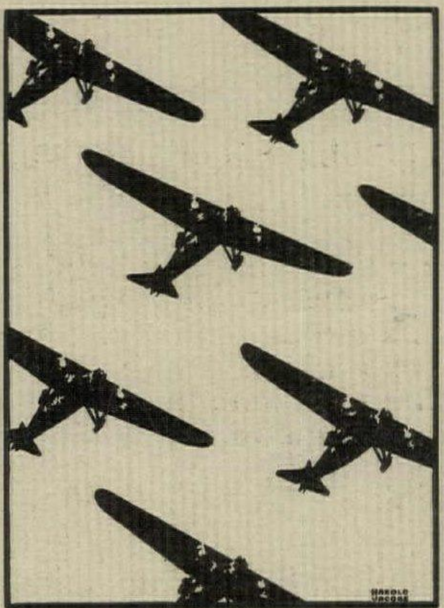
The AMERICAN ARCHITECT



Founded 1876

July 20 1929

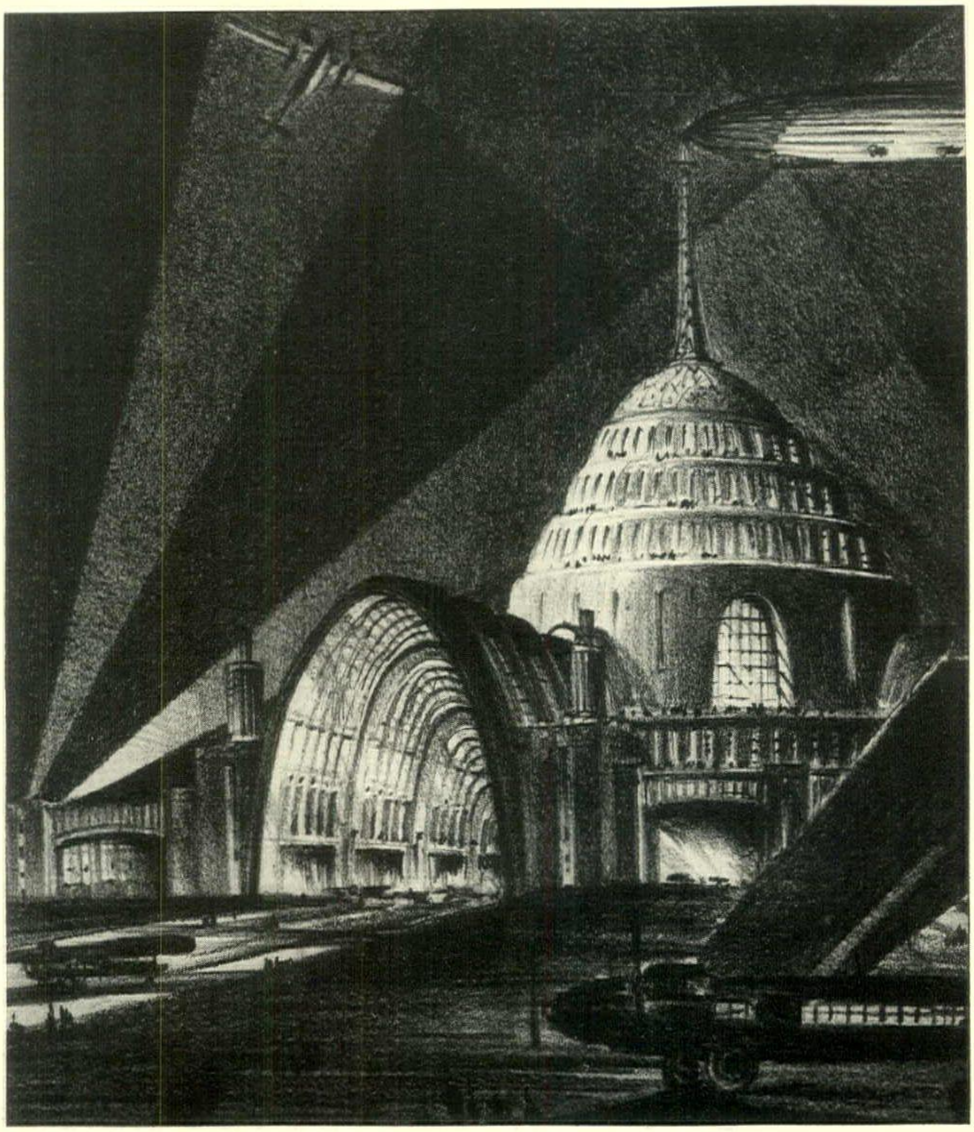
IN TWO PARTS

PART ONE

The American Architect, published semi-monthly by the Architectural and Building Press, Inc., 235 East 45th St., New York. Yearly subscription, $7.00. Entered as second-class matter, April 5th, 1926, at the Post Office at New York, N. Y., under the act of March 3rd, 1879. Issue number 2573, dated July 20th, 1929.

AIRPORTS must of necessity be designed from the flyers' point of view. The landing field must be located and planned for safety in landing and take-off. Adequate facilities must be provided for housing and maintaining the airplanes. Other facilities are in a sense incidental, for without correct provision for the ships and flyers the port must be a failure. We believe it opportune and fortunate to be able to present in this issue of THE AMERICAN ARCHITECT an article by W. D. Archer that treats of airports from the flyer's standpoint. Mr. Archer's experience as a lieutenant in the British Royal Flying Corps and continued interest in aviation makes him qualified to write with authority. * * * Louis Steuber, chief draftsman for George M. Bartlett of New York City, has been called upon to study and investigate the utilitarian as well as aesthetic aspects of hangar design. His article on Commercial Hangars will be found worth reading. * * * In this issue we also present a group of four sketches of New York towers by Earl Purdy. Mr. Purdy is a graduate of Cornell University, where he won among other honors the Beckwith Brown Medal and the 1920 medal of the Societe des Architects par le Government Francais. Mr. Purdy is in the office of Walker and Gillette, Architects, New York City. * * * Leslie N. Leet's article on the space requirements of pipe organs, which began in THE AMERICAN ARCHITECT issue of July 5th, is completed in the current issue.

July 20, 1929 *The Publishers*



THE "BEEHIVE" AIRPORT
A CONCEPTION OF A LARGE AIR TERMINAL OF THE FUTURE BY
FRANCIS KEALLY, ARCHITECT

THE AMERICAN ARCHITECT
July 20, 1929

The AMERICAN ARCHITECT

Founded 1876

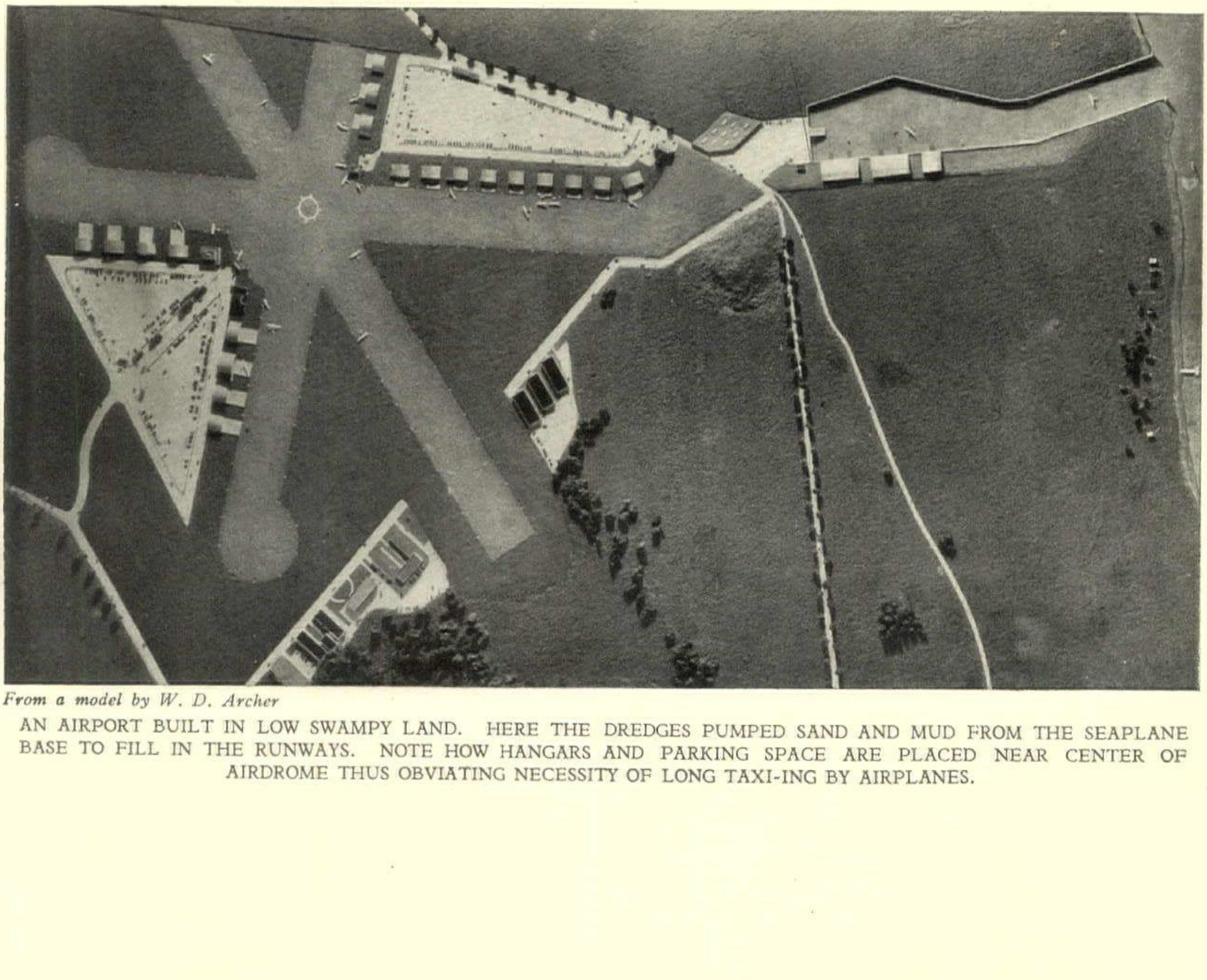
VOLUME CXXXVI | JULY 20, 1929 | NUMBER 2573

PRACTICAL AIRPORTS

By W. D. ARCHER

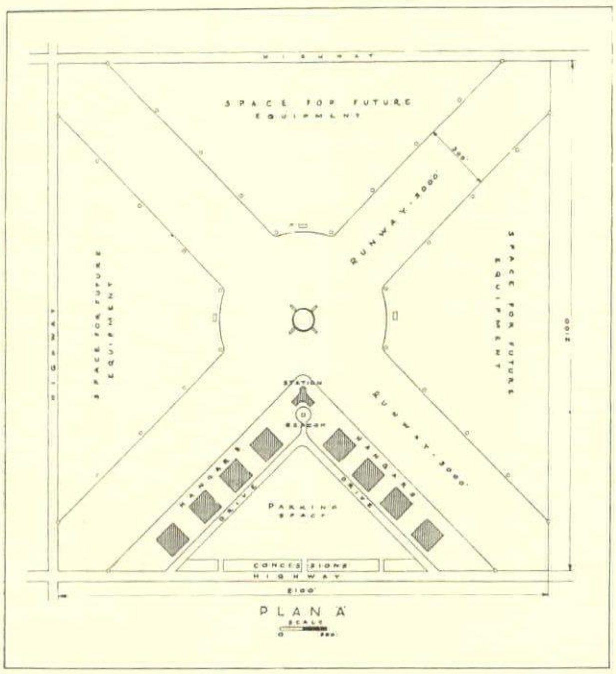
EVER since the American public has become air-minded it has groped around like a child in the dark in its endeavor to solve the airport problem. On every side one reads of airplane stock promotions and mushroom aviation companies, and the airport has been the most recent sufferer from the inexperienced airport designer with but a theoretical knowledge of his subject, and the self-advertising airport "expert," who is, in most cases, a civil engineer who has made a failure at everything else and who turns to aviation as a bonanza. Furthermore, in the experience of the writer, many of the architects who are now setting up as experts or consultants in matters pertaining to airports and aviation are doing so on the basis of a few weeks spent in a flying school, and these, in many cases, do not actually know the difference between an empennage and a side slip. One has but to study carefully the plans and drawings now adorning the magazines and newspapers to realize that the man who draws them knows little or nothing about practical aviation.

This sort of thing will no doubt wear itself out in time, but it is going to be costly to aviation and the public, and aviation is too important a



From a model by W. D. Archer

AN AIRPORT BUILT IN LOW SWAMPY LAND. HERE THE DREDGES PUMPED SAND AND MUD FROM THE SEAPLANE BASE TO FILL IN THE RUNWAYS. NOTE HOW HANGARS AND PARKING SPACE ARE PLACED NEAR CENTER OF AIRDROME THUS OBVIATING NECESSITY OF LONG TAXI-ING BY AIRPLANES.



DESIGN FOR RUNWAY AIRPORT

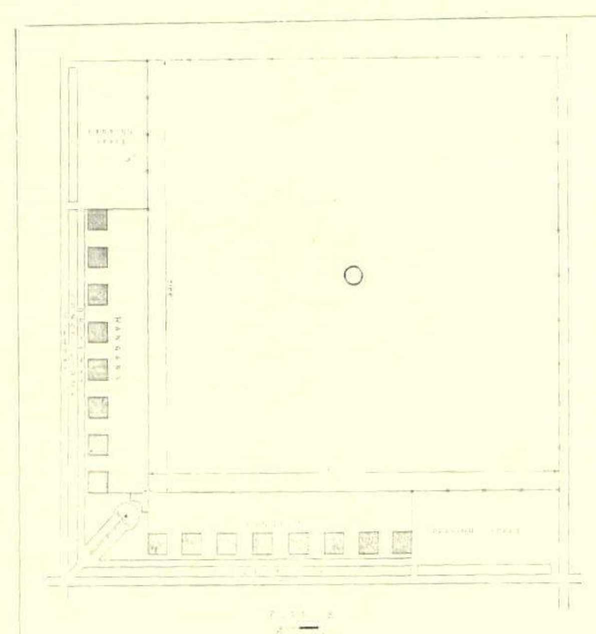
part of our future to be hampered in any way by inexperience and incompetency.

Now that the world is realizing the importance of aviation, and every little town or hamlet has, or is planning to have, a convenient landing field, it has become possible to fly almost anywhere in the United States and be within limping distance of some sort of an airport, or at least a field used by airplanes from time to time, which will probably develop eventually into an airport.

These fields as a rule are not much to look at either from the ground or from the air, and often are not discernible from the sky unless the pilot happens to know the territory over which he is flying or has a map on which such fields are marked. Of course, it is too much to expect an extensive network of first-class airports all over the country at this time, but it is encouraging at least to find that communities are turning their attention to the construction of landing fields, and even if they are not as yet as well laid out and marked as they should be, they are well on the road to being so. It is a great relief to a pilot when arriving over a strange airport or landing field to encircle it and be able to know exactly where to land by noting the markers and signs. All too frequently one flies over an airport on which, after circling around for some time, one manages to discern a wind direction indicator in more or less good repair, only to be confronted with the problem of where to land. By noting the state of the ground, such as tracks left by the wheels of airplanes which sank deep during the last wet weather, the pilot can pretty well guess as to the approximate spot where he is to touch his wheels. The proper drainage of a flying field is very important from the pilot's point of view and also from that of the aeroplane operating company, as it is often unpleasant and costly suddenly to sink up to the hubs in a soft spot. If the plane is moving very fast it is apt to nose over and at least break up the under-carriage and the propellor, if not doing more serious damage to the plane. In time such airports will be well laid out and the chances of spoiling a pleasant trip will be greatly lessened, but until that time comes flying is not the pleasure it might be.

The laying of concrete or asphalt on the runways, aprons, tarmac and other places where the planes are apt to tear up the ground, is far preferable to leaving the field in deep mud or ruts, and where concrete is not used grass or cinders should be placed and kept well watered and rolled, thus eliminating the danger of accident to either plane or passengers.

The ideal airport from a pilot's point of view, and he is surely entitled to some consideration in this connection as he is responsible for the well-



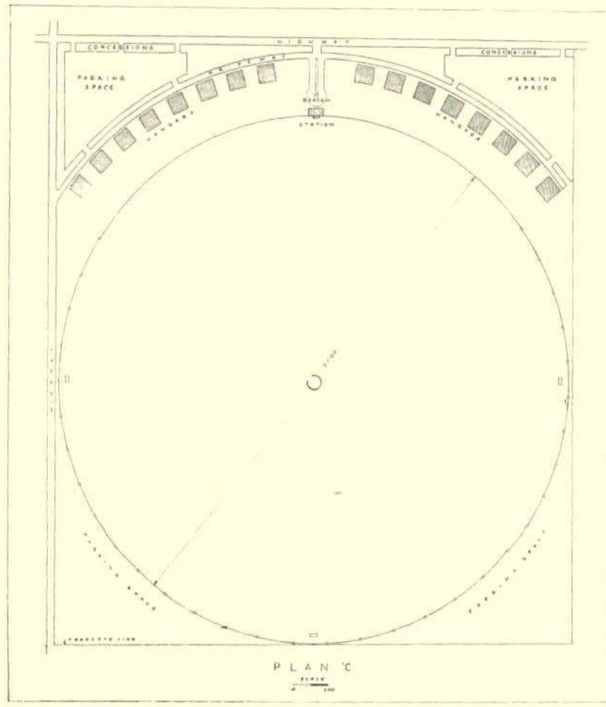
DESIGN FOR SQUARE AIRPORT

being of both plane and passengers, is an airport where there are no actual or mental hazards. Much misunderstanding and many accidents will be done away with and fool-flying made inexcusable by proper airport markings. It is a very pleasant feeling to circle over a strange airport and find big ground markings and a plain wind indicator. Too often there are no signs whatever to show what town it is, and the wind indicator is twisted on the supporting pole. At such times it is necessary to swoop very low if one is really lost and try to read the sign on the railroad station, and to observe the smoke from a kindly factory chimney if one wants to land. No doubt air markings will be taken up by the leading advertisers soon, and whether such would be of assistance or cause confusion remains to be seen.

One of the most welcome signs is the big white circle usually placed in the center of the flying field, although, sad to relate, too often this is placed in the center of the frozen wheel ruts of hundreds of planes which have landed there before.

On a large level field, well sodded with grass, one can land in almost any direction, and the grass has a cushioning effect when landing and does not affect the pilot's eyes by reflecting the sunlight. This latter feature is an important factor to be taken into consideration. Some years ago the writer was called to an airport for the purpose of discovering, if possible, the cause of many accidents in landing. These accidents seemed to happen at certain times of the day, and appeared to occur without apparent cause, for many of the best pilots were victims. It was discovered that some miles away was a glass roof, which reflected the sunlight across to the airport in such a manner as to blind completely anyone landing in that direction, blinding the pilot momentarily; and before he could readjust his eyes he had either flattened out too soon and "pancaked" or nosed into the ground, in both instances at least smashing up the undercarriage and more often than not wrecking the entire plane.

Of course, the expense of airport construction would make it almost impossible for the average community to possess a port that will fulfill every desire of the pilot's heart. It seems that one of the best solutions of the problem of plenty of space for airplanes to take off and land is a well planned runway. An airplane takes off and lands better if heading directly into the wind, and, by a careful



DESIGN FOR CIRCULAR AIRPORT

study of the prevailing wind directions on the spot selected for the airport, the runways can be so laid out that a pilot can land pretty nearly always into the wind. Where the winds are extremely variable and strong, runways are practically out of the question and a large field, levelled for landing, should then be built.

Not every airport need be extensive in area. This will be decided by a general study of the wind directions throughout the year, and the architect can then design accordingly. Also there are various types of traffic to be taken into consideration, such as huge air liners and mail planes, flying school planes and the small sporting planes, which, in a few years, almost every college boy will be flying. An airport near an international border should provide facilities for customs inspection and immigration rubber stamping, and also such an airport should be discreetly designed for effective military use. An airport along the

	A	B	C
TOTAL AREA REQUIRED	100 Acres	145 Acres	240 Acres
AREA OF RUNWAYS	32 Acres	100 Acres	162 Acres
AREA AVAILABLE FOR CONCESSIONS	68 Acres	45 Acres	78 Acres
INITIAL SURFACING	32 Acres	100 Acres	162 Acres
YEARLY MAINTENANCE OF RUNWAYS	32 Acres	100 Acres	162 Acres
FACILITIES	Equal Landing Facilities Afforded in All of These Types		
APPROACHES	Clear	50% Over Buildings	

CHART SHOWING THE RELATIVE EFFICIENCY OF THE THREE TYPES OF AIRPORTS SHOWN IN THE ACCOMPANYING PLANS. PLAN A IS BY FAR THE MOST ECONOMICAL AS REGARDS INITIAL EXPENSE AND UPKEEP AND ALSO DOES NOT PERMIT OF AIRPLANES TAKING OFF AND LANDING OVER BUILDINGS. CAREFUL STUDY OF COURSE HAS TO BE MADE OF THE GENERAL TREND OF THE WIND DIRECTIONS BEFORE LAYING OUT THE RUNWAYS.

route of an interior air line need make provision only for the refuelling and servicing of airplanes and the handling of mail and passengers without the considerations above mentioned. All over the war-affected countries of Europe are beautiful flying fields which have no practical use today on account of their distance from the centers of population, and are good only for military purpose. Such airdromes were constructed during the war by the various governments regardless of expense or the future, and are still dotted all over the landscape, fulfilling no purpose save that of disuse and disintegration.

At this time a type of undercarriage is being experimented with, which, if it proves successful, will do away with the necessity of an extensive landing field, for airplanes then would be able to make cross-wind landings with safety.

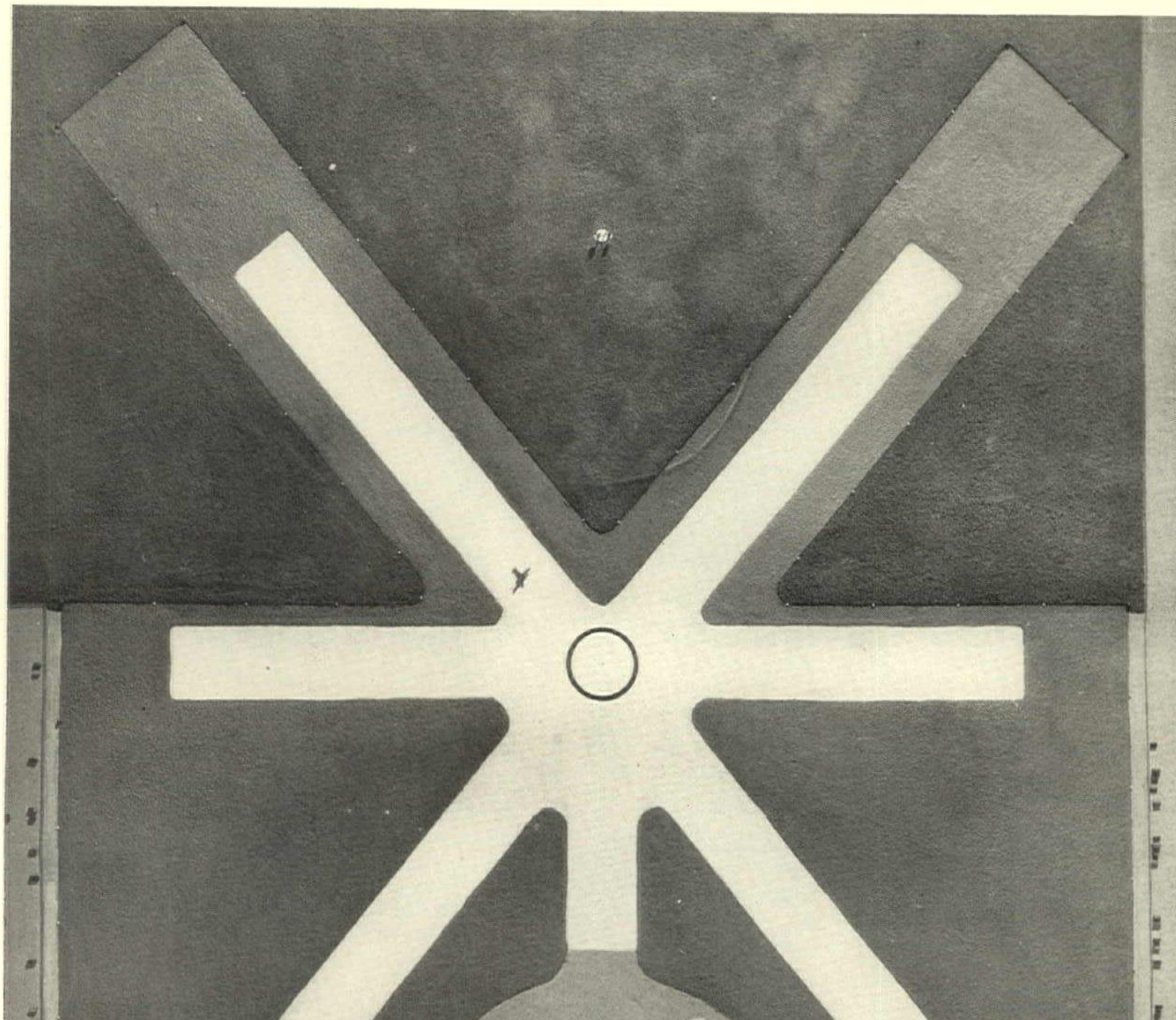
Also the helicopter is rapidly being perfected, and while little is known at the present time of its possibilities, there is no doubt but that it will be adapted in some way to permit airplanes to land and take-off in much smaller areas than is now possible. Should they be perfected, it is quite likely that they will be used to carry mail to and from the ocean liners and also for mail work where it is desired to alight in the heart of a city. However, today, they present so many mechanical difficulties and are so absolutely dependent on the engine that they will not come into general use at least for some time to come.

When this becomes an absolute possibility the problem of distance from the center of a city will be solved, as an airport can then be built long and narrow and could even be built over a highway or along the waterfront of a city. But until that time comes the more or less spacious airport will have to be designed and used, and this will, of necessity, have to be some distance from a city or town on account of the price of land and its freedom from buildings.

