerable more importance.

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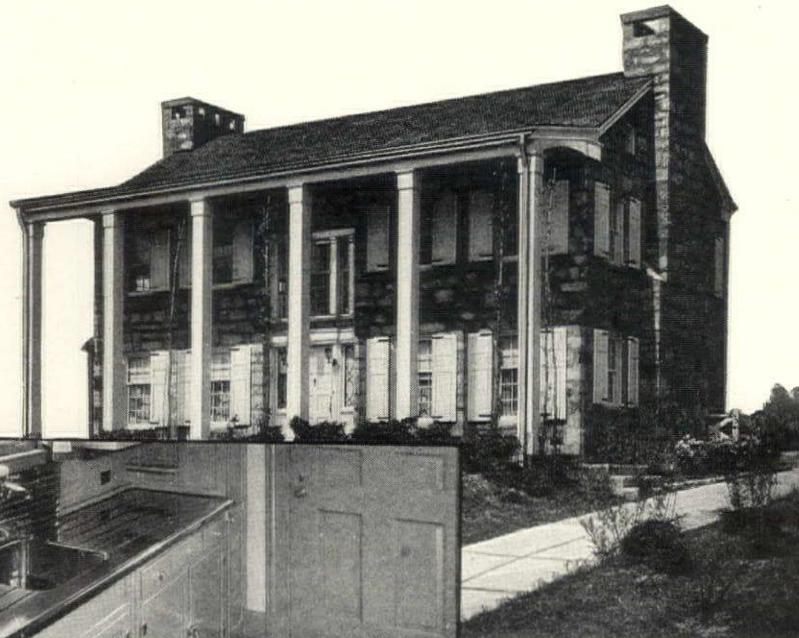
A Model Home



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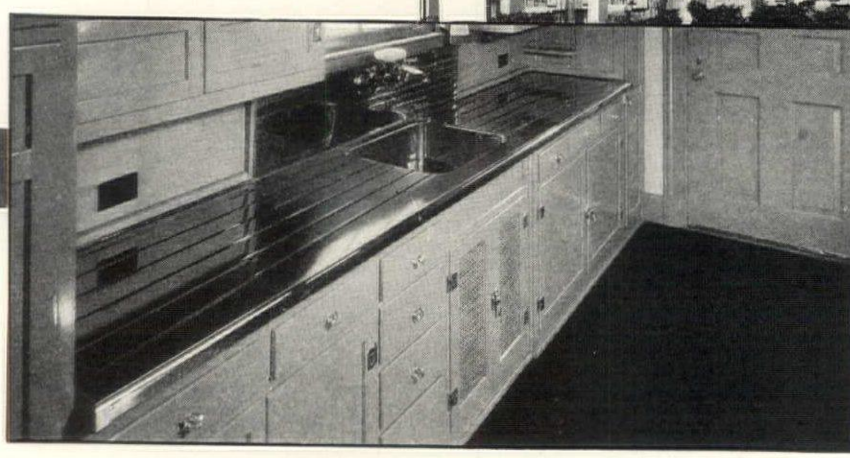

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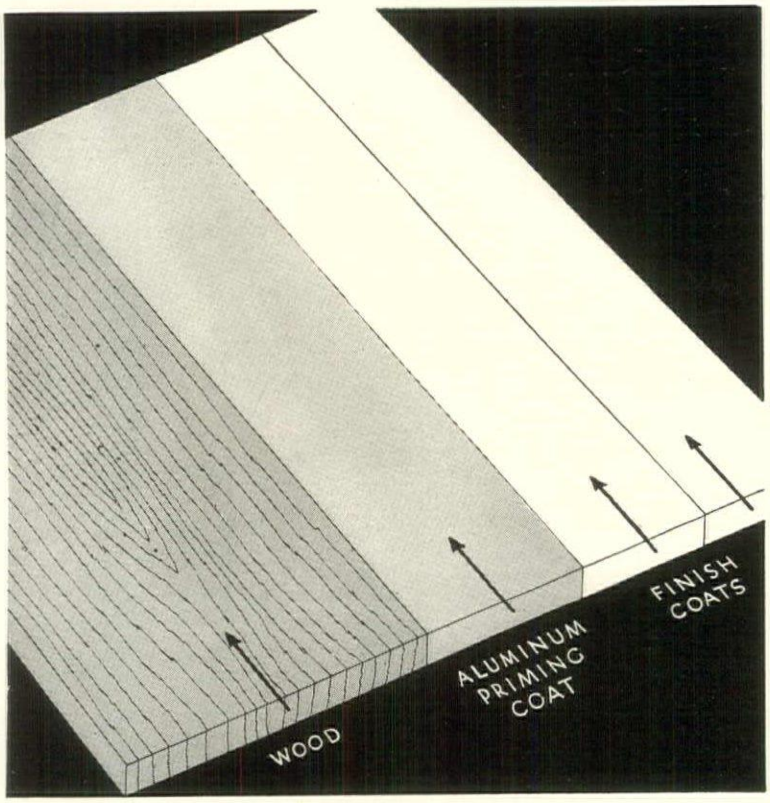

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1930

Beginning with this issue, THE FORUM inaugurates the constructive policy of a close relationship between the architectural and the engineering and economic descriptions of the buildings featured in each issue. The phases of architectural plan and design, ornamentation, decoration and finish are considered in the Architectural Design section of THE FORUM, and in the Architectural Engineering and Business section the structural design and the mechanical plant and equipment, and the economic phases of the feature building are taken up in detail.

The two articles about the *Chicago Daily News* Building, therefore, complement each other and form a complete and useful whole. The illustrations are carefully chosen and logically arranged in each article. In future issues this policy will be continued in order that architects may have the essential information regarding outstanding buildings throughout the country. It is believed that this arrangement will prove to be the most effective and useful presentation of the distinguished architectural accomplishments that are featured in THE ARCHITECTURAL FORUM throughout the year.

The Editors

THE CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

The Chicago Civic Opera House may be seen at the right. Graham, Anderson, Probst & White, Architects

THE
ARCHITECTURAL
FORUM

VOLUME LII NUMBER ONE

JANUARY 1930

THE STRUCTURE AND EQUIPMENT OF THE CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

BY

KENNETH KINGSLEY STOWELL

A DESCRIPTION of any building is dead and dry,—unless vitalized by the reader; unless he visualizes with understanding; unless he can read the living functioning between the lines of technical data and statistics. Especially is this true when the description is of those things below the surface,—the structure, the mechanical equipment, heating, ventilating, lighting, sanitation, communication, insulation, which we are considering here. Am I begging the question? Is it not the writer's function to set forth these things in their true light? Should he not so describe these things so that the reader must see them in their proper relations? Perhaps,—but where shall we find the author who will steer the true course between the Scylla of dry technicality and the Charybdis of "popular" worthlessness?

A description of such a large structure as the *Chicago Daily News* Building in which the reader could see only the component parts as so many of this and that, so big, would be as understanding as a coroner's report on a man after an autopsy,—missing the whole point, the vitality, the functioning, the personality of the building, as of the man. For today buildings are not mere shelters or creations meant to satisfy the eye alone and to give æsthetic pleasure;—they do that, but they are living organisms,—balanced, efficient structures with bones of steel and cement, nerves of electricity, lungs that breathe in fresh air, maintaining a constant temperature, equipped with mechanism to create the products man desires,—all actuated by man, reflecting the personality of him who created it.

In the section of THE FORUM *devoted to Architectural Design there will be found illustrations, details, and a general description of the architecture of this building.*

The *Chicago Daily News* Building serves and serves well in functioning for many purposes. It serves as the production plant for a great metropolitan newspaper. It houses the facilities of this great enterprise,—the executive and editorial offices, composing rooms, press rooms, paper storage areas and all the many and varied functions of the newspaper. A hundred tons or more of newsprint each day pass through the presses, issuing forth to spread the news in some 450,000 copies of an afternoon paper,—a Herculean task that requires efficiency in planning and nicety of adjustment that are awe-inspiring to the uninitiated. The building serves as a concourse for some 30,000 people who use it on their way to work from the railroad station each morning, and to their trains in the evening. It serves the complicated business of a great railroad office demanding special arrangements and communication facilities. Then, there are the floors of offices of private tenants who transact many and varied forms of business. The topmost floors are devoted to the unusual and highly developed broadcasting station of WAMQ, which must function without faltering from 5 in the morning until after midnight. And under this great structure there must pass the speeding trains of the Chicago, Milwaukee, St. Paul & Pacific Railroad,—trains belching forth smoke that would cut off the engineer's vision and perhaps cause serious accidents did not the building carry it away.

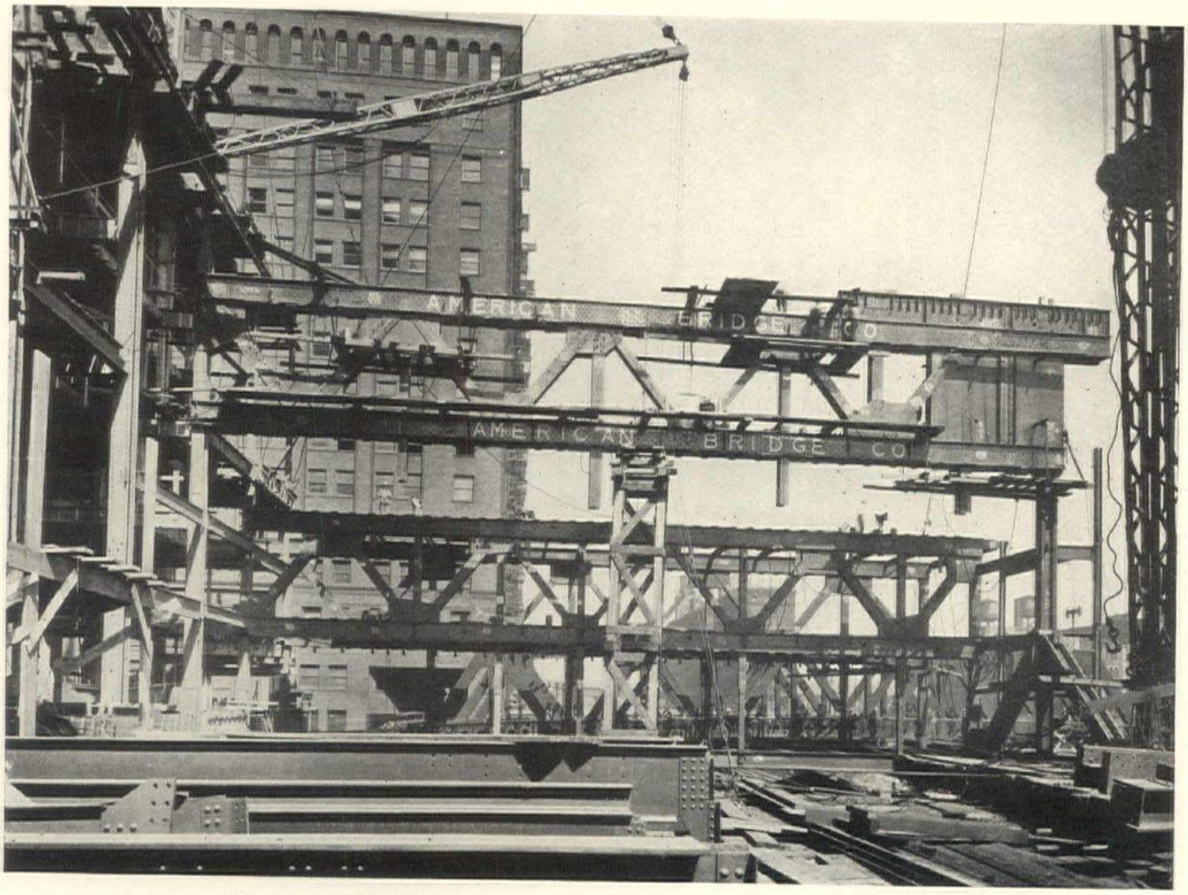
Structurally, these tracks caused the greatest complications, for they were laid out for the efficient operation of trains and could not be moved.

The Chicago Daily News Building Under Construction

The columns of the building, therefore, had to be placed in relation to the tracks first, and in relation to the superstructure, second. As the length of the building was approximately north and south, which is the direction of the tracks, the columns could be, and were, spaced on 20-foot centers in this direction. However, in the east and west direction the columns were spaced in relation to the tracks. In some cases, as under the north wing, the columns had to be 100 or more feet apart. This called for ingenuity on the part of the structural engineer, who solved the problem with cantilevered plate girders, some of them double, and with huge trusses, which we shall consider later. The foundations of the building proper are caissons to rock, about 90 feet below the level of Lake Michigan. Those under the plaza of the building rest on hardpan about 60 feet below the water level.

Smoke Disposal. The first floor above the tracks forms the bottom of the smoke chamber, which is about 5 feet high, varying over different portions of the plan. The first floor proper forms the roof of the smoke chamber. This smoke chamber, and the stacks leading from it, are of special importance because the building above the tracks would not have been possible had the smoke problem not been solved. In New York the same problem did not come up, because the roads there are electrified. The final plan for smoke disposal was not adopted until many experiments had been made to determine the behavior of smoke under actual conditions. In the floor of this smoke chamber, which forms the ceiling over the tracks, openings run continuously over each track so that the smoke will immediately ascend into this large expansion chamber. A section is shown in one of the diagrams (see page 111). The expansion of the smoke decreases its density and makes it practically as light as air. A great deal of the soot and solid portion of the smoke will accumulate on the floor of the smoke chamber, but this can easily be removed. The large concrete smoke stack running the entire height of the building is 15 x 20 feet, divided into two compartments. A fan is used, as well as gravity, to eliminate the smoke. This system was developed largely by Joshua D'Esposito, consulting engineer of the railroad.

The structural frame of the building is of steel, and the typical floor construction throughout the office portion of the structure is of the concrete joist and flat slab type, formed with

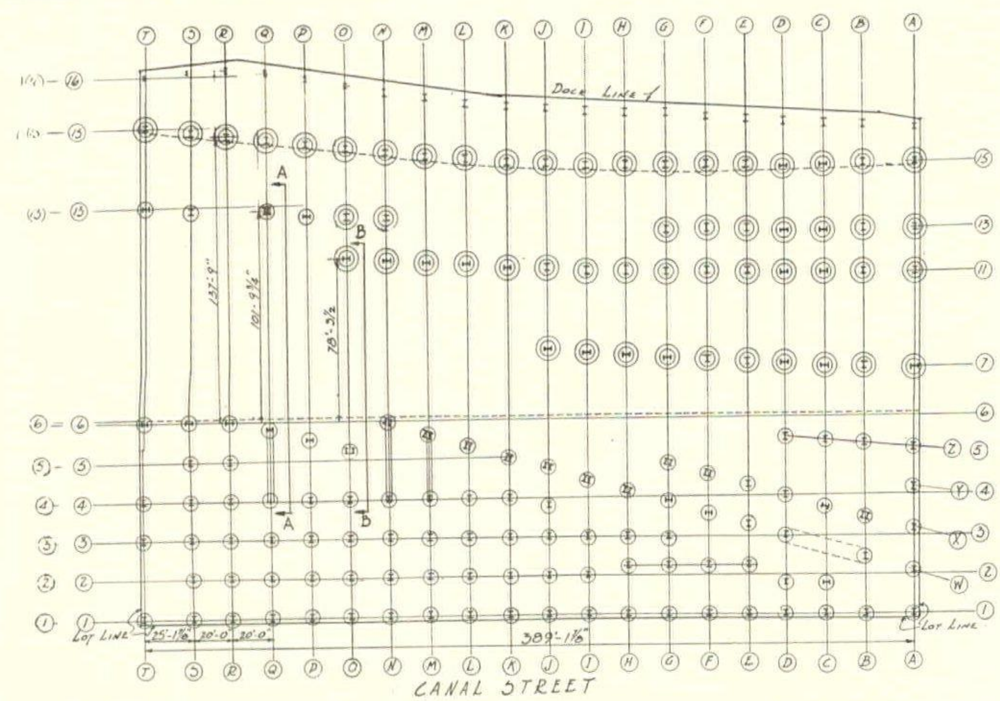


Trusses of the North Wing Over the Railroad Tracks

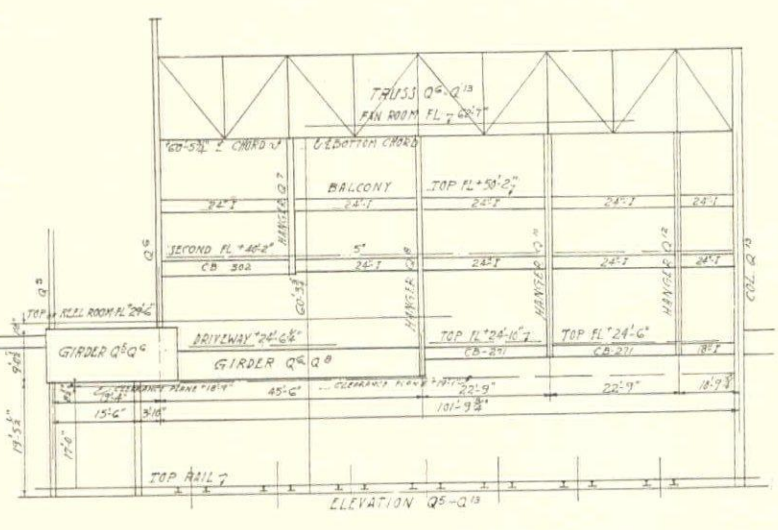
30-inch pans, as illustrated in the plan on page 113. Due to the difficulty of placing columns in proper relation to the tracks, the steel frame has some particularly interesting features. In many cases, large double plate girders, some 12 feet in depth, were cantilevered over the tracks to support the heaviest loads. In one instance, the moment on one of these cantilevers was 56 million foot-pounds. To these cantilevers there were attached smaller girders carrying the lighter loads and spanning the remaining distance between the columns. In some cases, it was necessary to use pin connections for this purpose because of the restricted headroom, dictated by the clearance above the tracks. In one instance, a truss, Q_6-O_{13}, supports a roof on its top chord, and four floors of the building are suspended from this truss. The bottom chord of this truss alone weighs 65 tons and was erected in two hours, which was the maximum time allowed, because it had to be put in place above the tracks without interfering with the train service. The rest of the truss was erected in place over the bottom chord. The truss may be seen in one of the illustrations as well as in the diagram. It is placed over the tracks in the north wing.

Vibration Insulation. The train tracks are insulated over the foundations and columns of the building so that none of the vibration of the moving trains will be communicated to the structure. This was accomplished, as will be seen in one diagram, by placing the tracks on a clay base without any connection with the structure. Another diagram shows the way in which the vibration and noises of the presses were insulated over the structure of the building. A heavy reinforced concrete floor, about 10 inches thick, was first laid. On this slab and around the bases of all columns there was placed a thick layer of compressed cork between iron plates. Over this another reinforced concrete slab, 6 inches in depth, was poured to support the presses. The cork insulation absorbs the vibration so that one is not conscious elsewhere in the building that these giant machines are operating.

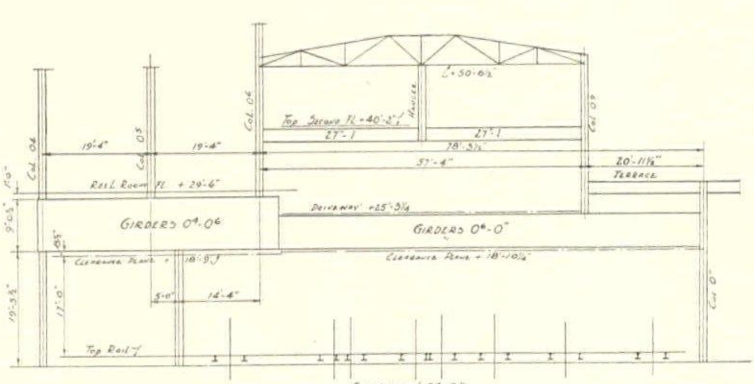
Paper Delivery. The immense tonnage of newsprint needed to feed these presses required careful planning for delivery. The paper is delivered (1) directly from the railroad, (2) by trucks driven into the heart of the building, or (3) by boat. The paper delivered by boat is lowered into a vertical shaft to a tunnel, which is over 8 feet high and 6½ feet wide, and it is 40 feet below the level of the lake. The tunnel



DIAGRAMMATIC PLAN SHOWING COLUMN LOCATIONS. PECULIAR COLUMN SPACING IS DUE TO LINES OF RAILROAD TRACKS



SECTION A-A SHOWING THE TRUSS Q6-Q13 SUPPORTING FOUR FLOORS OVER THE TRACKS; THE LOADS ON THIS TRUSS AND ITS MEMBERS ARE SHOWN ON PAGE 111. NOTE ALSO LARGE GIRDERS Q5-Q6 AND Q6-Q8



SECTION B-B (ON PLAN ABOVE) SHOWING GIRDERS SUPPORTING TERRACE AND FLOORS ABOVE THE TRACKS

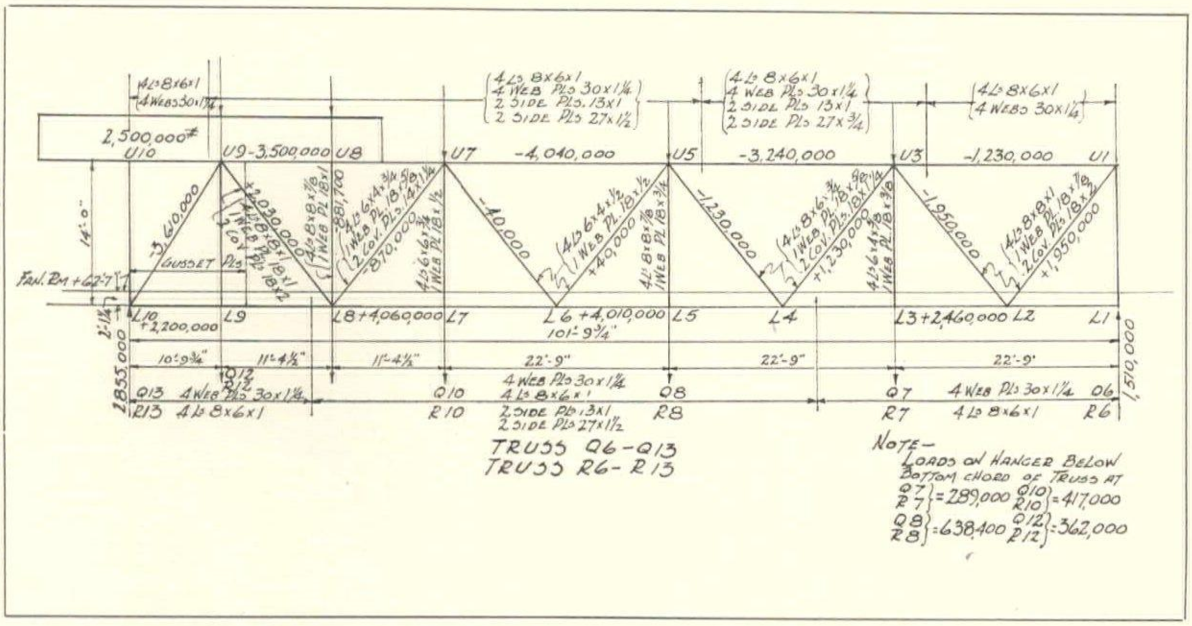
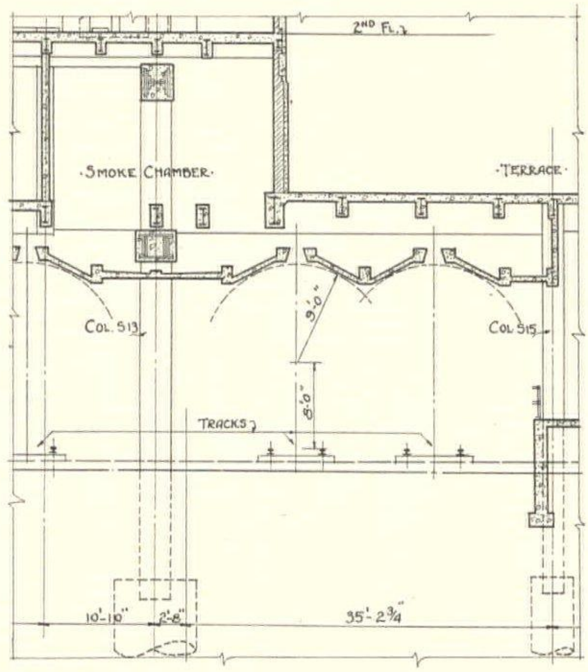


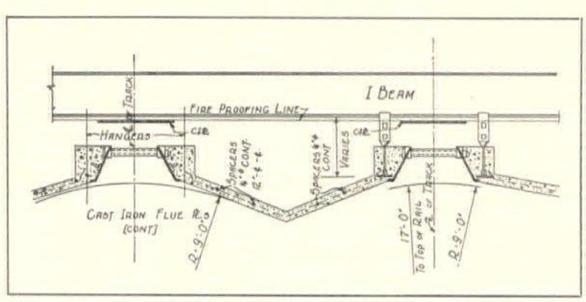
Diagram of Trusses Q6-Q13 Showing Loads, Stresses and Members

was placed at this depth in order that at some future date another level of tracks might be placed below the present track level, if necessary, without interfering with the paper delivery from the water side. The waterproofing of the concrete below the water level was taken care of, for the most part, by a careful proportioning of the 1:2:4 mix with the proper water ratio, and the use of small aggregate. The control of this work was determined by field tests. From the tunnel the newsprint goes up on elevators to the paper storage portion below the level of the presses. The presses themselves are of an improved type designed to conserve space by placing the rollers one above another rather than side by side in a horizontal position. Some 60 more lineal feet of floor area would have been needed for presses of the old style.

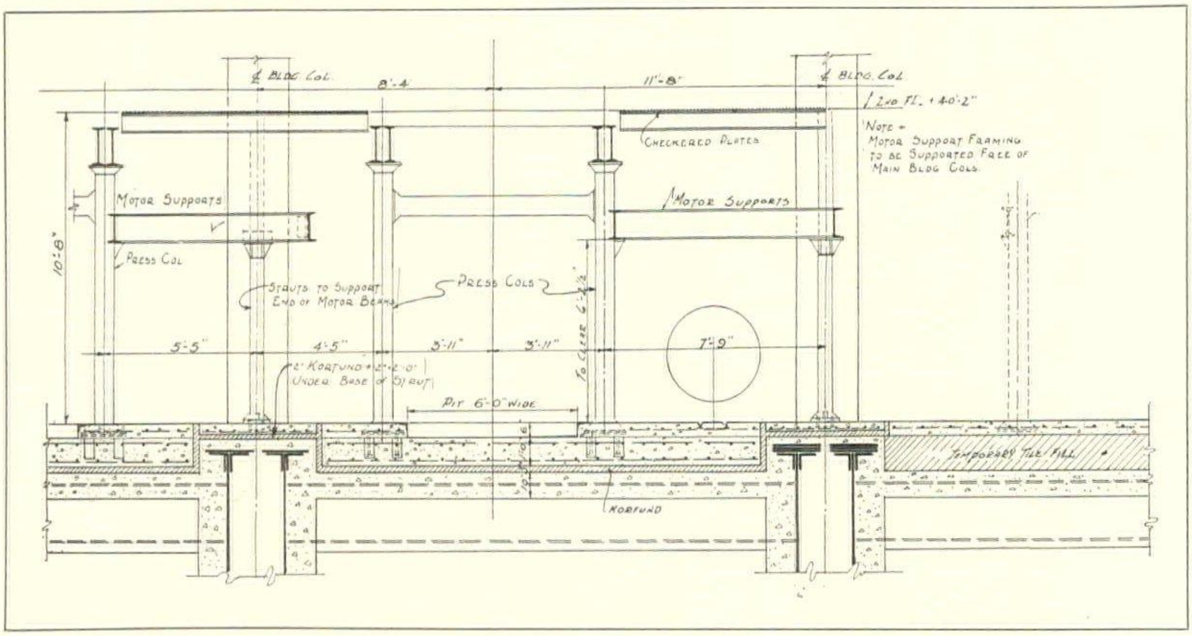
Heating and Ventilating. This building has no boiler room or power plant of its own, although provision has been made for such future installation if it should ever be advisable. The steam and electricity are supplied by public service companies. The heating of the building is by an up-feed system from the lowest to the 7th floor, inclusive, and by a down-feed system from the 23rd to the 8th floor, inclusive. The 24th, 25th and 26th floors, occupied by the radio studio, are heated by a separate up-feed system which has its pipe area on the 23rd floor ceiling. The distributing mains in this pipe space are equipped with air-operated valves for opening and closing, which are controlled in the pump room on the first floor. Two high-pressure lines run into the building,—one a 10-inch high-pressure pipe for general heating to carry the heaviest loads, and



Section Showing the Construction of the Smoke Disposal Chamber in Relation to Tracks and Terrace



Detail of Construction of Smoke Outlet Slots Centered Over the Tracks



Typical Cross Section, Upper and Lower Paper Reel Floors, Showing Insulation of Motor and Press Supports from Main Structure of the Building

one 4-inch high-pressure line to take care of the summer and hot water heating loads. There are pressure-reducing valves in the pump rooms. A vacuum system of heating is used throughout with cast iron radiators controlled by hand valves. Automatic control is provided, however, for the pressroom and in the radio studios. Leading from the heating system there is a 4-inch vacuum return to the Union Station, and a 2-inch condensate pipe.

There is no air conditioning, but mechanical ventilation has been provided for all the newspaper workrooms, such as the pressroom, reporters' rooms, storage, etc. The mechanical ventilation is both supply and exhaust. The air is heated to the proper temperature for distribution, filtered through an oil type air filter, and blown through the various sections of the building.

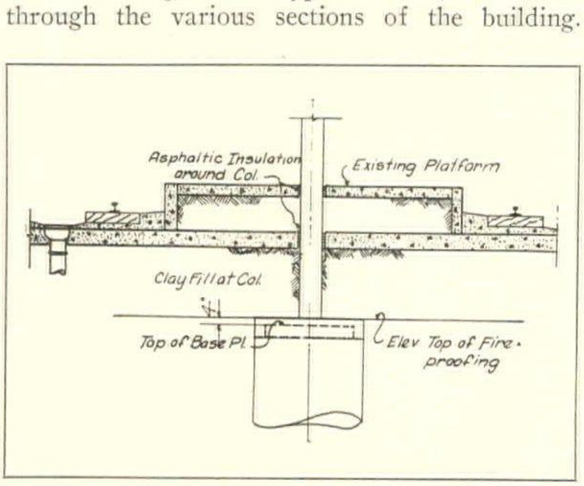
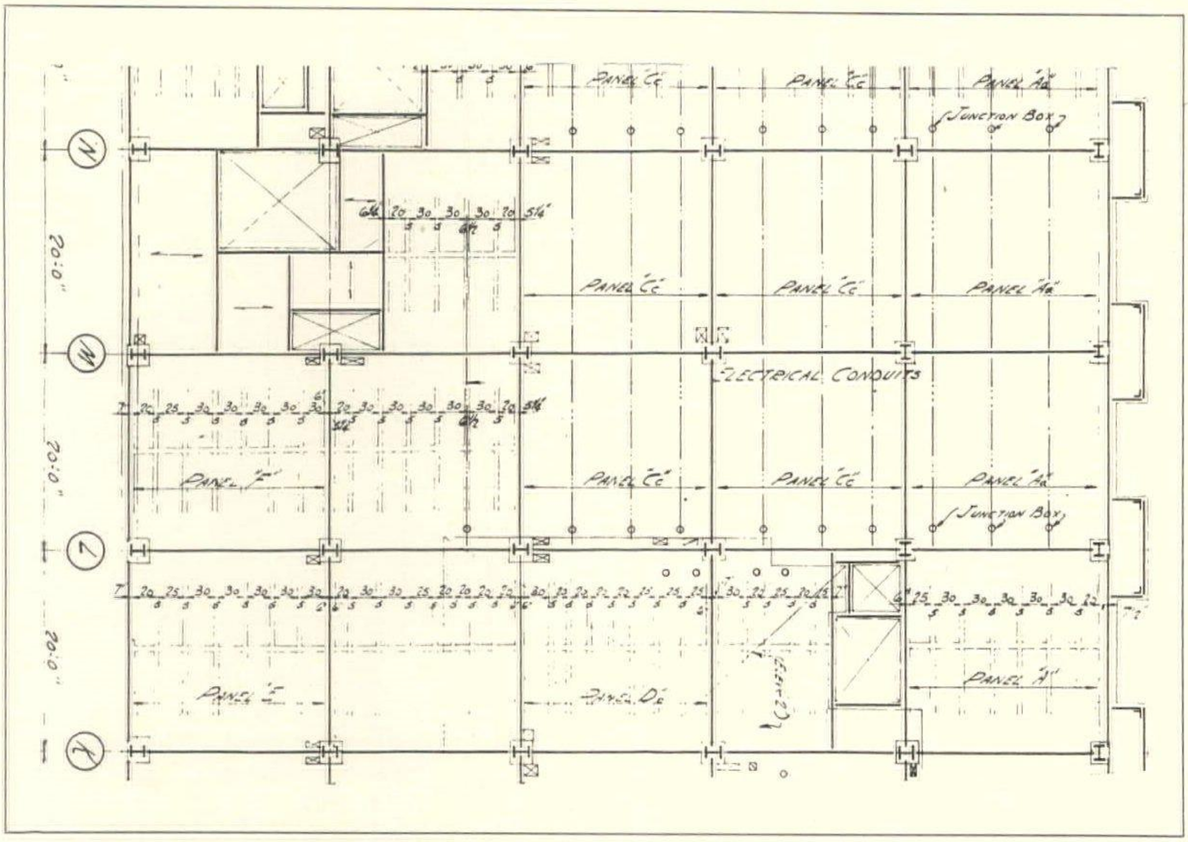


Diagram Showing the Vibration Insulation of the Tracks from the Foundations and Columns of the Building

There is no central system of ventilation, since such a system would undoubtedly distribute noise as well as air. The fans are placed where they are needed, and the ducts are run as directly as possible for efficient operation. The pump rooms have exhaust at the ceilings only. The first and second floors have supply ventilation only. There is no mechanical ventilation of the concourse, as natural ventilation is relied upon. The kitchen and cafeterias have separate systems, the supply being to the cafeteria in the north wing, and the fans on the fourth floor of this wing provide for the exhaust from the kitchen. A portion of exhaust air from the pressroom passes through the roof of the north wing, and three other exhausts from the pressroom direct the air downward into the driveway which runs from north to south through the building. The air that is thus expelled into the driveway is taken largely from the pressrooms, which have a considerable amount of heat. In this way, the driveway is somewhat warmed and made more comfortable for the delivery trucks passing through the driveway. There are five separate exhausts from the stereotype, etching, engraving and dark rooms to the outside atmosphere. There is no re-circulation of the air. Throughout the tenant floors the only ventilation is exhaust ventilation for toilets.

The ventilation of the portion of the building occupied by the radio broadcasting company, that is the 24th, 25th and 26th floors, has been very carefully devised to eliminate extraneous noises and the passage of sound from one room to another. The studios, control room, rehearsal studio and television studio are each connected

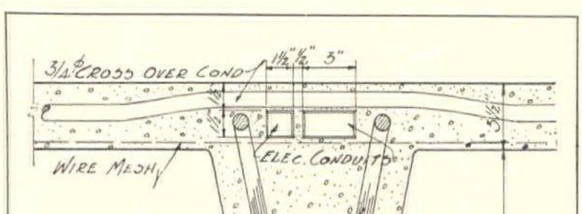


Portion of a Typical Floor Framing Plan. Floor Pan Construction and Electric Conduit Layouts are Shown

by a separate duct with the fan. The exhaust for each room is separate also to prevent sound travel along the ducts. Canvas connections are used between the ducts and the ventilating units in order that no mechanical vibration may find its way through the ducts. All fans are insulated from the floor by layers of cork and plank on 6-inch concrete foundations in addition to the floor. The heating coils of the ventilating system are controlled thermostatically.

Sound Insulation. The pressroom and linotype rooms are sound-insulated on the ceilings with a standard insulating material which has a perforated metal covering. This efficient insulation, combined with the insulation of the foundations of the presses, makes a comparatively quiet pressroom. The ventilating ducts in the pressroom are also covered with this sound-insulation material. In many portions of the radio corporation floors the efficient sound insulation has been provided by the use of a fiber type insulating board. By carefully eliminating mechanical connection where it might cause noise, by separating the ventilating systems, and by the use of sound-absorbing materials, the noise problem in this building has been solved.

Plumbing. There are two systems,—one the high-level, the other the low. The low-pressure system is provided by three electric centrifugal pumps with a cushion tank. The high system has two electrical pumps and discharges into the house tank which is on the 26th floor level. City pressure is used only for the sill cocks and for the drivers' toilet. The standpipe system has a 1,000-gallon, three-stage fire pump with a cushion tank. The sprinkler system is installed in the basement incinerator room, in the paper-baling room on the ground floor, and in such rooms as locker rooms, storage shops, carpenters' and electricians' rooms. There is an incinerator in the sub-basement in which rubbish of all kinds is



Section of a Typical Floor Joist Showing Reinforcing and Conduits burned, as the pressroom naturally provides a great deal of inflammable material. The pipes for both hot and cold water are of galvanized steel; the vent stacks, down-spouts, etc., are of wrought iron, and the steam system is of black steel pipe. The steam pipes running throughout the smoke chamber under the plaza and under the north and south wings are of flange-bolted cast iron protected by a double frost-proof cover tarred to seal, and wrapped in a 22-gauge aluminum jacket. The same type of insulation is used on the plumbing pipes in this location, which are of wrought iron with cast iron fittings. The drinking water is filtered in the pump room and 15 mechanical coolers are provided throughout the *Daily News* portion of the building. There are also ten bubblers. The drinking water for the upper floors is taken directly from the cold water system.

Electrical Equipment. The first question to be decided regarding electrical provisions was the type of current to be used. Considerations of the power rates and of the requirements of the machinery which had to be operated in the building were the determining factors. Direct current is used throughout the structure with the exception of the alternating current which is brought in a special A.C. feeder for the use of the broadcasting studio, WAMQ. D.C. current was chosen, as it allowed of the necessary refinement of control demanded by the presses. There are 32 units of presses arranged in eight lines and four 200-horse power motors are required for each line of presses. Other consumers of current are the lead-melting pots of the stereotype machines, of which there are four of 200 kw. each, and three of 60 kw. each. Approximately 5,000 kw. are required for the combined heating and power loads. These are brought in through 32 2-million circular-mill cables.

There are 16 elevators; three serve the *Daily News* portion of the building running to the seventh floor, having a speed of 450 feet per minute. There are five local and six express elevators running throughout the building, which have a speed of 700 feet per minute, and there are also hatchways for two more locals. All of these passenger elevators have the modern push-button type of control. In addition, there are one freight elevator for building use, and two freight elevators serving the newspaper spaces.

Wiring System. There are two main wire shafts so spaced as to equalize the horizontal runs. Standard round iron conduit with one outlet to each bay is used from the 7th to the 16th floor. Switches are provided throughout on the columns or walls as was convenient. Under-floor conduit in addition to the round conduit is provided for the offices of the Chicago & North Western Railway. There are three ducts in each of these underfloor conduit lines,—one duct for 110-volt current to provide for desk lights, dictaphones, etc., one for the telephone circuits, and one for the low-voltage signal circuits. These ducts may be tapped at 5-foot centers longitudinally, and they are tied together about every 40 feet across the building.

Lighting. The *Daily News* portion of the building, with the exception of the pressrooms and other special workrooms, is provided with indirect lighting fixtures, while the railroad offices use a direct lighting fixture of the enclosed opal glass globe type. The spacing of the ceiling fixtures is from 8 to 12 feet on centers, and in the working areas the level of illumination is never less than 10 foot candles. The lighting load was figured at 5½ watts per square foot. The pressroom is lighted by ceiling fixtures of the well known type having an opal glass globe within a white porcelain enameled steel reflector, No mercury lamps are used in this pressroom, although many pressrooms throughout the country do employ the mercury type of lamp.

Other Electrical Systems. The newspaper offices are wired with radio loud-speaker outlets in each important room. There are numerous signaling devices, such as press-dispatch signals, automatic annunciators in the executive publishing offices, business managers' offices, and so forth, signals which automatically report any irregularities in the starting of the presses which get out the regular editions, so that these matters may be immediately straightened out and the paper issued on time. There are call systems for messengers, stenographers, etc., and a call system for repair mechanics to work on the linotype, stereotype and presses. There is a mat-chute annunciator which records the delivery to the pressroom of mats from which the stereotypes are made. There is a complete electric synchronized time clock system throughout the newspaper section, consisting of 110 clocks and two large exterior clocks. The time is checked every hour from a master clock in the Station system. A portable watchman's clock system has about 150 switches in all throughout the building. Conduit has also been provided for an electric fire alarm system. The telephone system is a combination of manual and automatic.

It would be interesting to go into greater detail in regard to the equipment and its functioning, but such a course is impossible in an article of this character. It is hoped, however, that the high spots here outlined may indicate the excellence of the provisions that have been incorporated in this outstanding building in order that it may serve its multitudinous purposes with the maximum of efficiency and dispatch.

FINANCING THE LARGE BUILDING PROJECT

BY

ALTON L. WELLS*

ARCHITECTS, the country over, are finding that a knowledge of building finance and having substantial financial connections are factors of increasing importance to their offices. Not only is new business attracted by the fact that financial counsel and help may be obtained, but many a project in the perilous stages of early promotion is finally landed on an architect's boards solely because of his ability to suggest a satisfactory plan of financing or because of his ability to put his client in touch with a financial house that will provide the money that is needed.

A new building project usually comes to the architect in the form of an idea only. He is expected to translate the idea into blue prints and eventually into a building that will produce a satisfactory income for the owner. Seldom is the original conception accompanied by enough cash to finance the undertaking to completion, especially in these days when real estate operations are assuming such large proportions.

Procedure. In financing a new enterprise the procedure for securing funds falls naturally into these general divisions: (1) the preparation of a set-up or statement of facts concerning the proposed project; (2) the formulation of a financial plan to be followed in arranging the loan; (3) the selection of an investment banking house or other financial concern to which the appeal for funds shall be made; (4) the negotiations with the banker; and (5) the closing of the loan, once a commitment has been obtained.

Before proceeding to consider the matter of preparing the set-up, it should be observed that many proposals come to the architect's office that never should go further than the stage of a preliminary conference. Badly conceived projects, "shoe string" promoters, and other impractical schemes and schemers are all too familiar to members of the profession. Much time and money are wasted in attempting to develop undertakings which can never be "put over." Fortunately, undesirable business usually can be detected quite easily by asking a few questions.

Causes of Failure. The two most common causes of failure in new enterprises are inability to secure the site for the building, and the absence of any real capital in the hands of the owner or promoter. It is hardly worth while to prepare even preliminary sketches for a building unless the principal in the case either owns the ground involved or has a written option on it for a long enough time to insure that the necessary promotion work can be completed before its expiration. Many a likely operation has been wrecked, sometimes in the advanced stages of its development, because at the crucial moment it was found that the land could not be obtained; or that part of the site may have been available but some essential parcel could not be secured. A practical example of an unfortunate situation of this kind occurred last year when a $6,000,000 operation came very close to failure because the promoter neglected, until late in the financing negotiations, to secure a small piece of ground, worth about $10,000, that was an indispensable part of the building site. The owner of the ground, realizing the predicament of the would-be buyer, sat calmly in his office and listened to the bidding. The ground was finally purchased, but the price was $25,000 instead of its real value.

It is possible, occasionally, to finance an undertaking up to 100 per cent of its entire cost, the principal contributing nothing but his ideas and his time. But in the present condition of the money market, these cases are now occurring chiefly only in story books. And even if such financing were possible, it is questionable whether it would be sound business for either the promoter or the architect. It certainly would not be desirable from the standpoint of the banker and his clients. How much money a principal should have depends in great measure upon circumstances. But no one should expect to start a building operation, even under the most favorable conditions, unless he has at least from 15 to 25 per cent of the total cost of the project, either in cash or in ground value estimated at its actual worth.

Another vital factor which must be considered in determining the soundness and practicability of a new building operation is whether the estimated net income from the completed structure will be sufficient to defray all operating expenses and carrying charges, with a comfortable margin for contingencies. This cannot be discovered, usually, until the set-up facts and figures are prepared, but it should be definitely ascertained at that time. A building enterprise whose estimated net income is apparently insufficient to take care of all the obligations which must be met with enough left over to return a reasonable income on the owner's equity investment, may well be abandoned. Even if financing were secured, the undertaking would probably result, sooner or later, in financial grief for the owner.

Preliminary Survey. Preliminary to begin-

* *Manager Mortgage Department, Story & Company*

ning the actual work of assembling the information and material for the set-up, some consideration should be given to a survey of those general and special conditions which might affect the success of the proposed operation. While it is true that the principal concern of the architect is to design and erect a satisfactory building, when he assumes the role of financial adviser to his client he is under some additional obligations. He should do all in his power to assure himself that the proposed operation is one that will terminate favorably for his principal. Besides acting as a check-up on the safety of the enterprise, an investigation of this kind will serve the further purpose of providing the architect with many helpful facts which can be used when approaching the banker for financial aid.

PREPARING THE SURVEY

The scope of this survey should include such matters as general business conditions, the local rental situation, the desirability of the site selected, and the adaptability of the proposed building to the uses for which it is intended and to the character of the neighborhood in which it is to be erected. In judging the location these factors should be considered: street railway and bus transportation; available automobile parking space; proximity to railroad stations, trunk line highways, and shopping sections; trend of neighborhood improvements; property restrictions and local zoning ordinances. Naturally, the facts sought will vary somewhat with the type of building proposed.

The set-up, as is well known, is a compact statement of all the essential facts and figures relating to the proposed building operation. Its usefulness is two-fold; it enables the owner or promoter, by an examination of the information contained therein, to determine with a remarkable degree of accuracy whether the enterprise is a sound business undertaking, and it serves as a strong selling argument when the project is presented to the banker for financing. A set-up should be formulated with both these ends in mind.

The first step in preparing the set-up is to draw the preliminary sketches for the building. The drawings needed for financing purposes are a ground floor plan, a typical floor plan, and an elevation showing the number of floors and the ceiling heights. The ground floor plan should show store room sizes (if a commercial building), the dimension figures of other rooms, and the outside measurements of the base of the structure. The typical floor sketch should indicate the room and the corridor arrangement and the dimensions of the various rooms. Somewhere on the sketches there should be recorded the number of cubic feet in the building, the total number of square feet of net rentable area, and the number of square feet of rentable area on a typical floor. If the building is of a type that contains more than one variety of rentable space, as for instance store space, general office space, etc., the number of square feet of rentable area for each classification should be shown separately. Brief outline specifications, sufficiently complete to indicate the nature of the construction, should accompany the sketches.

These preliminary drawings should be free from non-essential details and of a character to be easily understood by the banker. It will be helpful, too, if sketches are made of a uniform size so that, when reproduced, they will conform in dimensions with the paper on which the set-up figures are written. This permits of all the set-up material being bound together in an attractive pamphlet that can be handled readily. It is surprising how a set-up of attractive physical appearance will influence a banker to look over a proposal when a carelessly prepared or too lengthy presentation will discourage him from even going into the preliminary details. Inasmuch as few people have the ability to visualize a completed building from an examination of its plans, an architect's rendered sketch, illustrating his conception of the finished structure, will repay its cost many times if skillfully used as a part of the set-up equipment.

Perhaps the most vital portion of the set-up is that which contains the figures relating to the costs of the enterprise, the proposed plan for providing funds, the estimated gross income, operating and maintenance expenses, net income, and other pertinent details. The success or failure of the operation will depend largely upon the story which these figures tell. The tabulation here will serve to indicate what facts should be presented:

COSTS		Totals
Ground value.		$————
Estimated cost of building (including builder's profit).		$————
Architect's fee (6% of building cost).		$————
Cost of financing.		
First mortagage.	$———	
Secondary financing.	$———	$————
Carrying charges during construction.		
Interest on loans.	$———	$————
Taxes.	$———	$————
Any other charges.	$———	$————
Miscellaneous expenses.		
Legal fees, trustee's charges, printing, appraisal charges, title expense, insurance, surveys, incidentals, contingencies.		$————
Total costs.		$————

In giving the ground value the number of square feet in the plot and the value per foot should be shown. The cost of the building may be ascertained by the use of a cubic foot cost figure which the experience of the architect indicates as conservative, or actual bids may be obtained from reliable builders. If the cubic foot cost method is used, the number of cubic feet in the building should be given and the unit cubic foot cost figure included. Prior to estimating the cost of financing, a rough calculation should be made of the total cost of the project. With this figure in mind a first mortgage loan of from 50 to 55 per cent may be presupposed, if an institutional loan is to be sought, or about 66⅔ per cent of the total cost if a bond issue is to be made. Secondary financing in an amount that, with the first mortgage, will aggregate from 75 to 85 per cent of the total cost, may be assumed. In these troublesome times of real estate financing it is difficult to predict what the charges for funds may be, but in a general way institutional loans should not cost over from 2 to 3 per cent, first mortgage bond issues not over 5 per cent, and secondary financing not over 10 per cent. If the rates asked are in excess of these figures, it is a question as to whether the ordinary building project can pay them without burdening itself with a serious financial handicap.