Of course, the designer of an airport cannot always have the say as to the actual location of an airport, but he can at least raise his voice in protest against the placing of an airport in a section of a city where fogs are more prevalent than in other sections, or where the smoke from factory chimneys causes poor visibility. It need not be a "pea soup" fog to cause a pilot trouble, as often a light ground mist will completely obscure the ground a hundred or more feet up. At such times factory chimneys are a good guide, as they often rise above the lie of the mist, but where there are none such a pilot is often apt to lose his bearings. The writer recalls an incident in the early days of mail plane flying just after the war, before we had the navigation aids of today, when a pilot rightly refused to take a plane up because of a thin ground mist which, at a certain altitude, completely hid the ground for miles. The government official—a non-pilot—in charge of flying, called him a number of unflattering names and finally accused him of cowardice and peremptorily ordered him up. The pilot, a former service aviator in France, climbed into the cockpit and took off, only to become lost and land in a tree top when his gasoline gave out. There are, of course, far worse places to land than on a tree top, as this acts as a sort of cushion, so that pilot may be called lucky. It is very discouraging to fly over some city charted on the map only to find it submerged in mist and, while circling around in an endeavor to find the field, to get a sudden bump from a hot factory chimney which is missed by a few feet.

Another factor which will give more comfort to those using airplanes is the eradication of the usual bumpiness which airports have that are made by filling in swampy land. The moisture which lies under the artificial ground seems to have a cooling effect on the air over it which gives a bump when a plane flies over it. Of course, not all bumps are dangerous or even unpleasant, but a calm, smooth atmosphere over and around an airport is far preferable to a bumpy one. Unnecessary bumps can be done away with or at least minimized by the use of roofing materials on the buildings of the airport and vicinity which do not get too hot in the mid-day sun and radiate heat, and the careful planting of grass over spots such as sand pits, which have the same heat-reflecting quality.

While not actually affecting the efficiency of an airport, but nevertheless exerting a more or less nervous effect on the pilot, are the actual and mental hazards which are sometimes to be found about an airport. Among these can be classed flag poles, telephone and electric light poles, smoke stacks, fences and unnecessarily high buildings. Where a tower or pole is absolutely essential about an airport, these should be clustered together so that a strange pilot can readily note the location of such obstacles and avoid them when circling over. While it is perhaps a foolish inhibition, the writer knows of at least three pilots who have gone through the war in France and who, to this day always, if possible, avoid flying over a town or city which has church steeples. This will serve to illustrate the nervous sensitiveness of the average pilot, and, if the architect who has the designing of an airport in mind can eliminate such mental hazards, much will be done to ensure good flying and conservation of the pilot's nerves.



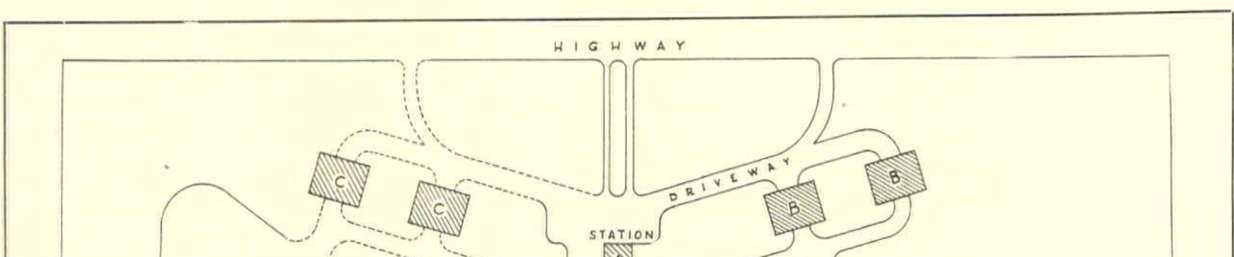
PROPOSED AIRPORT, NEW YORK CITY

FROM A MODEL BY W. D. ARCHER

PASSENGER TERMINAL, PAN-AMERICAN AIRWAYS, INC., MIAMI, FLORIDA

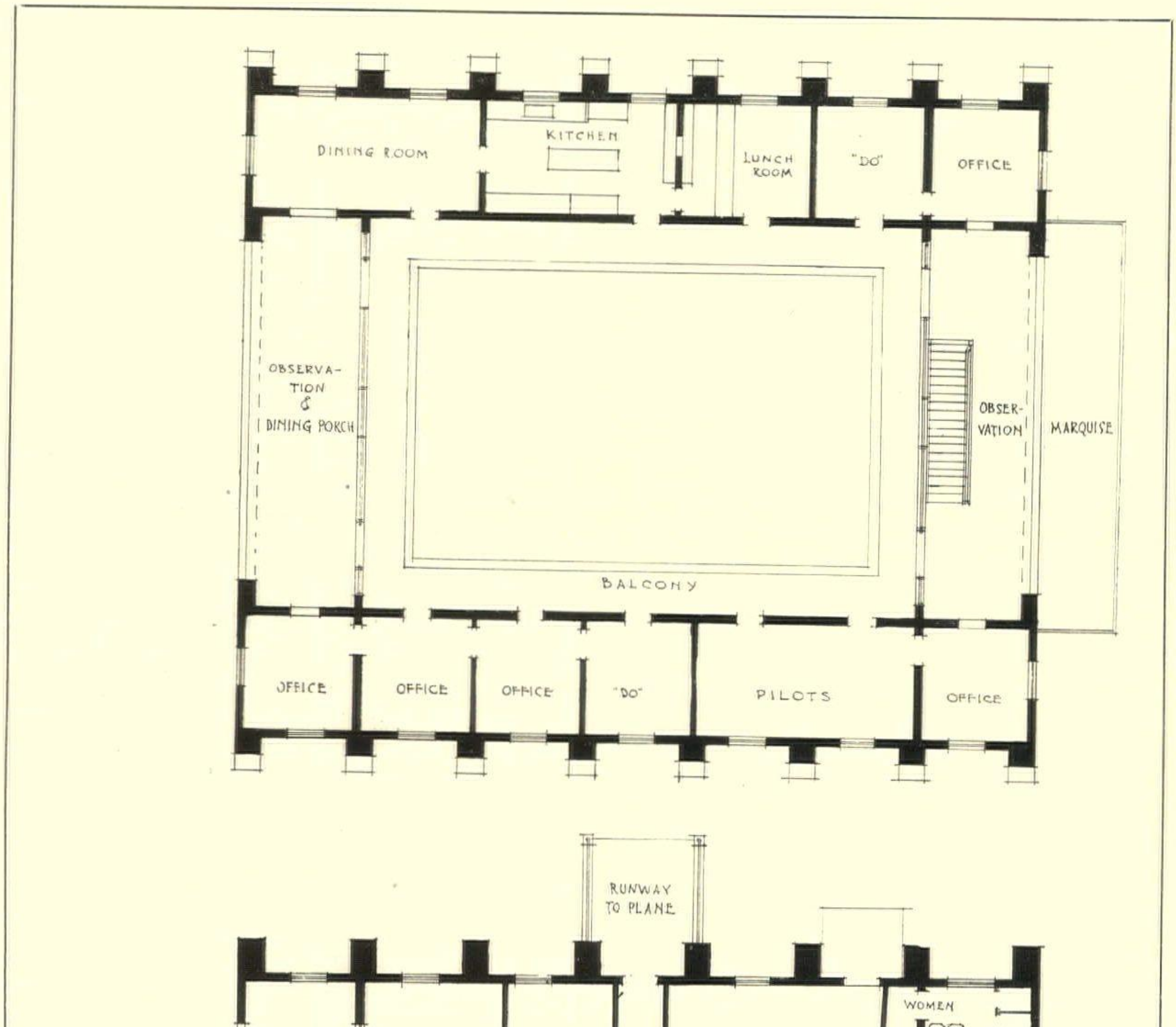
DELANO & ALDRICH, ARCHITECTS

THIS STATION EMBODIES COMPLETE FACILITIES FOR THE HANDLING OF PASSENGERS, MAIL, CUSTOMS AND AIRPORT PERSONNEL UNDER ONE ROOF, AND IS THE FIRST COMPLETELY EQUIPPED STATION BUILT IN AMERICA.



AIRPORT, PAN-AMERICAN AIRWAYS, INC., MIAMI, FLORIDA

HANGARS ARE PLACED NEAR THE STATION YET FAR ENOUGH AWAY TO REDUCE FIRE RISKS TO A MINIMUM.



PASSENGER TERMINAL, PAN-AMERICAN AIRWAYS, INC., MIAMI, FLORIDA

DELANO & ALDRICH, ARCHITECTS

Where runways are used it is helpful to a pilot to keep all obstructions out of the direct path of the runway for some considerable distance, and a good solution of this would be to construct boulevards out from the airport continuing in the direction of the runways. Should an engine cut out or a pilot have to land in an emergency, he could do so with comparative safety in the grassed center section of the boulevard without endangering anyone. The big air liners of today and tomorrow have not the quick manoeuverability of the small one or two passenger planes, and provision should therefore be made to ensure their safe landing and taking off. It is poor flying practice for a pilot to attempt to turn and land in a flying field if his engine should cut out while he is taking off. The safest thing to do under such circumstances is for him to nose down and land immediately in the same direction in which he has taken off. For such contingencies the boulevards would give greater security to both passengers and people on the ground. The center, of course, should not be too narrow, or planted with trees or other obstructions. It is true engines have been very much improved during the last ten years, but we still have with us the ignoramus who drops the oil funnel in the dirt and allows the wind to blow dust into the gas and oil, the actual cause of many of the accidents of today. And speaking of this type of aviator, it is well to bear in mind that these, who are now breaking speed limits and lamp posts with autos, will, it goes without saying, practice the same stunts tomorrow with airplanes. Designers have made planes so that they are almost fool-proof, and airports should be made so that there is no excuse for the embryo pilot, exhibiting his newly acquired ability to handle the joy stick, to harm anyone.

The buildings on and about many of our airports today are not very conducive to a desire to remain at the airport very long, and a slovenly appearing airport is apt to indicate a careless and slovenly method of handling the gas and oil, which means that a pilot stopping there for refuelling does not do so with any great degree of mental comfort. A little drop of water or a speck of dust in either the gas or oil can cause a lot of expensive trouble before the trip is over.

Another factor to take into consideration is that of an eating place on the airport. The pilot and passengers on a long trip must, of necessity, be fed, and on the majority of our airports the only "restaurant" is the hot dog stand. At the smaller airports it is not expected that a restaurant can be maintained, but it would prove a boon if an inn or road-house could be induced to set up and pay for itself out of the ordinary motor party revenue and at the same time be on hand to serve something hot and palatable to air passengers and pilots who have to land at such an airport. One of the gloomiest feelings is to land at an almost deserted airport and have to hire a taxi into the nearest town to get something to eat, particularly for the pilot who has to be on the job supervising the servicing of his plane and its preparation for resuming the flight.

However, airports adjacent to the larger cities and towns should provide a restaurant on the flying field, in addition to the other buildings, which should consist of the offices of the airport personnel, telephone, telegraph and cable facilities, restrooms, barber shop, news-stand with cigars and candy, etc., and such oddments as accessory manufacturers will advertise every air passenger should have, a building for the handling of air mail, and, if near the border, as before stated, provision for customs examination and so forth. Whether a small hotel would prove of value will depend on the distance of the airport from the city, and its schedule for handling passenger traffic. A garage with car storage facilities would be appreciated by many patrons who drive out to the flying field and either take a plane or fly their own—off to Canada for a little wholesome refreshment! But the buildings must not be high; the lower the better. Provision should be made for the unloading of both passengers and mail as near the station as possible, and under some sort of shelter. While it is unlikely that much flying will be done in the rain, we have not yet learned to control the elements, which often descend upon us without warning. Provision should also be made for the safety of the public when airplanes are about. One crack from a propellor blade would not only ruin a good blade and probably the engine also, but whoever was cracked would be good only for the undertaker. Very likely, now that the big air liners are becoming so popular, small tractors will be used in towing them to and from the hangars, which would add to the safety of the public.

The machine shops where the motor and plane will be overhauled and repaired should be near enough to the center of activity for convenience, yet far enough away to be no nuisance.

Where a railway taps an airport the tracks should be placed well out of the way of possible danger to aircraft, and, if the airport is adjacent to water, provision must be made for the safe landing and handling of seaplanes, flying boats and amphibians.

A seaplane base should be protected from strong currents and also the water on which the seaplanes take off and land should be at all times carefully patrolled for possible obstructions such as logs, boxes, barrels, etc. The pontoons and other parts of flying boats and seaplanes are made of extremely thin material, and a crack from one of the obstructions just mentioned is apt to be a costly repair job. Row boats, launches, etc., should be kept away from such a water landing area in order to maintain a clear runway for seaplanes at all times. The buildings required for an airport can be so arranged as to handle both types of traffic.

While on the subject of buildings and the like it is well to point out that logic is one of the main factors in airport design. During the past year or two many of the leading papers and magazines have been carrying articles by people whose only claim to the title of "expert" is theory and imagination, which is of less than no use when not combined with practical and technical knowledge. One illustration which received a good deal of acclaim in the papers recently depicted a large flying field in the center of which were a cluster of high buildings and from a flag pole close at hand a Zeppelin was gently tugging! It has been found out by costly experience, by both the Germans and others, that a Zeppelin or airship mast anywhere in the close vicinity of buildings, or even small sheds, is not practicable, for very obvious reasons, one of which being that in the event of any mishap to the airship it could, and probably would, fall down on the buildings and set them on fire. One other reason is that it is ridiculous to attempt to manoeuver either a Zeppelin or any other mammoth vehicle of the air in the vicinity of buildings.

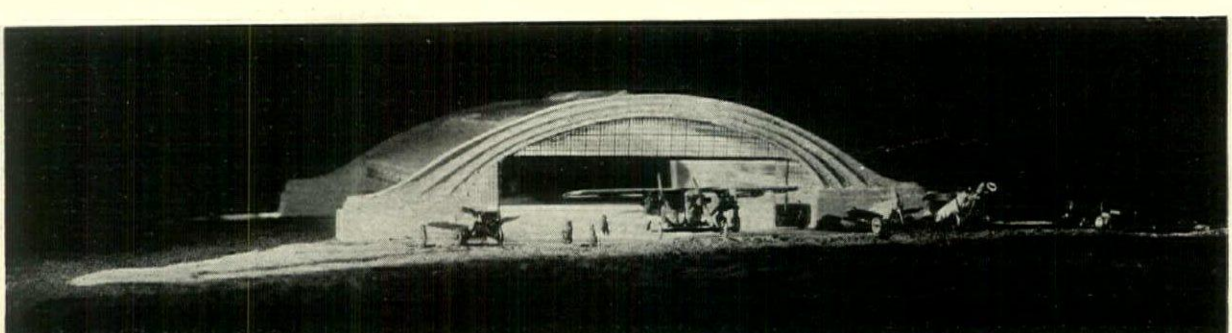
Another instance of the impracticable ideas now prevalent in the attempts at airport designing was one the writer recently was called in to see, which showed an airport on which fifty or more planes could take off or land at the same time in similar style. The intentions of the designer were laudable, but impractical. During the war such stunts were possible, though very seldom practiced, on account of the great manoeuverability of war planes and the high skill of the service pilot, and were even carried out after the war in flying exhibitions. But it is exceedingly dangerous for commercial planes carrying passengers to attempt such exhibition of flying skill, for if by any chance one of the leading planes should get into the "wash" or air current of another plane it would in all probability cause it to swerve and crash into other planes in its vicinity. Such designs as above outlined do more harm to sincere aviation development than one realizes, as the American public are open-minded and willing to be led. Only those qualified, therefore, should lead.

The construction of the air station is a matter to which much thought should be given, in order that comfort may be combined with convenience and efficiency. This should be long and low, with plenty of windows all around, so that the flying field can be viewed from all angles both by passengers and personnel, and designed along the lines of practicability rather than originality, as was one recently seen by the writer, which was designed after the outline of an airplane—the "wing" section forming the waiting room, etc., and the "fuselage" the offices, etc. One wonders why an architect does not design some great railroad station after the order of a box car or a locomotive!

Another problem which is fast assuming importance in our commercial aviation development and is of vital importance to the pilot is the lighting of an airport. At night this seems a simple matter at first, but after a little study will be far from satisfying. A flying field should be clearly visible at night and all hazards clearly marked. Variously colored lights should be used to indicate the actual boundary of the flying field and also the runways. Flood lights placed at strategic points enable a pilot to make a good landing and also powerful searchlights, when properly handled by the ground crews, are a great aid. A clever light expert recently showed the writer plans for lighting an airport which used runways and by a device controlled by the wind switched on and off various sets of lights. That is to say, if the wind was in a certain direction, the runway which was used when the wind was in that direction was illuminated, and the rest of the field limited to boundary lights. But he forgot to make provision for a quick change in the wind, which would bring another runway into use. Consequently a pilot would be coming down serenely to land on one runway when, if the wind should by some freak take a fancy for a few seconds to veer a little, the lights would go out, leaving him to land as best he could in the dark, and the lights would light up another runway. No doubt he has solved this little problem by this time. All lights should be shielded from the pilot's eyes and should reflect down horizontally, so that they will not at any time have a tendency to blind him. In this connection the police patrol about an airport should see that automobile lights from parked cars do not unnecessarily cause an aviator trouble.

The problem of the proper handling of giant dirigibles is a big one, but from the writer's experience not one which will come very much in the way of the architect who is laying out small airports. From the nature and cost of such airships their use for some time to come will be restricted to the transoceanic routes and not over the inland country to any great extent. France has done away with the use of dirigibles, and so has Italy. The only two nations doing anything of importance in that direction are the British and the Germans. The latter seem to know more than anyone else about such airships, and to date they have not greatly impressed the world with unusual performances. These ships require such a vast space in which to manoeuver when landing that it will prove a very expensive problem for the small community to make provision for such. However, a large level field, circular in shape and in the center of which a mooring mast is placed, with all obstructions removed from the immediate vicinity, will serve the purpose. The erection of large and expensive hangars is not necessary, except in the big coastal terminals where, if such transoceanic services should eventually become successful and profitable, they would be of value in servicing the dirigibles. These big hangars are a sort of inverted dry dock and crane combined and a dirigible can be swung from the steel frame work and worked on by the repair crews as easily as a ship in dry dock. Recently the writer was called in to examine a set of plans for an elaborate airport near a big city. The plans were beautifully drawn up and everything seemed to have been given thought and care. But upon mentally flying around over the projected airport some blazing errors showed up. Big buildings were placed directly in the path of one of the chief runways, and mental as well as actual hazards dotted the airport. But to cap the whole thing, a Zeppelin hangar was placed on the edge of the flying field at practically right angles to the general wind direction, and when the dirigible was being taken in or out of the hangar the whole airport would have been rendered useless to airplanes by reason of the dirigible and the landing crew taking up most of the landing space, and also for the reason that it is bad flying policy to have heavier-than-air craft manoeuvering in the vicinity of a dirigible. These big airships are very deceptive, and a pilot is apt to come closer to them than he realizes by their sudden swerving, which makes them very vulnerable to accidents from other flying craft. On one occasion, the writer, in company with four other pilots, was flying in the vicinity of a dirigible and in manoeuvering about the giant gas bag in battle practice one of the five airplanes caught the outer casing with his tail skid, penetrating into one of the gas cells, causing a leakage of gas. All were well trained service pilots, yet such accidents are practically unavoidable if airplanes are allowed to come in close proximity to dirigibles. On the plan above mentioned the use of rails to get the big ships in and out of the hangar could not be used, as such rails would prove a hazard to airplanes. After a little study the hangar was placed on this plan where it could be handled without limiting the use of the landing field by airplanes. Space also was found for the erection of a mooring mast with adequate swinging space.

There are many more angles to be taken into consideration in the design of an airport than in the design of a building, on account of the many hazards attached to aviation, but the time is not too for distant when it will be realized that there are four main factors to be worked on—logic, practicability, convenience and efficiency—for on these four important factors combined is the perfect airport—at any rate for present conditions—constructed.



HANGAR, SKY HARBOR AVIATION COUNTRY CLUB, GLENCOE, ILL.
ALFRED P. ALLEN AND MAURICE WEBSTER, ASSOCIATE ARCHITECTS

COMMERCIAL HANGARS

By LOUIS M. STEUBER

OF THE OFFICE OF GEORGE M. BARTLETT, ARCHITECT

IT is not the purpose of the following disconnected effort to convey an expert text on the exact science of hangar construction. The field, too new and untried to have emerged from the pioneering stage, has not yet developed experts. The extensive activity in building for Aviation has, however, attracted specialists who are giving the problem much thought and are getting some wonderful results. These paragraphs are just the chatter of a "fellow sufferer" talking shop. The information, if any, not being wholly original, has been absorbed by rubbing shoulders with an air-minded population while helping to produce the working drawings for a number of commercial hangars now under construction.

The hangar has come into its own and is no longer the sheet-iron shed which served so nobly during the war. It has "gone" commercial, become complicated and "glorified." Now it is a problem which requires the services of the architect at 6 per cent per copy.

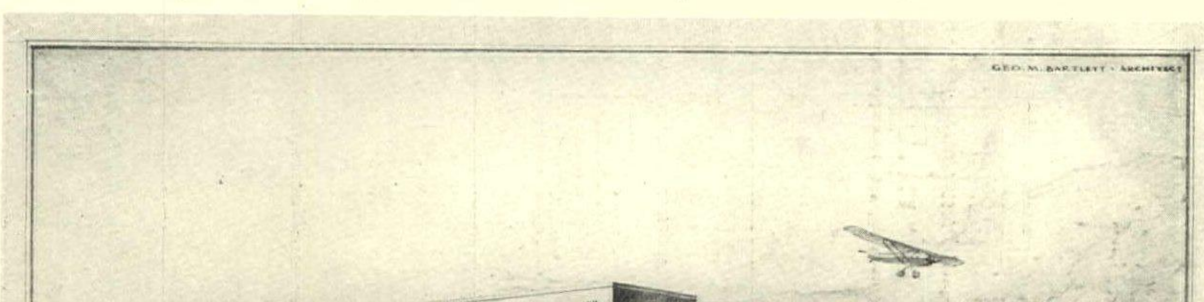
Although the hangar is still fundamentally a shelter for costly and delicate machines, the acceptance of the aeroplane as a safe and speedy means of transportation has greatly added to its requirements. Modern commercial hangars may be classified in three general groups: Depot Hangars, Service Hangars and Sales Hangars. Mechanic's Schools and Flying Schools are combined with all three types, although there are cases where hangars are designed primarily for instruction.

The storage portion of all hangars is very similar; the variations in the different types occur in the accessory accommodations. These accommodations are housed in wings on one or both sides of the storage portion and are often referred to as "lean-tos." While standardization of the storage space is possible for each type of hangar, every lean-to of each classification varies slightly to meet local requirements.

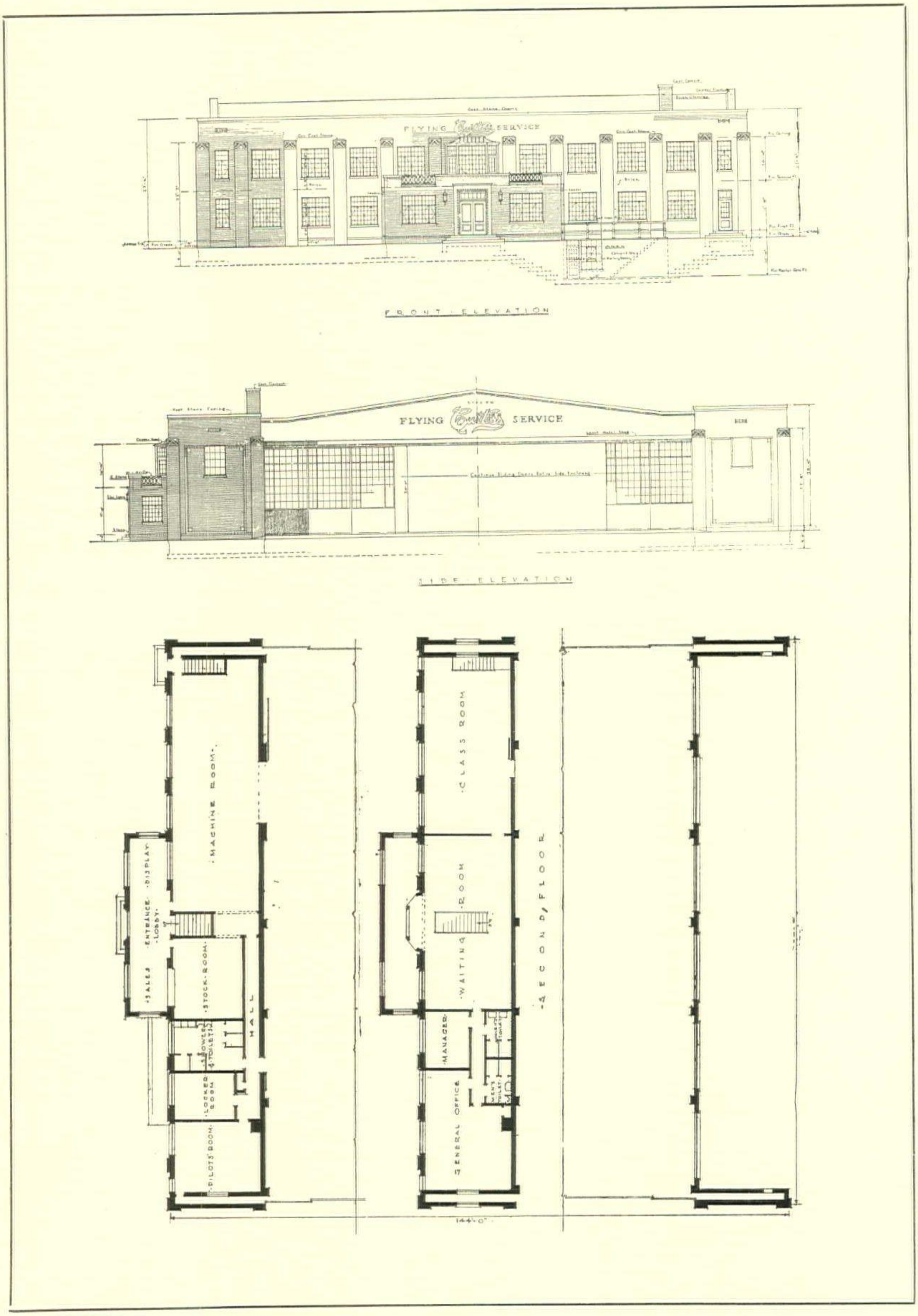
Aviation attracts the highest class passenger in the world. The Depot Hangar, therefore, should have the atmosphere of a club rather than a public station. The business activities of the Depot Hangar are chiefly transportation and "hopping." Much thought should be given to the comfort of the passenger and the control of the public on the field. The Depot Hangar should include, in addition to the waiting room, lounge, observation deck, public toilets and rest rooms, general offices and shop; sleeping accommodations for pilots and mechanics, a large machine shop with a stock room, and a classroom. Accessory and "tog" shops have proven very profitable at flying fields.