Some very good authorities insist that financing charges should not appear in the cost figures. But general practice is against this contention, the belief being that financing charges are as necessary an item of cost as those for materials, labor or any other essential element that enters into the construction of the building. Many estimators place the expense of a completion bond in the cost column. It would seem that this should be done only when this item is not provided for elsewhere. Sometimes a builder provides bonding service which is given without cost if he proves to be the successful bidder. Occasionally the price of the bond is included in the estimate of building cost. Not infrequently cost estimates contain provisions for working capital and for furniture and fixtures. The banker almost invariably eliminates these amounts from the set-up on the assumption that they are not properly charges against the building operation. At the same time, when funds for these items are essential to the successful operation of the building, the banker will probably insist that they be provided for independently of the regular financing. This, no doubt, is sound practice.

PLAN FOR PROVIDING FUNDS

Under this heading there should be given a brief resume of just how the owner or promoter proposes to raise the money for 100 per cent of the cost of his enterprise. As for example:

First mortgage	$———
Secondary financing	$———
Equity investment	$———

The total of these amounts should equal the total amount of costs. In setting forth these figures it is well to indicate the rates of interest on the first mortgage and the secondary financing, and the amounts of amortization which the project can probably pay on each.

The interest rate on first mortgage financing is fairly well stabilized at present at 6 per cent. Secondary financing will probably carry an interest charge of from 6 to 6½ per cent according to the amount of discount paid on the issue. Institutional first mortgage loans in conservative amounts may be had at 5½ per cent, and in some rare instances as low as 5 per cent. Long term first mortgage bond issues will probably involve an annual amortization payment of about 2 per cent, and secondary issues will have to be amortized at rates varying from 3 to 5 per cent per annum. If preferred stock is issued for secondary financing, it will no doubt carry a 7 per cent dividend requirement. The advantages of making these suppositions as to interest and amortization are that they serve as guide posts to the banker as to about what the project can pay, and they permit the owner or promoter to calculate whether his net income is going to be sufficient to pay all necessary charges.

GROSS INCOME

Here there should be shown estimates of all possible earnings of the building. The illustration given here is general. The essential requirement is that the facts stated shall be comprehensive, and clearly indicate from just what sources revenue is expected and in what amounts. Where space is segregated to produce different rates of rental return, the different classifications should be shown separately.

Store rentals, ——— sq. ft. @ $——— per sq. ft.	$———
Upper floors, ——— sq. ft. @ $——— per sq. ft.	$———
Concessions, cigar stand, restaurant, etc.	$———
Any other sources of revenue	$———
Total gross revenue	$———

VACANCIES

Instances are rare where, year in and year out, a building continues to be fully rented. Vacancies occur, and they must be considered in computing net income. For set-up purposes the vacancy rate is estimated, such estimate being based upon the general experience with buildings of similar character and upon conditions in the specific locality of the proposed project. All types of buildings do not have the same percentage of unoccupied space. The allowances ordinarily made for vacancies are: office buildings, 10 per cent; apartment houses, about 15 per cent; and commercial hotels from 25 to 30 per cent. If the vacancy experience exceeds these figures, it is almost certain that either the management is inefficient or the building is improperly located. Theaters, particularly large houses, are seldom built without being leased in advance. This is often true of hotels.

OPERATING AND MAINTENANCE EXPENSES

Quite naturally, the expense of operating and maintaining a building varies with the type of structure. Expense schedules for an office building and a hotel will differ, as will, also, those for a large and a small building. Care should be taken to see that every item of expense connected with the operation and maintenance of the building under consideration is included in the list furnished. The items given here are by way of suggestion only, but they include most of the ordinary expenditures.

Payroll; managers, clerks, telephone operators, elevator operators, janitors, firemen, and other employes under the direction of the chief executive. The list of salaries should be itemized and the total carried out.
Electricity; light and power
Coal
Gas
Water
Decorating and repairs
Elevator maintenance
Supplies
Ashes and garbage removal
Window cleaning
Insurance, fire, rent, liability, casualty, etc.
Taxes
Management
Miscellaneous
Total expenses $______

Expense estimates should be very carefully computed. Where possible, they should be compared with experience of similar buildings in the same locality. They should be liberal enough to provide for contingencies.

NET INCOME

Practically all of the figuring done thus far in the preparation of the set-up has been for the purpose of arriving at the amount of that extremely important factor, net income. Upon the showing which the net income figure makes will depend very largely the decision of the banker as to whether he cares to go further into the details of the project. To compute net income is a simple matter when once the figures for gross income, vacancy, and operating and maintenance expenses, are in hand. For instance:

Gross income		$______
From which are deducted:		
Vacancy	$______	
Operating and maintenance expenses	$______	$______
Net income		$______

A considerable number of people contend that income tax requirements should be deducted from gross income in addition to the items already suggested, particularly if the owner of the building be a corporation. This is an open question. For practical purposes in presenting the set-up to the banker, a common practice is to omit the income tax deduction on the assumption that if the question is raised by anyone it should be raised by the banker.

To be safe for the owner, and to be acceptable to the banker, the net income of a project should be at least twice the amount of the annual interest charges on the first mortgage. This, however, is a minimum. If the ratio is 2½ or 3 times, so much the better. A recent analysis of 20 leading issues of real estate securities marketed during the last year showed that the average ratio of net income to first mortgage interest charges was 2.48 times.

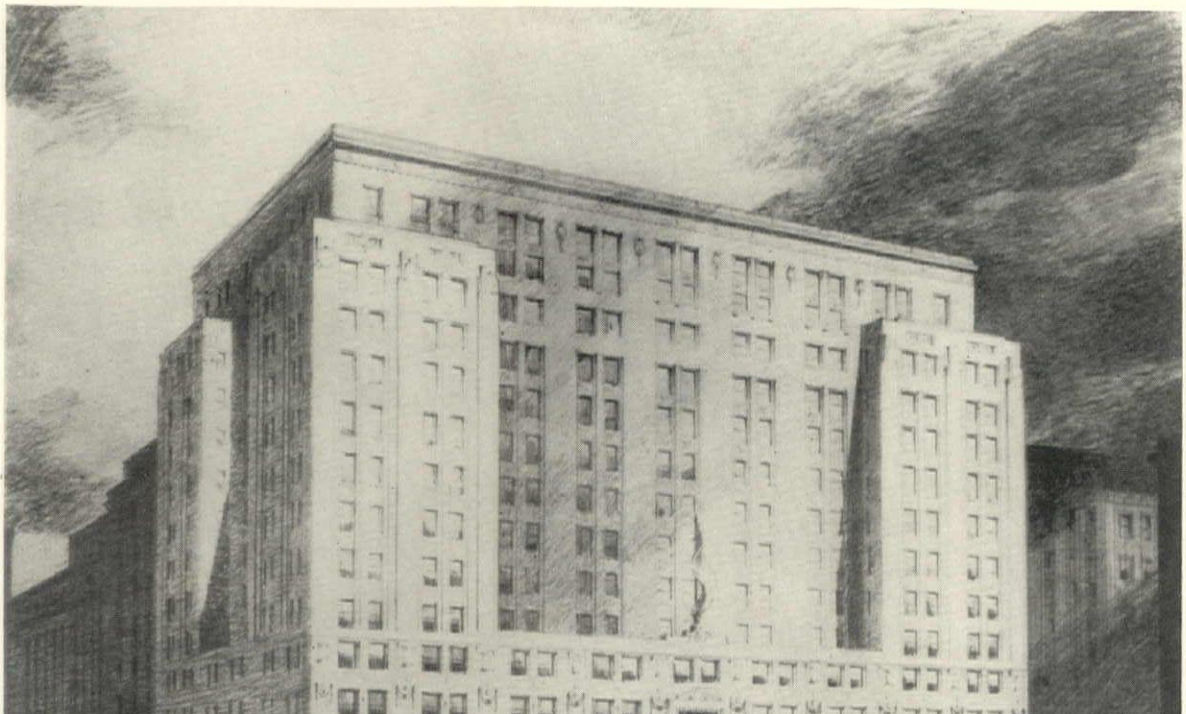
So much for the set-up proper. Without any further preparation, an appeal for funds might be made to the banker. But while the set-up should be brief, and its significant features capable of being comprehended almost at a glance, there is some supplementary material that should be included for the purpose of amplifying and supporting the facts already compiled. This additional data may be submitted in considerable detail. It should be neatly bound and attached to the set-up in such a way that it can be referred to by the banker if his interest in the enterprise prompts him to seek further information. Included in this section of the set-up there should be:

1. A map of the city in which the operation is located, with the site of the building marked thereon. A small map is preferable.
2. A locality map, drawn by the architect, showing the important buildings in the immediate vicinity of the proposed structure together with any other data that might serve to emphasize the value of this particular location.
3. A plot map of the ground, also prepared by the architect or obtained by him from the city surveyor's office, showing lot lines and dimensions.
4. One or more appraisals showing the value of the ground on which the building is to be located. These appraisals should be made by well known local real estate authorities.
5. If the building costs in the set-up have been based on actual offers of responsible builders to construct for the figures named, copies of the

letters making such offers should be attached.

6. Rental estimates should be supported by the written opinions of rental experts, saying that the rates quoted are reasonable and that, according to their judgment, the space in the proposed building should rent quite readily. If advance leasing arrangements have been made with prospective tenants, this information should be included. Any further evidence supporting contentions as to amount or permanency of income will prove valuable.
7. The banker will be much interested in the financial stability of the principal. Full information regarding him should be furnished, such as address, business connection, and financial and other references. One or more commercial agency reports will add weight to the evidence. If the principal has been successful in the operation of other properties, this fact should be disclosed. If the principal is a syndicate, full information should be given about all the members of the group. Emphasis should be laid on the actual amount of cash, or its equivalent, that the principal is investing in the project.
8. A statement should be made of any other facts that might strengthen the case. As for example, increases in the values of adjacent properties, the existence of well rented and prosperous buildings in the immediate vicinity of the proposed structure, new developments, such as improved transportation, that might tend to enhance the value of the undertaking.
9. An index page, placed at the front of this section of the set-up, will facilitate the use of its contents.

Backed up with the full equipment which has been suggested, the promoter is ready to start out in search of financial backing. Before attempting this, however, one important precaution should be taken. *Verify every fact in the set-up.* There is hardly a situation more embarrassing, or one that is more inimical to successful negotiation, than to discover, during the course of the conferences with the banker, that some of the information submitted is inaccurate. Inaccuracies are due in most cases to placing dependence on loose statements made by other people. One who is seeking to borrow funds running, perhaps, into seven figures, can ill afford to jeopardize his opportunity of bringing home the essential dollars by relying upon anything less than personally verified information.



The Architect's Rendering of a Proposed Office Building Helped Very Materially in Securing the Required Financing

FINANCIAL SET-UP OF AN ACTUAL OFFICE BUILDING PROJECT

COSTS

Ground value, 16,492 sq. ft. @ $82.50 per sq. ft.		$1,360,590
Estimated cost of building, 1,970,000 cu. ft. @ $.55 per cubic foot		1,083,500
Architect's fee, 6%		65,000
Cost of financing,		
First mortgage, 5% of $1,900,000	$95,000	
Secondary, 10% of 375,000	37,500	132,500
Carrying charges during construction (period of 1 year)		
Interest on loans,		
$1,900,000 @ 6%	$114,000	
375,000 @ 6½%	24,375	
*Taxes	26,650	165,025
Miscellaneous expense, including legal fees, appraisals, trustees, charges, printing, title expense, surveys, insurance and contingencies (estimated)		35,000
Total costs		$2,841,615

*In this particular case there was an old, heavily taxed, existing improvement on the ground. This was demolished later.

PLAN FOR PROVIDING FUNDS

First mortgage, $1,900,000 bond issue for 15 years, 6% interest, 2% annual amort.	$1,900,000
Secondary financing, $375,000 bond issue for 10 years, 6½% interest, 5% annual amort.	375,000
Equity investment	566,615
Total financing	$2,841,615

GROSS INCOME

	Annual
10,000 net rentable square feet on each of 11 floors, or 110,000 sq. ft. @ $2.25 per sq. ft.	$247,500
12,500 square feet of net ground floor area, at average rate of $9 per sq. ft. (figures based on leases running from 5 to 10 years)	112,500
Concessions, and miscellaneous	none
	$360,000

VACANCY

Figured on a basis of 10%	$36,000

OPERATING AND MAINTENANCE EXPENSES (Estimated)

The figures given here are based on the actual costs of operating a nearby building.

Payroll	$20,000	
Electricity and gas	6,000	
Coal	5,000	
Water	1,200	
Partitioning and remodeling	2,500	
Supplies	3,000	
Ashes and garbage removal	600	
Window cleaning	1,200	
Repairs	5,000	
Insurance	2,200	
Taxes	30,000	
Total expenses		$76,700

NET INCOME

Gross income		$360,000
From which are deducted:		
Vacancy	36,000	
Operating and maintenance expenses	76,700	
		112,700
Net income		$247,300

Annual interest charges on first mortgage, $114,000.

Net income, $247,300 or 2.17 times interest requirements of first mortgage.

AIRPLANE HANGAR DESIGN

BY

R. W. SEXTON

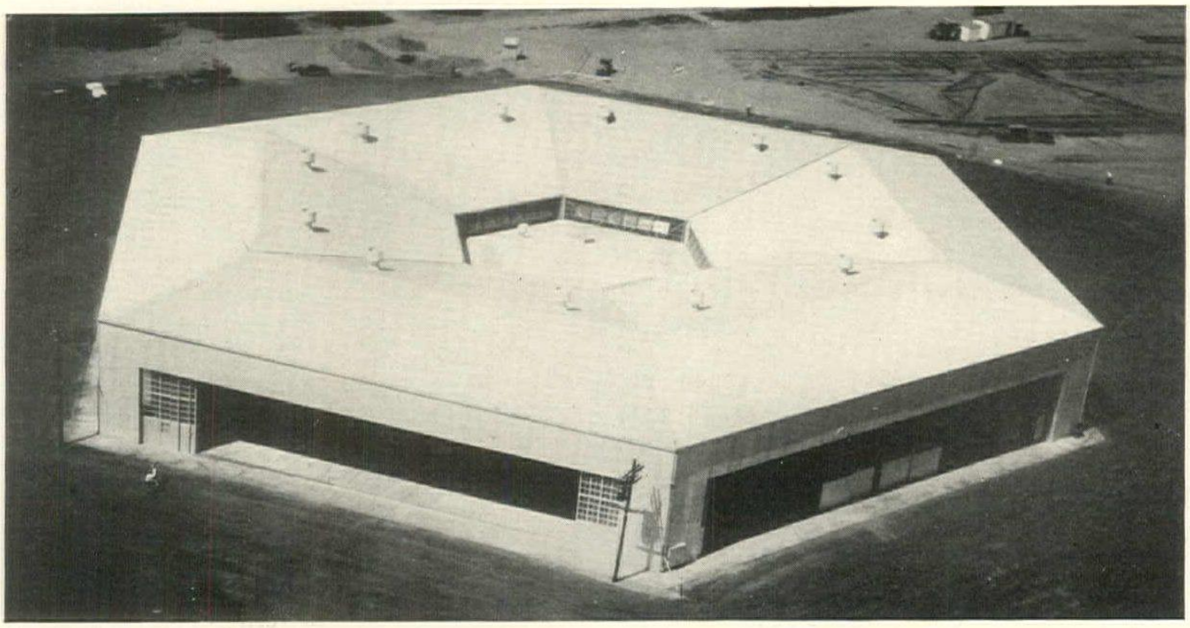
THE practicability of air transportation as a commercial enterprise has been demonstrated for a number of years, and now the architectural features involved are claiming increased attention. The hangar is the essential building to be designed, with the incidental structures pertaining to airports, such as passenger and freight terminals, hotels and restaurants. The hangar is the only one of the airport buildings that presents a new problem. The hangars that have been built to date have had no particular architectural character. They are merely four walls and a roof, serving every practical purpose. They have been constructed with the utmost economy because, perhaps, of the speculative character of the air transportation business along with its lack of funds.

An architecturally attractive hangar is a difficult problem in design, and it has not yet been solved satisfactorily. Now that the elements of the plan and the necessary utilities have been fairly well established, the element of architectural design may well be studied and the hangar lifted out of the locomotive round-house class of architecture as designed by the old time railroad engineers. The hangar is deserving of a better appearance than the round-house because it usually has better surroundings and is in closer contact with the passengers and the public. The function of the hangar is to house airplanes and airships, and in addition there are sometimes included divisions used for repair shops, storage of supplies, washrooms and other facilities. The maximum economy in hangar construction is attained when it has minimum cubic contents, and this will result by correctly relating the plan of the structure to the size and shape of the vehicles to be housed. As air vehicles of the airplane and airship types are recent inventions, it is not probable that their design and limits of size have become fixed; on the contrary, quite radical changes are to be expected, and corresponding changes will have to be made in hangar designs. Obsolescence will be a factor in the experience of hangars, as it is found to be inevitably so with other commercial buildings, and it is a factor to be considered in their designing and construction.

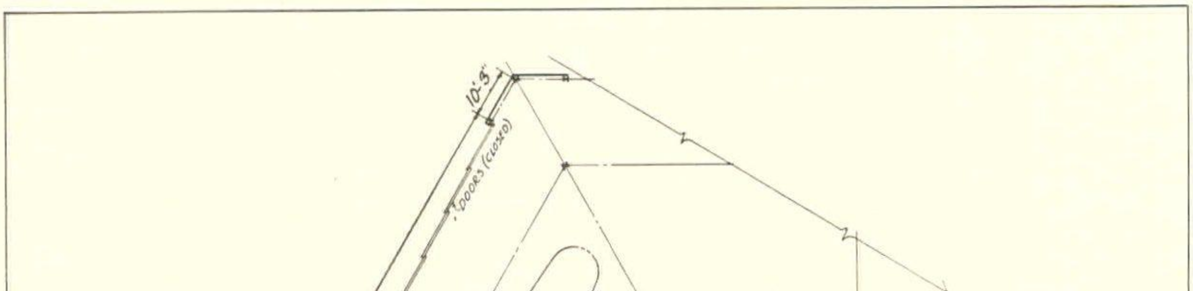
Considering the cross-section of hangars, it is found that airplanes are more snugly and economically housed with vertical side walls of minimum height and approximately flat roof construction of minimum depth. The shape of the airship is such that the semi- elliptical cross-section is the most appropriate. The cost of heating hangars, which is necessary in the greater portion of the United States, depends upon their cubic contents and the construction of the walls, doors, windows and roof. Minimum cubic content is best secured by using trusses of the least possible depth, having horizontal lower chords and horizontal, slightly pitched or curved upper chords. The insulation of the walls and roofs can be adequately provided by several well established methods.

The rectangular plan has been used generally for airplane hangars, and these are sometimes built in series of two or more units separated by division walls. The door openings are usually placed in one end or at opposite ends, and are of sufficient size to admit vehicles of specified height

Fireproof Hangars at the Central Airport, Camden, N. J., Fifteen Minutes From the Center of Philadelphia



HEXAGONAL HANGAR AT THE WESTERN AIR EXPRESS, INC., AIRPORT, LOS ANGELES



PART PLAN AND SECTION AT TRUSSES T1-T2. HEXAGONAL HANGAR AT THE WESTERN AIR EXPRESS, INC., AIRPORT, LOS ANGELES

A. M. EDELMAN AND A. C. ZIMMERMAN, ASSOCIATED, ARCHITECTS

Interior View of Hexagonal Hangar at The Western Air Express, Inc., Airport, Los Angeles

and wing spread. The length of the hangar depends upon the number and size of the airplanes to be housed. The repair shops, storerooms, washrooms, heating plant and other facilities are usually housed in a lean-to section built along one side of the hangar, or at the rear of the building.

A radical departure from the rectangular hangar plan was made in a building erected recently, which has a hexagonal plan. It was designed by A. M. Edelman and A. C. Zimmerman, associated, architects for the Western Air Express, Inc., at Los Angeles. The hangar was designed for servicing airplanes between their scheduled flights. The building is designed to accommodate six airplanes having a wing spread of 99 feet and a depth of 70 feet. Connecting the four extremities of this vehicle produces a quadrilateral figure which, except for the obtuse-angled area in front of the wing axis, is triangular in shape. To accommodate this shape of ground coverage in the most economical manner, a building hexagonal in plan was designed to house six airplanes of that size.

The sides of the hexagon are 143 feet, 6 inches in length, the minimum or normal diameter is 248 feet, 6⅞ inches and the maximum diameter is 287 feet, all center to center of columns. The roof is supported on 24 columns. There are six door openings 122 feet, 4 inches wide and 20 feet high. In each opening there are 12 doors supported on rails and sheaves, with the tops confined in guide channels. A hexagonal stockroom, washroom and office, having sides 20 feet, 6 inches long, is placed in the center of the building. Work benches are placed around these rooms. The roof of the central portion, having sides 41 feet long, is dropped about 6 feet below the main roof. Vertical windows are placed between the two roof levels, and there are six skylights in the lower roof around the stock and washrooms. These windows and skylights, with the glass in the exterior doors, provide well distributed daylight illumination over the entire floor area.

It is not necessary to heat this building because of its location in southern California, and for that reason the structure is enclosed with corrugated iron. Therefore, the cost of the structure is quite low, $1.69 per square foot. The building covers 53,800 square feet, in which 270 tons of structural steel were used.

The low cost of this hangar is attributed to its plan and construction and to the lack of heating apparatus and non-insulated roof. Another factor which contributes to the low cost of this hangar is the intensive utilization of floor space, which is shaped to the form of the airplane floor coverage.

At present the airplanes used have a wing spread of 80 feet and a length of 50 feet. Three of these vehicles can be placed in each section of the hexagon. Future hangars for storage purposes will be built. These will consist of a row of triangular units with doors on each side of the row.

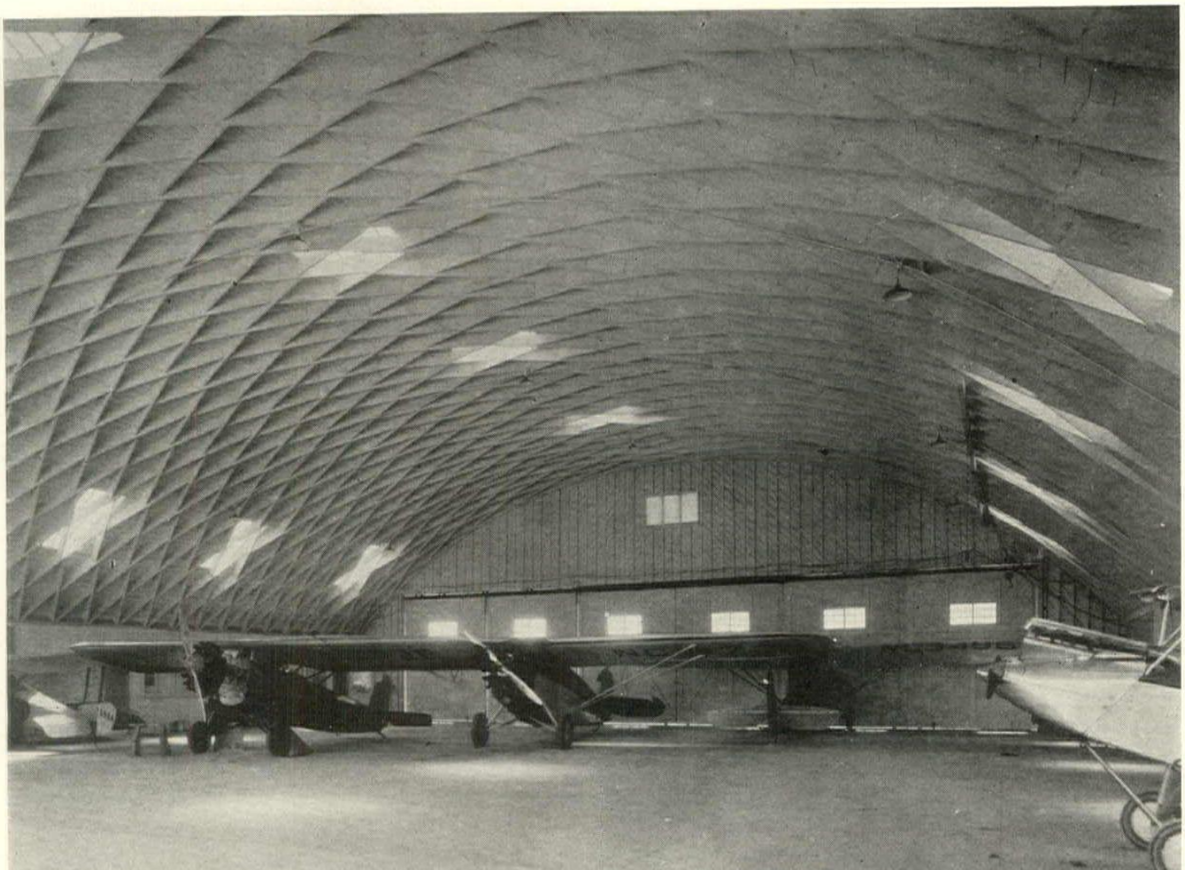
The designing of hangar doors, owing to the unusual size of the door openings, presents an unusual mechanical problem. Aside from the construction of the door itself, its air-tightness when closed and the means of operating it, require special consideration. Air-tightness has an important

Hangar at The Municipal Airport, Pontiac, Mich.

Hangar and Service Station, Bridgeport Airport, Bridgeport, Conn.

effect on the designing of the heating system. Planning the operation of the doors constitutes an important item of labor and time. The large size and great weight of each section of the multiple door cause a large amount of frictional resistance to movement which must be reduced to a minimum by the use of correctly designed motion elements placed either above or below the door. In localities subject to snowfall and ice, it is advisable to have the motion parts on tracks placed above the doors and protected. In other climates, floor-level tracks are suitable.

With extra heavy door sections, especially those opened and closed on the accordion principle, the operating load accumulates so that it requires the use of steel cables operated by hand or electrical motor-driven winches. Although the door is practically the only movable part of the hangar, it is one of its most important features. The manufacturers of operating mechanisms have made a special study of the hangar door problem, and have produced them in satisfactory forms.



Clover Field Airport, Santa Monica, Cal. Interior View of Hangar Showing the Laemella Wood Roof Construction

AIRPORT AND HANGAR HEATING

BY

WILLIAM HULL STANGLE

OF THE OFFICE OF KENNETH FRANZHEIM, ARCHITECT

THE problem of heating the buildings in a modern airport has called for the exercise of no little ingenuity on the part of architects and engineers. Although somewhat similar to those of a large industrial plant or a multi-building institution, the conditions of airport heating are sufficiently different, and the lack of precedent is so pronounced as to call for considerable research and for more pioneering.

Aviation is a new industry, and the airport a new kind of traffic terminal. What applies to industrials does not always apply to aviation. What applies to railroad terminals, steamship terminals or bus terminals does not always apply to airports. The unknown size of the future airliner alone precludes obtaining definite solutions to the problems of airport engineering. The writer has discussed with prominent pilots the future of the terminal. Indications so far seem to divide air transportation into three classes, i.e., (1) the long haul by lighter-than-air machines, (dirigibles); (2) the short haul by heavier-than-air machines, (aëroplanes); and (3) the field-to-city hauls by autogyro or heliocopter machines, the latter type to allow nearly vertical ascent or descent to permit landing on a large building in the heart of a large city. The public is not yet air-minded enough to trust planes for long hauls, particularly inter-continental transportation, but it has already demonstrated its faith in flying.

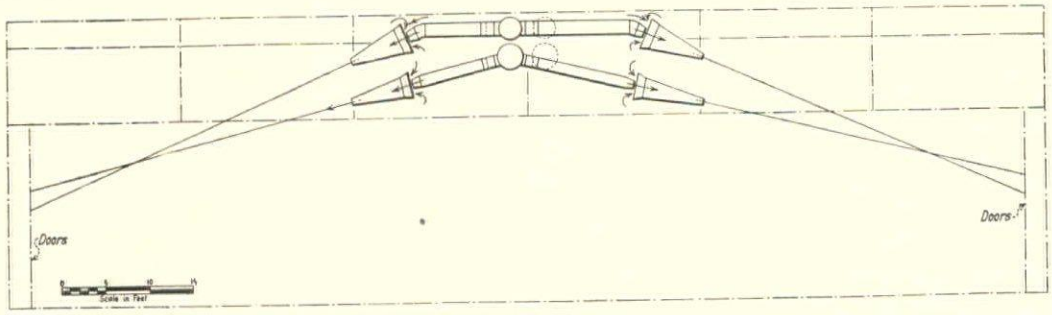
The greatest handicap to aviation today, in influencing the public mind to the greater use of airways, is the usual distant location of the airport from the heart of the urban community it serves. The chief selling point of the aviation service is time saved for the passenger. Only too frequently, however, that saved time is lost in getting the passenger from the airport to the nearby city. It is predicted that with perfection of the autogyro this condition will be improved and the service more quickly accepted by the public.

But what has all this to do with airport heating? It has much to do with the problem. When one pioneers, one must have all known factors. A glance at the plot plan of a modern airport will show several things of paramount importance in influencing the heating design. It is noted that an airport covers a vast area; that as at present planned the buildings are comparatively small; and that these buildings are spaced at a considerable distance from one another. The contour of the ground cannot be shown, but it does affect conditions. Briefly, a port will contain hangars, terminal or administration building, and concessions. The larger ports will include repair bases, dope shops, and motor test buildings. The greater ports will ultimately include restaurants, garages, taxi and bus terminals, hotels, and even railway terminals.

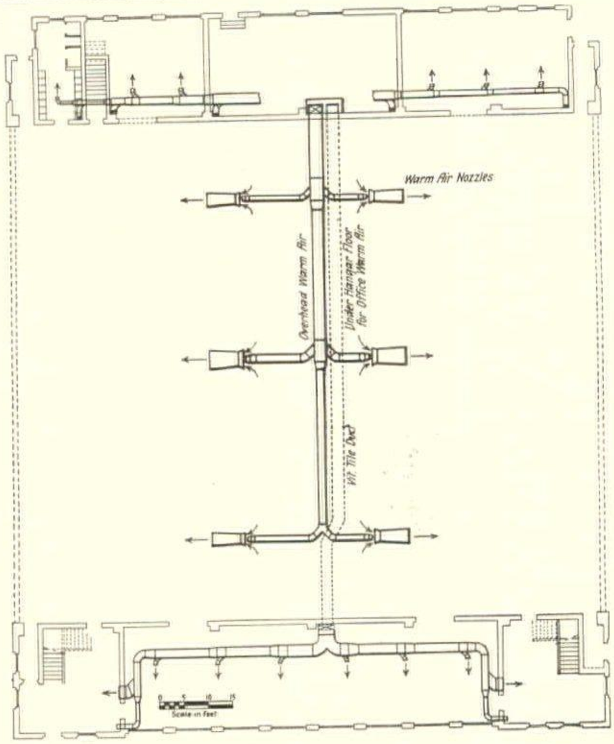
Possible Heating Systems. The first thought as to heating has naturally to do with a central steam plant with an underground distribution system of steam supply and condensation return pipe lines. In the larger ports this at once becomes prohibitive for several reasons,—the high initial cost, high maintenance, and, last but not least, the nearly impossible prediction as to future needs. Here we are confronted with the lack of knowledge of the future of the new industry. It is true that operating cost may show up very well, but it is more than likely, as has been proved in several instances, that local physical conditions will increase the operation cost. In one case, the contour of the ground made necessary considerable pumping of condensate. One other point to bear in mind is that the steam load is for heating, and that practically no power load or industrial load is needed. In only rare cases are railroad sidings available for coal and ash handling, or for the supply of fuel oil.

The next thought has to do with developing several smaller central steam plants, but this involves high salaried operators, and only in a rare instance will it work out economically. The third suggestion is that of an individual steam plant for each building. This, of course, means a low-pressure system to eliminate the necessity of employing licensed operators. For certain of the buildings this will work out satisfactorily. With an individual plant for each building, the first concern is as to the fuel to be used. The experience already gained has proved that it is nearly impossible to get proper attention for heating plants. Coal and ashes have to be trucked to and from the buildings, and good housekeeping is well nigh impossible. Careful investigation has shown that automatic firing of each plant with gas or fuel oil is advantageous. Where gas is available and where an economical rate can be obtained, it is most desirable, but gas is rarely available at an airport. Fuel oil has been accepted as a satisfactory solution to the fuel problem.

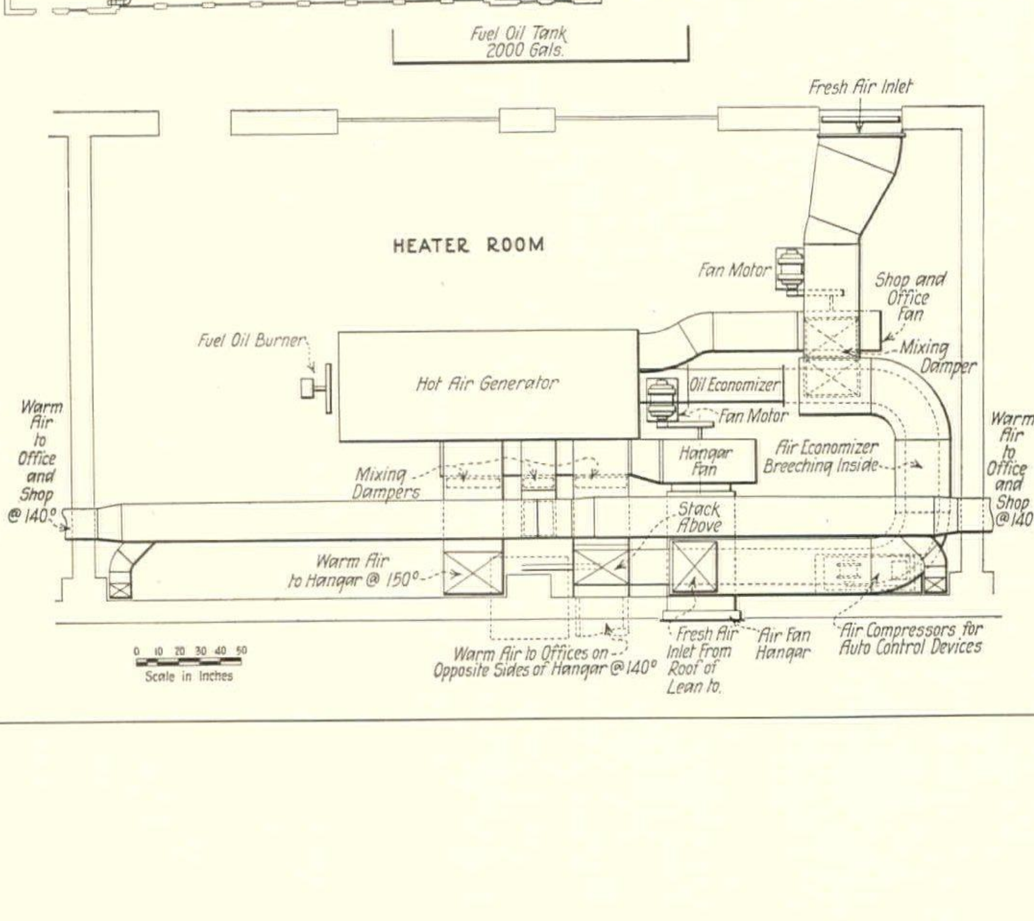
Hangar Requirements. But we are particularly interested in the heating of the hangars, for they have offered unusual problems to the heating engineer. A hangar is a garage for planes, with shops, offices and space for mechanical equipment. The accompanying sketch shows a modern



(Above) Sectional Diagram Showing the High Velocity Hot Air Nozzles Directed Toward the Doors



(Left) Plan Showing the Heating Room and the Distribution Ducts



(Below) Plan Showing Heating Apparatus and Arrangement in the Heating Room hangar. The average space for housing planes is approximately 100 feet square, and the clear height, under bottom chords of trusses, is 20 feet. This gives a minimum free volume of 200,000 cubic feet. Where no hung ceiling is used, the volume will run from 250,000 to 300,000 or more cubic feet.

When a plane is housed in zero weather, the doors, which open the full width of the hangar, give a free opening of some 2,000 square feet. In a few moments the entire hangar temperature drops to the outside temperature. Here is the real problem of hangar heating. The hangar must be quickly re-heated. The accepted temperature is 50° Fahr. The shops should be heated to 60°, and the offices to 70° Fahr. It can be seen that there is considerable danger of freezing any water lines in a hangar if a careless pilot or attendant fails to close the hangar doors in zero weather. The time in which to re-heat the hangar has been arbitrarily set at approximately 20 minutes, as no serious damage can result in this length of time. Many planes have water-cooled engines, and there is danger in possible freezing. Another danger is in a cold motor.

Since we have a very large volume and desire to heat it quickly, the first thought is to rapidly propagate the heat throughout the hangar. Convection of heat is the quickest means. To do this it is best to rapidly circulate and re-circulate hot air. This can be done by heating air over steam coils or by directly heating the air in a hot air generator and circulating it with fans and ducts. To properly circulate and re-circulate warm air, a duct system must be employed to evenly distribute the heated air and maintain an even temperature. Planes are relatively large bodies; their wings and fuselage present large surfaces, and it is necessary to get the warm air to all points to melt off snow or ice.

The two greatest factors in heat losses are in the infiltration at the huge doors and in the roof losses. Too little attention has been paid to the designing of hangar doors, and too much emphasis has been placed on the low initial cost of roof construction and hung ceilings. It is recommended, as shown in the practical application indicated on the accompanying sketches, that the hot air be directed down in front of the doors (inside the hangar) to warm the air at the points of infiltration, and that the air in the attic be re-circulated to maintain a lower even temperature under the roof.

Circulation System. Since convection is necessary, it becomes apparent that rapid circulation of warm air is required. A most economical system has been developed, as indicated, wherein, by aspiration, a maximum re-circulation is produced with least power consumption. The aspirating nozzle shown in the accompanying sketches was originally designed for a re-circulation of 100 per cent air,—that is, for every cubic foot of air furnished through the high velocity nozzle, another cubic foot of air is circulated by aspiration. Actual tests of this nozzle have resulted in from 200 to 300 per cent aspirated air, definitely proving the reliability of the aspirator.

To meet these conditions, it is of course necessary to supply heated air. The most inexpensive method found is a hot air generator which is a direct-fired unit. The firing in the present cases is with fuel oil. The fans for circulating the air are motor-driven. Automatic control is provided and is described in the accompanying diagram. The fuel oil burners are designed for full automatic control and may be arranged for a graduated high and low flame as well. It is best to consider a variable flame, since better control and greater efficiency will probably result. Ignition is accomplished by dual gas-electric ignition. Where gas is not available at a port, gas supplied in containers is used. The type of burner for these installations will burn a heavy 14-16° Baume oil and give excellent results.

Features in connection with the design are the air economizer and the oil economizer. Waste gases give up some of their heat to the air and oil, making for greater efficiency. An emergency electric automatic heater is used, and a manual electric heater is provided for extreme emergencies and for starting the system after a long shut-down.

The automatic control provides thermostatic control for the hangars and office space, wherein the temperature of the room activates the system. A remote push-button control is also provided, should it be required, to shut down the system or start it up under unusual circumstances. In addition, the oil burner valve is controlled by the temperature of hot air supply to the hot air plenum, and mixing damper control is provided to allow control of the final temperature of the pre-heated air as admixed with cooler air. Air is re-circulated by the hangar supply fan from the hangar. Air for offices and shops is furnished fresh from the outside, but pre-heated over the air economizer. The offices and shops always receive fresh warm air, whereas the hangar receives re-circulated air. There is ample infiltration in the hangar doors to offset any normal vitiation.

A system of this type will cost in the neighborhood of $10,000 per hangar installed, dependent upon location, and when using 14-16° oil the cost of operation is low, considering the requirements. In only rare instances has lighter oil been recommended. With this system little attention is required, and the temperatures necessary are automatically maintained.

POLICY AND OPINION

A.D. 1930

THE annual forecast of architectural and building activity, published on the pages following, is generally optimistic in tone. Once again, the importance to the architect of a knowledge of economics and financial arrangements is brought strongly to our attention, since the amount of building, and therefore of architectural prosperity, is dependent on available funds,—easier and plentiful mortgage money means more work for the architect. Other things being equal, the architects who are equipped to aid clients to obtain money for building, both through financial knowledge and financial contacts, are in the strongest position to go ahead with their work. Those who have not these assets, nor clients with ready cash, may have time to use in introspection.

It becomes more and more apparent that the practice of architecture has become a business and that the successful conducting of that business demands more than the ability to design and plan (though that is the prime essential); it requires an organization equipped with knowledge and ability in engineering and business. Architecture is following the modern trend of organization along the lines of "big business," which it serves. Efficient architectural service now demands knowledge of so many fields and ability of so many kinds that a well rounded group rather than an individual is the rule for successful large practice. The architect has become the executive of an architectural organization coördinating the work of designers, engineers, draftsmen, superintendents, contact men, clerks and even salesmen. THE ARCHITECTURAL FORUM recognizes this complexity of architectural practice today and has established a program for 1930 that is comprehensive. The problems of architecture for 1930 have been analyzed into five groups, each with its major and minor sub-divisions, and each problem will be treated authoritatively and in the most useful way possible in these pages. *K.K.S.*

NEW CODES FOR OLD

BUILDING codes become obsolete proportionately to the improvement of the materials and methods of construction and the growth of technical knowledge. This fact is of importance because the building code is a tremendous factor in the economics of construction, realty ownership and public welfare. The antiquated and now obsolete building code of New York is a handicap to the building industry and militates against progress in that city in the same manner that obsolete building codes affect other cities.

Recognizing the gravity of the situation, the Merchants' Association of New York initiated a revision of the New York Building Code. The recommendations of six technical sub-committees have been presented to the Advisory Committee which is authorized to obtain suggestions and criticisms and secure public support for its adoption when presented to the mayor. The Association is to be commended for its understanding and initiative in this important matter, and its committee and sub-committees are equally to be commended for their unselfish contribution of technical knowledge and work.

Some questions have been raised as to the true purport of certain administrative sections contained in the reports on Minimum Loads and Structural Steel, and Foundations. In them, it is stipulated that all structural and foundation plans shall be accompanied by an affidavit of the designing engineer saying that he is familiar with the building code and that to the best of his knowledge and belief the design conforms to it. Also, that he shall file an affidavit saying that the work has been executed according to the plans before a certificate of occupancy is granted.

These stipulations have been construed by some to affect the position of the architect as the responsible agent in all of the phases of building designing. THE ARCHITECTURAL FORUM has always maintained that it is the proper function of the architect to coördinate all of the plan, construction and equipment elements that are required for the erection of a building, to supervise its construction, and make sure that all of the contractual relations involved eventuate successfully.

The complexities and intricacies of modern building construction necessitate the architect's delegation of certain functions to others of his own selection and for whom he is properly responsible. It is a well established principle of business, professional and military practice, that final responsibility must lie with one and not with several dissociated units. This principle is demonstrated by experience to be necessary in the successful consummation of large building projects.

Assurance is given by architect members of the Committee that the filing of plans and specifications with the authorities for approval will remain, as heretofore, with the architect, and that in the execution of the plans, he will be the only architect of record. All affidavits and calculations pertaining to the plans are to be filed with the building department by the architect as part and parcel of the plans and specifications. The building permits may be procured by others.

In some instances, the architect contracts to make and file the plans and specifications only. Under these conditions he has nothing to do with the construction or inspection of the work, and to safeguard the stability of the structure it is proposed that the designing engineer, or other licensed engineer, shall make affidavit to the effect that he has inspected the foundations during construction and that they comply with the plans of the designing engineer. A similar affidavit is required as to the steel or other structural features. Under the conditions of the limited employment of the architect, these requirements are not an invasion of his rights.

The place and manner of filing these affidavits should be clearly defined, as should the conditions under which they should be filed by a designing engineer instead of by the architect of record. In some cities the required affidavits are made on the tracings, appear on the blue prints, and are accepted by the building department. This method has the advantage of publicity, which the mere filing of a document lacks.

Of course, honest opinions on many points will vary, but when the personnel of the various committees and the close attention of their members given to the development of the code are taken into consideration, it seems assured that all material factors are correctly appraised and that the proposed code is representative of the best current practice. In every city there is a potential danger of inadvisable changes in a building code actuated by special interests. There is also danger in the delegation of interpretation of the code and in the provisions made for allowing exceptions and special rulings. The tremendous financial investment in building construction in New York offers a field for special privilege exploitation which is very tempting, and as a matter of ordinary business precaution, this code must be safeguarded throughout its entire course by its proponent, the Merchants' Association of New York, and by the organized effort of those interested in economic and public welfare. *A. T. N.*

FINANCE AND ARCHITECTURE

ARCHITECTURE is dependent on capital which makes building possible. The amount of capital available for construction is therefore a determining factor in the amount of business on the boards of architects. A study of recent financing discloses the fact that much of the money invested in buildings becomes "frozen" capital which has not the advantages of more liquid capital invested in readily marketable securities, such as stocks and bonds listed on the large exchanges. Realty and building securities have not been easily marketable, nor could these securities be used readily as collateral,—distinct disadvantages both.

To provide a liquid market for realty securities, to stabilize values and to make such securities as attractive to investors as stocks and bonds of other kinds, is necessary to realty, to building and to architecture. For some 16 years effort has been directed to this end,—culminating in the opening of the New York Real Estate Exchange, Inc., on December 16, 1929. It is probable that similar exchanges will be established in other cities, and therefore the progress of the New York exchange will be watched with interest. A detailed account of this exchange was published in THE ARCHITECTURAL FORUM for August, 1929 in an article entitled "Wall Street Enters the Building Field" by John Taylor Boyd, Jr.

The significance of the new exchange, the reasons for its establishment, and its probable effects were again brought out at the luncheon celebrating the opening. "We are adding another basic unit to the financial system of the country, and by strengthening and expanding this system we are contributing to national economic welfare," said Peter Grimm, President of the Real Estate Board of New York, Inc., sponsors of the exchange. "As a primary market for securities, the exchange will be an influence at the very root of business. The opening culminates a long program of painstaking study and meticulous planning. Sixteen years ago, after four years of preliminary discussion, the Real Estate Board of New York began its first efforts to provide real estate with an exchange for its securities. The work has been going on ever since. We celebrate today the result of thorough research into the problem.

"The reasons for establishing the exchange were: modern real estate development's requiring huge capital; the necessity for raising this money through liquid securities, the character of which must be investigated and made known, and the market value recorded daily. In fulfilling these purposes, the exchange is destined to stimulate the pulse of real estate, bridging the gap between the investing public and realty investment and distributing the profits more widely."

Cyrus C. Miller, president of the new exchange, presided at the luncheon, and voiced the hope that operation of the exchange would be "reflected in better homes and commercial buildings as a result of stabilized values for real estate securities." Certainly the profession of architecture will benefit, and architects will inform themselves of this new factor in the financing of construction which has a direct bearing on their projects. *K. K. S.*

WILL ARCHITECTS BE BUSY IN 1930?
NINTH ANNUAL BUILDING SURVEY AND FORECAST

BY

C. STANLEY TAYLOR

TO a great extent the architects of this country represent the advance guard of its building construction. They constitute, perhaps, the first group which records changing trends in the volume and type of building construction. The reasons for this condition are obvious, because architects are the first to hear of most projects and the first to discuss them in any detail outside of the owner's immediate circle of business contacts. The architect works on plans and specifications long before there is any general knowledge of the project, and he knows approximately when the project will be offered for contractors' bids.