Most flying fields have administration buildings housing large restaurants. They also have provisions for radio operators and meteorologists. This eliminates these items from the general requirements of the hangar.

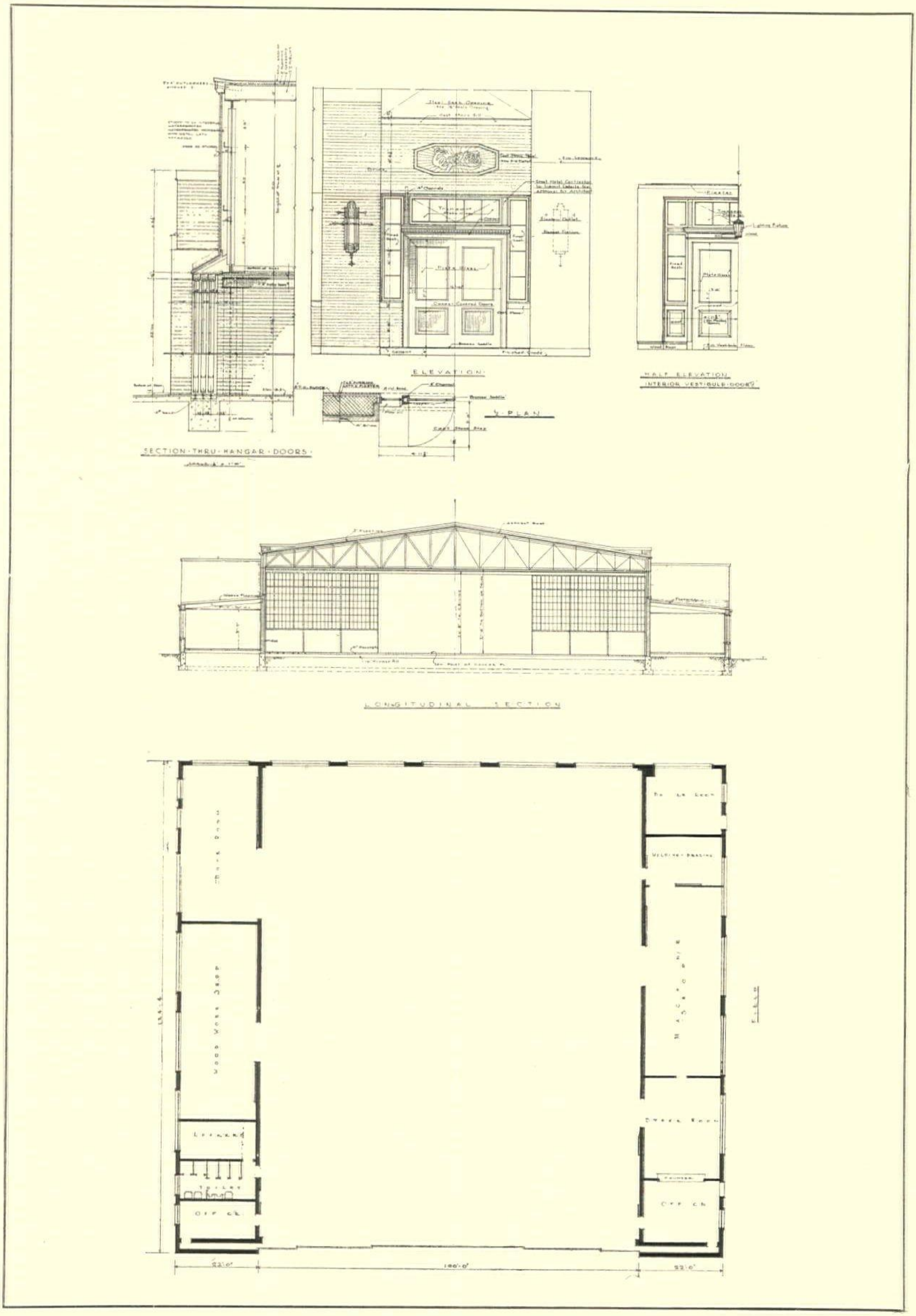
The Sales Hangar has most of the requirements of the Depot Hangar with the exception that a large display space is added where the sales force may mingle informally with the public. In order to provide an area large enough to exhibit aeroplanes, the lean-to must be widened to 30 feet clear instead of the usual width of 20 feet. A



TYPE "A" HANGAR, CURTISS FLYING SERVICE, INC.
GEORGE M. BARTLETT, ARCHITECT

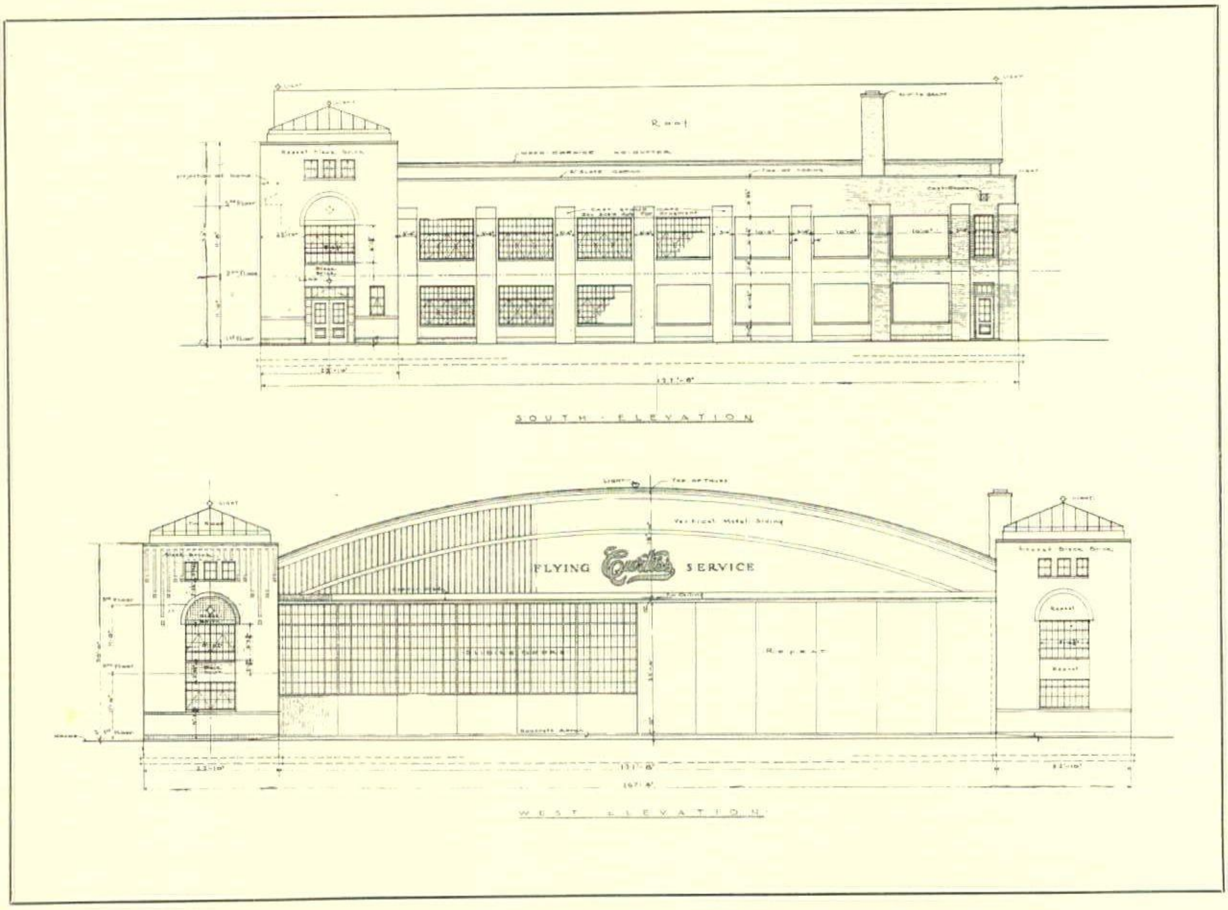


TYPE "A" HANGAR, CURTISS FLYING SERVICE, INC.
GEORGE M. BARTLETT, ARCHITECT



SERVICE HANGAR AT KANSAS CITY, MISSOURI—CURTISS FLYING SERVICE, INC.

GEORGE M. BARTLETT, ARCHITECT



HANGAR AND DEPOT AT COLUMBUS, OHIO—CURTISS FLYING SERVICE, INC.

GEORGE M. BARTLETT, ARCHITECT

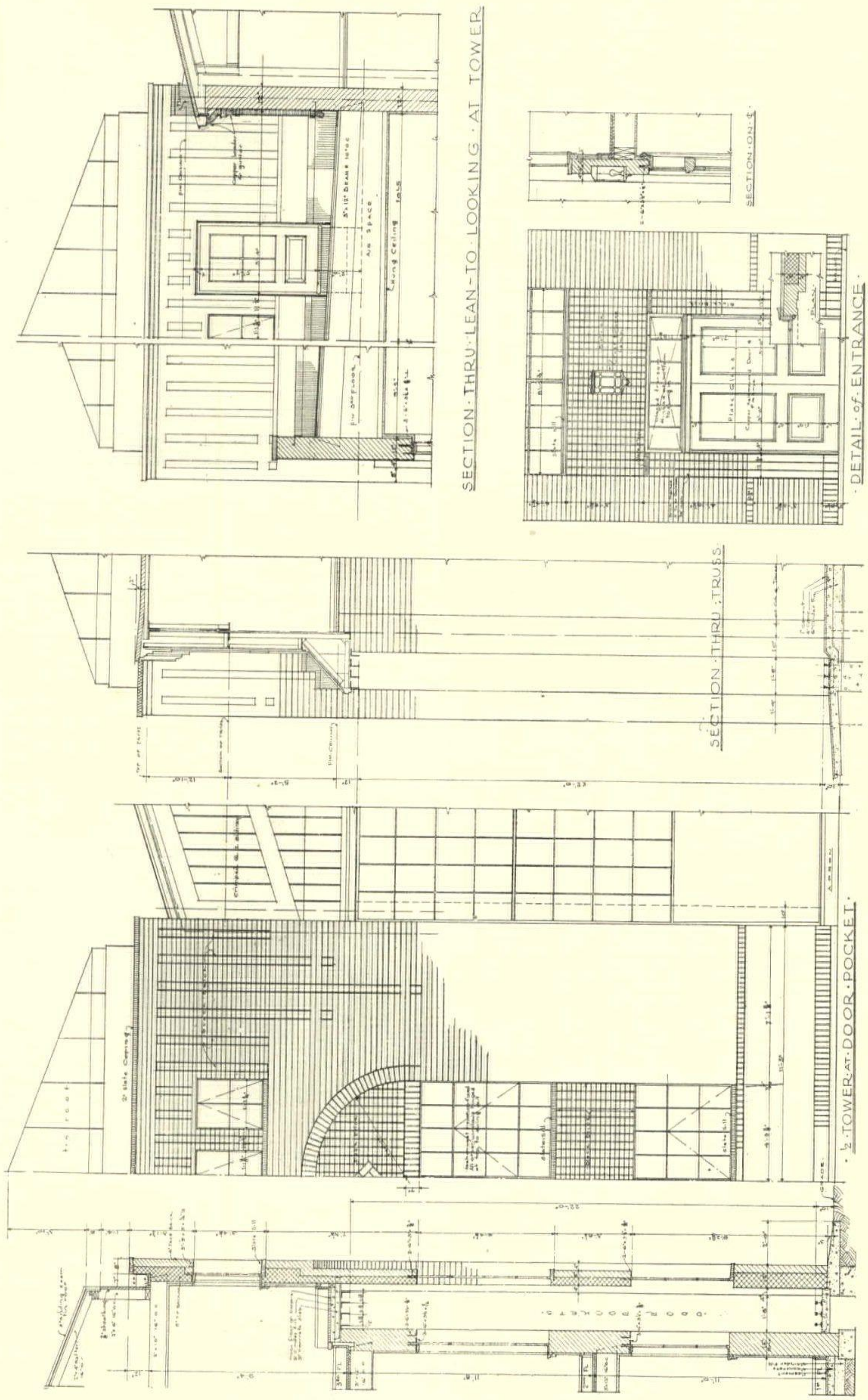
locker room for the public with showers and toilet facilities is desirable.

The Service Hangar is a huge repair shop for the adjustment of planes and motors. Where a group of hangars is planned for one location, a service hangar is included to isolate the noise, dirt and odors from the commercial group. The Service Hangar generally has doors at one end only and is a building about 120 feet long with a clear span of 100 feet. The rear bay of the hangar is walled off, forming a fireproof enclosure for the "dope shop" where wings and fuselage are chemically treated with a "smelly" and highly combustible coating. This room should be mechanically ventilated. The general dimensions should be 20 feet wide by 60 feet long, with an opening 14 feet by 16 feet at the end enclosed by a rolling steel shutter. The remaining portion should be divided into a stock room, manager's office and toilets and lockers for the mechanics.

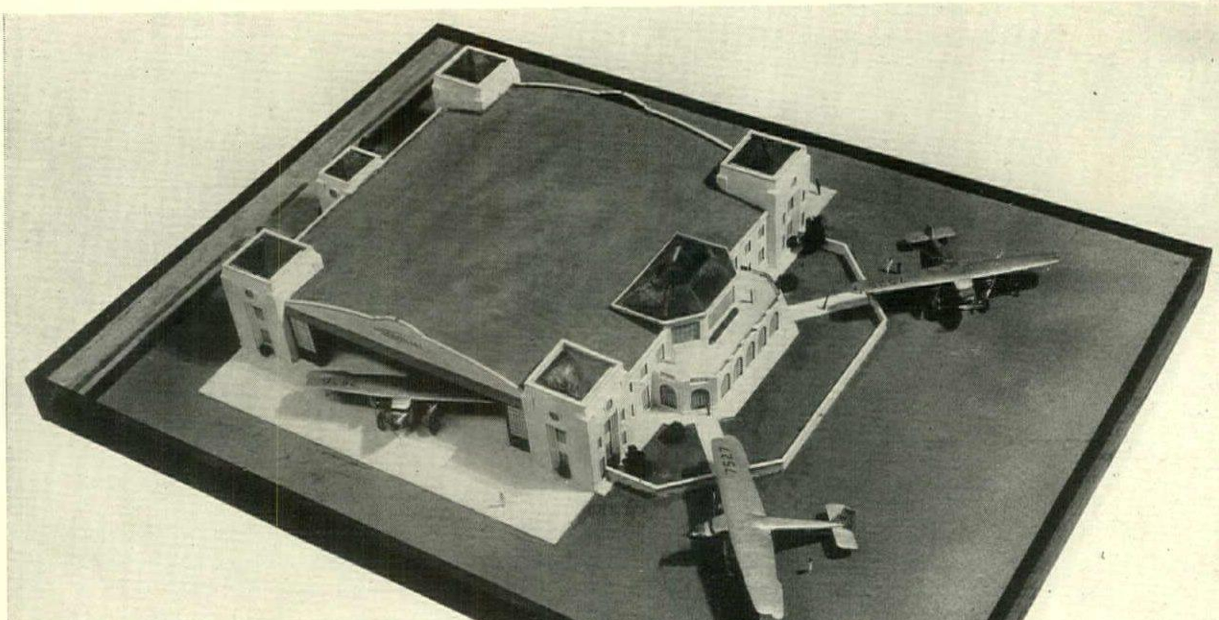
Although types and sizes of planes are constantly changing, aeronautical engineers assure us that the changes in planes for common commercial use will not greatly affect the architect's problem for some time to come. The standard dimensions of the storage space or hangar proper may therefore be fixed without immediate danger of complete revision. Spans vary from 80 feet to 120 feet. The standard span of 100 feet clear with an economical column spacing of 20 feet center to center has been accepted by several companies. In length hangars are from 100 feet to 160 feet. Plans with doors at the ends become awkward when over 160 feet long unless side doors are introduced to relieve the dead space at the center. Side doors are seldom used, however, due to the costly steel framing required by them. The door openings are from 18 feet to 22 feet in height with 20 feet accepted to meet usual requirements. Due to excessive weight the doors are seldom made in wider units than 10 feet.

There are many types of hangar doors on the market, the most popular being the "straight sliding" and the "around-the-corner" types. The around-the-corner door, which nestles in a side-wall door pocket, also has its advantages. These doors are illustrated in plan by figures "A," "B," and "C" respectively.

The first two types are "fool-proof," that is, any door or doors may be moved at the same



TYPICAL DETAIL OF HANGAR AND DEPOT AT COLUMBUS, OHIO—CURTISS FLYING SERVICE, INC.
GEORGE M. BARTLETT, ARCHITECT



MODEL OF HANGAR AND PASSENGER TERMINAL, COLONIAL AIRWAYS, INC.
GEORGE M. BARTLETT, ARCHITECT

time without interference. The third type has its advantages on narrow lots and where access on the end wall of the lean-to or the side wall of hangar is desired, but the doors must be moved in regular order to avoid collision on the turn.

The straight slide type, channel constructed doors seem to solve the problem with the least grief to the architect and greatest satisfaction to the mechanics who operate them. They are economical, easy to operate, rigid and mechanically simple. They are easy to weather and cut down leakage to a minimum. With floors pitched for drainage and ceilings plastered, it is not necessary to cut up floors and ceilings to provide for overhead guides and tracks required by other types of doors. The straight slide door permits the use of ventilating sash on the outside wall of the hangar and communication between the hangar and lean-to which are ordinarily cut off where around-the-corner doors are used. It also makes it possible to place work benches along the side walls of the hangar.

Steel casement windows meet the requirements of the lean-to to good advantage, giving the maximum light and ventilation and when combined with wood frames are easily screened. Airports usually being located in outlying districts, the screening of the lean-to portion should be taken into consideration. The hangar windows may be standard factory sash with projected or pivoted ventilating sections.

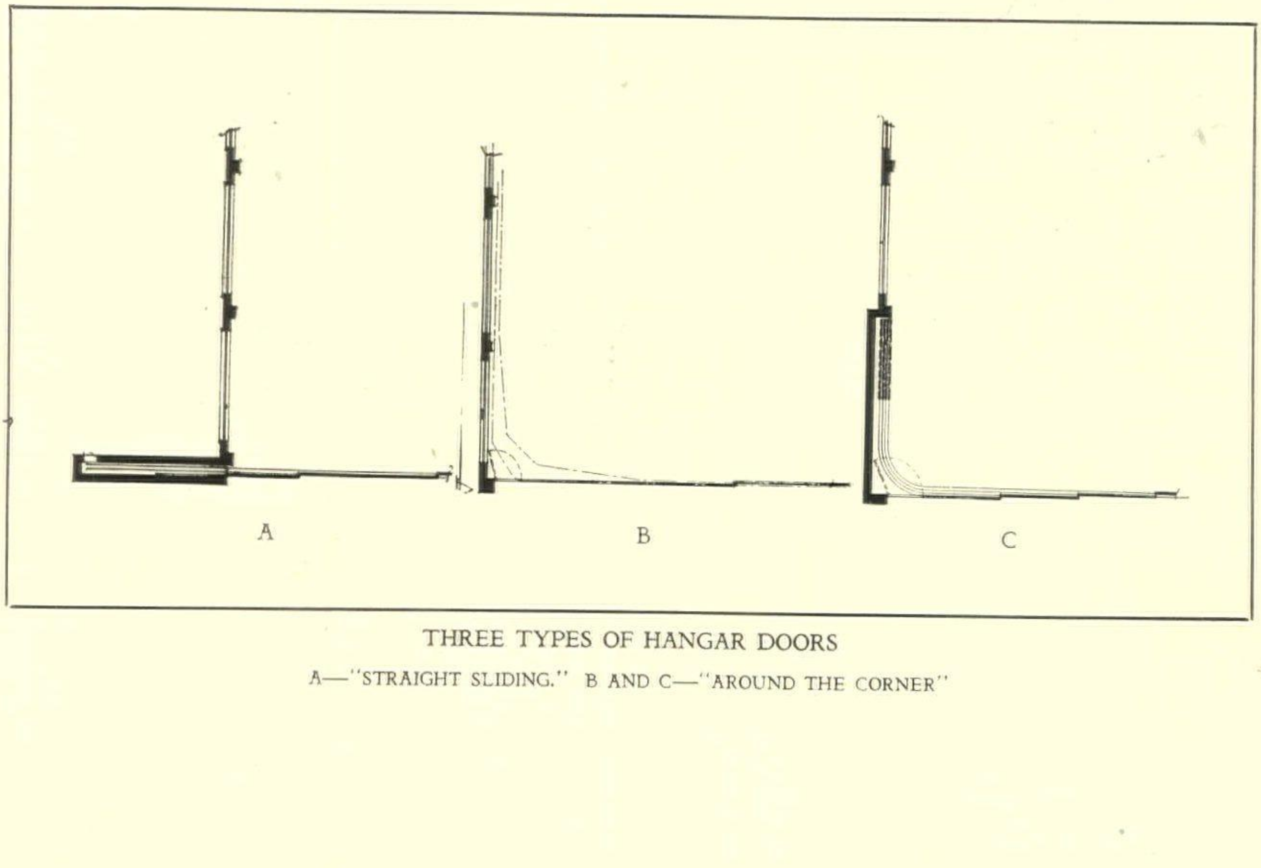
The hangar should be of fireproof construction. The roof construction often is 2 in. T. & G. plank on wood beams or nailer-joists supported by steel trusses. Standard welded steel trusses have proven themselves economical because of the long span combined with a light load. A metal lath and cement plaster ceiling should be suspended from the lower chord of the trusses to protect the frame construction from fire. This ceiling will also cut down the cube of the hangar and lighten the requirements for heating. The walls are generally 12 in. thick of brick, T. C. block or cinder block. The floor is cement with "float" or "whisp" finish and should pitch toward the doors. Expansion joints should be provided every twenty feet in both directions and slags reinforced with steel mesh where the bearing is poor.

The apron should be the full width of the building and at least 20 feet wide. The openings between the hangar and the lean-to should not exceed 100 square feet in area and should be enclosed with fire doors. The lean-to, when protected from the hangar by fire walls, may have wood floor construction.

On the exterior the problem is so new and unprecedented, the plan so large and massive and Aviation so thrilling and romantic that the designer has but to "go modern" and let the imagination run. Nevertheless, the severe, almost military exteriors are very pleasing.

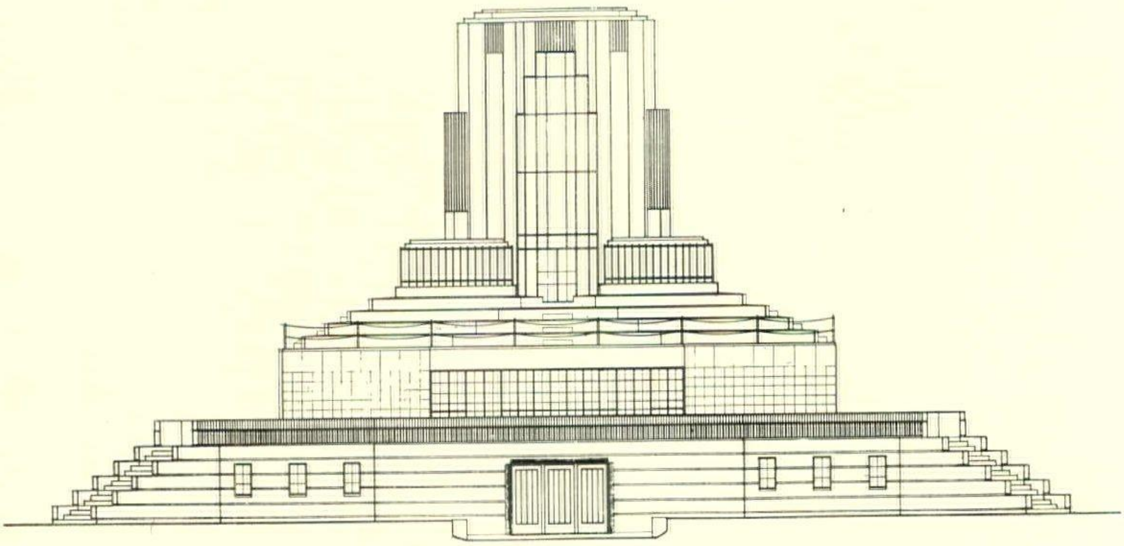
Architects are meeting the demands of Aviation in much the same manner as in the past they have met every step in civilization. They are giving the problem their best and getting wonderful results.

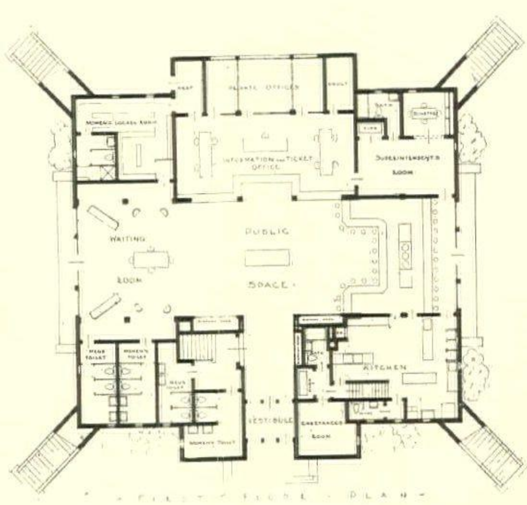
The future development of the commercial hangar will be interesting to observe.



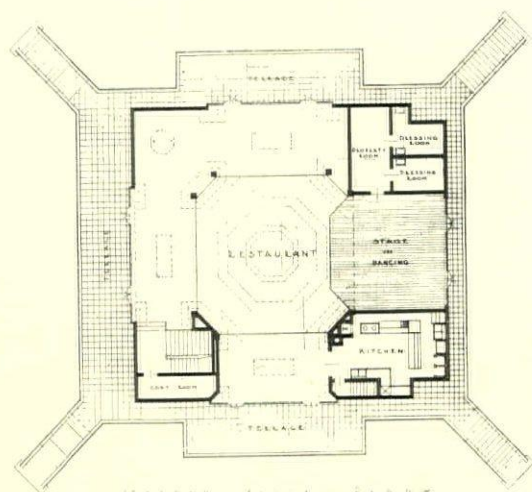
THREE TYPES OF HANGAR DOORS

A—"STRAIGHT SLIDING." B AND C—"AROUND THE CORNER"

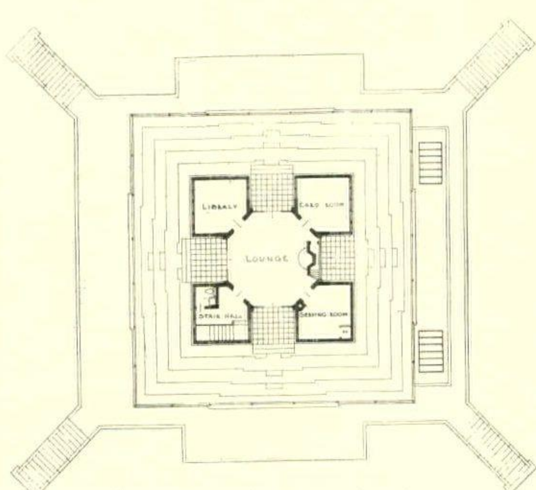




FIRST FLOOR PLAN



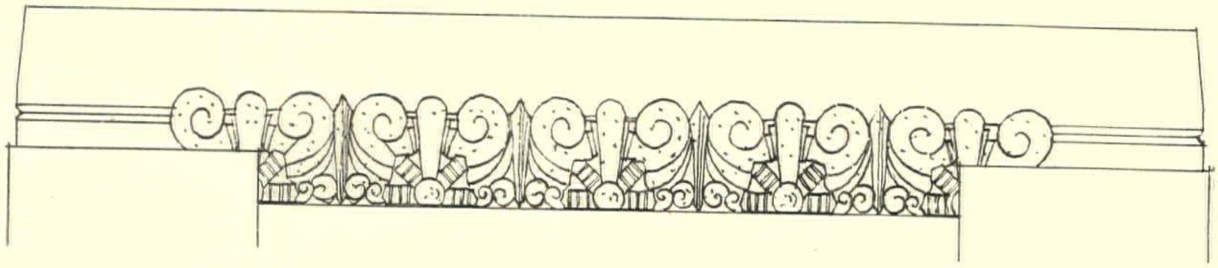
SECOND FLOOR PLAN



THIRD FLOOR PLAN

CLUB HOUSE
SKY HARBOR AVIATION COUNTRY CLUB
NORTH SHORE AIRPORT, GLENCOE, ILL.

ALFRED P. ALLEN, MAURICE WEBSTER
ASSOCIATE ARCHITECTS

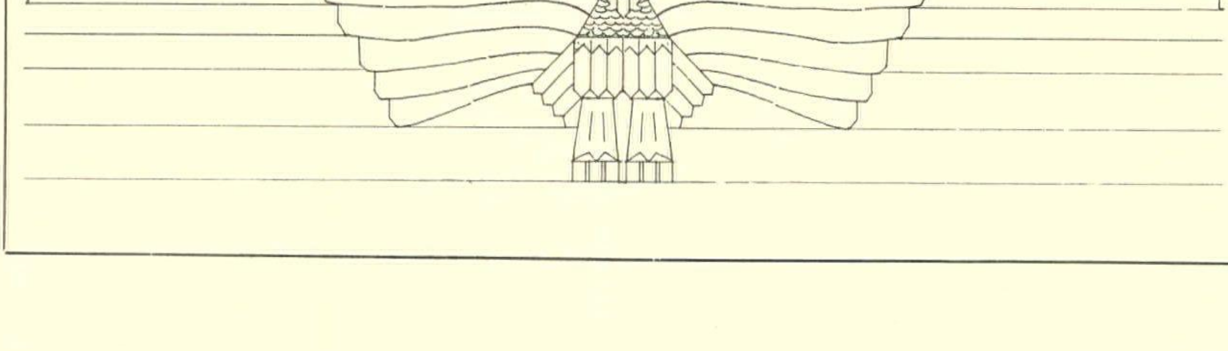


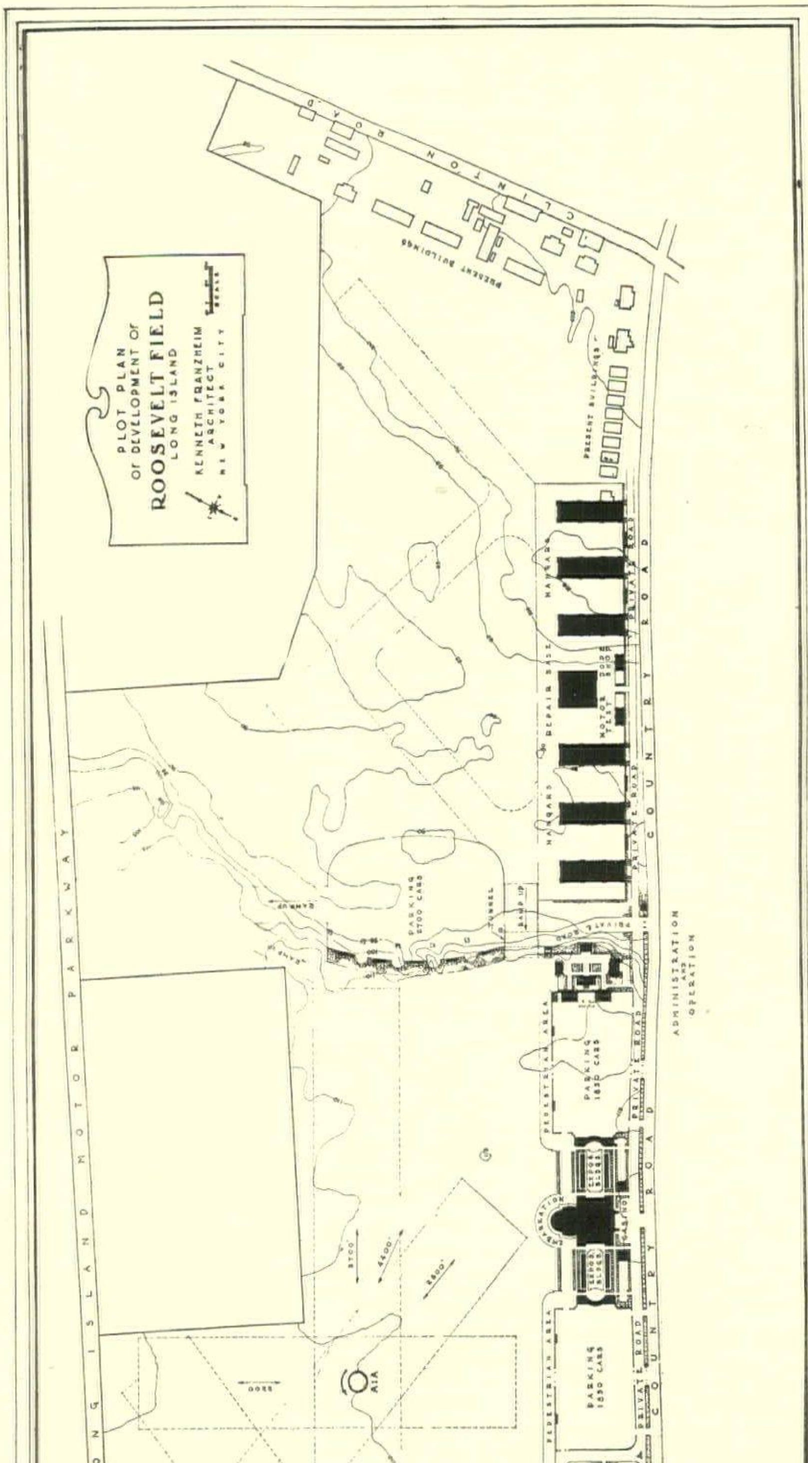
ROOSEVELT FIELD

LONG ISLAND, N. Y.

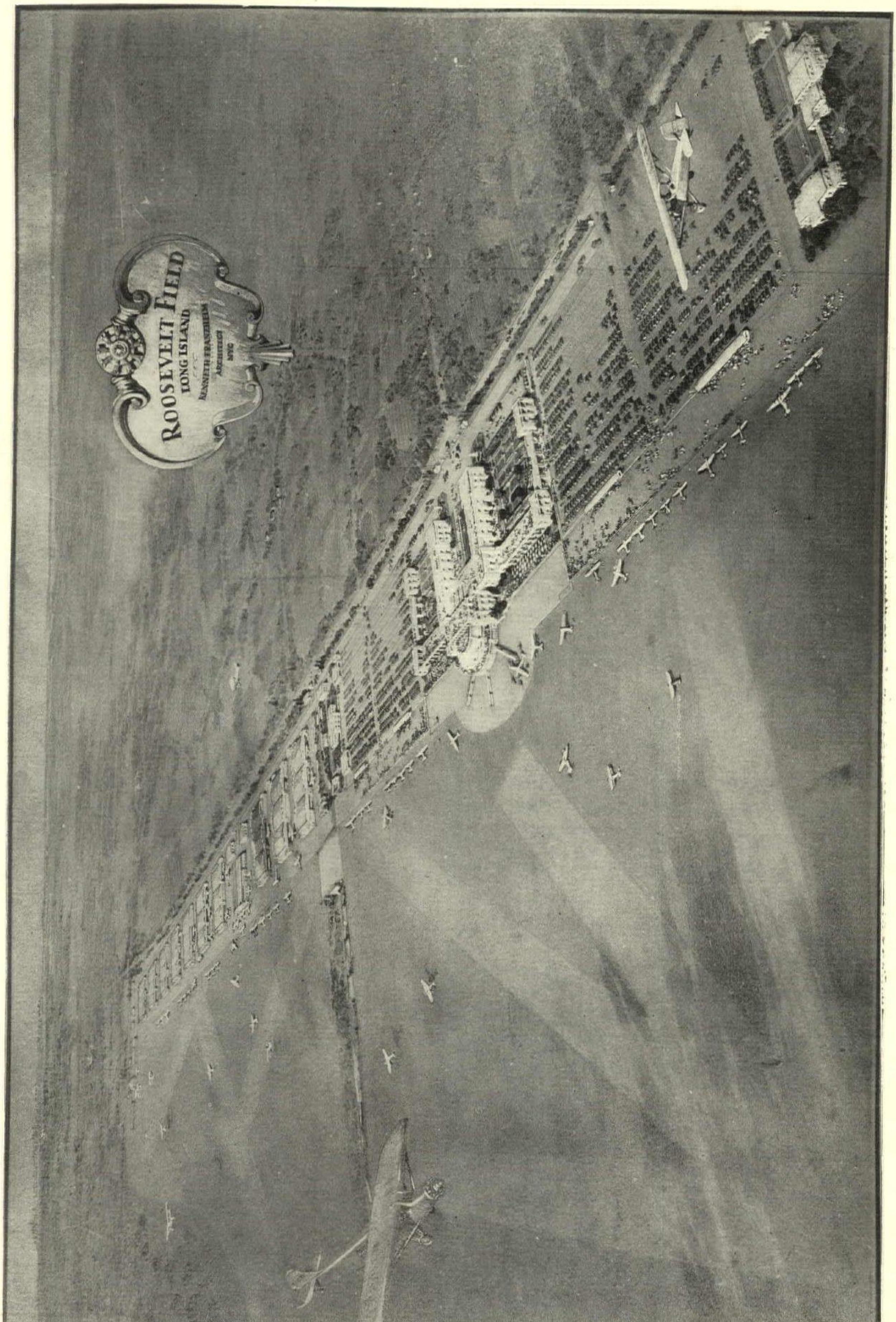
Kenneth Franzheim, Architect

A group of drawings showing the plans for the development of Roosevelt Field. The plans and elevations of the hangars reproduced on the following pages have been redrawn from the architect's working drawings. The character of the design is in keeping with the modern purpose which the buildings serve.