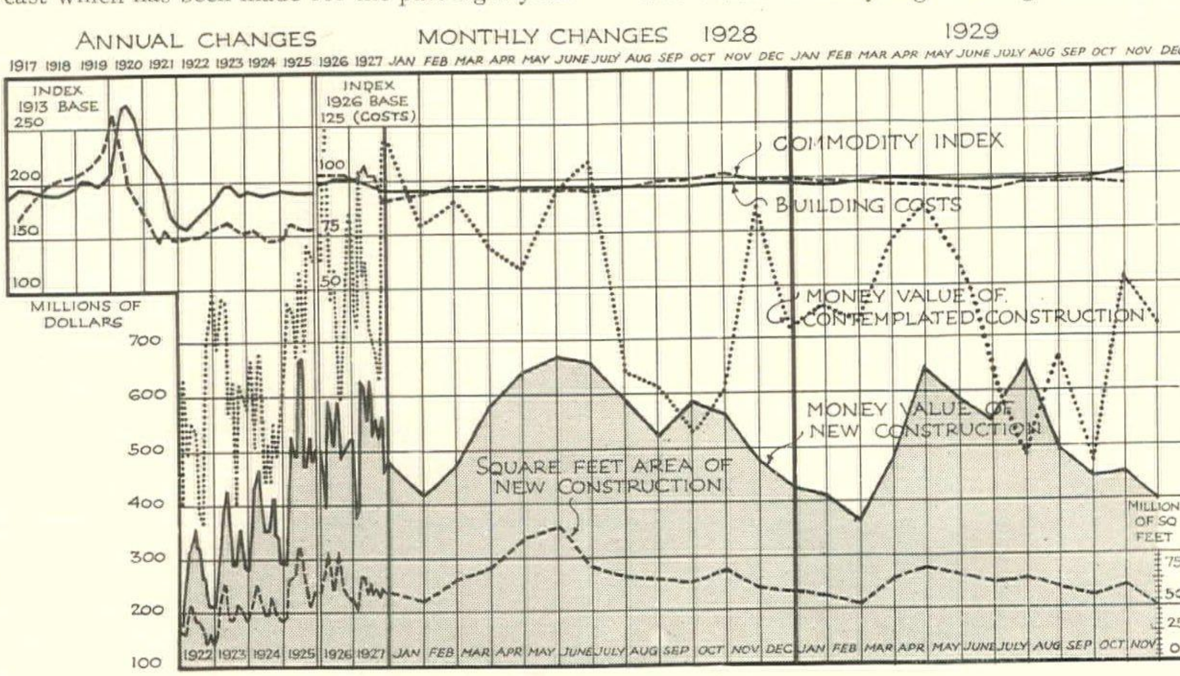
The building industry, including its advance guard of architects, is looking forward to 1930 with what might be termed tremulous expectancy. Opinions as to the building activity which may be expected during the year 1930 vary considerably and are so entangled with unusual economic developments that there seems to be no positive average opinion, such as we have had in previous years. If the new building projects which are on the architects' boards and under discussion for 1930 *do* eventuate,—even if 60 per cent of them become actualities,—the architectural profession will enjoy a prosperous year.

Readers of THE ARCHITECTURAL FORUM are quite familiar with the annual survey and forecast which has been made for the past eight years in an effort to predict building conditions. This year one of the significant facts disclosed by the survey has been the hesitancy of many architects to predict their own future activities. The reason is obvious,—lack of mortgage money, also somewhat complicated by the fact that no one seems to be able to predict the trend of public confidence in business conditions. There are a vast number of projects under planning now by architects which are going ahead in 1930 if they can be financed, and if owners do not lose confidence.

Realizing the logic of this condition THE ARCHITECTURAL FORUM has just conducted a telegraphic survey of mortgage conditions. Questionnaires were sent to the leading officials of savings banks, building and loan associations, title companies, insurance companies, and other mortgage-lending institutions in every part of the country. The questions asked are these:

1. Have there been indications of easier mortgage money since the Wall Street readjustment?
2. Do you anticipate easier mortgage conditions in 1930?
3. Do you anticipate many applications for building and permanent mortgage loans in 1930?

The result of analyzing the large number of



THE BUILDING SITUATION

The Various Index Lines are Designated on the Chart, which is Developed from Reports of the United States Department of Commerce, the F. W. Dodge Corporation Reports, and the *Engineering News-Record* replies sent in by the officials of mortgage-lending interests has been the formation of a fairly definite picture as to mortgage money conditions for 1930. The replies which were received were in general encouraging because they were conservative and carefully considered. The average opinion indicated that there has already been some signs of easier mortgage money during the short period since the recent Wall Street collapse. As a rule, these indications varied consistently according to districts of the country. In the area of metropolitan New York the first signs have already appeared in the development of a number of large building projects. Mortgage money, however, has not yet become easier for smaller projects nor for projects in the outlying suburban districts. This same condition holds true for the middle west. On the Pacific coast optimism is the rule rather than the exception, and this is perhaps a natural condition because the stock market situation did not affect the Pacific coast as drastically as in the states of the east and central west. Upper New York state and most of New England has shown relatively little change, while in the south mortgage money conditions show definite signs of improvement.

It must be realized that for a period representing probably the first half of 1930 mortgage money channels are seriously blocked by two obstacles. In the first place, savings banks and possibly even building and loan associations, were recently drained heavily for funds to meet stock margin and collateral loan requirements. The funds which might ordinarily go for mortgage purposes have been used to meet demands of the Wall Street collapse. Thus this important channel of mortgage money is temporarily dammed and will reëstablish itself only as savings and conservative investments mount again. But they will surely mount, because the public has learned a lesson. The second obstacle is the fact that many mortgages coming due at this time are being called by mortgagees who wish to use the money to cover their own situations. These mortgages on existing buildings must be replaced, and as a rule they take precedence over loans for new construction. These may be cleared out of the way, and this readjustment has already begun. It would seem obvious that there will be a great increase in the amount of money placed through mortgage channels. There is always a swelling tide mortgage money after any great economic adjustment, but it will take time and patience before the last obstacles are cleared away and before

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U.S.A.
Automotive	$23,361,800	$47,580,500	$6,519,000	$18,978,900	$56,575,900	$16,859,200	$169,875,300
Banks	37,806,100	31,602,800	2,029,500	10,688,700	48,515,300	7,281,600	137,924,000
Apartments	27,765,200	325,954,100	9,114,300	26,026,800	95,407,000	68,355,200	552,622,600
Apartment Hotels	2,980,700	65,050,600	8,466,500	24,571,300	73,156,300	36,367,000	210,592,400
Clubs, Fraternal, etc.	5,797,400	44,653,100	2,242,700	17,978,500	75,891,000	15,243,800	161,806,500
Community and Mem.	6,437,000	26,486,000	861,000	5,608,800	26,670,500	26,752,500	92,815,800
Churches	12,685,400	44,665,400	30,262,100	34,784,400	70,876,700	23,993,200	217,267,200
Dwellings (Below $20,000)	24,751,700	33,968,500	10,245,900	11,676,800	41,323,900	15,846,500	137,813,300
Dwellings ($20,000 to $50,000)	11,877,700	44,362,000	8,269,700	9,983,500	45,628,900	15,571,800	135,693,600
Dwellings (Over $50,000)	13,300,400	39,524,000	6,642,000	6,810,100	34,739,300	11,041,300	112,057,100
Hotels	13,919,500	78,941,400	31,910,300	76,711,000	87,649,800	104,468,000	393,600,000
Hospitals	33,488,800	161,523,600	11,500,500	46,649,800	94,025,300	24,190,000	371,378,000
Industrial	14,358,200	58,634,100	23,985,000	21,381,500	141,060,500	29,725,000	289,144,300
Office Buildings	56,662,000	250,788,800	1,107,000	41,922,500	255,930,200	72,426,500	678,837,000
Public Buildings	14,296,700	88,182,800	7,293,900	18,876,400	146,062,500	44,062,700	318,775,000
Schools	47,855,200	188,395,000	30,053,000	77,174,300	223,003,100	74,374,000	640,854,600
Stores	15,485,700	74,136,200	8,790,400	10,282,800	43,726,500	14,509,900	166,931,500
Theaters (all types)	11,808,000	21,250,300	10,036,800	15,260,200	30,167,800	9,056,900	97,580,000
Welfare, Y.M.C.A., etc.	29,151,000	59,749,300	5,817,900	8,581,300	34,517,900	5,510,400	143,327,800
TOTAL VALUE OF NEW BUILDINGS	$403,788,500	$1,685,448,500	$215,147,500	$483,947,600	$1,624,928,400	$615,635,500	$5,028,896,000

New Construction Under Architects' Supervision $5,028,896,000

Buildings of All Types—Excluding Public Works and Utilities—Not Designed by Architects 1,972,000,000
(Estimated from Averages of Previous Years)

TOTAL ESTIMATED CONSTRUCTION FOR 1930 .... $7,000,896,000
(Exclusive of Public Works and Utilities)

we reach again a normal condition in this field.

A glance at the accompanying chart showing building activity during 1929 immediately reflects the influence of mortgage money in establishing the volume of building construction activity. The year 1929 would have represented a very large volume of construction business if its foundation of mortgage money had not been almost entirely destroyed. The building industry cannot compete with high priced call money. It cannot show the dramatic profits which the ticker tape has spelled out through this past period of blind speculation, but the building industry can and will compete with any line of legitimate investment or even speculative profit, and it looks very much as though it were about to have its chance again.

When we reflect upon these conditions we can understand why architects were hesitant this year in predicting their own activities. We can understand why even with excellent projects in actual stages of plans and specifications the architect could not be sure of reaching contract stages. We can also understand the conservative statements of bankers and the fact that the mortgage financing survey, which has just been conducted, reflects as the average opinion:

(1) That there have been some signs, although not many, of easier mortgage money in certain sections of the country;

(2) That it will take the early part of 1930 for adjustments to clear away the obstacles already described as blocking the mortgage money channels, but that we may confidently expect much easier conditions in the second half of the year, and

(3) that there are a large number of building projects which will be ready for financing during 1930.

General business conditions are becoming more and more encouraging. The panic idea has already been discounted by the fact that hundreds of thousands of people have gone to work more seriously than ever to maintain personal and general prosperity. It is probably quite true that some industries will show an extensive falling off in business. Perhaps the demand in 1930 will be less for luxuries and more for practical improvements. The building industry will benefit rather than suffer from such a condition, because all the buildings of this country are not luxuries,—they are practical machines developed for practical purposes. There will unquestionably come a positive reduction in the amount of speculative building because the facilities for gambling of this nature will not be present. On the other hand, legitimate building for profit to meet known demands may be expected to increase as financing becomes easier and cheaper.

In considering the possible building program of 1930, an immeasurable factor has been introduced suddenly into the picture. This is the great construction program fostered by the government and supported in theory at least by states and municipalities. President Hoover turned in a very natural manner to the construction industry as a means of stabilizing the business welfare of the American public. There exists today a tremendous demand for public buildings and civic improvements. There is great pressure being exerted for public utilities, for increased facilities and service. There is great need for better roads, bridges, transportation facilities, and various other types of engineering projects which come within the scope and control of national, state and city officials. So definitely has this program been presented and so enthusiastically has it been supported that it cannot help but contribute a great volume of building activity to the total of 1930.

Summing up the general situation, therefore, and considering the figures of The Forum forecast as presented herewith, we find these significant facts arrayed for consideration:

1. The general demand for new building construction is approximately the same as it was at the beginning of 1929.
2. The trend toward there being a far greater supply of mortgage money is very definite.
3. The deliberate program of construction which is being started by the government, by states and by municipalities will evidently assume very large proportions.

This combination of factors would seem to provide reasons for optimism regarding the building activities of 1930. It would seem that we can assume at least as much building construction during this new year as we had in 1929, and probably more. In fact if mortgage money becomes really much easier, and if the contemplated great schedules of public improvements are carried out, it would seem to be quite within reason that 1930 might exceed all construction years. Probably it will not do this, because the contributing factors may not get under way strongly enough during 1930 to swell the totals beyond past records.

It is true that never before has the human element entered so strongly into the picture of the building industry. Who can foretell what will be mass psychology? We believe that everyone senses a returning spirit of confidence based on hard work and intelligent planning. The signs of the times are pointing favorably. Even in the self-sustaining statements of captains of industry there is to be found an intelligent realization of the great things which can be accomplished by the American public when it really goes to work, —and it has gone to work. For the American public to work it requires tools, and the chief tools of industrial and commercial activity are the buildings which house the multi-fold operations.

Before turning to an analysis of the change in public demand for buildings of various types, we cannot well leave the stage of prophecy without commenting on the existing trends which are under way in the field represented by the designing of buildings and the materials and equipment which are required. In the first place, the influence of mortgage loaning interests on plans and specifications has never represented such significant control as it is now assuming. The very scarcity of mortgage money assumes that the collateral on which it is placed must be most carefully scrutinized. There is coming a far greater volume of mortgage money financed through bond issues and certificates issued by large loaning companies. This is a more flexible type of mortgage investment from the point of view of the individual investor, and as it is handled through large central organizations it is obvious that the facilities for provision of plans and specifications will be greatly improved. It it quite apparent that as mortgage money mounts again in volume it will be more scientifically handled, and the natural result will be better quality in design and in the types of materials and equipment selected. We are to have better buildings, regardless of type, first, because of a more intelligent demand on the part of the public and, second, because of the more carefully scrutinized control of mortgage money.

This is a significant condition for architects, because it means a constantly increasing demand for the better type of architectural service. An investing public is learning more of the value of good architectural service, because the architectural profession is learning to render a more valuable service. The economic condition of the architectural profession is strengthening constantly as architects assume a broader relationship with building projects and with the economic structure which casts its shadowy lines over the drafting board. More and more in successful building projects of all types the architect and the engineer are finding the recognition which always develops for practical contributions. Withal there is no decline in the art of this great profession. The æsthetic phase is mounting too in its practical contribution to American business and social life.

There have been tremendous developments in the manufacturing side of the building industry. Not only have great capitalists become actively interested, but the very size of the industry has forced vision, and together with an intricate combination of research and technical improvements, which is completely changing many of our construction methods, materials and equipment, some of the great basic divisions of the building industry, such as those supplying steel and lumber, are being forced to the development of hundreds of specialties for the building industry. There has been a tremendous increase in the application of engineering skill to the solution of building problems. All of these things, while they require far greater study and more comprehensive understanding on the part of the architect, contribute in turn to the quality of finished buildings. Good accounting is showing the fallacy of cheap construction. The competition of building against building is rapidly elevating standards of service and æsthetic requirements. The costs of maintenance and depreciation are more thoroughly understood than ever before as factors which determine building investment profits. In every direction it seems that forces are gathering which may show the year 1930 as a very profitable year for architects, and perhaps as the beginning of an interesting cycle of active years as the public turns again to mortgage financing as an outlet for its money and to buildings as an important factor in maintaining prosperous business conditions.

In establishing a forecast of building activity it is of definite interest to analyze the changes in public demand evidenced for the coming year as compared with that of a year ago. In order to show this condition there will be found herewith a detailed tabulation in which the percentages of public demand for the various types of buildings which made up the total forecasts for 1929 and for 1930 are compared. Both forecasts were based on the figures presented in the large number of detailed questionnaires sent in by architects from every part of the country. The actual figures of The Architectural Forum forecast of building activity for 1930 are shown in the accompanying table and indicate total construction activity exclusive of public works and utilities to the value of $7,000,896,000 as compared with $7,308,793,-200 forecast for the year 1929.

The changes in the trend of public demand are indicated in tabulations which present a comparison of requirements for new buildings by the public in the year 1929 as compared with those of the year 1930. The total amount of building construction represents 100 per cent, and the figures shown in each column are the percentages based on total values for each individual type of building. The figures given under the column headed "Change" represent the change in percentage figures. For instance, in the column of national percentages the change shown for automotive buildings is plus 6. This figure is obtained by subtracting the 1929 figure of 2.8 from the 1930 figure of 3.4 and signifies that an apparent demand for automotive building in this country has increased almost one fifth at the beginning of the year 1930 as compared with the beginning of the year 1929. Some of these figures show startling changes in the public demand for new structures.

In analyzing these figures, it must be remembered that they apply only to the types of buildings which come under architectural control; but after all they represent the bulk of better building construction, and lend considerable interest to the forecast as to what types of buildings will show less or greater activity in this year of 1930.

CHANGES IN PERCENTAGES OF PUBLIC DEMAND FOR NEW BUILDINGS IN 1930 COMPARED WITH 1929

National Percentages, U. S. A.

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.8	3.4	+ .6
Banks	2.9	2.7	− .2
Apartments	13.1	11.0	−2.1
Apartment Hotels	4.8	4.2	− .6
Clubs, Fraternal, etc.	3.4	3.2	− .2
Community, Memorial	1.2	1.9	+ .7
Churches	4.2	4.3	+ .1
Dwellings (under $20,000)	3.6	2.7	− .9
Dwellings ($20,000 to $50,000)	2.3	2.7	+ .4
Dwellings (over $50,000)	1.9	2.2	+ .3
Hotels	6.7	7.8	+1.1
Hospitals	4.9	7.4	+2.5
Industrial	7.5	5.8	−1.7
Office Buildings	13.5	13.5	....
Public Buildings	6.7	6.3	− .4
Schools	11.7	12.8	+1.1
Stores	3.4	3.3	− .1
Theaters	3.2	1.9	−1.3
Welfare, Y. M. C. A., etc.	2.2	2.9	+ .7

North Atlantic States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.1	2.8	+ .7
Banks	2.7	1.9	− .6
Apartments	18.5	19.3	+ .8
Apartment Hotels	1.0	3.9	+2.9
Clubs, Fraternal, etc.	3.5	2.6	− .9
Community, Memorial	1.1	1.6	+ .5
Churches	2.8	2.7	− .1
Dwellings (under $20,000)	4.2	2.0	−2.2
Dwellings ($20,000 to $50,000)	2.0	2.6	+ .6
Dwellings (over $50,000)	2.2	2.3	+ .1
Hotels	4.8	4.7	− .1
Hospitals	5.6	9.6	+4.0
Industrial	6.6	3.5	−3.1
Office Buildings	12.3	14.9	+2.6
Public Buildings	9.4	5.2	−4.2
Schools	8.4	11.2	+2.8
Stores	4.0	4.4	+ .4
Theaters	3.2	1.3	−1.9
Welfare, Y. M. C. A., etc.	2.4	3.5	+1.1

Northeastern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	5.4	5.8	+ .4
Banks	5.9	9.4	+3.5
Apartments	6.3	6.9	+ .6
Apartment Hotels	1.0	.7	− .3
Clubs, Fraternal, etc.	2.7	1.4	−1.3
Community, Memorial	1.3	1.6	+ .3
Churches	7.9	3.1	−4.8
Dwellings (under $20,000)	4.1	6.1	+2.0
Dwellings ($20,000 to $50,000)	3.9	2.9	−1.0
Dwellings (over $50,000)	2.5	3.3	+ .8
Hotels	8.1	3.4	−4.7
Hospitals	7.1	8.3	+1.2
Industrial	7.6	3.6	−4.0
Office Buildings	4.7	14.3	+9.6
Public Buildings	5.8	3.5	−2.3
Schools	16.8	11.8	−5.0
Stores	2.4	3.8	+1.4
Theaters	2.4	2.9	+ .5
Welfare, Y. M. C. A., etc.	4.1	7.2	+3.1

Southeastern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	5.3	3.0	−2.3
Banks	.8	.9	+ .1
Apartments	7.5	4.2	−3.3
Apartment Hotels	3.6	3.9	+ .3
Clubs, Fraternal, etc.	1.1	1.0	− .1
Community, Memorial	1.1	.4	− .7
Churches	16.3	14.1	−2.2
Dwellings (under $20,000)	4.8	4.8	....
Dwellings ($20,000 to $50,000)	4.2	3.8	− .4
Dwellings (over $50,000)	4.0	3.1	− .9
Hotels	10.1	14.8	+4.7
Hospitals	3.3	5.4	+2.1
Industrial	11.2	11.2	....
Office Buildings	3.5	.5	−3.0
Public Buildings	4.4	3.4	−1.0
Schools	9.3	14.0	+4.7
Stores	3.2	4.1	+ .9
Theaters	2.7	4.7	+2.0
Welfare, Y. M. C. A., etc.	3.6	2.7	− .9

Southwestern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.9	3.9	+1.0
Banks	1.6	2.2	+ .6
Apartments	5.7	5.4	− .3
Apartment Hotels	4.3	5.1	+ .8
Clubs Fraternal, etc.	3.6	3.7	+ .1
Community, Memorial	1.6	1.2	− .4
Churches	6.6	7.2	+ .6
Dwellings (under $20,000)	3.1	2.4	− .7
Dwellings ($20,000 to $50,000)	2.1	2.1	....
Dwellings (over $50,000)	1.6	1.4	− .2
Hotels	12.5	15.9	+3.4
Hospitals	3.5	9.6	+6.1
Industrial	9.8	4.4	−5.4
Office Buildings	11.4	8.7	−2.7
Public Buildings	5.1	3.9	−1.2
Schools	16.5	15.9	− .6
Stores	2.2	2.1	− .1
Theaters	2.1	3.1	+1.0
Welfare, Y. M. C. A., etc.	3.8	1.8	−2.0

Middle States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	3.2	3.5	+ .3
Banks	3.2	3.0	− .2
Apartments	9.7	5.9	−3.8
Apartment Hotels	5.5	4.5	−1.0
Clubs, Fraternal, etc.	3.8	4.7	+ .9
Community, Memorial	1.0	1.6	+ .6
Churches	3.9	4.4	+ .5
Dwellings (under $20,000)	2.3	2.5	+ .2
Dwellings ($20,000 to $50,000)	2.1	2.8	+ .7
Dwellings (over $50,000)	1.4	2.1	+ .7
Hotels	5.7	5.4	− .3
Hospitals	4.1	5.8	+1.7
Industrial	8.7	8.7	....
Office Buildings	17.0	15.7	−1.3
Public Buildings	4.9	9.0	+4.1
Schools	14.4	13.7	− .7
Stores	3.1	2.7	− .4
Theaters	4.2	1.9	−2.3
Welfare, Y. M. C. A., etc.	1.8	2.1	+ .3

Western States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.4	2.7	+ .3
Banks	2.2	1.2	−1.0
Apartments	14.3	11.1	−3.2
Apartment Hotels	7.1	5.9	−1.2
Clubs, Fraternal, etc.	2.7	2.5	− .2
Community, Memorial	1.9	4.3	+2.4
Churches	3.4	3.9	+ .5
Dwellings (under $20,000)	4.1	2.6	−1.5
Dwellings ($20,000 to $50,000)	2.5	2.5	....
Dwellings (over $50,000)	2.2	1.8	− .4
Hotels	11.2	17.0	+5.8
Hospitals	5.6	3.9	−1.7
Industrial	4.9	4.8	− .1
Office Buildings	14.8	11.8	−3.0
Public Buildings	4.7	7.1	+2.4
Schools	9.8	12.1	+2.3
Stores	3.9	2.4	−1.5
Theaters	1.5	1.5	....
Welfare, Y. M. C. A., etc.	.8	.9	+ .1

ILLUMINATING THE BARCELONA EXPOSITION

BY

K. W. JOHANSSON*

ELECTRICAL ENGINEER

THE engineering section of the International Exposition at Barcelona took special interest in giving to the illumination of the central decorative area an effect more elaborate than has been accomplished heretofore. The attainment of this objective has been evident from the many favorable comments of Spanish officials and patrons regarding the effects achieved.

In planning lighting of this nature the essential considerations are the general layout of effects desired, æsthetic design of fountains, cascades, crystal elements, etc., and the procuring of lighting units and control equipment so that this mass of light may be varied in intensity and color from a central point overlooking the whole area.

The original fundamental idea governing the project was the absolute suppression of direct lighting by electric lamps in the whole of the decorative area. Illumination was obtained in all cases by indirect means,—either by concealing, in the case of piazzas and facades, the lamps or reflectors in cornices or decorative motifs of the building, or by mounting them within luminous crystal elements of æsthetic design in many and varied forms, imitating at times, in the avenues and open spaces, fantastic flowers or plants. To the amount of lighting thus obtained was added that produced by underwater units which threw light on and through the water in cascades and in several fountains in the central area. One of these fountains played a stream of water 200 feet into the air, and with electrically-controlled pumps the shape could be changed into 32 different designs. To take care of this program, powerful electrically-driven pumps circulated water at a rate of 200,000 cubic meters per day.