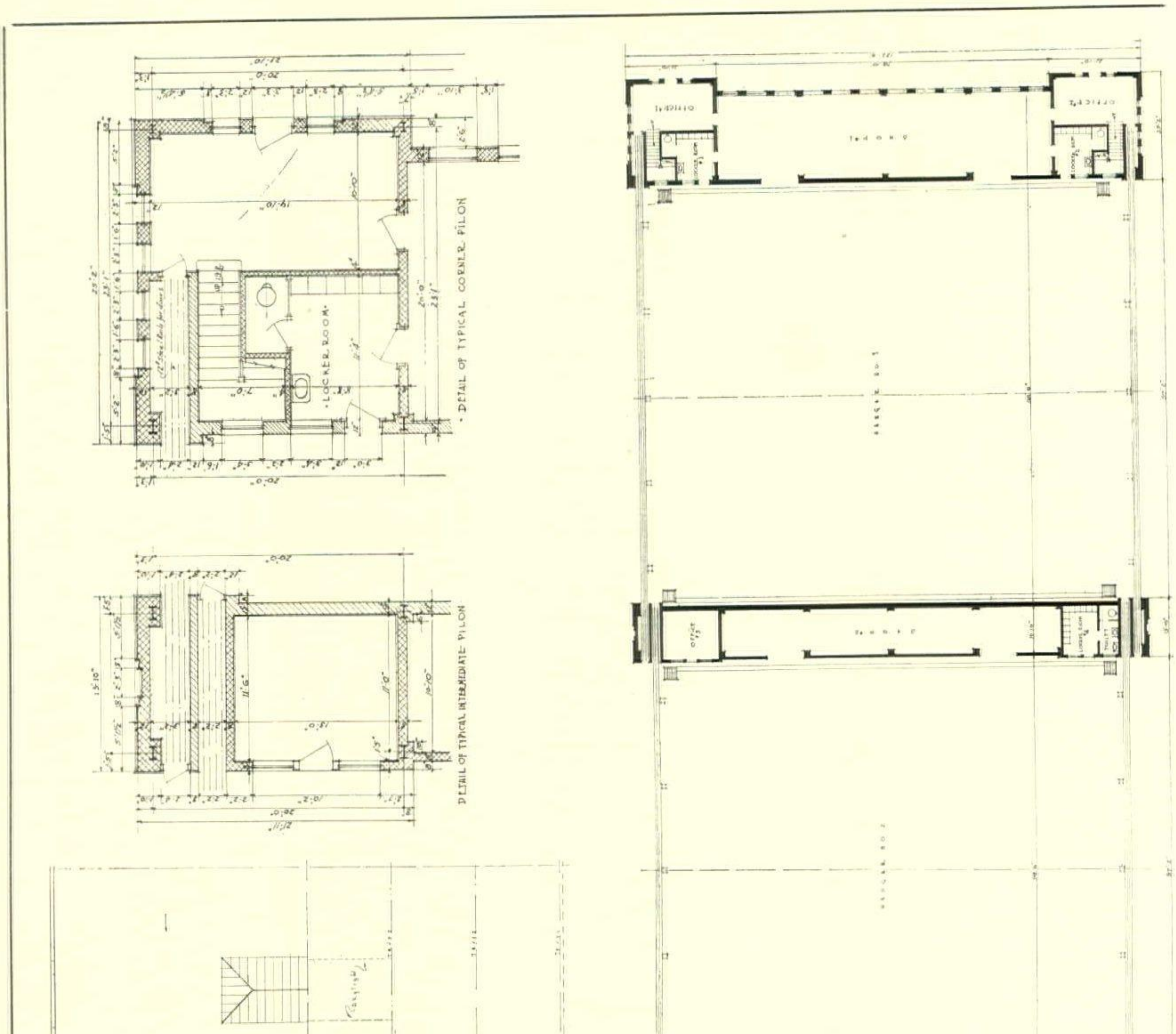


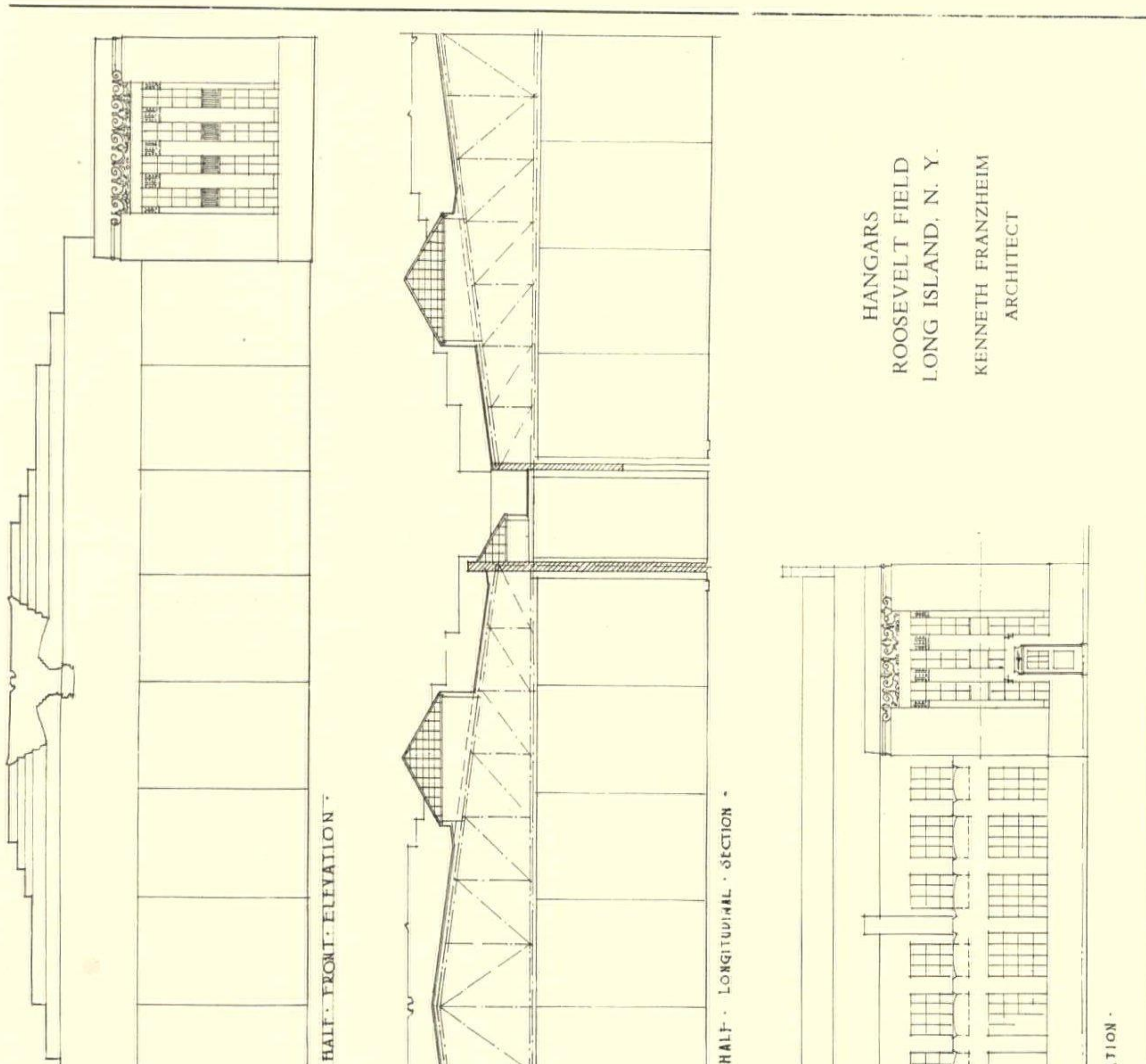


ROOSEVELT FIELD, LONG ISLAND, N. Y.
KENNETH FRANZHEIM, ARCHITECT

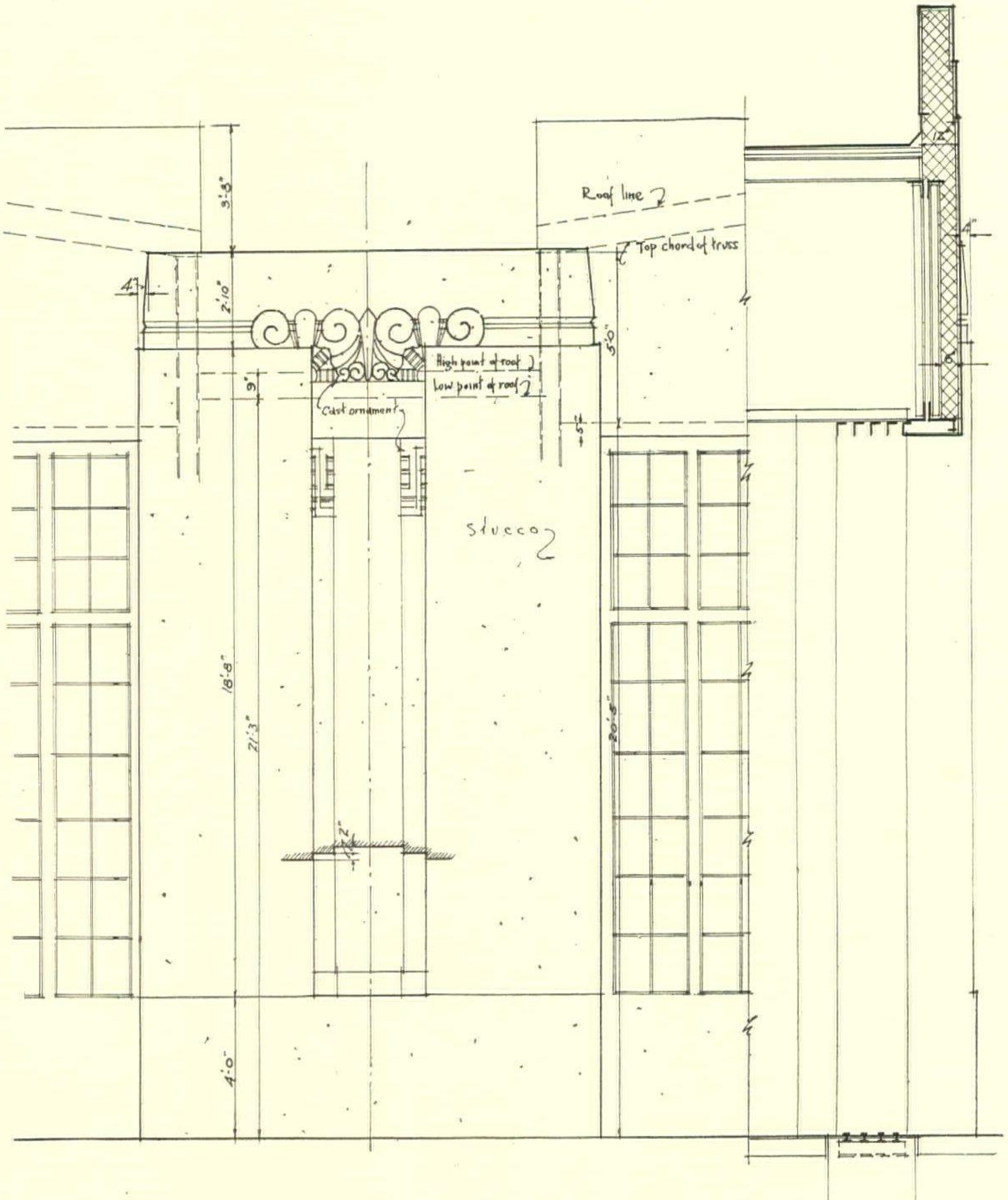


ROOSEVELT FIELD, LONG ISLAND, N. Y.—KENNETH FRANZHEIM, ARCHITECT


DETAIL OF TYPICAL CORNER PILON
LOCKER ROOM
DETAIL OF TYPICAL INTERMEDIATE PILON
PART PLAN OF SECOND FLOOR AND ROOF

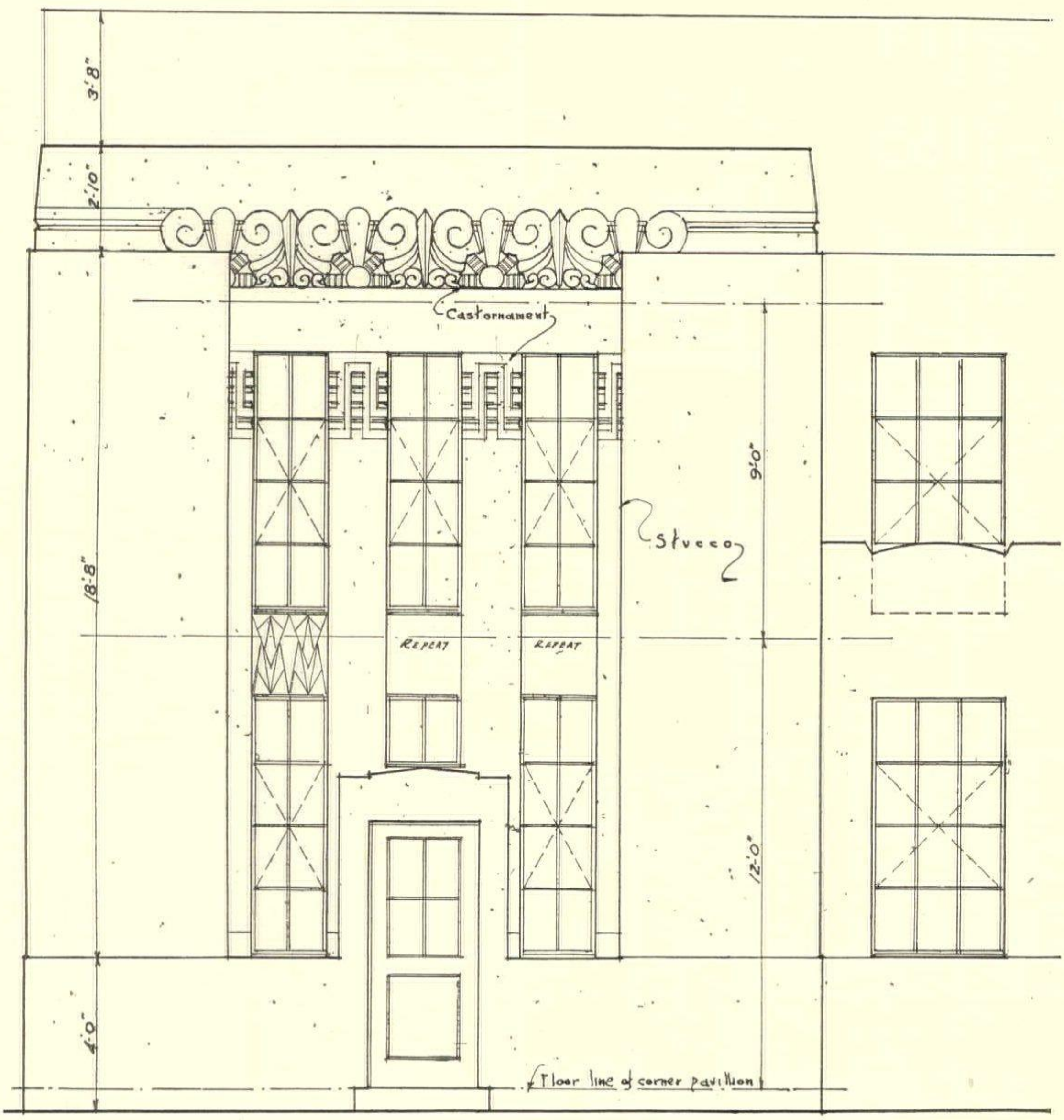


HANGARS
ROOSEVELT FIELD
LONG ISLAND, N. Y.
KENNETH FRANZHEIM
ARCHITECT



ELEVATION OF INTERMEDIATE PYLON

HANGARS, ROOSEVELT FIELD, LONG ISLAND, N. Y.
KENNETH FRANZHEIM, ARCHITECT



END ELEVATION OF CORNER PYLON

HANGARS, ROOSEVELT FIELD, LONG ISLAND, N. Y.
KENNETH FRANZHEIM, ARCHITECT

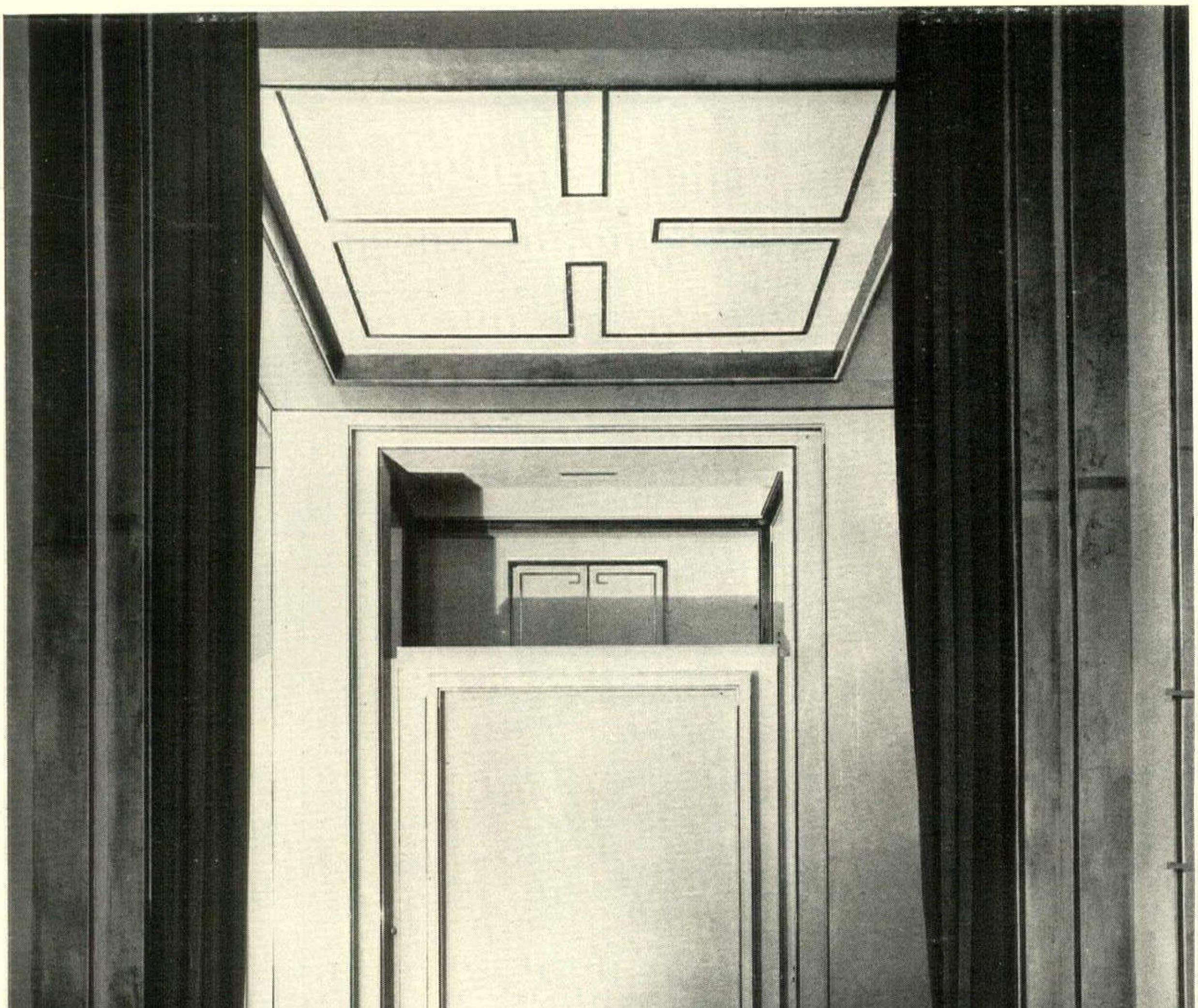


Photo by Mary Dale Clarke

ASSEMBLY HALL LOOKING TOWARDS CONFERENCE ROOM, J. WALTER THOMPSON CO., NEW YORK

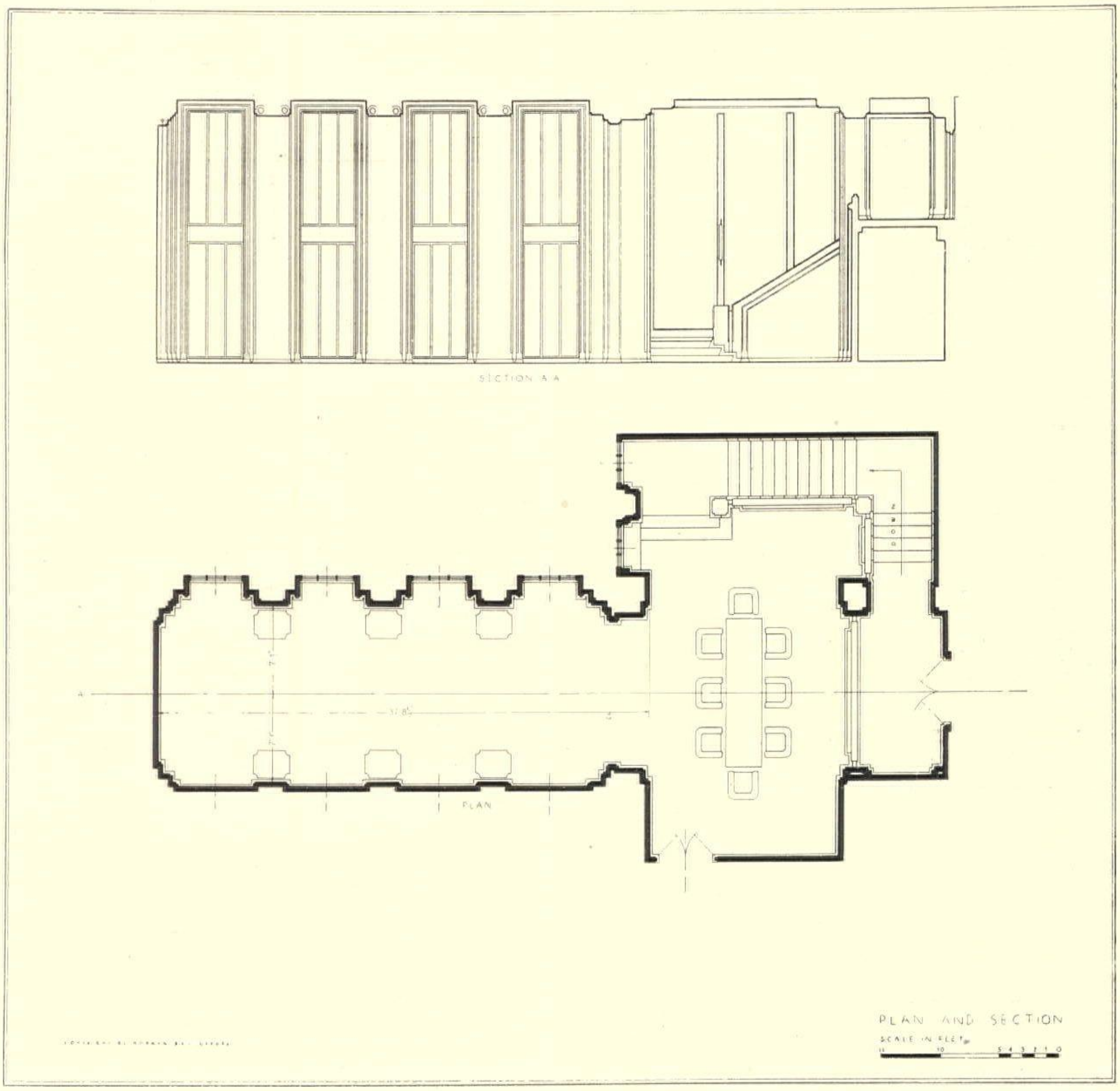
NORMAN BEL GEDDES, ARCHITECT

INTERIOR ARCHITECTURE

A MODERN ROOM FOR A MODERN PURPOSE

THE larger advertising agency of today, acting as adviser to business enterprises of frequently enormous size, requires for purposes of assembly with its clients and their organizations, an Assembly Hall of adequate size, of dignity and of quiet. Such a room also serves the purpose of a small auditorium for addresses by distinguished visitors or for the presentation of such things as radio auditions or motion picture programs. It is also a conference room for members of the staff.

Such an Assembly Hall, probably the first ever designed for precisely this purpose in modern industry, has just been completed in the offices of



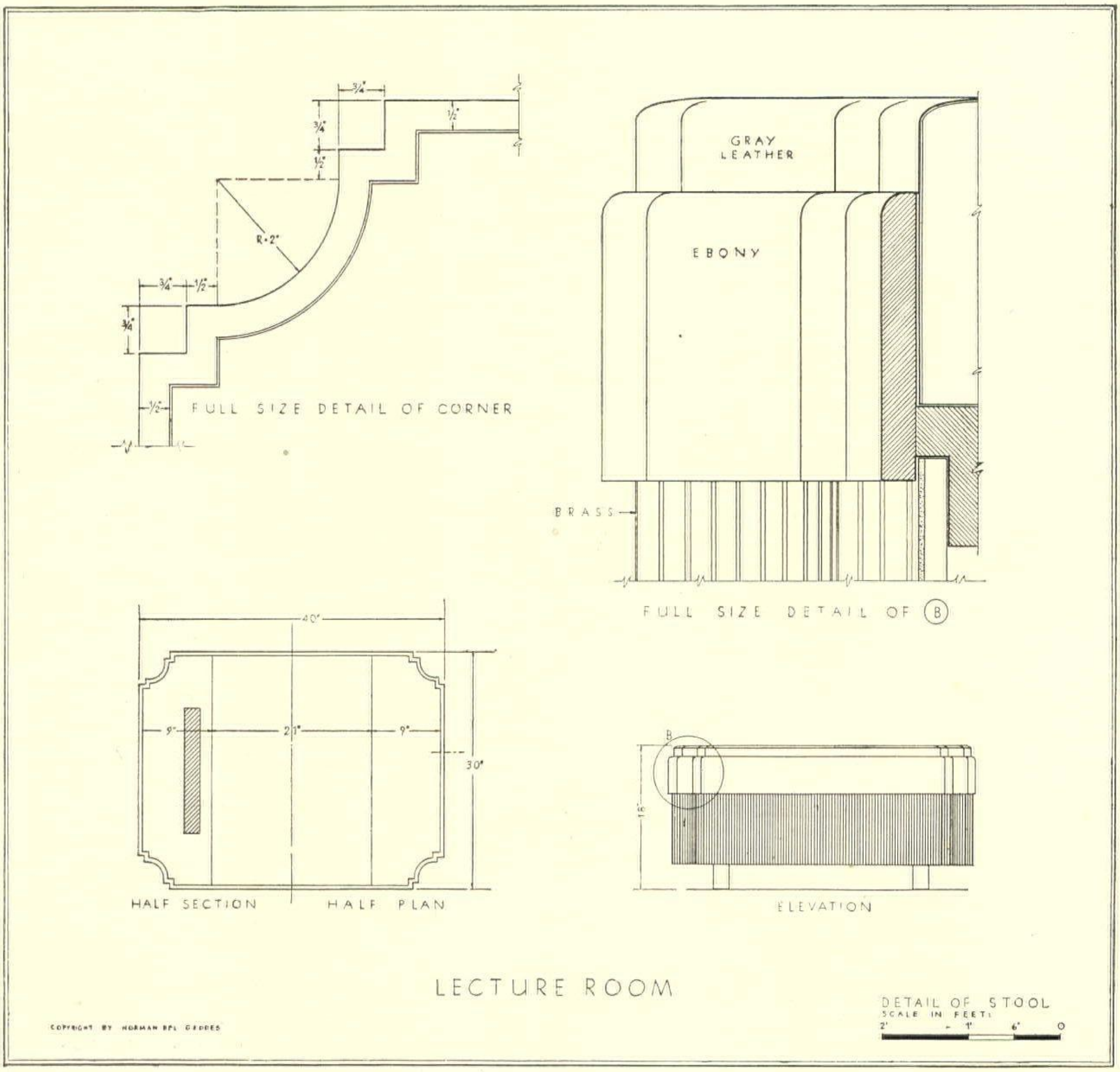
PLAN AND ONE ELEVATION OF ASSEMBLY HALL, J. WALTER THOMPSON CO., NEW YORK
NORMAN BEL GEDDES, ARCHITECT

the J. Walter Thompson Company, New York.

The proportions of the Hall—long and narrow with a lofty ceiling—were obtained by securing space on the floor below, thus having a room that is two stories high into which one descends by a staircase. These fundamentals of proportion lent themselves to the modern architectural treatment which is especially appropriate in a background for today's business transactions.

The design carried out is appropriately lacking in meaningless ornament, its decorative qualities are purely architectural in character, with the result that there is nothing to detract from its business-like nature. Witness the simple beauty of the long narrow windows which replace the standard one-story office building windows—the satisfying use of color and materials in faintly grey walls, with strips of black vitrolite glass and brass, and the theatrically vivid, yet wholly dignified, straight green hangings and rather square, squat chairs. The plan shows the manner in which the space has been divided to form a combination auditorium and conference room.

Particular attention has been given to heating, lighting and ventilation. A hidden ventilating system forces out the used air and brings in fresh air so that the windows need never be opened to let in the disturbing noises of traffic and building operations. Radiators are concealed behind decorative brass panels between the windows, while the lighting units are installed in the ceiling beams and the side walls behind frosted glass.



DETAILS OF STOOLS, ASSEMBLY HALL, J. WALTER THOMPSON COMPANY, NEW YORK

NORMAN BEL GEDDES, ARCHITECT

Photo by Mary Dale Clarke

CONFERENCE ROOM, J. WALTER THOMPSON COMPANY, NEW YORK

NORMAN BEL GEDDES, ARCHITECT

The lights are controlled on dimmers which may be set for any interval of time, so that when you press the regulation switch in the wall, the light is turned on gradually instead of jumping to its full intensity immediately. It does not reach its full intensity for about twenty seconds. The result is unusually pleasing, and in the instance of the room being dark when someone is speaking, it eliminates the distraction of the light flaring up suddenly. Furthermore, it may be

Photo by Mary Dale Clarke

ASSEMBLY HALL, J. WALTER THOMPSON COMPANY, NEW YORK

NORMAN BEL GEDDES, ARCHITECT

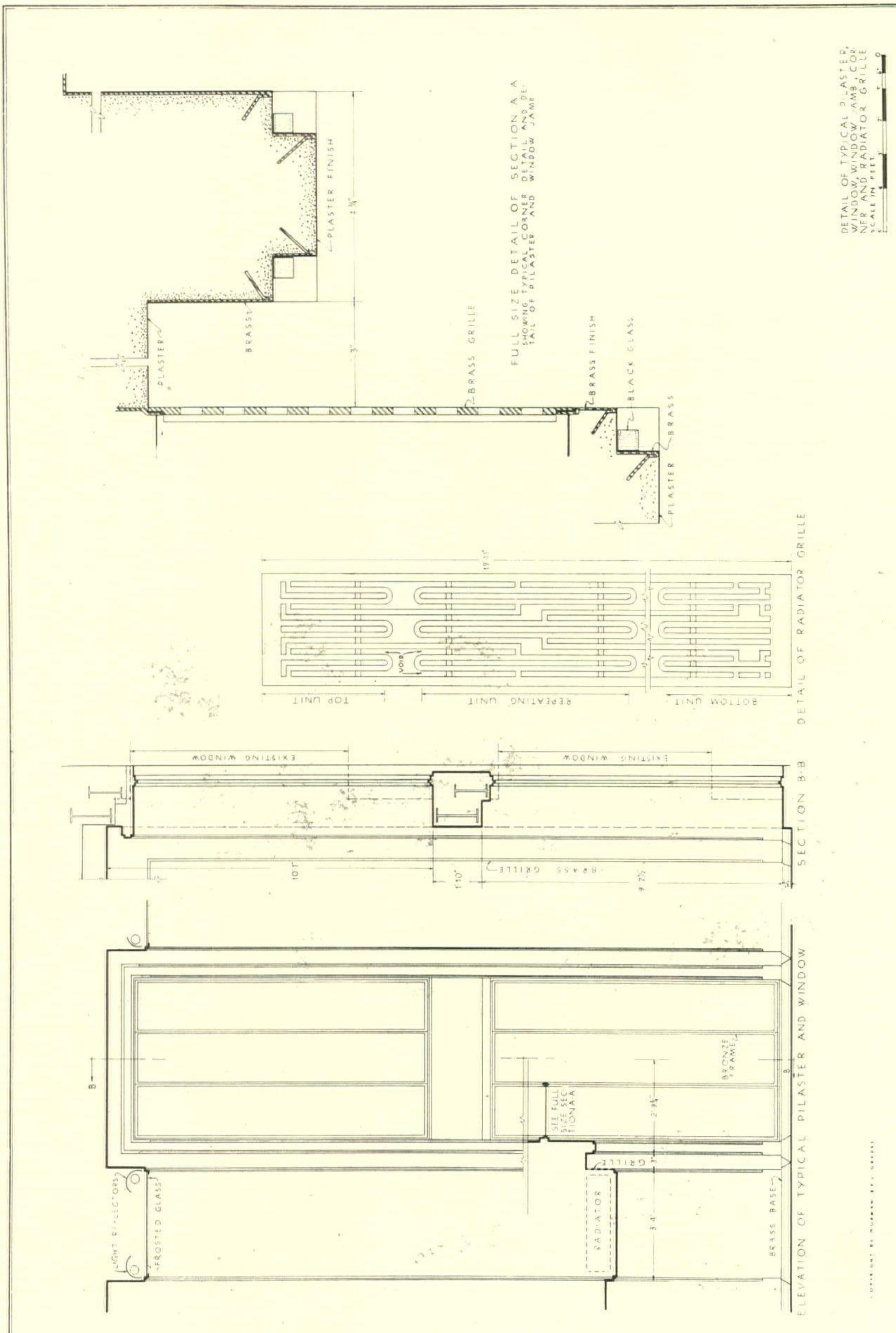
stopped at any point in the dimming process.

The auditorium seats one hundred and seventy-five people, with folding chairs brought in to supplement the before-mentioned broad armchairs. A big wall area is arranged so that brass rods can be inserted between the pilasters to hold strips of cork for the display of layouts, car cards and posters. A curtain is provided for the showing of motion pictures. Telephones are out of sight and may be plugged in when wanted.

Photo by Mary Dale Clarke

STAIRCASE TO ASSEMBLY HALL, J. WALTER THOMPSON COMPANY, NEW YORK

NORMAN BEL GEDDES, ARCHITECT

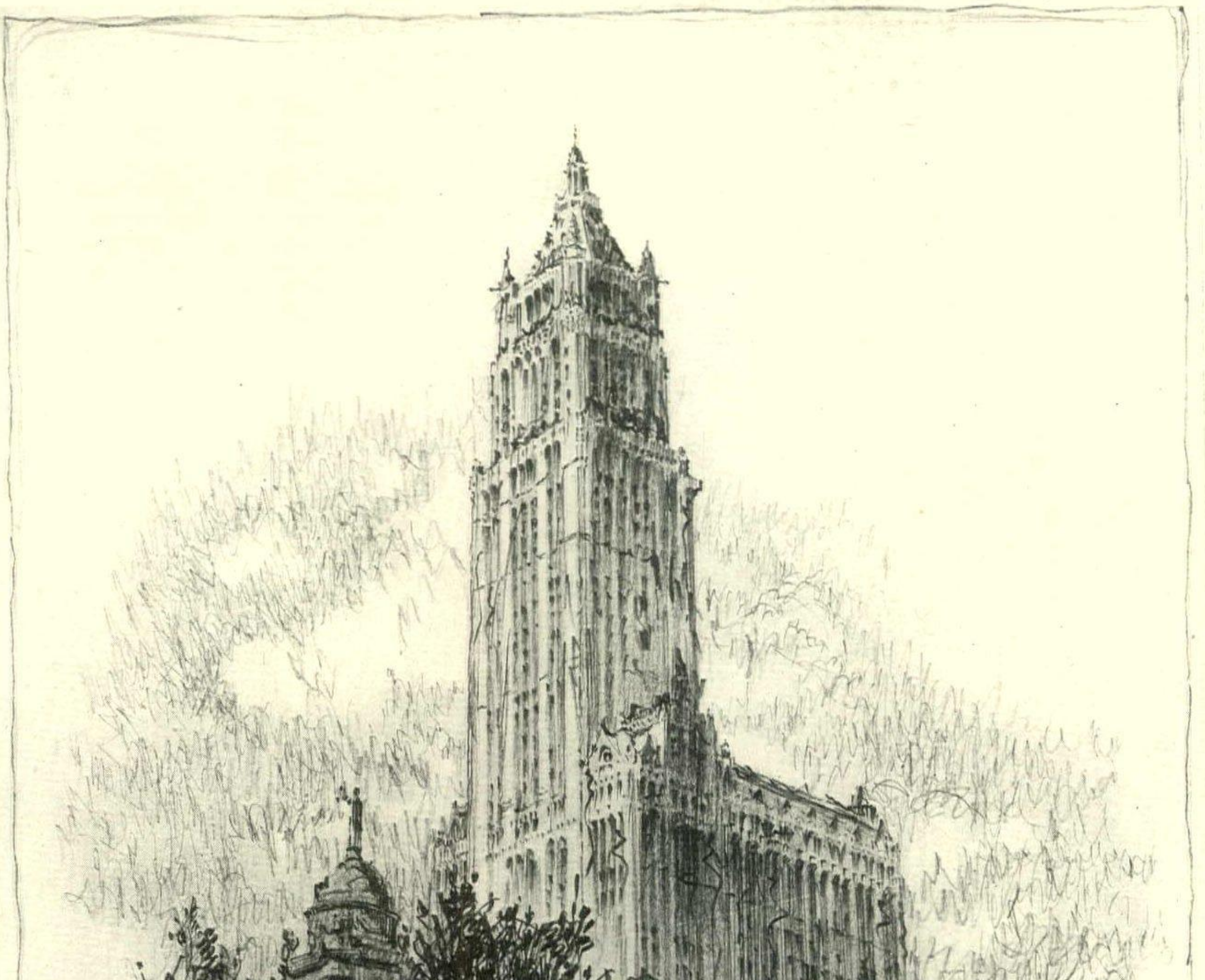


DETAILS OF WINDOW, ASSEMBLY HALL, J. WALTER THOMPSON COMPANY, NEW YORK—NORMAN BEL GEDDES, ARCHITECT

STUDIES OF MANHATTAN TOWERS

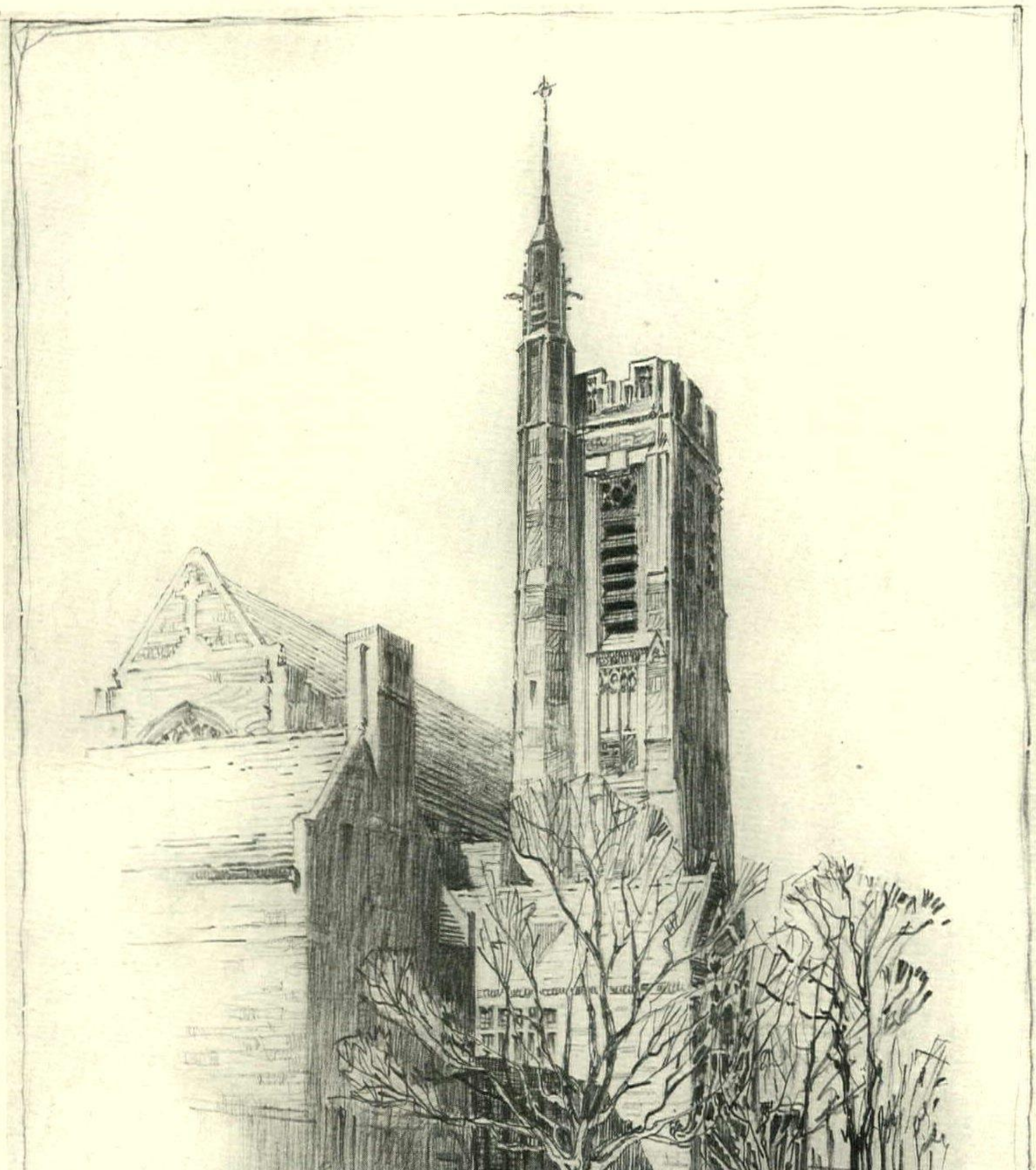
By Earl Purdy

NEW NETHERLANDS AND SAVOY-PLAZA HOTELS



WOOLWORTH BUILDING, NEW YORK
FROM A DRAWING BY EARL PURDY

HECKSCHER BUILDING, NEW YORK
FROM A DRAWING BY EARL PURDY



CHURCH OF THE INTERCESSION, NEW YORK
FROM A DRAWING BY EARL PURDY

CITY NATIONAL BANK & TRUST COMPANY

BRIDGEPORT, CONN.