This mass of lights may be made to have varied rhythmically, or at the dictates of fancy, intensity and color by use of centrally located control equipment. The difficulty in putting these ideas into practice was a very serious problem, when it is considered that the total energy put to work for the illumination and cascades was about

*Westinghouse Electric & Manufacturing Company

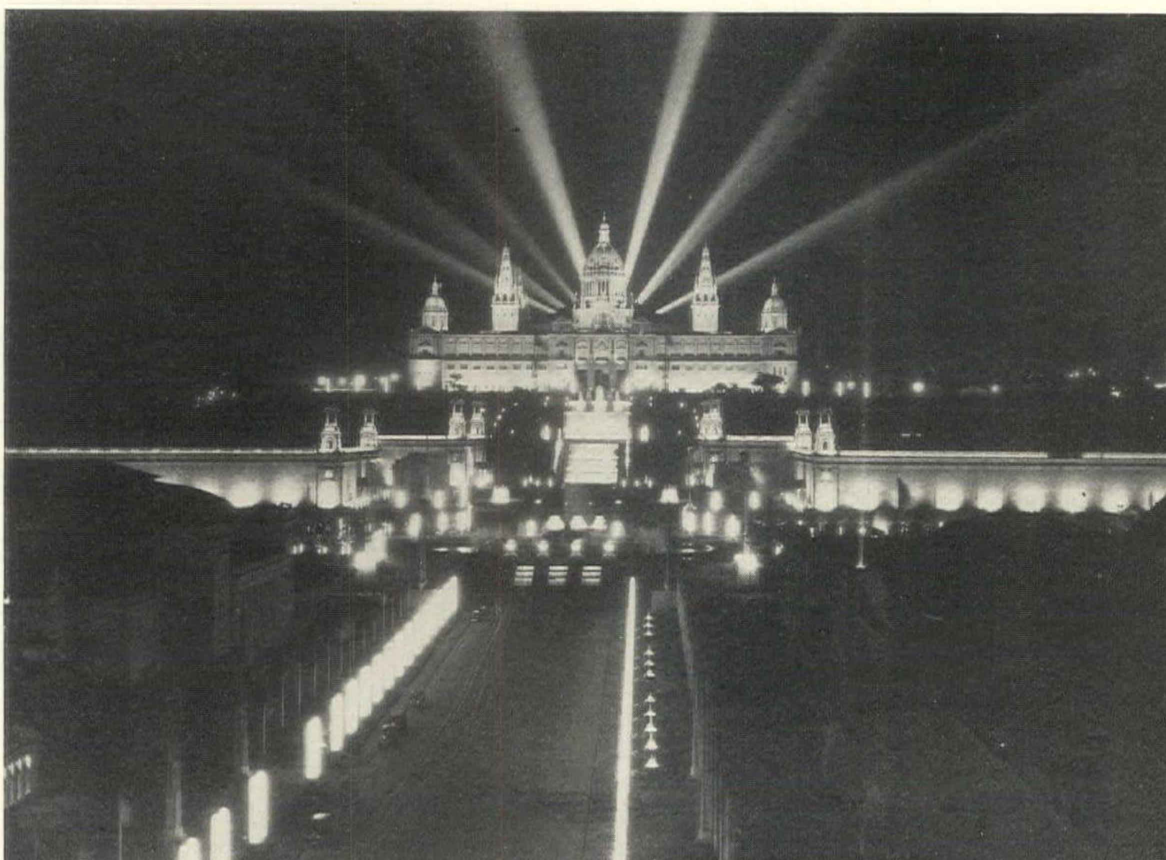


Fig. 1. General View of the Illumination of the Decorative Area of the Barcelona Exposition

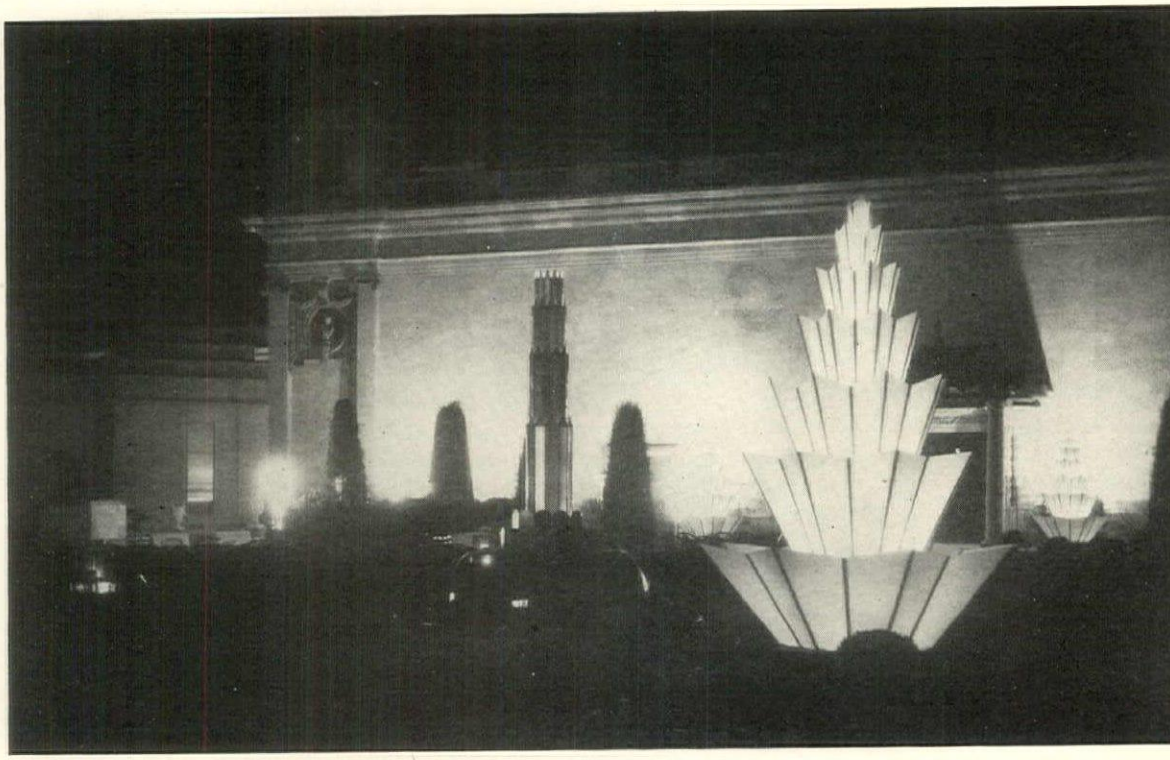


Fig. 2. Illuminated Crystal Elements in Front of the Reina Victoria Eugenie Palace, Barcelona Exposition

5,252,000 watts. It was almost impossible to think of regulating the consumption current by direct means, as it would have necessitated the use of cable of inadmissible section, and control apparatus of extraordinary dimensions.

Lighting Control. The control for the whole lighted area was divided into one central control station, re-actor substations, and five manhole re-actor stations, properly located. The central control station was located in the top of the right tower at the entrance at the Plaza de Espana, overlooking the whole Exposition. This control station was the nerve center of the controls and contained the manually-operated switchboard and contactor board, the automatic controls and motor generators sets for direct-current excitation of the re-actors. The re-actor substations contained, as the name indicates, the re-actors and the necessary switching equipment for handling the alternating-current circuits, going out to the lighting.

The fundamental idea of this whole plan was indirect control by means of pilot wires of extremely small section, and specially designed units for regulating the intensity of the light. These units are called re-actors and look very much like three-phase transformers, but carrying on two coils the outer cores, one on each core, connected in series, and interposed in the lighting circuit. The center core carried a third independent coil, which was connected in a direct-current circuit. When no current flowed in this direct-current coil, the two alternating-current coils possessed a high re-actance in series with lights, and the whole was so calculated that, when there were enough lights in circuit corresponding to full load of the re-actors, the lights were practically extinguished. Upon passing current through the direct-current coil, the flux in the core of the re-actor would increase, and upon reaching saturation point the outer coils would have practically no effect, there being no variation in the flux, and the lights would reach their full brilliance. Between these two extremes any intermediate degree of brilliance could be obtained. Since the current absorbed by the direct-current coil was very small, a small rheostat with very fine wires could control a very large amount of power. The re-actors used varied is size from 16kw., 125 volts, air-insulated, to the largest ever built, 200 kw., 6,000 volts, oil-insulated.

Operation. With the exception of the units for the cascades and the fountains which had specially constructed color controls, all lighting units were composed of groups of lamps in four colors, —white, yellow, red and blue,—all individually controlled, so that it was possible to obtain any blending of colors. The intensity of each group of colors was controlled by reactance units, the direct-current coils of which were controlled by dimmer plates located at the central control station as has been already explained in detail.

The general scheme for lighting the central dec-

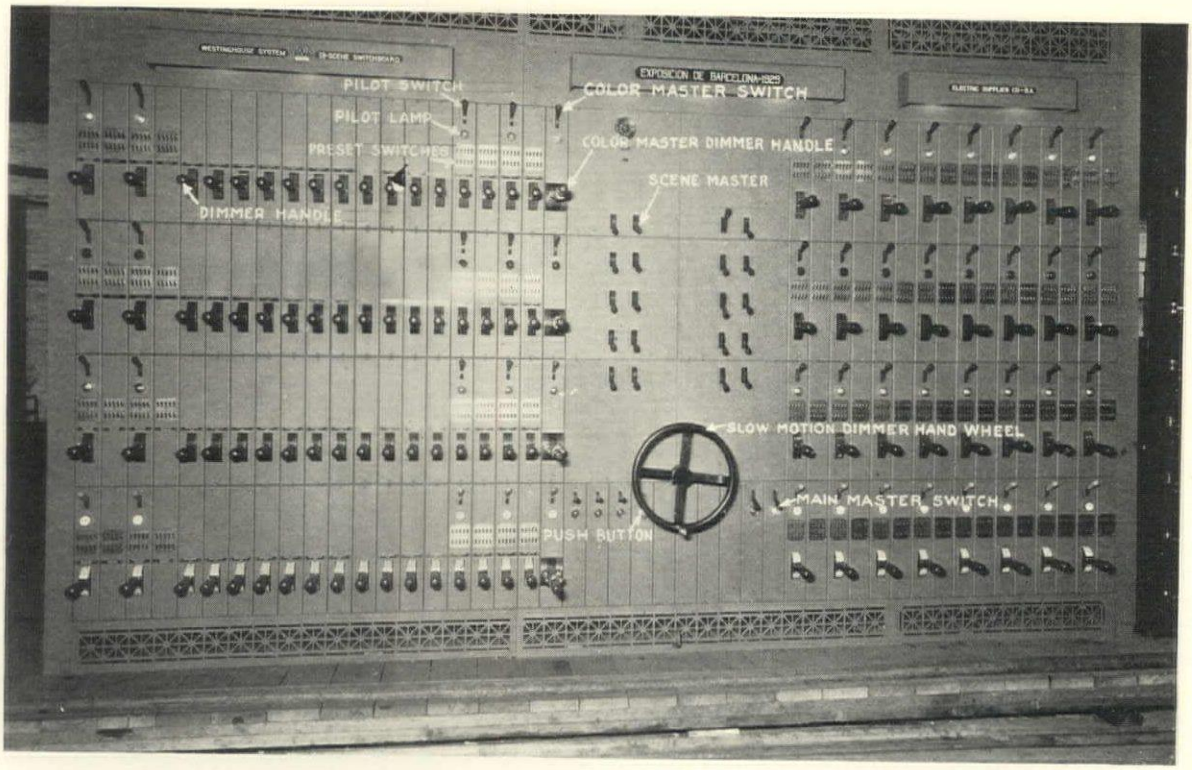


Fig. 3. Manually Operated, 20-scene, Multi-preset Switchboard, with Main Switches Used for Operation Specified

orative area of the Exposition could be segregated into the two distinct classes of programs:

1. The mobile-automatic lighting program.
2. The manually-operated program.

The Automatic Program. This program, as the name indicates, showed a flow of light proceeding from the National Palace located at the top of the hillside, down the central ornamented area, down Reina Maria Cristina Avenue, to the Plaza de Espana. Beginning at the National Palace, the white color went down slowly through the cascades, descending to Reina Maria Cristina Avenue and the entrance at Plaza de Espana at a rate of 7½ feet per second. As the white wave reached Reina Maria Cristina Avenue, the yellow color commenced at the National Palace and proceeded at the same rate, followed by red and blue. The whole automatic program lasted about 10 minutes. The blue light finished the wave action, and the control was so arranged that the entire area would be lighted in blue. At this time a bell would ring, indicating to the operator that the controls should be transferred to the manually-operated board.

The control for the mobile lighting consisted of a flasher (Fig. 4) and several motor-operated dimmer banks. The flasher had 128 contactor brushes, 76 of which controlled the individually-driven dimmer plates; 36 controlled the color screen motors of the fountains, and 16 were provided for spare controls. The contacts of the flasher were arranged to provide waves of color 1,300 feet long from dim to bright and then back to dim. The speed of the wave could be changed by means of variable resistance in the field of

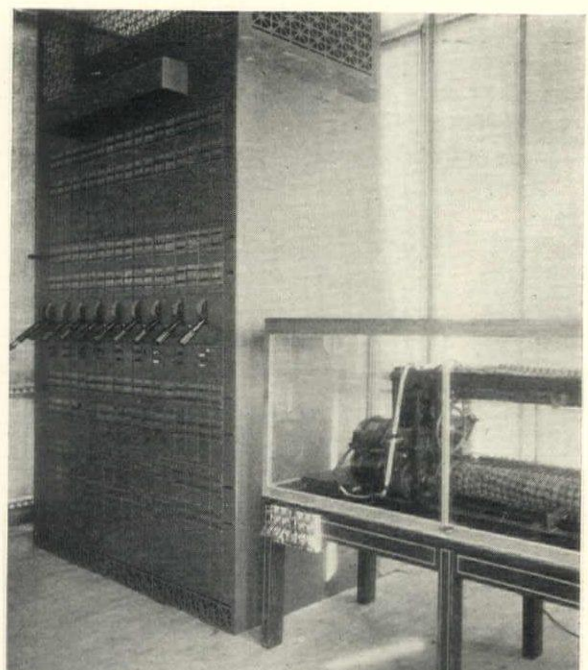


Fig. 4. Flasher and Color Screen Control Board Located in the Tower

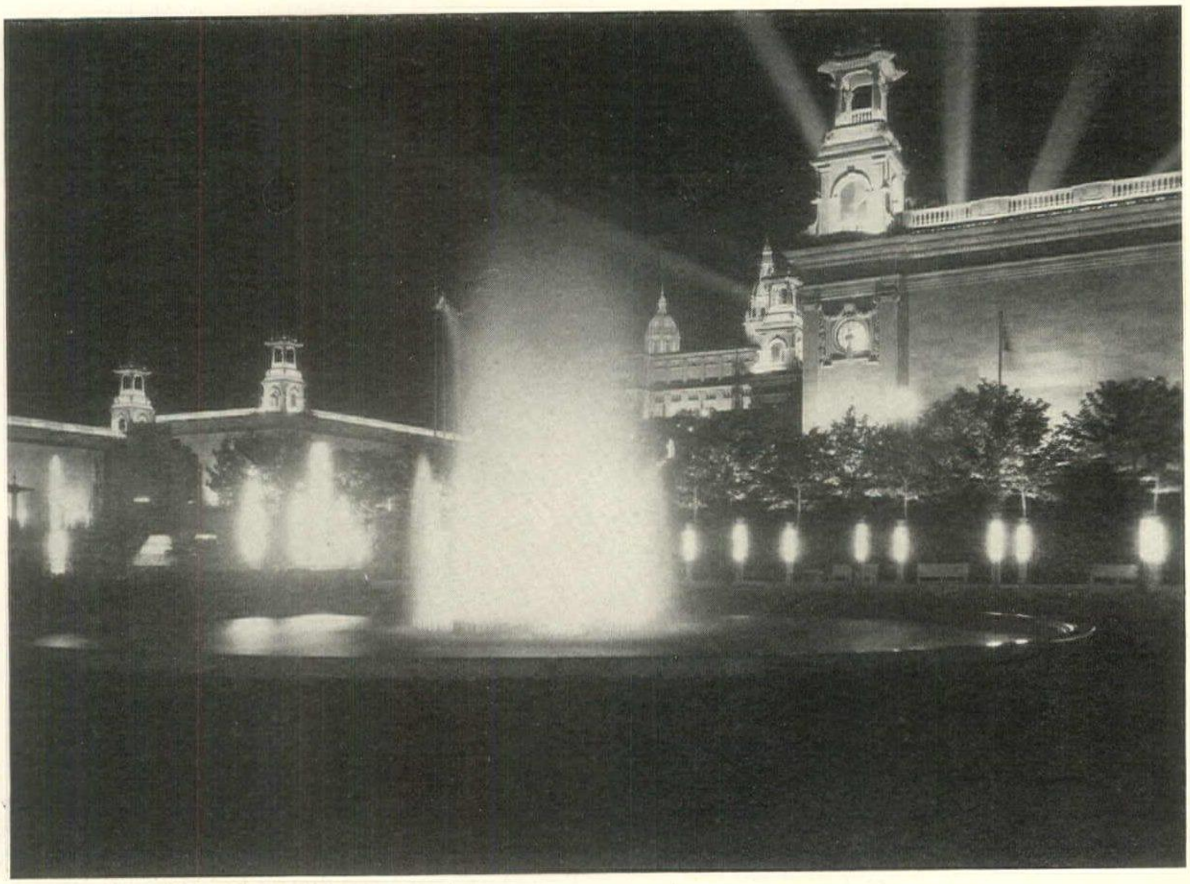


Fig. 5. Illuminated Fountains in Square Below Reina Victoria Eugenie Palace

the flasher motor. An additional contact was provided on the flasher to ring a bell to notify the operator that the wave action had been completed. The flasher stopped automatically after the program was completed. The motor-operated dimmer bank consisted of 76 individually-driven dimmer units, each unit being operated by a ¼-h.p. 115-volt motor (Fig. 6). These dimmer plates controlled the current in the direct-current coils of the re-actors located in the sub-station and thereby controlled the intensity of the lights. This bank was 28 feet, 2½ inches long, 90 inches high, and 32⅝ inches deep. The approximate weight was 18,000 pounds.

The Manually Operated Program. After the control had been transferred to the manually-operated switchboard, the whole lighting area might be illuminated in all white, all yellow, all red, and finally all blue, and all the color screens might be synchronized with this color scheme. After this, a program followed mixing the colors and varying in intensity and location. A 20-scene, multi-preset switchboard was used for this program. Twenty different scenes varying in color could be set up in advance, and by closing only one master switch a special lighting effect could be obtained.

The board embodied the dimmer bank, the dimmer-operating mechanism, and all switching equipment for producing the lighting effects. The dimmer bank was mounted on a heavy angle iron frame. Each dimmer or set of dimmers for one circuit had a handle for individual operation.

Four color groups were furnished, and the switches and dimmers for each color were mounted in a horizontal row, while the switches and dimmers for each circuit were mounted in a vertical row. (See Fig. 3.) All colors for a single circuit were thus placed in a vertical row with the blue control at the top and the red, yellow and white controls in that order. Each pilot unit, which consisted of a pilot switch, pilot lamp, preset switches, and dimmer levers, was provided with a separate cover plate.

Despite the great number of complex switching setups possible, and the distinctive effects which could be created, the operation of the multi-preset board was exceedingly simple. All the controls for a single circuit, (which included the pilot switch, pilot lamp, preset switches and circuit dimmers), were mounted together on a small section of the board. There were 20 preset switches for each circuit. The preset switches were arranged in horizontal rows of ten switches.

To set up a circuit, the preset switches for the

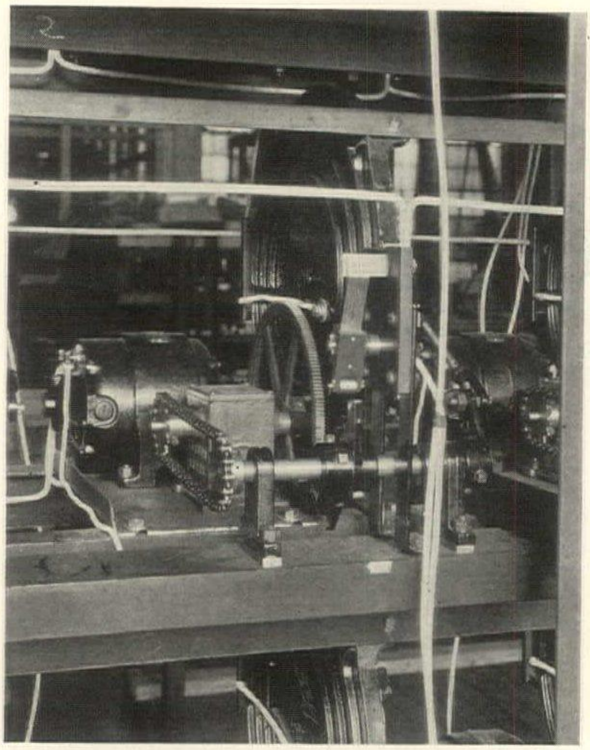


Fig. 6. Detail Showing One of the Motor-operated Dimmers

scenes, in which that circuit was to be used, were thrown to the "on" position, and for the scenes in which the circuit was not to be used, they were moved to the "off" position. This procedure was followed for all the circuits on the board, and when completed the board was ready for the performance. The setting up could be done in advance, and the effects could then be given serious attention and changed until just the right lighting was obtained.

The pilot switch handles were pushed up into the setup position, closing the lower contacts. This is the position in which they were ordinarily left for production, and it placed the circuit under the control of the color master switch. The middle position was the "off" position, and the lower position connected the circuit to the hot bus. Pushing the color master switch handle up, placed the color circuits under the control of the scene master switches. There was a scene master switch for each scene that could be set up, or a total of 20 switches. To change from one scene to another without a black-out, it was necessary to close the scene master switch for the next scene, before opening that for the scene in progress.

The color master dimmer handles, the color master, the scene master switches, and slow-motion dimmer handwheels were all located at the center of the board, so that the operator did not have to run back and forth in handling the lighting. The individual circuit dimmer could be interlocked with the color master handle and the color master handle in turn interlocked with the slow-motion master handwheel. A cross control was provided so that each color master handle could be interlocked in such a way as to brighten or dim the lighting of its color group as might be desired, irrespective of the direction of motion of the other color dimmers.

Scene master switch No. 1 was used for the cycle dimmer only, and the other 19 scene master switches were used for normal operation. A transfer was provided so that when this switch was closed for the cycle dimmer operation it was not possible to operate the other 19 scene master switches until the transfer switch was thrown over to the other position.

The main master switch and the lock switch controlled both the cycle dimmer and the manually-operated board. Therefore, in order to start the cycle dimmer, this setup was necessary: close the lock switch, the main master switch, the scene master switch, and throw the transfer switch to the cycle dimmer position. By pressing the push-button, the mobile program would begin and run till the end, when it would automatically stop and ring the bell.

A separate control board was provided for the color screens in the fountain, and was so interconnected with the manually-operated switchboard that it was possible to make setups in advance and control the board by means of the master scene switches on the main pilot board. Setup No. 1 was for the flasher control, the same as on the main board, and provision was made for manual operation independent of the main board using a special 8-point switch, each point on this switch controlling an individual color screen.

This description has covered only the main points of the equipment involved in illuminating this vast area. Without this control apparatus an operator would have had to make and break an electric contact every few seconds, and time his work perfectly. No operator could possibly have run off the amazing array of color effects at the Exposition without the help of the control apparatus described here.