Dennison & Hirons

Architects

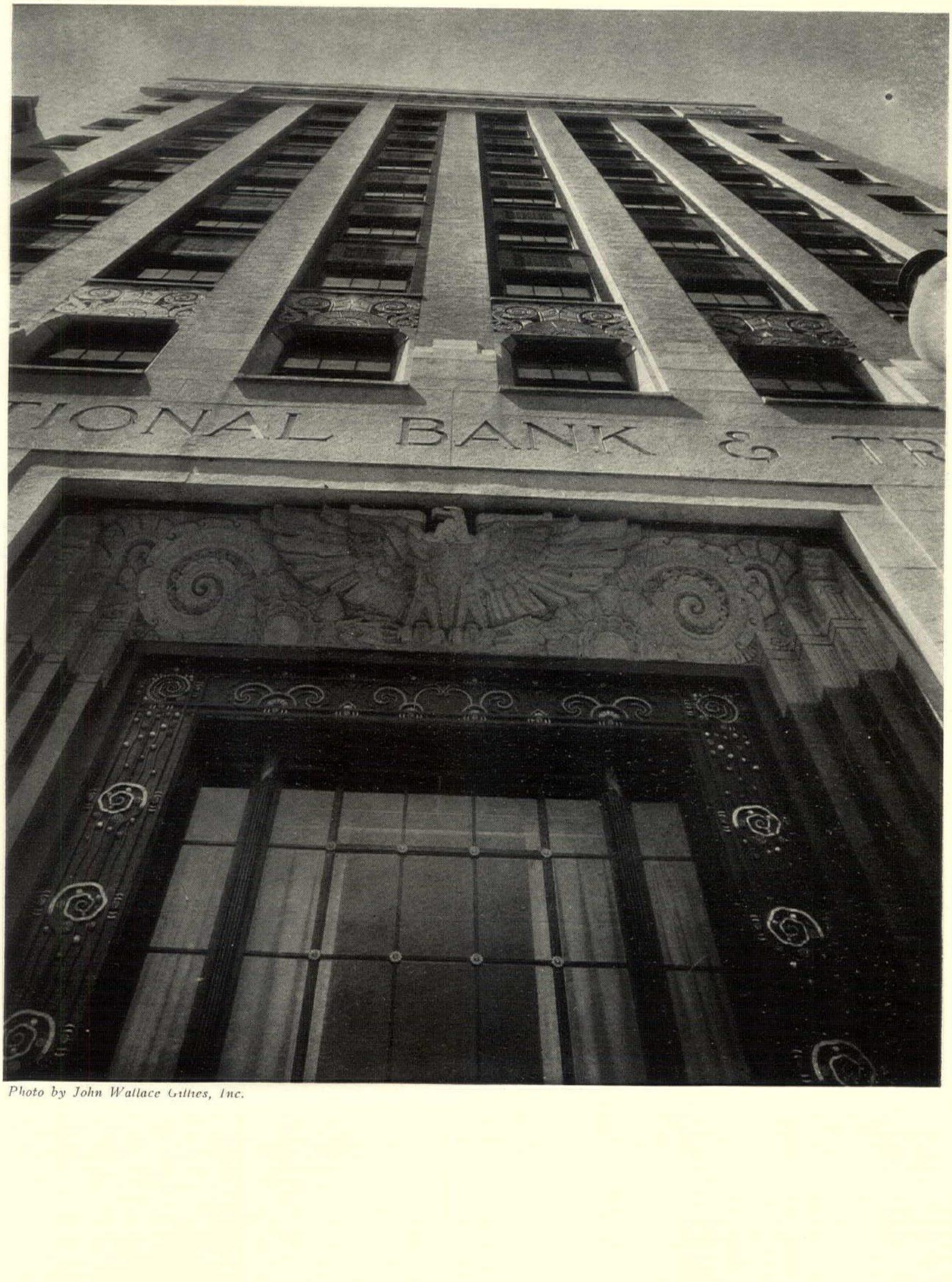
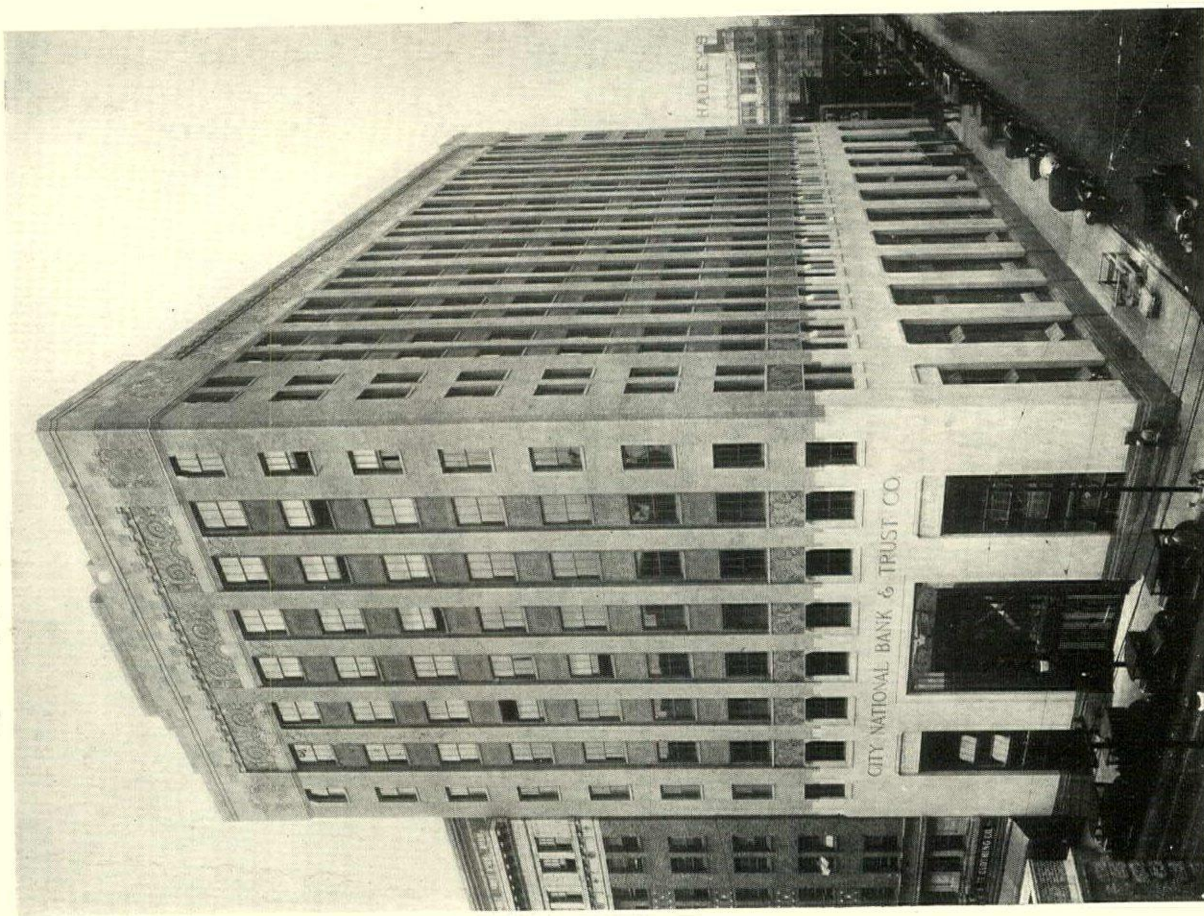
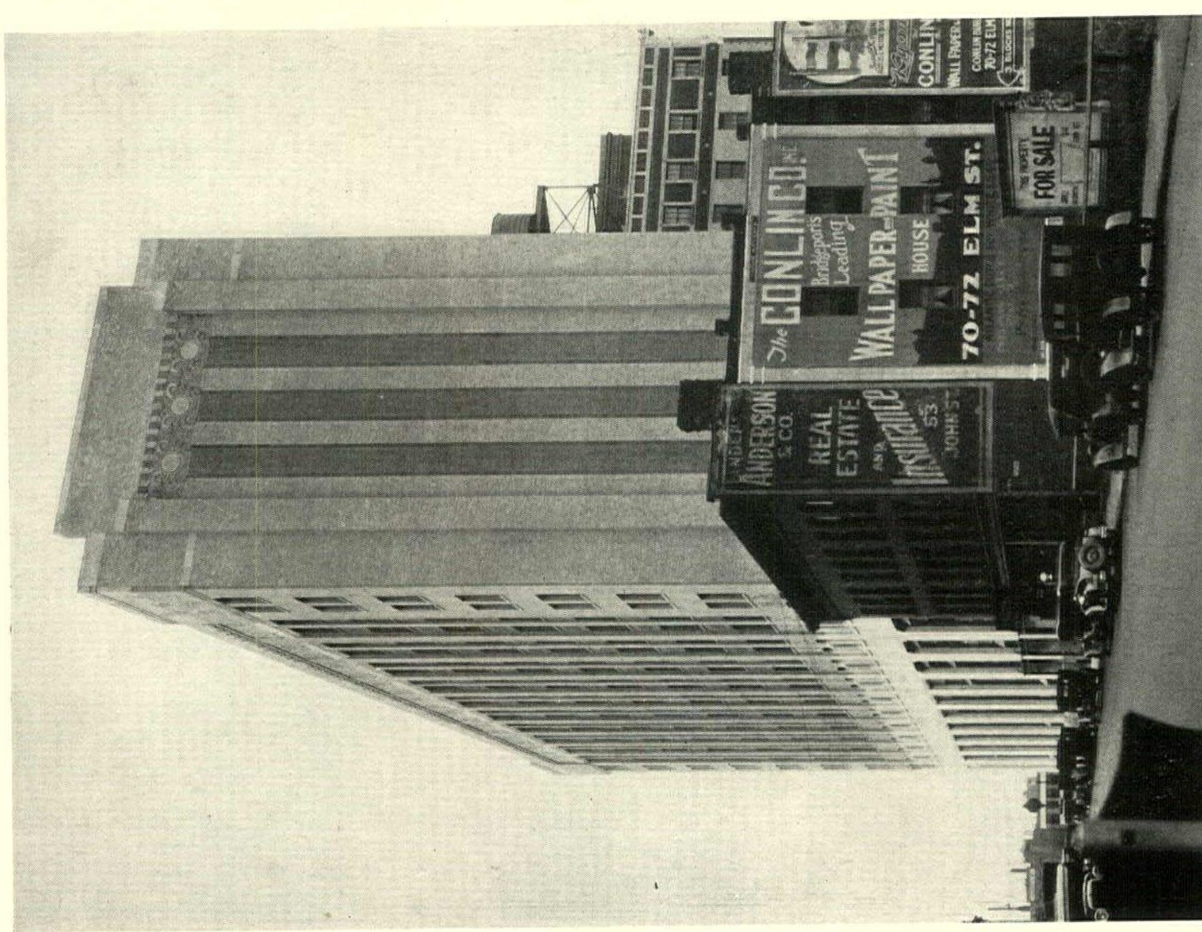


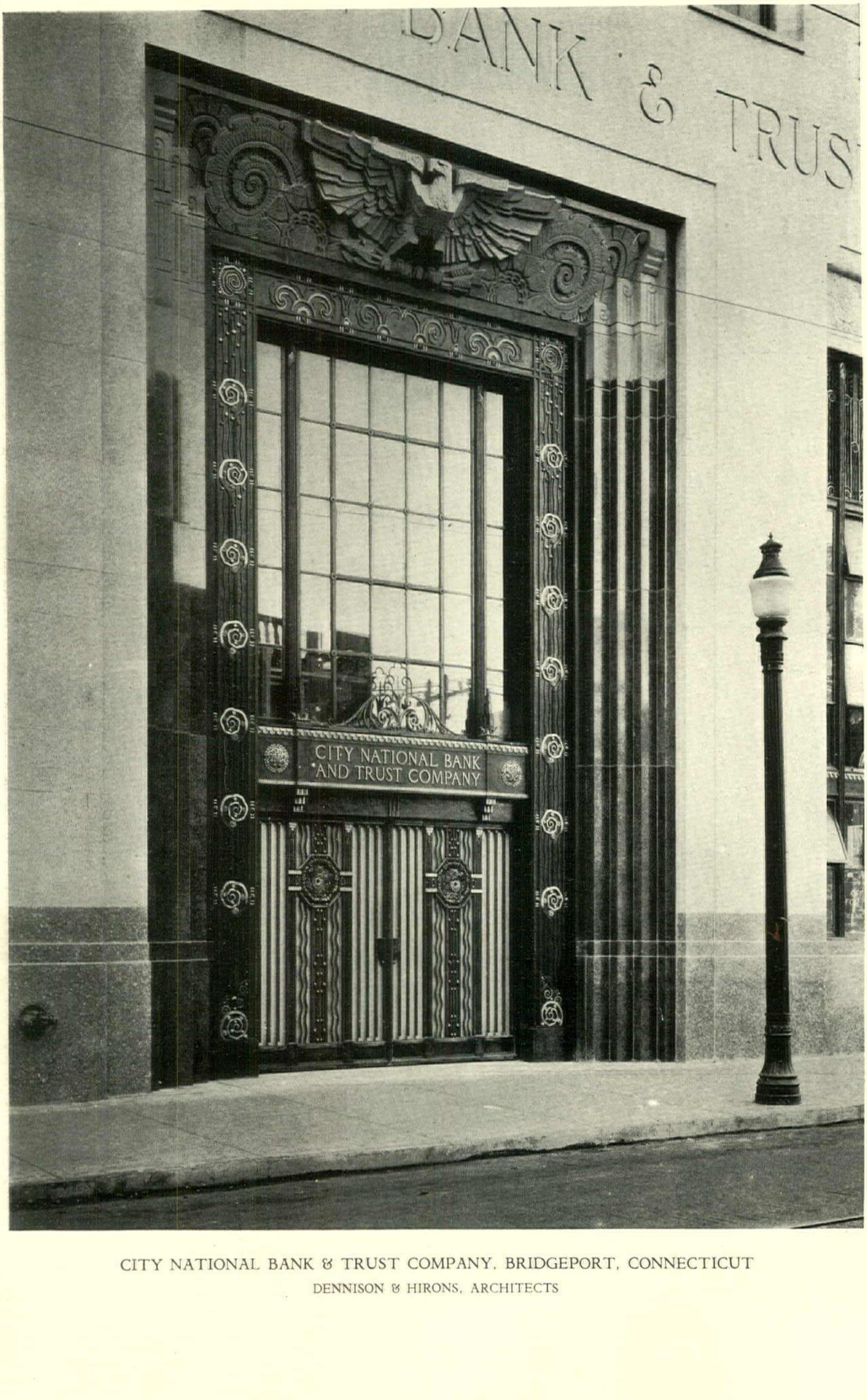
Photo by John Wallace Gillies, Inc.





CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT—DENNISON & HIRONS, ARCHITECTS

CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT—DENNISON & HIRONS, ARCHITECTS



CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

Photo by John Wallace Gillies, Inc.

CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

Photo by John Wallace Gillies, Inc.

CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

Photos by John Wallace Gillies, Inc.

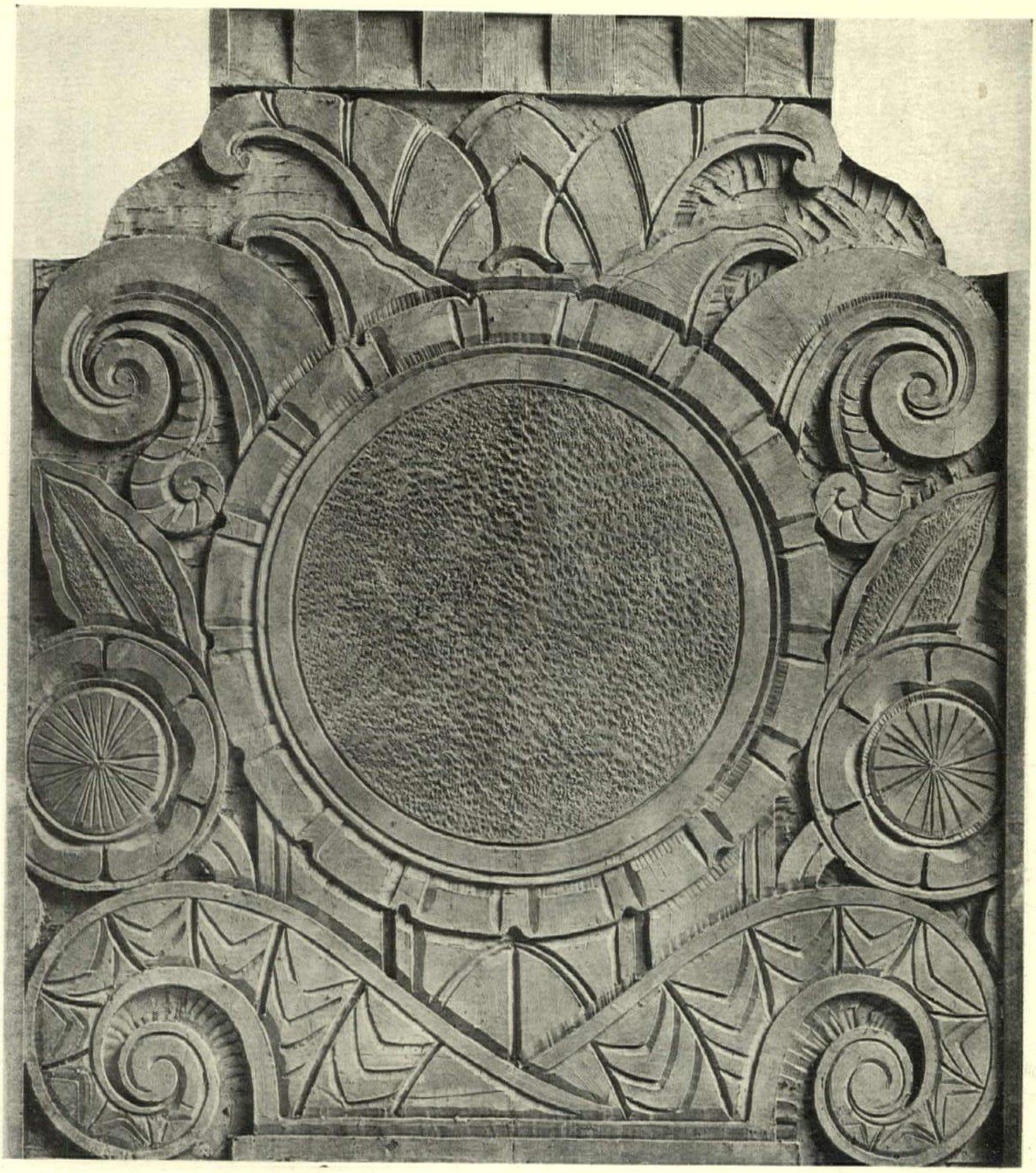
CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

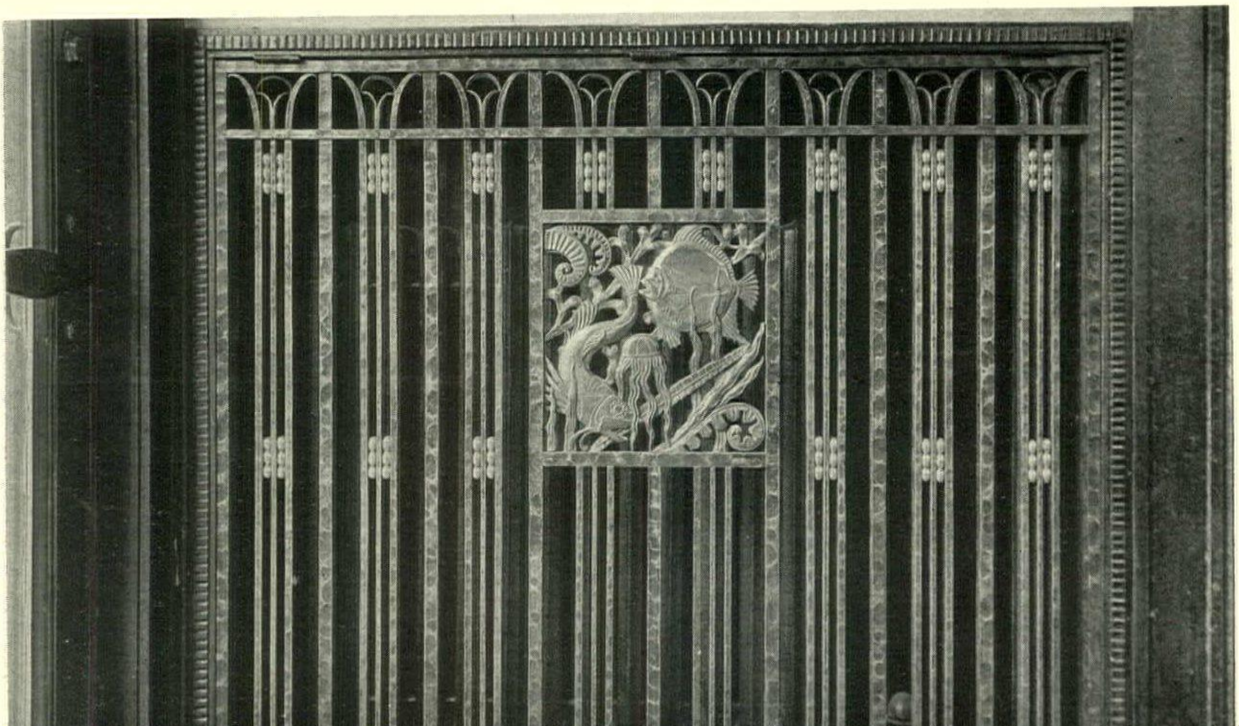
CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

Models by Rene Chambellan, Sculptor



CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT
DENNISON & HIRONS, ARCHITECTS
Models by Rene Chambellan, Sculptor



Photos by John Wallace Gillies, Inc.

CITY NATIONAL BANK & TRUST COMPANY, BRIDGEPORT, CONNECTICUT

DENNISON & HIRONS, ARCHITECTS

ORGAN SIZES AND SPACES FOR CHURCHES AND AUDITORIUMS

By LESLIE N. LEET

Technical Director, Organ Department of the Aeolian Company

This article is continued from THE AMERICAN ARCHITECT, *issue of July* 5, 1929

In addition to the space for the organ proper there will also be required proper space elsewhere in the building for a Blower Room. For obvious reasons this should be well away from both the organ chamber and the congregation as, despite the perfection attained in the manufacture of the blowing equipment, the energy required to raise the pressure of the air for the organ produces some sound which is least annoying when well separated from the instrument and its auditors. The

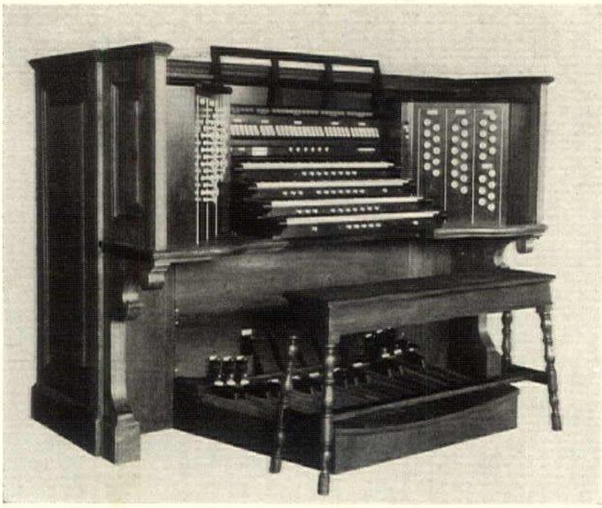


FIG. 14—TYPICAL FOUR MANUAL CONSOLE OF DRAW KNOB TYPE

blower room should be carefully soundproofed. A blower room for an average size, three manual organ should be about 75 square feet in area and at least 6 or 7 feet high. The doors and passageways to this blower room should not be restricted or trouble will be encountered in placing the apparatus in the room.

The console can be located as the needs of the organist and choir will indicate. It is unwise to locate the organist at a great distance from the organ or from the choristers. The ideal location is where the organist can hear both organ and choir equally well and also have a clear view of the choir. The old position for the organist facing the organ with the console recessed into the organ case work could hardly have been worse in these respects and the advent of the electro-pneumatic organ which has made it practical to locate the console at any convenient point makes this undesirable position entirely unnecessary. Fig. 14 illustrates a modern four manual console of the draw knob type and Fig. 15 shows a two manual console using tablets for the stop control.

Discussion up to this point has been related to an organ located in one chamber since this is usually the ideal condition. In some auditoriums, remotely located divisions that are to be played together (note that this excepts the Echo and Antiphonal Organs) do not result in producing good musical results with each other. When the divi-

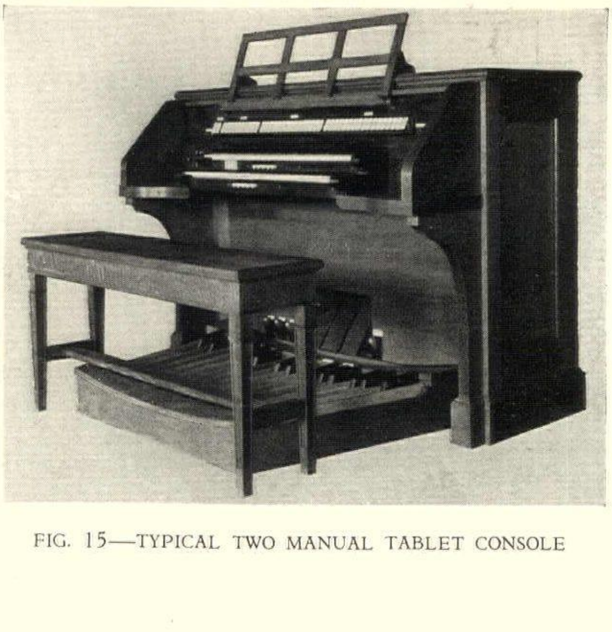


FIG. 15—TYPICAL TWO MANUAL TABLET CONSOLE

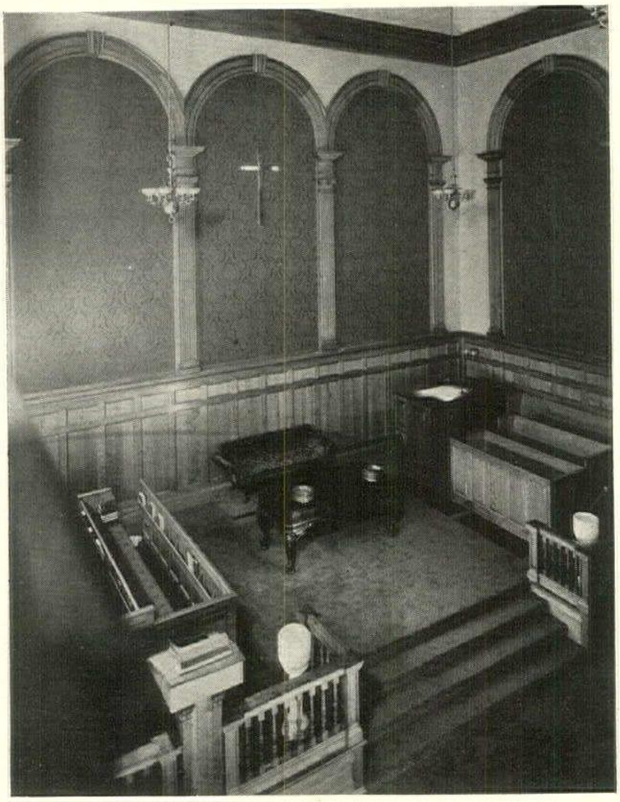


FIG. 16—FABRIC SCREENS MAY BE USED TO GOOD EFFECT OVER THE TONE OPENINGS OF THE ORGAN
FIRST PRESBYTERIAN CHURCH, ORANGE, N. J.
E. P. MELLON, ARCHITECT

sions are so separated the listener is apt to become confused by sounds from two directions and in some cases with a Solo from one Section and the accompaniment from another. Only those half-way between the two divisions get a well balanced effect. Generally speaking, an organ on each side of the chancel blends well and it is almost impossible to state, even when seated well forward in the nave, from which side the tones are coming.

An interesting example of an organ on each side of a choir in practically chancel form with the largest portion of the organ behind the front wall of the chancel is shown in Fig. 16, illustrating the First Presbyterian Church, in Orange, N. J. This organ is unique in that it is not screened by either display pipes or grille work. The generous tone openings are covered with a fabric of substantial texture and the general effect both tonally and architecturally is pleasing. A plan of this organ is given in Fig. 17, which shows an actual instrument of fairly large size.

A totally different type of organ is that in the Trinity E. L. Church, in Fort Wayne, Ind., where all of the organ divisions except the Choir are at the left of the chancel and the Choir Organ only is at the right. Unfortunately, this Choir Organ is directly beside the Console and the effect to the organist is too prominent, but from the

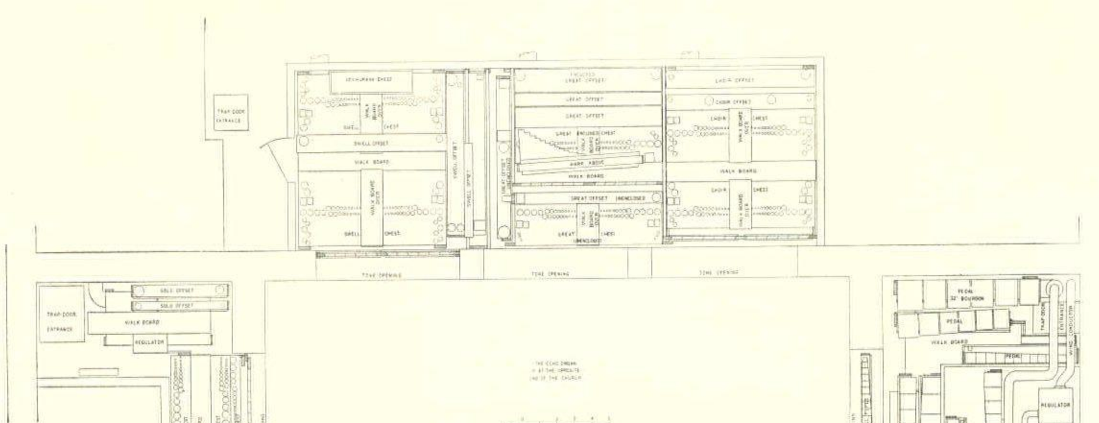


FIG. 17—PLAN OF ORGAN SPACES ARRANGED AROUND CHANCEL
FIRST PRESBYTERIAN CHURCH, ORANGE, N. J.
E. P. MELLON, ARCHITECT
(See also Fig. 16)

body of the church it is very satisfactory. This organ is screened with a most unusual grille that represents a very satisfactory form of covering when display pipes are not desired and the conventional grille of repeated geometrical figures is not favored. The grille designed by the architect of the Church, the late Bertram Grosvenor Goodhue, is shown in Fig. 18.

An example of the treatment of an organ completely enclosed by the use of swell shades introduced into the tone openings is that of the organ in the Masonic Temple, in Westfield, N. J. This organ, shown in Fig. 19, is a substantial, two manual organ of nine manual stops and two pedal stops, and has proven to be an effective installation. A plan taken from the actual working drawings of the organ is shown in Fig. 3. It is pertinent to point out that the adequate and well placed tone openings no doubt contribute largely to the success of the instrument.

The instrument in the Westfield Masonic Temple is an organ enclosed in one expression chamber. As previously pointed out, when it is possible to do so, it is a distinct advantage musically to enclose the separate divisions in individual expression chambers. An instrument of about the same size as that in the Westfield Masonic Temple, except that it is enclosed in two expression chambers, is the organ installed in the Church of Our Lady of Perpetual Help, in Bernardsville, N. J. Here, as at the Westfield Masonic Temple, the organ builder received the complete co-operation of the architect and the tonal results give evidence that such co-operation pays. The instrument, containing 12 manual stops and three pedal stops located in a gallery in the north transept, with the Console located in the Choir gallery in the south transept, occupies what is traditionally the correct place for the organ in a Roman Catholic church. A grille designed by the architect of the church,

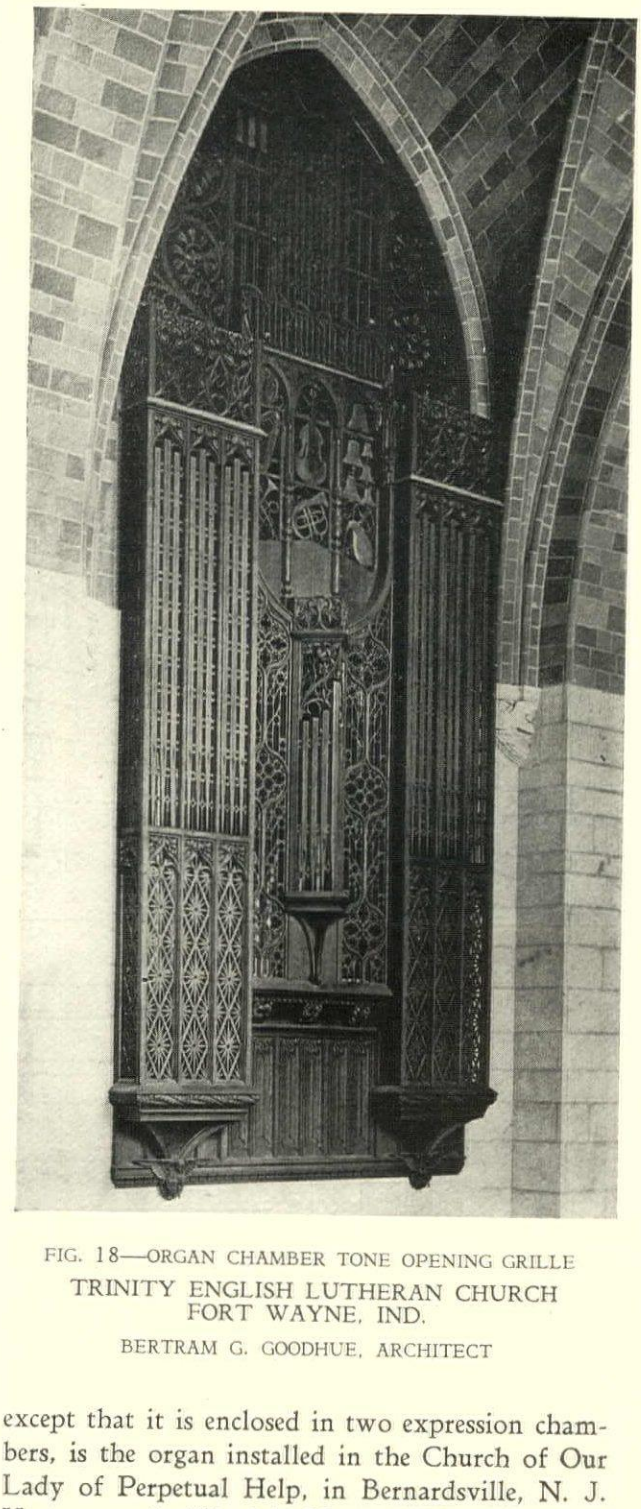


FIG. 18—ORGAN CHAMBER TONE OPENING GRILLE
TRINITY ENGLISH LUTHERAN CHURCH
FORT WAYNE, IND.
BERTRAM G. GOODHUE, ARCHITECT

FIG. 19
PERFORATED SCREENS COVER THE TONE OPENINGS
WESTFIELD MASONIC TEMPLE, WESTFIELD, N. J.
JOHN F. JACKSON, ARCHITECT
(For plan of concealed organ see Fig. 3)

FIG. 21—DECORATIVE ORGAN SCREEN DESIGNED TO CONFORM TO THE ARCHITECTURE OF THE INTERIOR

CHURCH OF OUR LADY OF PERPETUAL HELP
BERNARDSVILLE, N. J.

WILFRED E. ANTHONY, ARCHITECT

FIG. 24—PERFORATED SCREENS CONCEAL THE MAMMOTH ORGAN OF THE CHAPEL

NEW JERSEY COLLEGE FOR WOMEN
NEW BRUNSWICK, N. J.

LUDLOW & PEABODY, ARCHITECTS

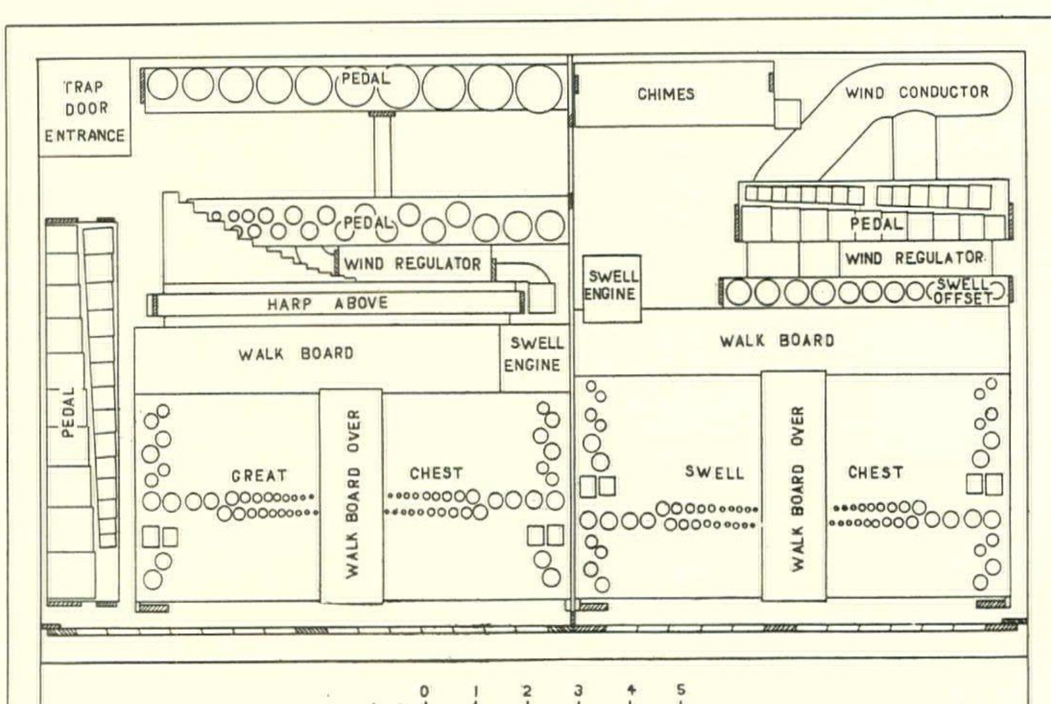


FIG. 20—PLAN OF ORGAN CHAMBER

CHURCH OF OUR LADY OF PERPETUAL HELP, BERNARDSVILLE, NEW JERSEY

WILFRED E. ANTHONY, ARCHITECT

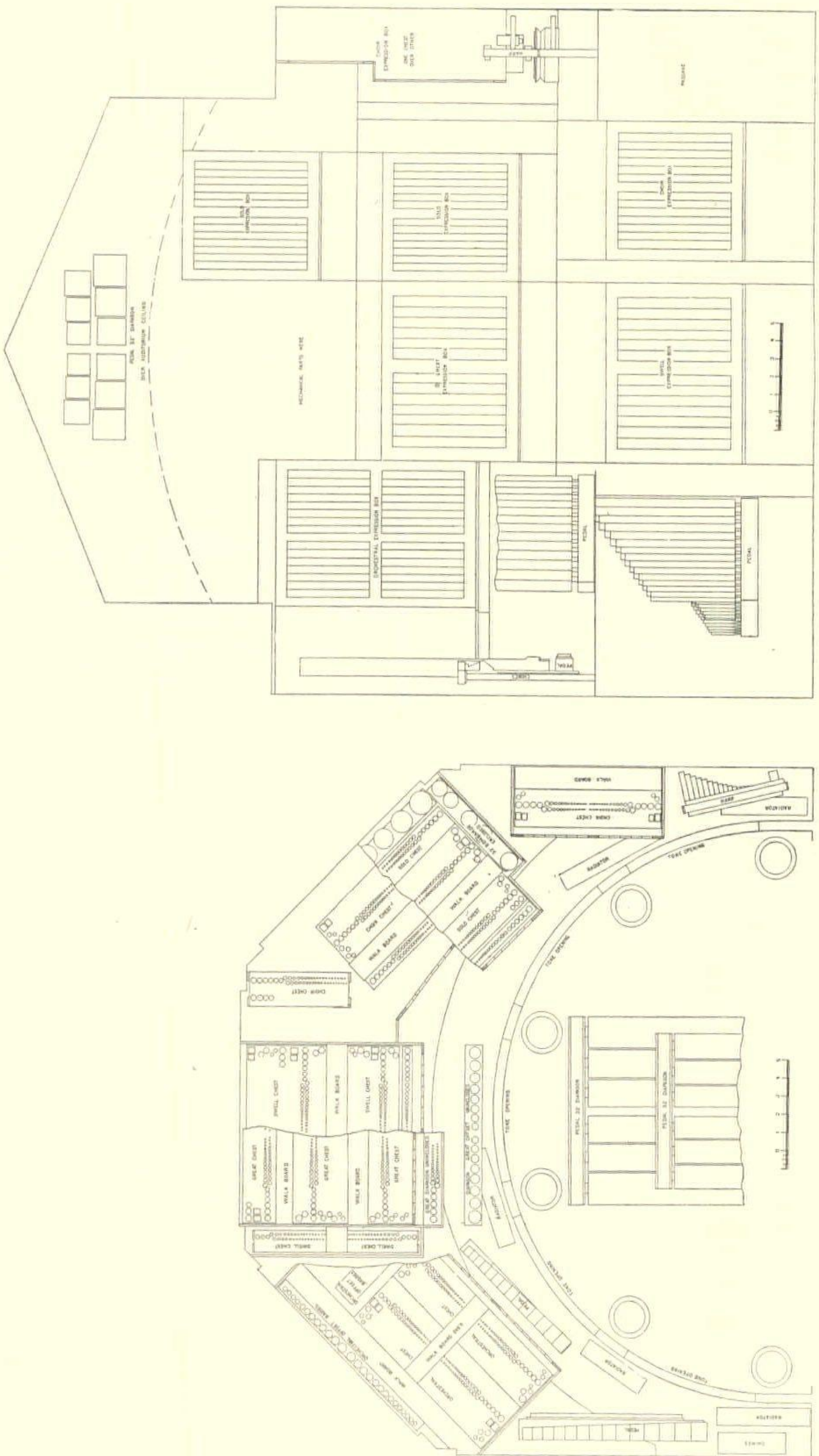


FIG. 22 AND FIG. 23

PLAN AND ELEVATION OF ORGAN CHAMBER CHAPEL, NEW JERSEY COLLEGE FOR WOMEN, NEW BRUNSWICK, N. J.

LUDLOW & PEABODY, ARCHITECTS

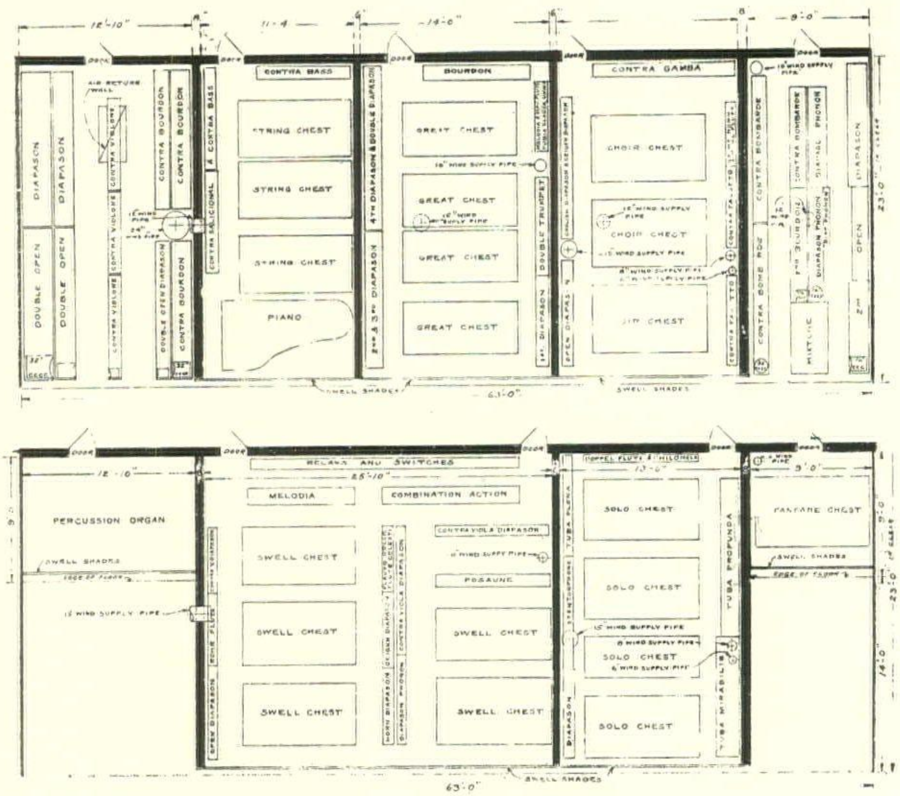


FIG. 26—PLANS OF UPPER AND LOWER LEVELS OF ORGAN CHAMBER

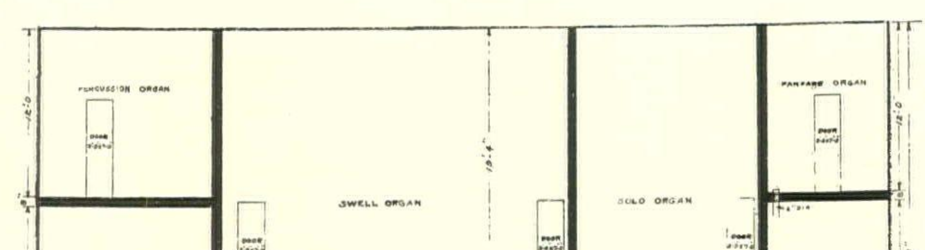


FIG. 25—ELEVATION OF ORGAN CHAMBER

LARGE ORGAN FOR A CONSERVATORY NEAR WILMINGTON, DELAWARE

E. WILLIAM MARTIN, ARCHITECT

relieved by two small towers of display pipes (not speaking pipes), encloses the organ. The organ installation in this church is an excellent example of the handling of the instrument in a small building. The plan of this organ as shown in Fig. 20 and Fig. 21 is a view of the organ screen.

Of a totally different type of installation is the mammoth organ. Such an instrument is located in the Chapel of the New Jersey College for Women, in New Brunswick. This organ is in seven manual sections, as shown on the plan and the elevation given in Figs. 22 and 23. The instrument contains 98 actual sets of pipes and the total number of pipes in the organ is 7,053. The 32 foot Pedal Open Diapason pipes are over the false ceiling, the pipes lying horizontally—which in no way impairs their effectiveness. A photograph of the Chapel interior is given in Fig. 24, showing an effective method of screening an organ.

To illustrate the development of an organ of gigantic size. Figs. 25 and 26 show an elevation with lower and upper plans of an organ for a conservatory located near Wilmington, Del. The architect has allowed ample space for the instrument with well proportioned tone openings.

In closing the reader may be reminded of the simple development of the space conditions from the small organ of five manual stops to the last mentioned instrument that contains 200 stops and 10,010 pipes. In each case the simple formulae to solve the width of the chests and the space for the basses work out equally well. In the large organ there are more divisions and more stops in each division, but this certainly is no complication as it merely creates additional units which, as far as space is concerned, are practically identical. It is true that as the instrument becomes larger it is more difficult to provide adequate tonal egress for each division but thought and study rather than malediction for the organ builder will solve this just the same as it will the thousand and one other problems that confront the architect in every project.

If it is borne in mind that plenty of space and good tone openings make the organ less expensive to build, less expensive to service and much more effective musically, it may be felt as less of a catastrophe when the cubage given up to the instrument is figured. The writer is conscious of the shortcomings of this article, which, due to its nature, is perhaps too brief for the subject, but it is hoped that the information contained will be of value and arouse a healthy curiosity in the members of the architectural profession regarding the work as well as the trials of the organ builder.

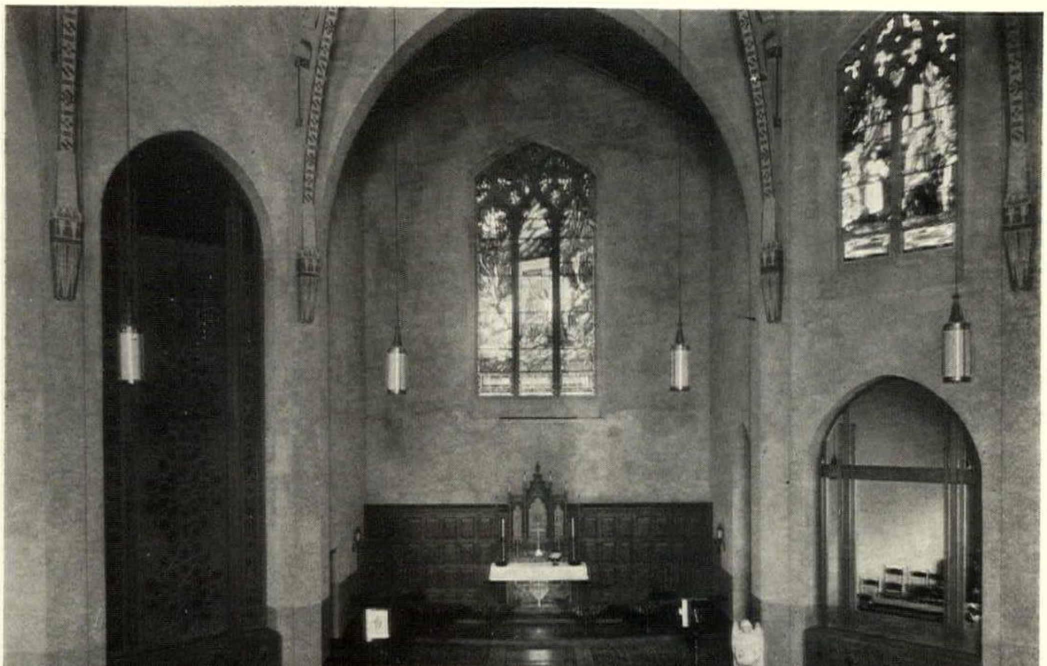


Photo by Bogart

THE DECORATIVE GRILLE AT THE LEFT COVERS THE ORGAN CHAMBER

THE EVANGELICAN LUTHERAN CHURCH OF THE REDEEMER, BROOKLYN, N. Y.

EDITORIAL COMMENT

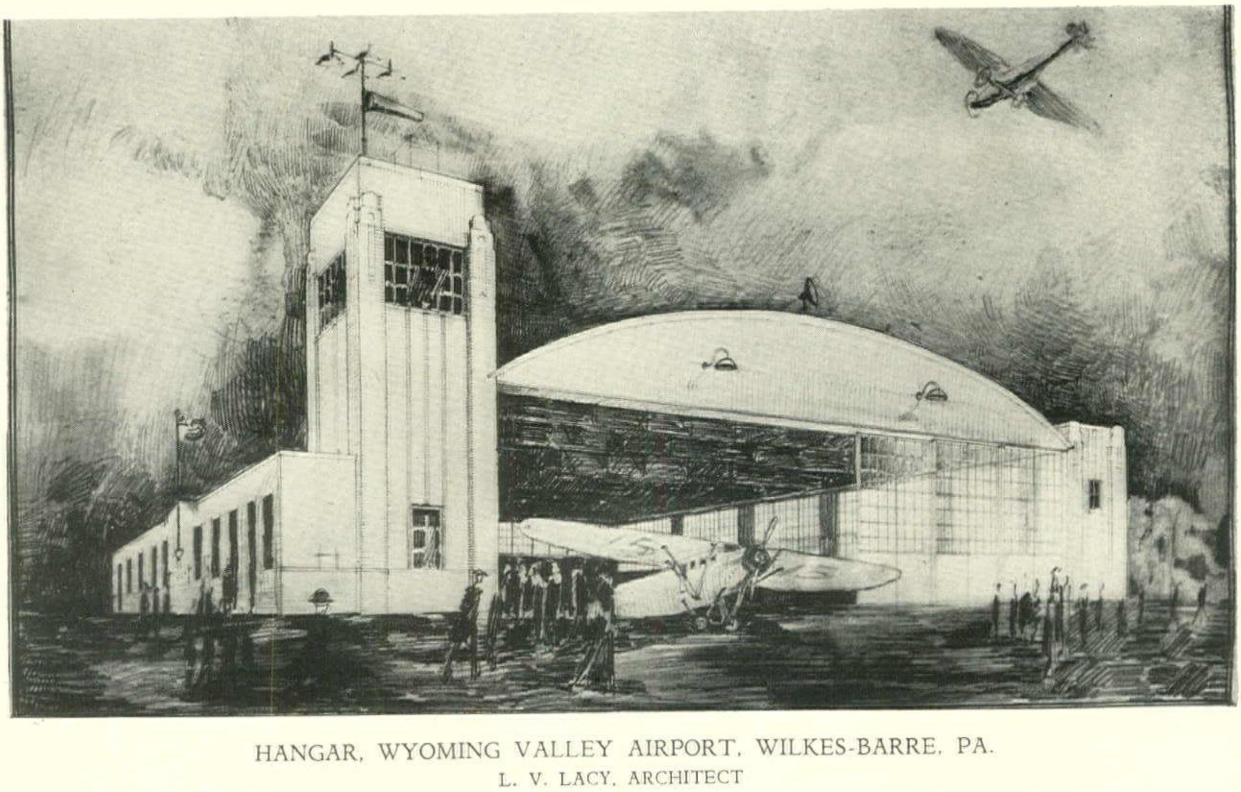
ONE of the most important principles on which architectural design is based stipulates that the plan should allow the building to function properly. This holds just as true in the design of an airport as it does in the design of a church, a schoolhouse or any other type of building.