STADIUM DESIGNING IN RELATION TO SEAT PREFERENCES AT FOOTBALL GAMES

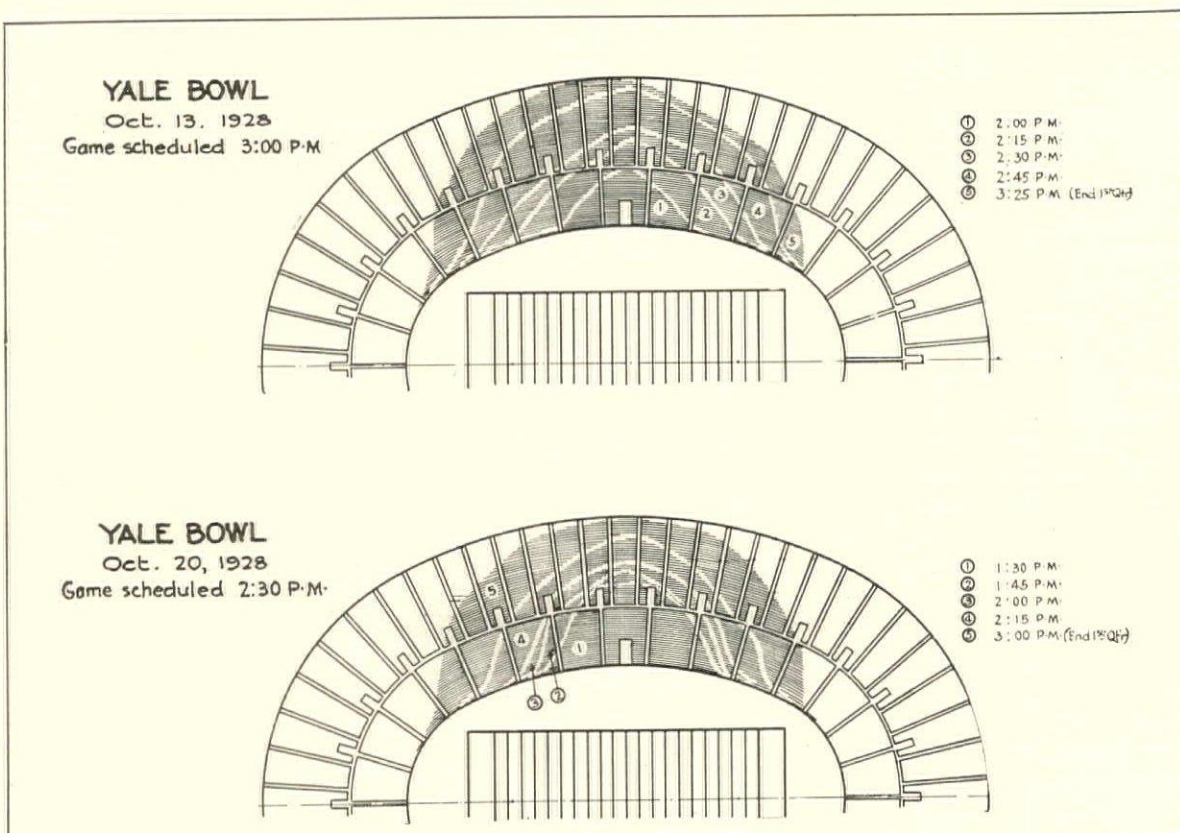
BY

GAVIN HADDEN

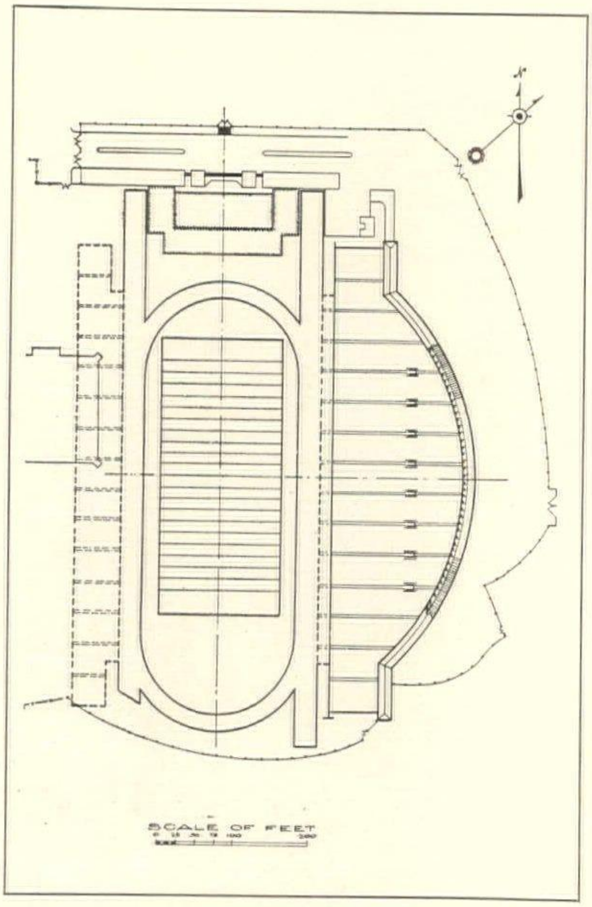
DURING recent years the increasing number of football stadium structures of considerable size have made it more than ever desirable to make accurate observations and studies of the relative desirability of different locations for seats, based on the actual wishes of average spectators. The habits and expectations of spectators have in the past been influenced from time to time to a certain extent by changes in the rules of play; they have also, more recently, been influenced partly by the very fact that more large stadia have been built, thus providing wider ranges of experience in seat locations.

Anyone who has been concerned with the sale or distribution of seats for football games knows that seats on the transverse center line of the field,—the 50-yard line,—are in general universally preferred by spectators. What has not always been known, however, is that the average spectator will definitely prefer a seat on or near this center line, even though located at a considerable distance from and at a height above the field, to a seat at or near the end of the gridiron, even though this seat may be right down close to the field of play. Some who have not studied the subject of seat preferences for football still believe that the order of preference is substantially dependent upon the distance from the boundary lines of the field of play, and that the best locations for any large number of seats will be found in uniform rows completely surrounding the field.

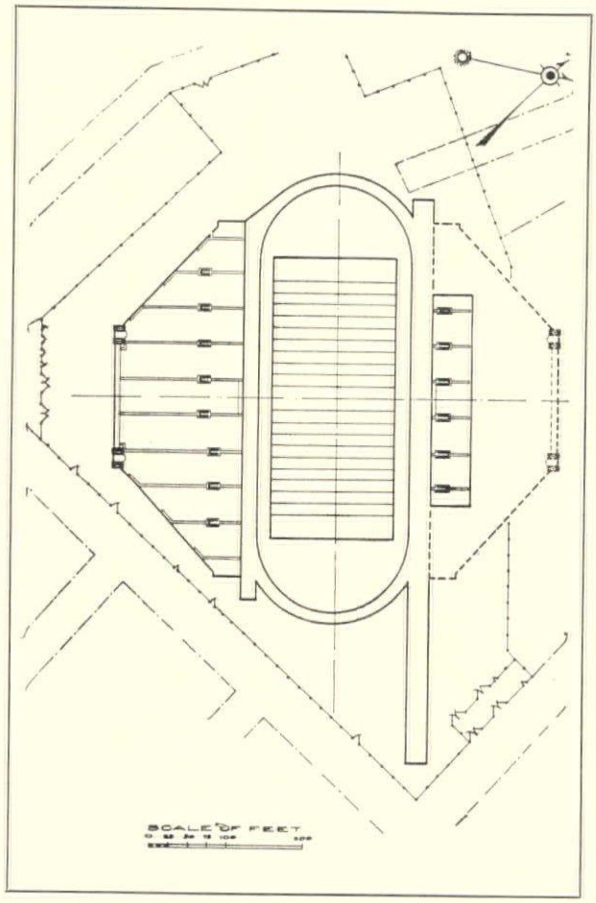
Some years ago the author made careful studies of the seat preferences of average spectators, by observations of crowds taking unreserved seats, when each entering spectator exercised complete freedom of choice of those seats not yet occupied. These studies, made at widely scattered fields, showed that for any sized crowds within the limits of the seating capacities of existing structures, the most desired seats were generally found lying within a circle centered on the center of the gridiron, with a radius of sufficient length to en-



Diagrams Showing the Seats Chosen by Spectators at the Yale Bowl. Shaded Areas Indicate Seats Taken at 15-Minute Intervals



Plan of the Cornell Crescent, Ithaca



Plan of the Brown Stadium, Providence

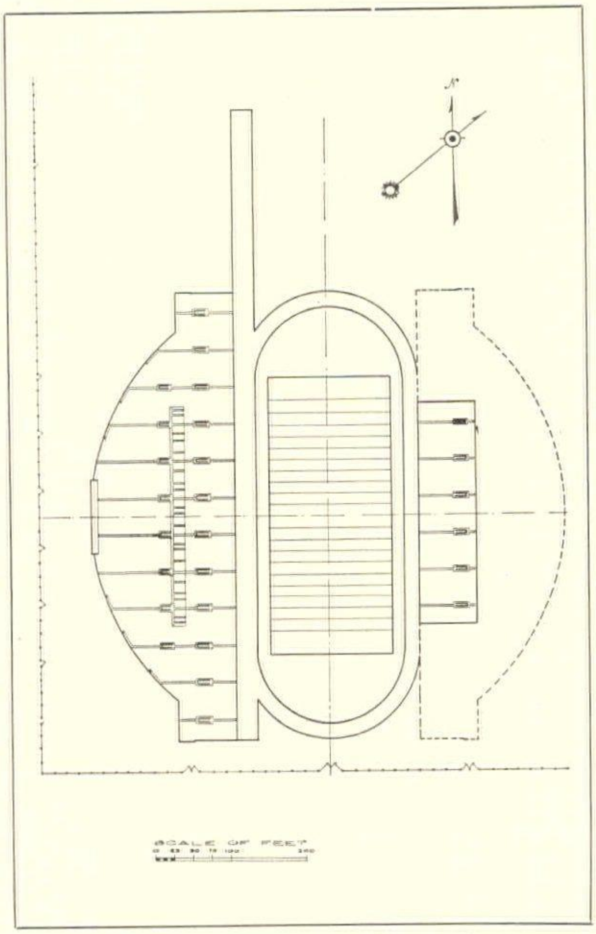
close the required number of seats. From these studies there was also evolved the theory that for still larger crowds the enclosing curve would probably be somewhat altered by the influence of the "maximum" view (the view to the most distant corner of the field) as compared with the "average" view, to the center of the field. No structure, however, has yet attained sufficient size to enable this latter theory to be definitely proved, although continued study of the subject has furnished convincing indications of its soundness.*

The author first applied these principles of seat location in designing the Cornell Crescent, followed by a number of other stadium designs. Proofs of the correctness of these principles have been multiplying year by year, and among the most convincing of these proofs are observations made at the Yale Bowl last fall. These observations were made of the visitors' side of the field only, at two mid-season games (on October 13 and October 20) when only a negligible number of seats were reserved. The reserved seats were too few to have any effect on the observations and on the results shown, so that every spectator involved may be regarded as having exercised complete freedom of choice of available seats on this side of the field. The end sections reserved for small boys were not included in the observations.

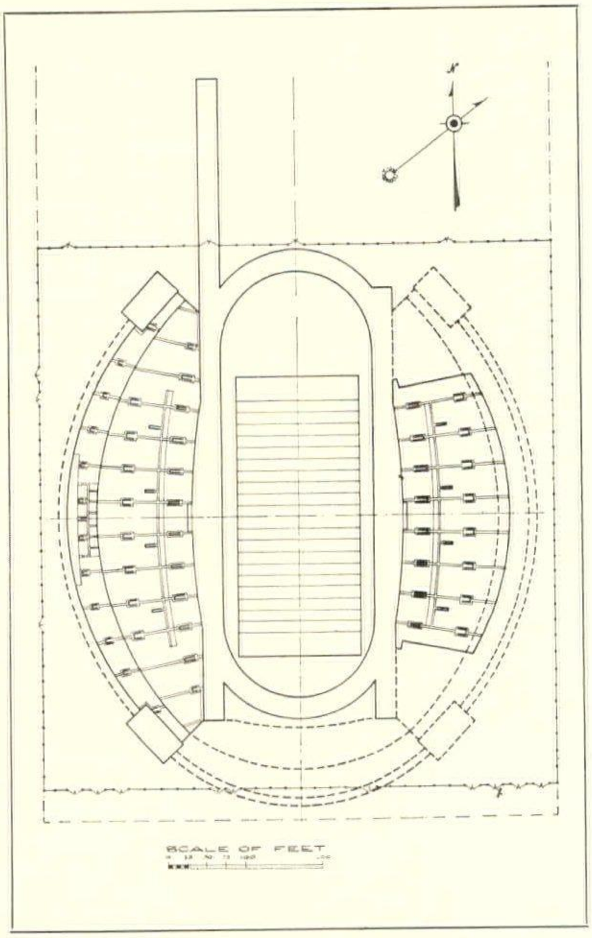
The results of the observations are shown on accompanying diagrams on the preceding page. It will be noted that in each case the general outlines of the crowd at four 15-minute intervals prior to the game, and at the end of the first quarter are shown. The general outlines were sketched with reasonable accuracy, using the portals and aisles as definite and accurate guides. While all seats within the sketched boundaries were of course not occupied, the outlines were in each instance very definite and complete. It was astonishing how very few spectators chose to sit at a distance from the main concentrations;—in some cases there would be less than 20 persons altogether scattered over the empty sections of the Bowl.

Analysis of the diagrams shows that the general outline of each increment of spectators approximated generally a circular curve centered on the center of the gridiron, except that until the central part of the crowd was restricted by reach-

*The results of these studies are described in some detail in the paper "Stadium Design," presented by the author before the New York Section of the A.S.C.E., May 20, 1925, published in the *Athletic Journal* in September and October, 1925, pp. 11 and 12.



Plan of the University of Denver Stadium



Plan of the Dyche Stadium, Northwestern University

ing the top of the deck, there was a tendency to greater preference for the center line and near-center line seats, causing a hump in the center of the curve. At the October 13 game a definite eccentricity of location was observable, particularly with the later arrivals, with a larger proportion seated at the north side of the center line than at the south side. This eccentricity was, as observed, attributable to the fact that a majority of the later spectators entered through the northerly portals (coming presumably from the parking spaces) and walked around on the deck from this end. When it became more difficult to filter through the occupied part of the deck, these later spectators took seats nearer the north end, even though somewhat more desirable seats were still unoccupied on the other side of the center. Mere inspection of these diagrams will show beyond the possibility of a doubt just about where seats should be located if they are to be placed where they are most desired by spectators. Assuming that seats are placed symmetrically on both sides of a gridiron, the diagrams indicate the ideal seating plans for crowds varying from about 4,000 to about 40,000.

With the experience gained during past years at structures of the new type, such as the Cornell Crescent, the Brown Stadium, the Denver Stadium, and the Dyche Stadium, at Northwestern, the soundness of the extension of the same principles to crowds of 50,000 and 60,000 and more has been amply demonstrated. Diagrams which are given here show plans of these structures and indicate how, with modifications of various kinds, the author has applied in practical design the principles herein demonstrated.

FOUNDATIONS OF THE WILLIAMSBURG SAVINGS BANK, BROOKLYN

BY

FRANK W. SKINNER
CONSULTING ENGINEER

THE most interesting structural feature of this 40-story building is probably the somewhat unusual foundation of reinforced concrete on dry sand, which, with the massive steel grillage, eliminates girders for the support of the 85 columns.

The Williamsburg Savings Bank Building, at the corner of Ashland Place and Hanson Place, has street frontages of 210 feet and 99 feet, covers an area of about 20,000 square feet, and has 325,000 square feet of floor space. It has three and one half stories below the street level, and 40 stories in all above the street level. The steel framework rises 513 feet above the curb, or 569 feet above the lowest point of the footings, making this, it is claimed, the tallest building in Brooklyn. There are 25 main stories in the body of the structure besides 15 in the tower, which rises 122 feet above the 27th floor; the exterior walls are of brick, limestone and granite. The principal materials included 7,100 tons of structural steel; 3,000,000 bricks; 6,300 yards of concrete and 523 tons of reinforcement steel. In the basement there is a 35 x 82-foot bank vault, 12 feet high, with 20-inch reinforced concrete walls, lined with 1-inch battleship steel, and there are three entrance doors, weighing with their vestibules 65 tons each.

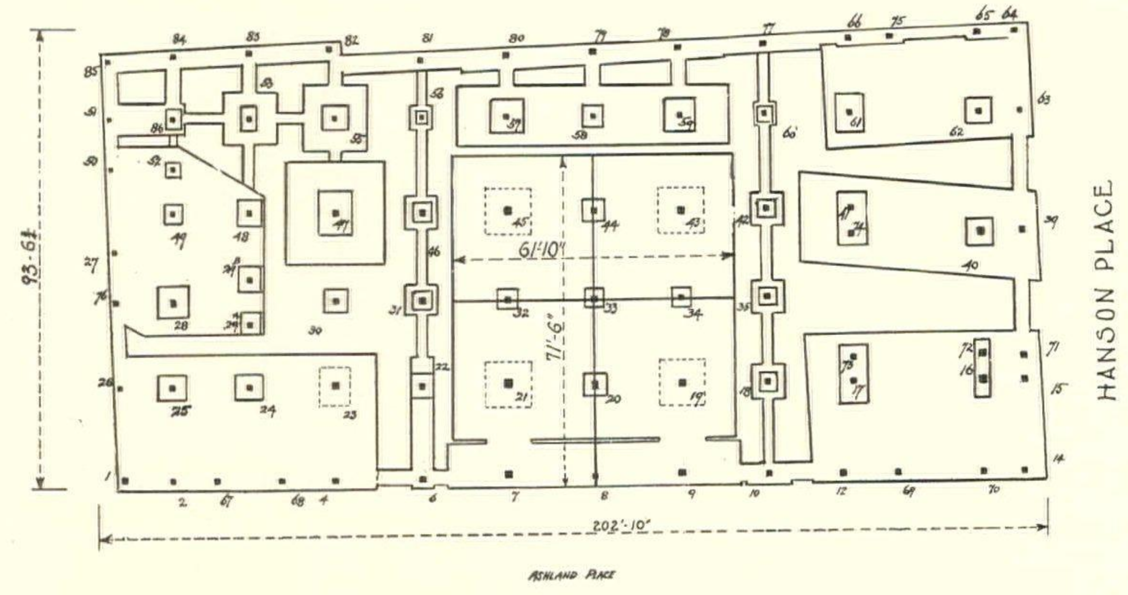
Besides the main and auxiliary banking rooms, the former having a very large unobstructed floor space and a ceiling height of about 60 feet, there is, in the upper stories, a large amount of rentable office and commercial space. The original estimated cost of the building was about $5,000,000, and it was completed in 1929.

Construction Conditions. The location of this building on dry, sandy soil far above hard stratum, the very heavy concentrated column loads, the deep general excavation, and the treacherous condition of the adjacent soil, most of it consisting of imperfectly compacted backfill to a considerable depth, made the substructure work unusually difficult and costly. On Ashland Place the main excavation extended to the Sea Beach Line subway 54 feet below the curb, and 100 feet beyond the opposite side of the lot in St. Felix Street is the Brighton Beach subway, 62 feet below the curb. On a third side of the lot, in Hanson Place, is a 16-foot sewer, 38 feet below the curb. Of the entire 210 x 304 feet area around the bank building, all had been excavated and backfilled, excepting the 83 x 210-foot site,—about one sixth of the entire area,—of the Hanson Place Methodist Church, and even there, the soil conditions were considered very treacherous.

During the construction of the Brighton Beach subway in 1917, a section of its trench timbering collapsed, and caused a movement of the soil that extended far underground to the line of this excavation, displacing old walls 4½ inches horizontally. In Ashland Place, the street pavement had settled 14 inches, and it was subsequently found that much of the old permanent timbering underground had decayed, and many cavities were found adjacent to the existing subways. Under these difficult conditions, the utmost care was necessary in designing and proportioning the new foundations, and in excavating and maintaining the cellar pit with a maximum depth of 56 feet below the curb. Fortunately, the deep trenching and drainage provided by the adjacent subways and sewer had lowered the ground water level several feet below the bottom of the excavation, enabling the foundation work to be carried on in the open, and without pumping. Explorations made by a considerable number of test borings demonstrated the presence of a deep stratum of sand and gravel, with a good bearing power.

Spread Footings. It was therefore decided to adopt spread footings of reinforced concrete on the dry sand at subgrade to support the 85 columns. These footings are continuous under the outer walls of the building, and those for the interior columns vary from 5 feet x 5 feet to 62 feet x 62 feet, with thicknesses of from 2 to 9 feet, all of them calculated to reduce the unit pressure on the sand to a maximum of 8,000 pounds per square foot. These footings support from 1 to 12 columns each, and, except those for the wall columns, are entirely separate and independent, except as connected by transverse struts that prevent the possibility of horizontal displacement, while they allow for possible slight irregularities of settlement without injury to adjacent footings. The required combined area of all the footings is about 17,200 square feet, leaving unloaded intermediate spaces aggregating about 3,600 feet, or 17 per cent of the total lot area.

The very heavily loaded columns are seated on single and double tiers of plate girders, with bases reducing the unit loads to less than the working compressive strength of the concrete. The smaller columns are seated on concrete pedestals on the footings. When two or more columns are seated at the opposite ends of a footing, the latter is designed as a continuously loaded girder, distributing the column loads over the entire lower surface, thus eliminating the use of cantilevers and other

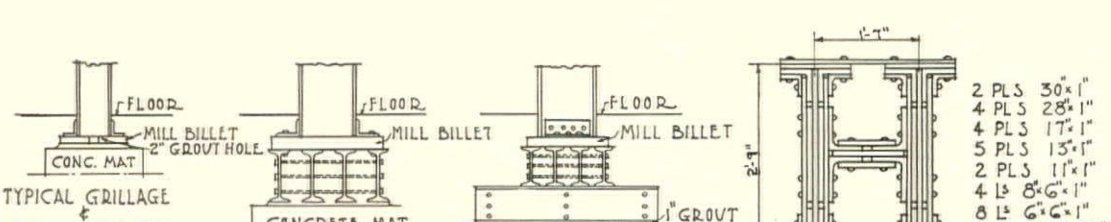


Plan Showing the Column Locations and Reinforced Concrete Mat Foundations

very heavy steel girders often interposed between columns and their footings. The stresses were very carefully computed and the substructure completely detailed; great pains were taken to secure the highest quality of concrete and the most accurate, reliable work in placing it and the reinforcement bars.

Although these footings are perhaps more massive than have been used in any other office building, they are so simple in design, accurately proportioned, and so accessible for construction and inspection that, involving only uniform standard materials and ordinary operations, they are believed to be more satisfactory and reliable than the more expensive types of deep heavy foundations that are often constructed at greatly increased cost.

Underpinning, Bracing, and Steam Shovel Excavation. Construction operations were commenced by the removal of a dozen four-story brick and brownstone front dwellings that occupied the site, with their cellar floors and rubble stone footings on earth about 9 feet below the curb level. Below the street level the debris was removed by the ¾-yard bucket of a steam shovel delivering into trucks that descended from the street to subgrade on a ramp, and continued the excavation of the loam, sand and gravel with sloping sides inclined about 3 horizontal to 4 vertical. At a depth of 20 feet dry sand and gravel were encountered, and the steam shovel continued the excavation to a maximum depth of about 5 feet more, excavating in all about 12,000 cubic yards in about 15 working days. Before excavating the sloping sides of the pit, the 60-foot front of the four-story Hoover Building at one corner



Typical Column Bases Resting on the Concrete Mat Foundations; Also Section of One of the Larger Columns of the lot, and the 38-foot front of the four-story church parsonage on the opposite diagonal corner were needled, and the walls were underpinned with concrete piers extending 2 feet below subgrade of the final excavation.

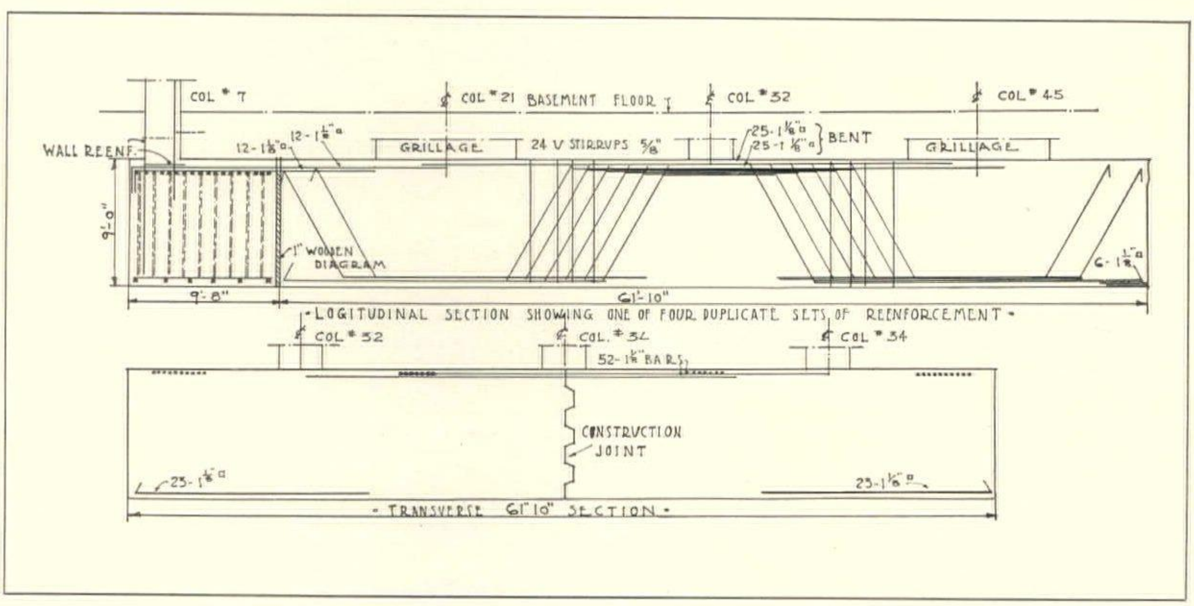
Permanent Concrete Marginal Piers. At intervals of 14 feet on centers, there were excavated on all four sides of the lot more than forty 4 x 5-foot pits sheeted down with horizontal boards to a depth of about 5 feet below curb level, and 8 feet above ground water level, which was found to be about 19 feet below high tide. Below subgrade of the main excavation, the sides of these pits were extended 12 inches in every direction.

In each pit there was built a 60 x 30-inch full height marginal pier of 2:3:5 concrete with four full length rods of ¾-inch diameter. The piers located under the front walls of the buildings served to underpin them, and all the piers were used as buttresses to take the bearings of the ends of four tiers of longitudinal and transverse cross lot timber struts.

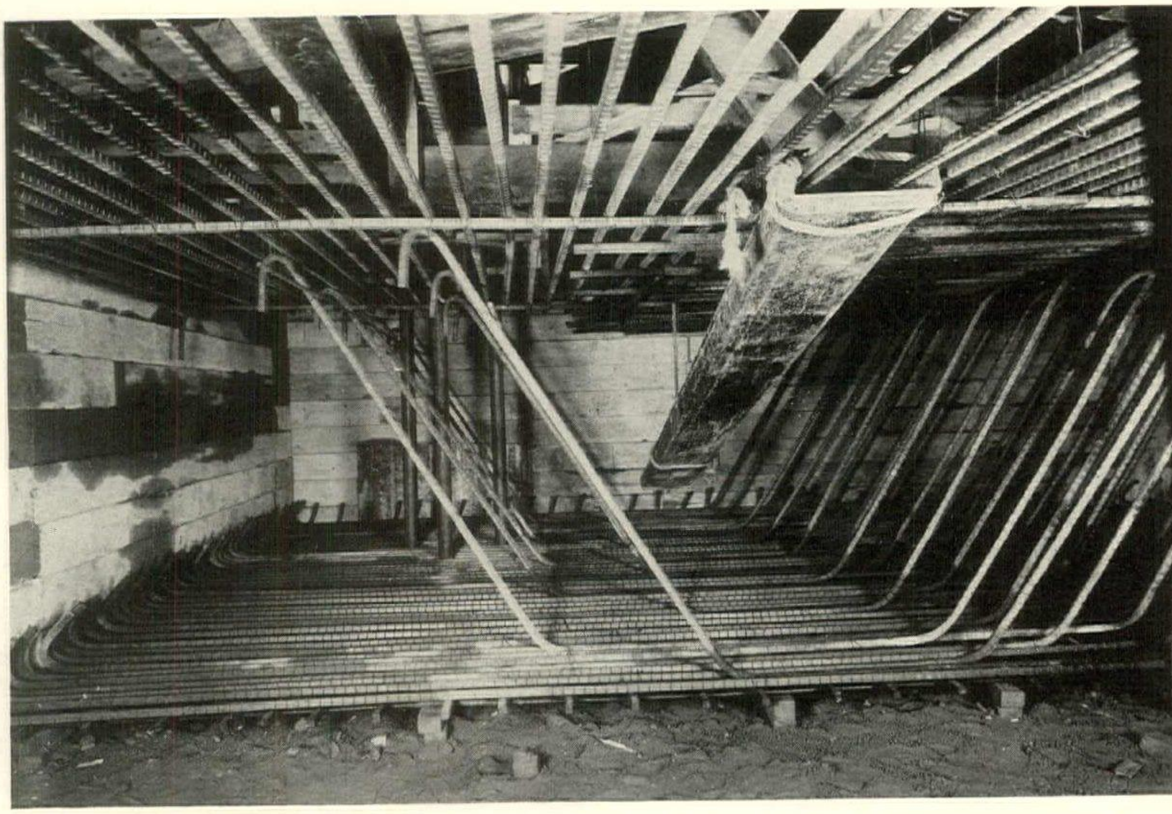
Cross Lot Bracing. The struts in the two upper tiers, about 10 feet apart vertically, were each made with a pair of 6 x 12-inch timbers splicing each other's staggered joints and separated 3 inches. Between them were bolted 3 x 8-inch diagonal braces connecting the first and second tier struts in the same vertical plane, and making them respectively the top and bottom chords of trusses intended to resist the horizontal thrust of the embankment on each side of the pit. All of the trusses were 99 feet long, forming a series of transverse braces below which there were two more tiers of single 12 x 12-inch continuous struts in the same vertical planes. The longitudinal struts consisted of four corresponding tiers of 12 x 12-inch single timbers in the same horizontal planes that were wedged to bearing with the transverse struts at their intersection. The struts were installed successfully from the top down as the side slopes and bottom of the pit were excavated by hand, making this procedure possible.

General View, Williamsburg Savings Bank Building, Brooklyn

Halsey, McCormack & Helmer, Architects



Sections Through the Reinforced Concrete Mat Foundation of the Tower



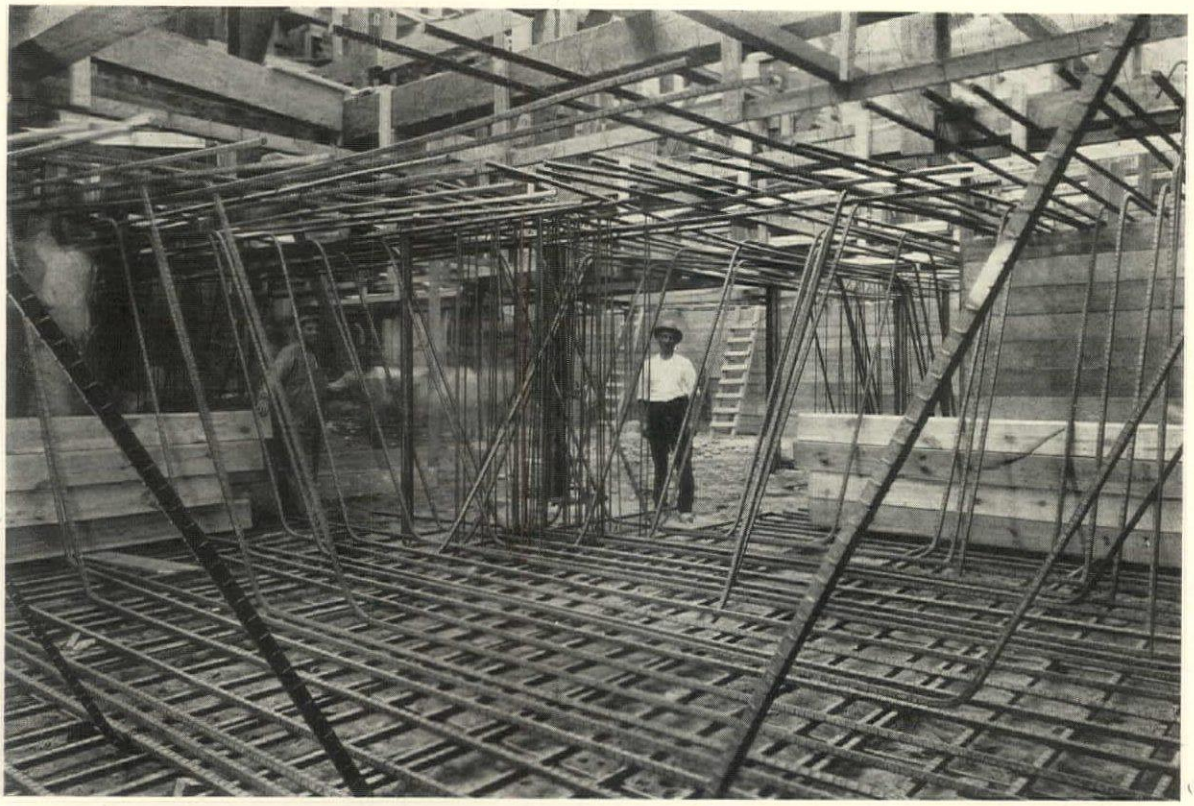
Part of Reinforcement for Tower Mat. Bars Accurately Spaced, Wired Together and Suspended from Temporary Overhead Beams. Steel Chute for Concreting

Sheeting and Hand Excavation. The earth between the vertical buttress piers was retained by 3-inch horizontal planks bearing against the outer faces of the concrete piers and placed from top down, as the excavating progressed. The muck was excavated by hand and mostly shoveled into wheelbarrows that were placed on a three-barrow electrically-operated platform hoist, from which they were dumped into an elevated hopper in the street, delivering to trucks. About 20 per cent of the excavated material was shoveled into buckets handled by a 60-foot boom of a derrick that usually delivered directly to the trucks. The total amount of excavation was about 42,350 yards.

Soil Test. The bottom of the pit was carefully trimmed and leveled to subgrade, and the soil which would be under the tower was subjected to a test load, placed on a 10 x 10-foot platform of horizontal 2 x 8-inch planks laid flat on the surface of the ground, forming the bottom of a bin having sides made of vertical 2 x 10-inch planks 13 feet long braced on the exterior. Accurate level readings on the four corners of this bin were taken and recorded, and the bin was gradually filled with sand delivered from the street through a chute, and leveled as fast as it was deposited. When the sand was 3 feet, 6 feet, and 9 feet deep, level readings were taken, the average of which showed a settlement under full load of ⅜ inch, which after 24 hours increased to about ¾ inch. This load corresponded to an average pressure of slightly more than 8 tons per square foot of the surface covered, and was acceptable to the building department, which allowed a working load of 4 tons per square foot on the soil. During the construction of the building, and subsequently, the contractor and his engineer took level readings, that have, so far, indicated no settlement of the finished structure.

Concrete Plant. Just below street level there were installed in the upper part of the excavation two wooden hopper bottom storage bins, one of about 500 yards capacity for coarse aggregate, and the other of 200 yards capacity for sand, both of them filled directly by dumping from trucks in the street. Materials from both bins were delivered by gravity through chutes with measuring boxes to wheelbarrows on runways supported by the bracing timbers. These wheelbarrows charged six 1-yard and ½-yard portable concrete mixers, shifted from time to time as convenient, and located at different heights to receive the aggregate direct from the wheelbarrows, or from chutes into which the barrows dumped. All concrete was chuted directly from the mixers to the required positions in the foundation forms.

Reinforcement Steel. All the reinforcement steel was 1⅛-inch square bars, except the ¾-inch



Part of the Reinforcing Steel for the Mat 62 feet by 71 feet, 9 feet thick, Supporting Four Tower Columns and Five Basement Columns

round stirrups. It was cut to length at the mills, and was bent by hand on the site. A substantial wooden platform 50 feet long and 30 feet wide was built at the site, and on it were bolted angle iron templates to which the bars were bent with hickeys. The forms for the foundation mats were made with horizontal 2-inch planks nailed to 2 x 4-inch verticals about 3 feet apart. The reinforcement bars were suspended by wires from a system of 2 x 4-inch joists laid on the lower tier of cross lot braces. They were carefully assembled, and tie-wired at intersections.

Tower Foundations. The 19,416-ton weight of the central or tower section of the building was almost entirely carried through the four main columns, 19-21-43-45, at the corners of a 37½ x 37½-foot rectangle, to the 62 x 62-foot main foundation mat 9 feet thick, which contains 51 tons of reinforcement bars, and 2,812 tons or 40,176 cubic feet of concrete. This mat was heavily reinforced by four sets of bars, one set being shown in the accompanying longitudinal section of the mat.

After the erection of the four sides of the concrete form on the carefully leveled subgrade, all of the reinforcement was assembled and fixed in position, and interior transverse and longitudinal bulkheads were built dividing its area into four equal parts with three horizontal keyways through the full length of each vertical partition. All of the available mixers were concentrated to deliver concrete through steel chutes to the first section of this mat, which was completed in one 11-hour shift. The next day the bulkhead was removed from one side of this section, and a second section was concreted in 11 hours, and so on, for the two succeeding days, until the entire mat was finished, great care being taken to maintain the reinforcement bars in exact position, and to keep them 4 inches within the outer surfaces of the concrete. Tampers and wooden paddles were used to compact the concrete, and to force it under and around all pieces of reinforcement steel.

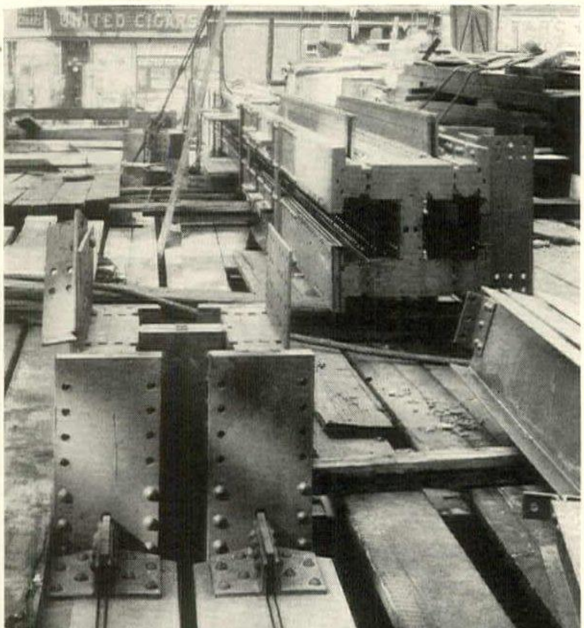
This mat was separated from the footing for the Ashland Place wall columns 7-8 and 9, by a vertical diaphragm of 1-inch boards built permanently into the concrete, and having in it two openings 10 inches wide providing physical connection between the mat and the wall footing, so as to resist transverse displacement. The supports for the cross lots bracing timbers over this and other large mats included many 12 x 12-inch verticals located within the area of the mat, which were temporarily shored and the lower portions cut off, and permanent concrete footings below subgrade were made on their centers before the concrete was placed in the mat. On these footings Lally columns were set and wedged to bearing against the lower ends of the vertical timbers, the shoring removed, and Lally columns were concreted into the mats, and after completion of the latter were cut off level with their upper surfaces.

As some of the footings projected beyond the building line, they encroached on the permanent concrete piers of the cross lot bracing system, and in some cases the latter were shored by inclined H-beams and their inner faces undercut to clear the concrete mats. All mat concrete was proportioned 1:2:4 with a maximum of seven gallons of water per bag of cement, and a mixture of hydrated lime. All hooks on reinforcement bars had a minimum of 9 inches.

Other Principal Footings. Besides the tower mat already described, which carries four main columns, and five smaller columns, there are six other principal mats carrying from four to 12 columns each. The four largest mats together carry 12,874 tons column loads. One 32¾ x 52½-foot mat 6 feet, 8 inches thick, contains 11,400 cubic feet of concrete, and 30 tons of reinforcement. Another mat, 23 x 60 feet, and 6½ feet thick, contains 8,970 cubic feet of concrete, and 18 tons of reinforcement steel, and supports six columns. A 19½ x 53-foot mat 7 feet thick contains 7,238 cubic feet of concrete, and 15 tons of reinforcement, and transmits a total load of 4,030 tons to soil having a bearing capacity of 4,136 tons. A 26 x 46-foot mat 7½ feet thick contains 8,970 cubic feet of concrete, 20½ tons of reinforcement, and loads the soil beneath it to about 4,800 tons, which is substantially its full bearing value. The proximity of quicksand made it necessary to drive interlocking corrugated sheet piles before completing the excavation for this mat. The seventh large mat is 34½ x 40 feet and 5 feet thick, containing 6,900 cubic feet of concrete, and 20½ tons of reinforcement, and carries nine columns, with a total load of 4,900 tons distributed over soil having bearing capacity of 5,520 tons.

The heavily loaded columns are seated on single- and double-tier grillages distributing their load over the surface of the concrete mat. Those with lighter loads are set directly on the surface of the concrete. The loads of the four main tower columns vary slightly, the largest being 3,322 tons exclusive of wind loads, and the smallest 3,141 tons, also exclusive of wind loads. Each of those four columns weighs about 2,000 pounds per linear foot, and their 65-foot sections passing through the very high banking room, were each loaded on four heavy automobile trucks for night transportation through the city, where they broke many manhole covers, and were twice stalled in the streets. Two trucks were lashed together, moving forward under the front end of the column, and two were lashed together moving backwards under the rear of the column. The columns were erected by a steel derrick, with a 75-foot boom of 70 tons capacity.

The architects were Halsey, McCormack & Helmer; Lange & Noska were the structural engineers, and the William Kennedy Construction Company the general contractor.



Main Tower Columns Having Maximum Cross Section of About 600 Square Inches, Weighing 1 Ton per Lineal Foot

THE SUPERVISION OF CONSTRUCTION OPERATIONS

CHAPTER 13

ROUGHING-IN BY PIPE TRADES

CONTRACTS for heating and plumbing for the school building, which forms the basis of these discussions, were awarded shortly after the arrival of the superintendent. Local concerns had bid on both items, but the heating contract had gone to a large outside corporation whose low bid had been approved by the architect. This company was prompt in filing a surety bond made out on the architect's form, and equally prompt in submitting a schedule of kinds of material proposed to be used. Not so with the plumber, who was a local dealer of a distinctly different type. The confidential report on this individual, sent by the superintendent to his employer, declared him to be deficient in several important particulars. He was under-financed and could buy from only one supply house. His reputation as a substituter was bad, and his workmen did not rate the best. But, for reasons such as were given in a preceding chapter in The Architectural Forum for May, 1929, the architect had not interfered to prevent the awarding of the contract to him, nor had formal objection been made to the filing of a personal bond.

The day after the bond was filed, the plumber was on hand with his trench diggers, ready to start the sewer trench, and was much taken back when the superintendent refused to allow him to proceed until the bond had received the formal approval of the board. The plumber was so persistent in his efforts to begin the work that the superintendent had to threaten arrest in order to make him understand that he meant business. Again there appeared the hardware dealer to urge a special concession in view of the excellent weather conditions. To this the superintendent rejoined that he would insist upon the manholes being constructed ahead of the laying of sewer (and after approval of the bond), the recent heavy rains having demonstrated the harm that might result from leaving undrained trenches open indefinitely.

A week later, the bond having been accepted, the plumber put in his water connection and would also have installed the gas supply, but this was so premature and would have interfered so much with other work that the superintendent prevented it by the simple expedient of holding up the board's application for the gas service connection. This unwonted eagerness on the part of the plumbing contractor to get all parts of his work under way was presently explained by his filing a padded statement of cost of work done, in order to obtain a certificate for a substantial May 1 payment. This was duly pared down by the superintendent. It was some time in May before the general contractor's mason completed the sewer manhole in Orchard Street, and then the plumber was permitted to proceed with the installation of the sewer. This was closely watched and stopped twice because of the careless manner of bedding the tile and cementing the joints. The plumber finally employed a more experienced man, who replaced several sections and laid the remainder in accordance with the specifications. The two sumps were constructed at the same time, at the southwest and southeast corners of the building for receipt of seepage from the lines of farm drain tile discussed in Chapter 11, "Waterproofing and Dampproofing," in the November issue of The Architectural Forum. With this tile the setter proceeded systematically from the low points, at connections into sumps, the fall being only 12 inches from the high points, midway on lines of north and south wall footings. This slight fall was carefully equalized by frequent tests with straight edge and level. Each piece of pipe was carefully laid on a full, firm bed of natural earth, the joint covered with a half-circle band of galvanized iron and then embedded in a 12-inch layer of coarse gravel, after the outside of the foundation wall had had its approved coat of waterproofing.

In cities where plumbing ordinances are in force, architects are accustomed to depend to a great extent upon official inspectors to see that all piping for sanitary work is as it should be, the superintendent merely supervising it in a general way, guarding against interference, and making sure that all such work is promptly installed. Where no such city inspection is provided, necessity of his supervision of the work of the pipe trades is increased. He must know that:

(1) All material is of the kind, make, grade and weight called for.
(2) It is located in accordance with approved pipe diagrams.
(3) It is level or properly inclined in all cases.
(4) All joints are well made, with proper materials of sufficient quantity, — calked, threaded, shoved, wiped or flanged and bolted, as case may be.
(5) All pipes are rigidly supported with due allowance for expansion and contraction, where it is called for or is necessary.
(6) All exposed work is properly aligned and left in the finished condition specified.
(7) All testing is properly conducted and all

indicated corrections made in proper way.

(8) All reports, certificates and guaranties are filed as stipulated.

Knowing that this particular plumber would need watching at every stage of the work, our superintendent started weighing the pipe and fittings, using a heavy spring balance which he secured for the purpose. The cast iron pipe was specified to be "extra-heavy," but many pieces were found to be under weight, according to a standard table. The contractor claimed that all pipe heavier than "standard" must be extra-heavy, and that he had never before heard of its being weighed. It developed that he had bought the pipe from a wrecking company and had no knowledge of its make, except in the case of a few marked pieces.

Owing to the fact that every plumbing and steam heating concern is a retail supply house, they naturally desire to use materials they carry in stock or can easily procure through their regular sources of supply. A superintendent must know when this is permissible and, *per contra,* when it is incumbent upon him to insist upon "the letter of the law." Frequently, he will find that (in this as in other lines) the contractor has deliberately allowed himself to run short of time, so as to facilitate substitution. This should be foreseen and circumvented, which demands a lot of time in the case of a confirmed offender.

The correct location and proper incline, alignment and support of piping are not matters that are difficult to check, but they do demand careful attention, as all such details are easily slighted. This intensive inspection begins with the placing of inserts in concrete forms, as related in Chapter 10, in The Architectural Forum for November. Another frequent source of trouble arises from careless spotting and leveling of floor drains and of those pipe cleanouts which are supposed to finish flush with floor surfaces. Inasmuch as the general contractor is responsible for correctness of finished floor levels, he should give the plumber (and others), on demand, the necessary information as to such levels. But, if the superintendent is not careful to check the heights to which the plumber is working, he may later find him wrong and trying to throw the blame on the man who gave him the information. The superintendent must *know* which is right. He must also see that no exposed plumbing parts, drains, cleanouts, valves, etc., are located where they will be covered or will interfere with subsequent work; also that pipe that is intended to be covered is not crowded into corners nor against walls in such a manner as to leave insufficient room for applying the covering.

The foregoing is intended to apply chiefly to plumbing piping, but is equally applicable to that for steam or hot water heating. Since much of such piping is exposed, its alignment (especially its verticality) is of the utmost importance. Particular caution must also be exercised where such pipes extend through ornamental ceilings, to see that they occur where they will cause the least damage to decorative members.

The three customary methods of testing soil pipe are by smoke, peppermint fumes, and water. The latter method is most generally used and is effected by merely plugging all outlets before sewer connection is made, then filling all connecting lines with water up to the tops of the roof vents. If the water fails to hold its level, the leakage is traced and due corrections are made. Sometimes the faults are hard to find, but no excuse can be accepted. The water must hold. This test is considered too severe for standard pipe in buildings of more than two stories in height, because the hubs will not stand the character of calking needed to provide the resistance to such a head of water. Hence, if tests of standard piping are called for, smoke or peppermint is resorted to. But *all* soil piping should be satisfactorily demonstrated to be free from leaks.

Water piping is easily tested by turning on the supply and submitting the piping to full pressure. This should, of course, be done before the pipe is covered. This is true likewise of piping in heating systems. They should be amply tested by prolonged demonstration, then duly covered only after all is found satisfactory.

Gas piping is always tested by inspectors of the local service company. The superintendent should insist upon receiving a certificate of approval on this work before permitting it to be covered by lathing or other permanent construction. This is a frequent bone of contention between workmen, the lather always appearing desirous of working in the particular place where a gas or electric outlet is yet to be located. It therefore behooves the superintendent to make it plain to the pipe trades that they will be held responsible for delaying the lathers (or others) after a certain time,—and to the lathers that they will have to replace at their own expense any of their material that has been put in place over unaccepted work.

Pipe covering is generally specified so definitely that the superintendent has merely to see that it is fully attended to, with the proper material, and neatly secured and finished. Specifications are sometimes lax in not particularly stating how pipe connections are to be covered. This point should be made clear. The superintendent should also give particular attention to such pipe covering as is to be permanently exposed, as it is generally specified to be finished in better manner than that intended to be concealed.

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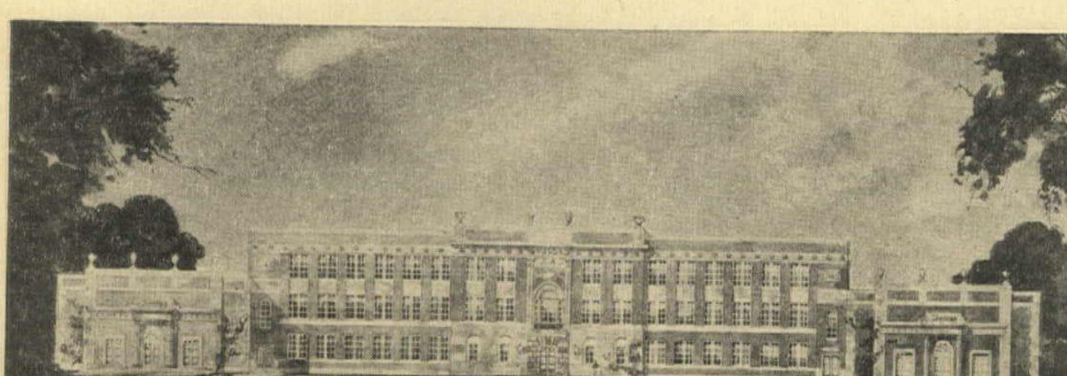

Again, time proves durability of Opex Lacquer

Hunter-Dulin Building, San Francisco, Calif. Architects: Schultze & Weaver Supervising Architect: T. Heitschmidt Painters and Decorators: A. Quandt & Sons

A typical office in the Hunter-Dulin Building

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