It can readily be seen that if an airport is not planned to meet the needs and requirements of the aviator, as well as of those who fly only as passengers or those whose business it is to repair the planes, the airport cannot be a success. It is not to be expected that an aviator can plan a good airport. He is not familiar with the engineering and structural features which enter into its design, nor is he capable of creating a design that conforms to the fundamental principles of architecture. It might just as truthfully be said that an architect cannot design a successful airport without an understanding of aviation.

The leading article in this issue, entitled "Practical Airports," is written by one who has had flying experience and knows aviation. The article is intended to enlighten the architects on certain features of flying which vitally effect the plan of an airport.

The airport is still very much in the primary stages of its development. Ten years from now many of the airports which seem to function according to our present ideas of flying may be entirely obsolete. There is a possibility of such a condition prevailing due to the fact that the airplane itself is still in a state of evolution. The problem of designing an airport is different from that presented by a church or a school in that there is no standard to work from or to. Airports may have improved from what they were five and ten years ago, but the ideal airport has not yet materialized because the ideal airplane has not yet made its appearance.

It is logical that the design of the various buildings which go to make up an airport reflect modern tendencies. Another important principle of architectural design states that the design of a building should express its purpose. Thus aviation, itself a modern development, should naturally be allowed to function in buildings of modern design, in order to comply with the doctrine of this principle. The several illustrations shown on the preceding pages demonstrate clearly how architects in solving their modern problems have striven to give expression to modern impulses.



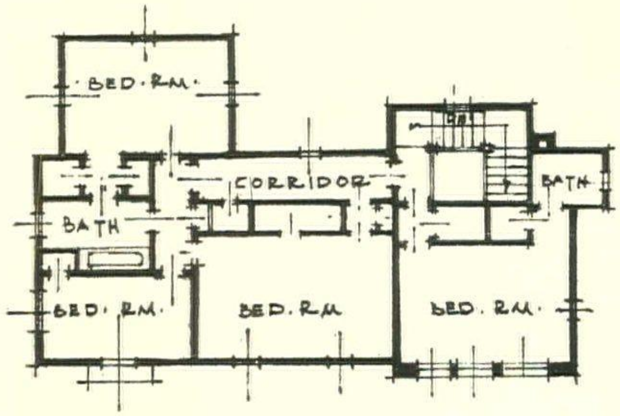
HANGAR, WYOMING VALLEY AIRPORT, WILKES-BARRE, PA.
L. V. LACY, ARCHITECT

A Group of Sketches of Houses in San Antonio, Texas

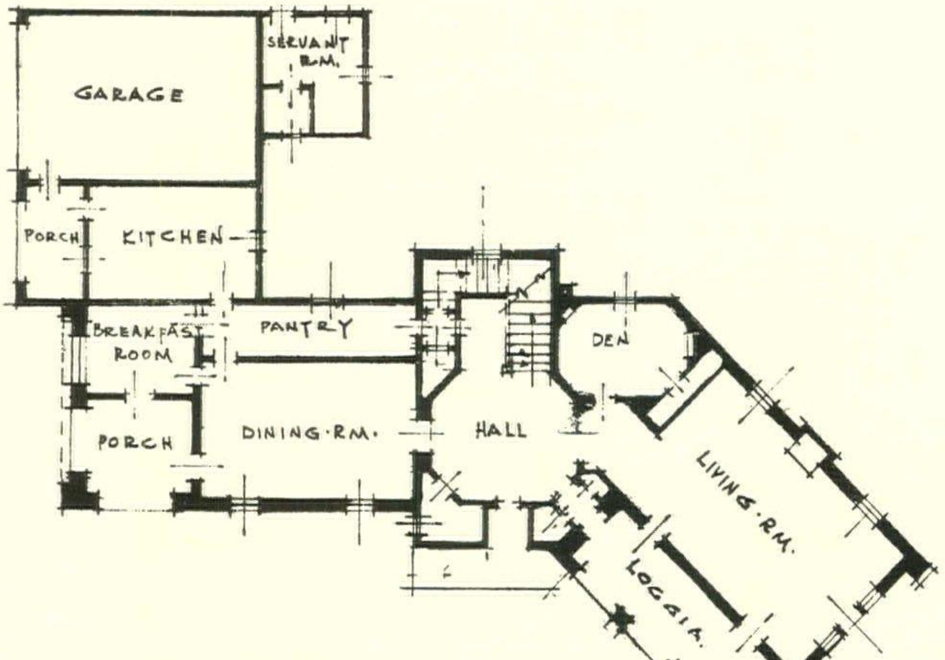
▽

ATLEE B. & ROBERT M. AYRES
Architects

HOUSE FOR P. F. ALLAN, SAN ANTONIO, TEXAS
ATLEE B. & ROBERT M. AYRES, ARCHITECTS



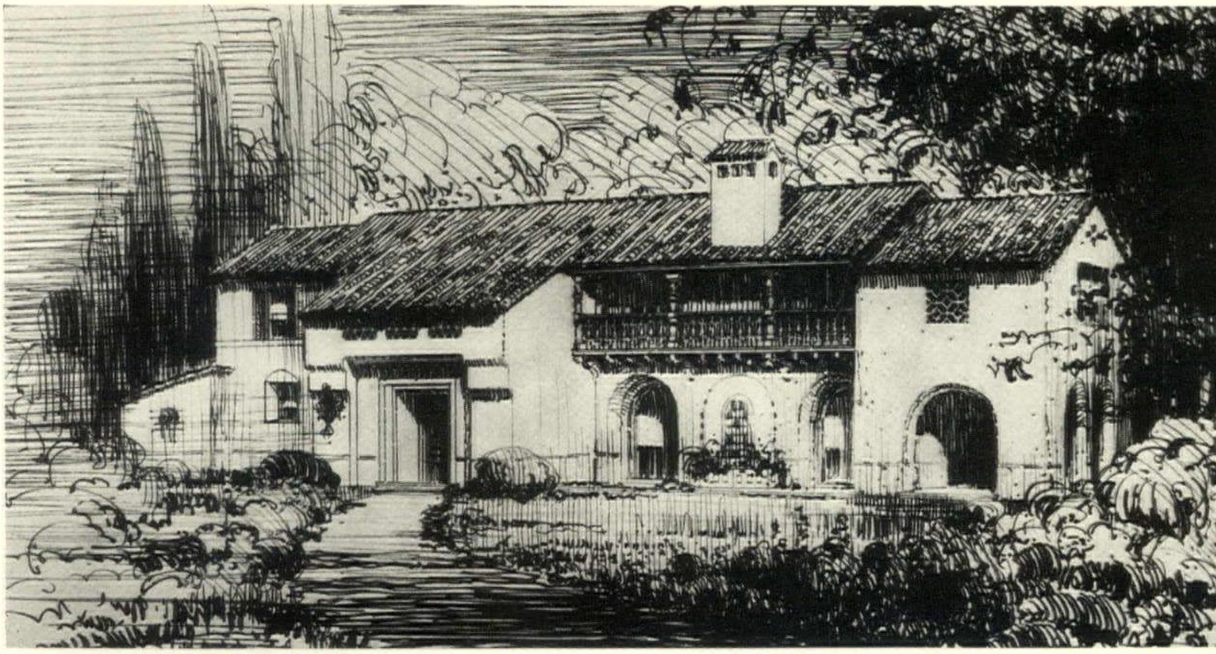
SECOND FLOOR

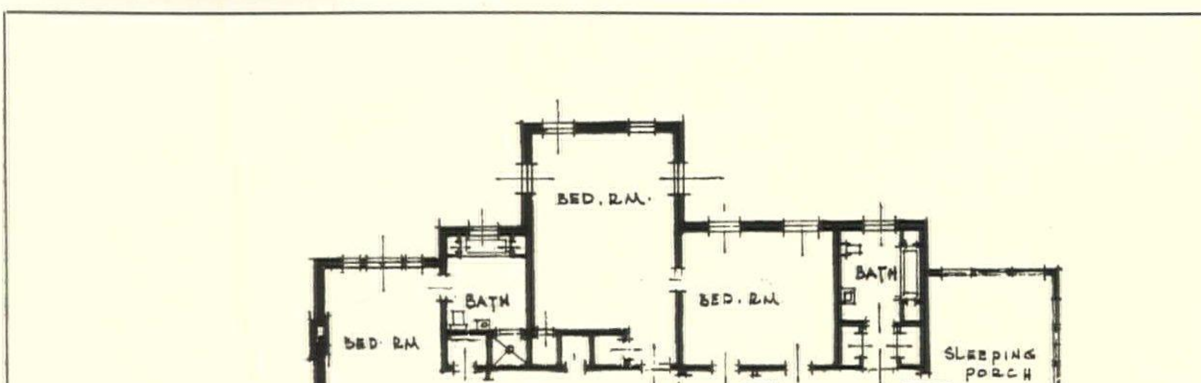


FIRST FLOOR

HOUSE FOR P. F. ALLAN, SAN ANTONIO, TEXAS

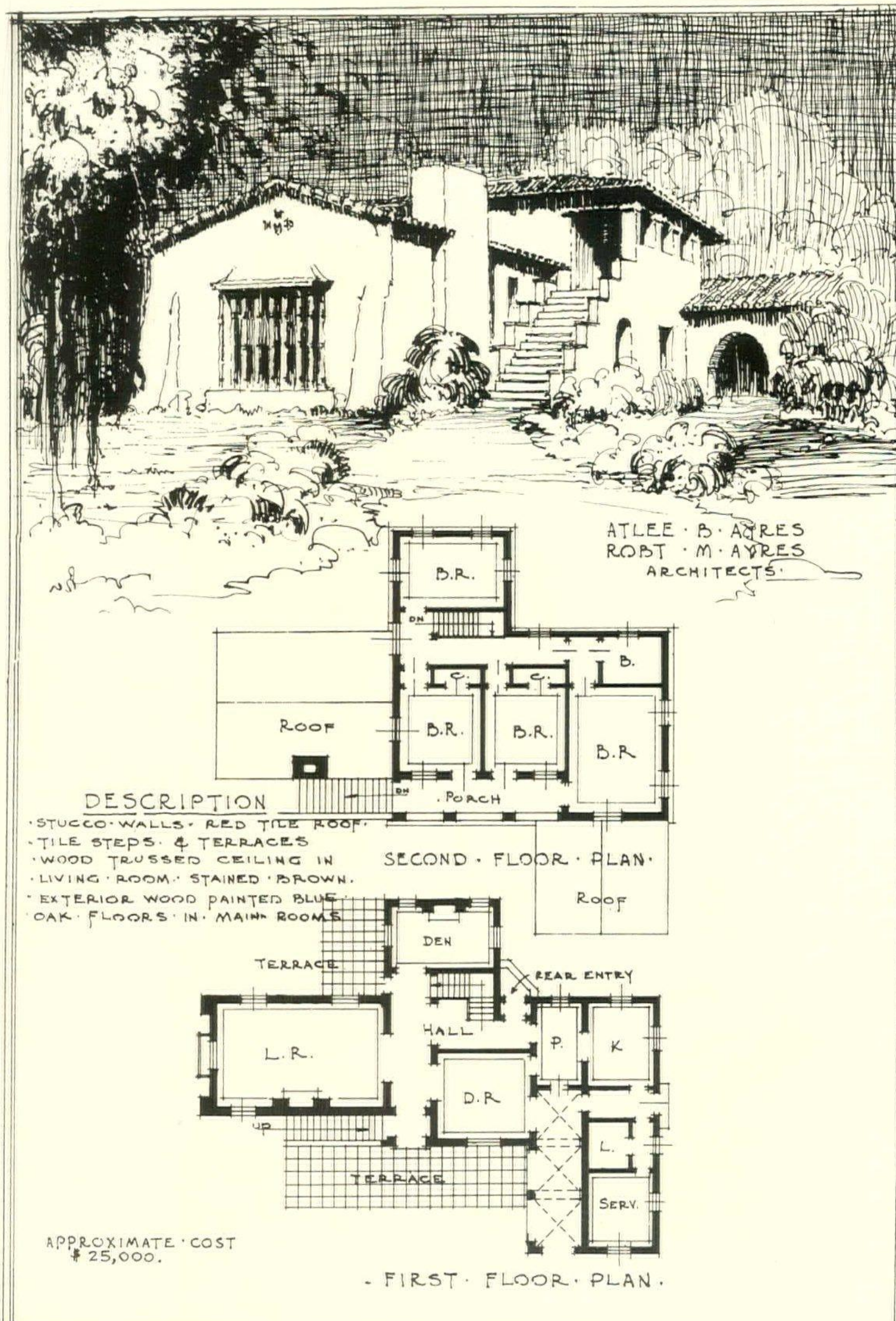
ATLEE B. & ROBERT M. AYRES, ARCHITECTS





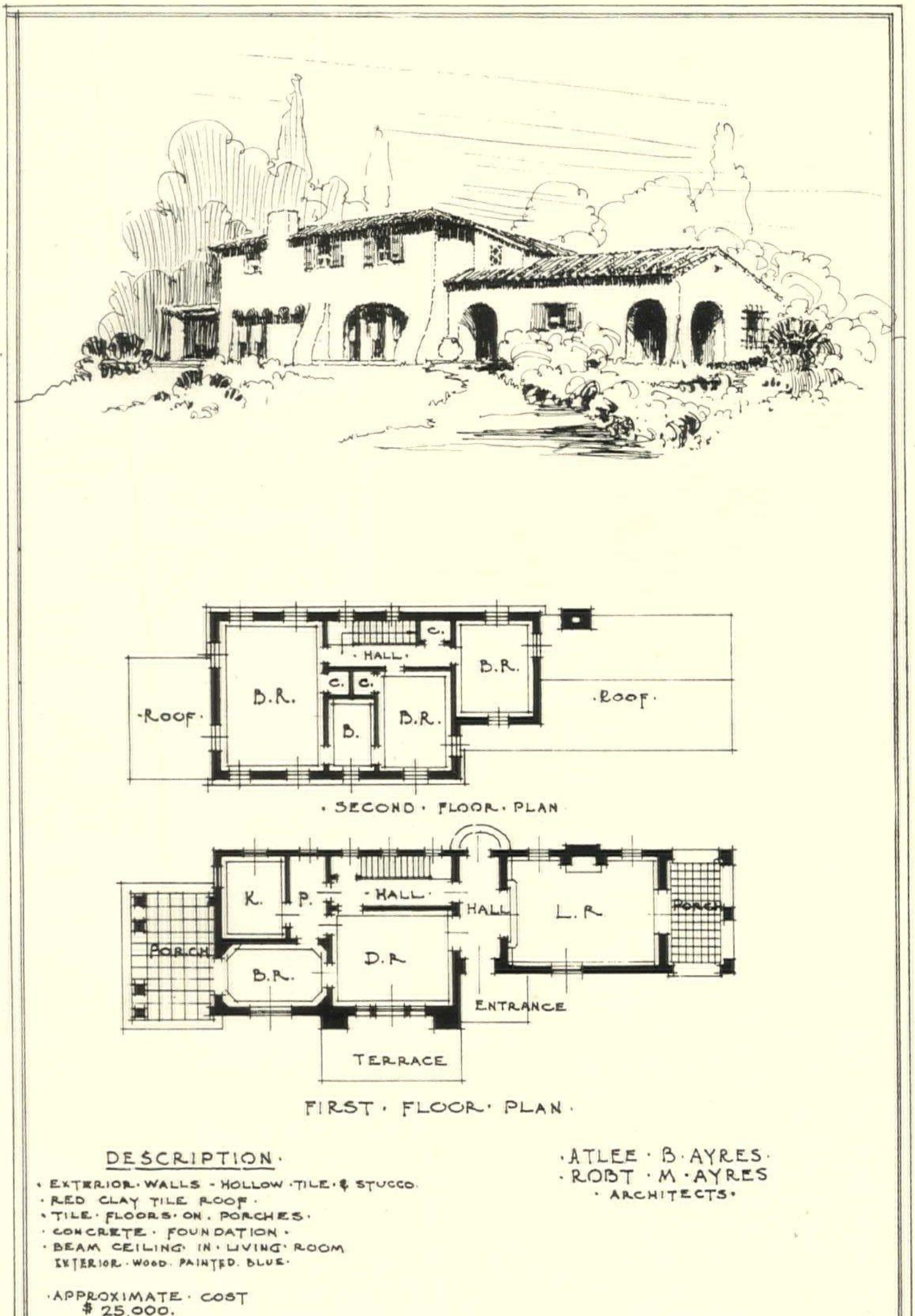
HOUSE FOR P. F. ALLAN, SAN ANTONIO, TEXAS

ATLEE B. & ROBERT M. AYRES, ARCHITECTS



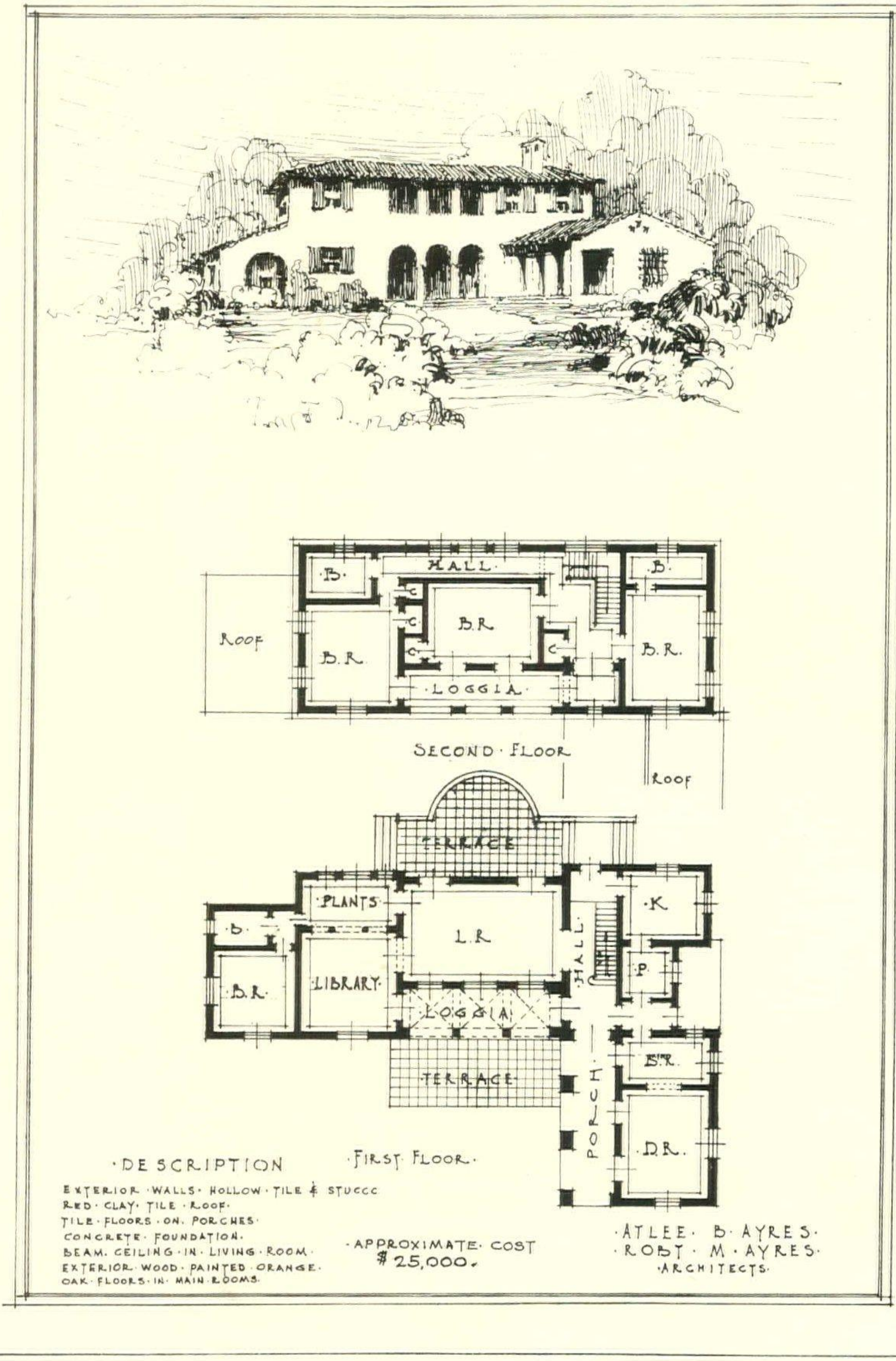
HOUSE FOR THE TERRELL HILLS DEVELOPMENT COMPANY, SAN ANTONIO, TEXAS

ATLEE B. & ROBERT M. AYRES, ARCHITECTS



HOUSE FOR THE TERRELL HILLS DEVELOPMENT COMPANY, SAN ANTONIO, TEXAS

ATLEE B. & ROBERT M. AYRES, ARCHITECTS



HOUSE FOR THE TERRELL HILLS DEVELOPMENT COMPANY, SAN ANTONIO, TEXAS

ATLEE B. & ROBERT M. AYRES, ARCHITECTS

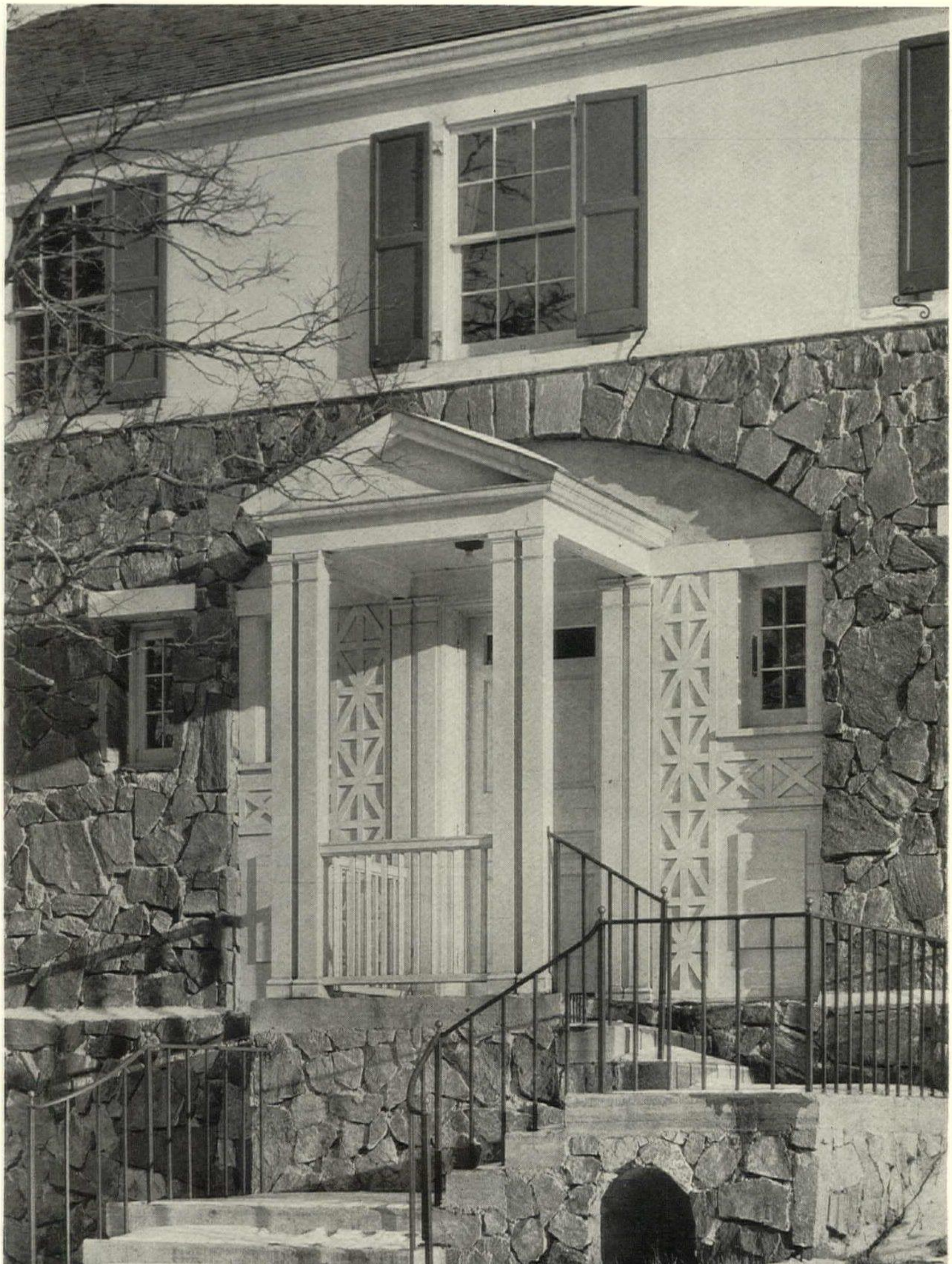


Photo by Nyholm

HOUSE OF DONALD McL. FROTHINGHAM, DARIEN, CONNECTICUT

LA FARGE, WARREN & CLARK, ARCHITECTS

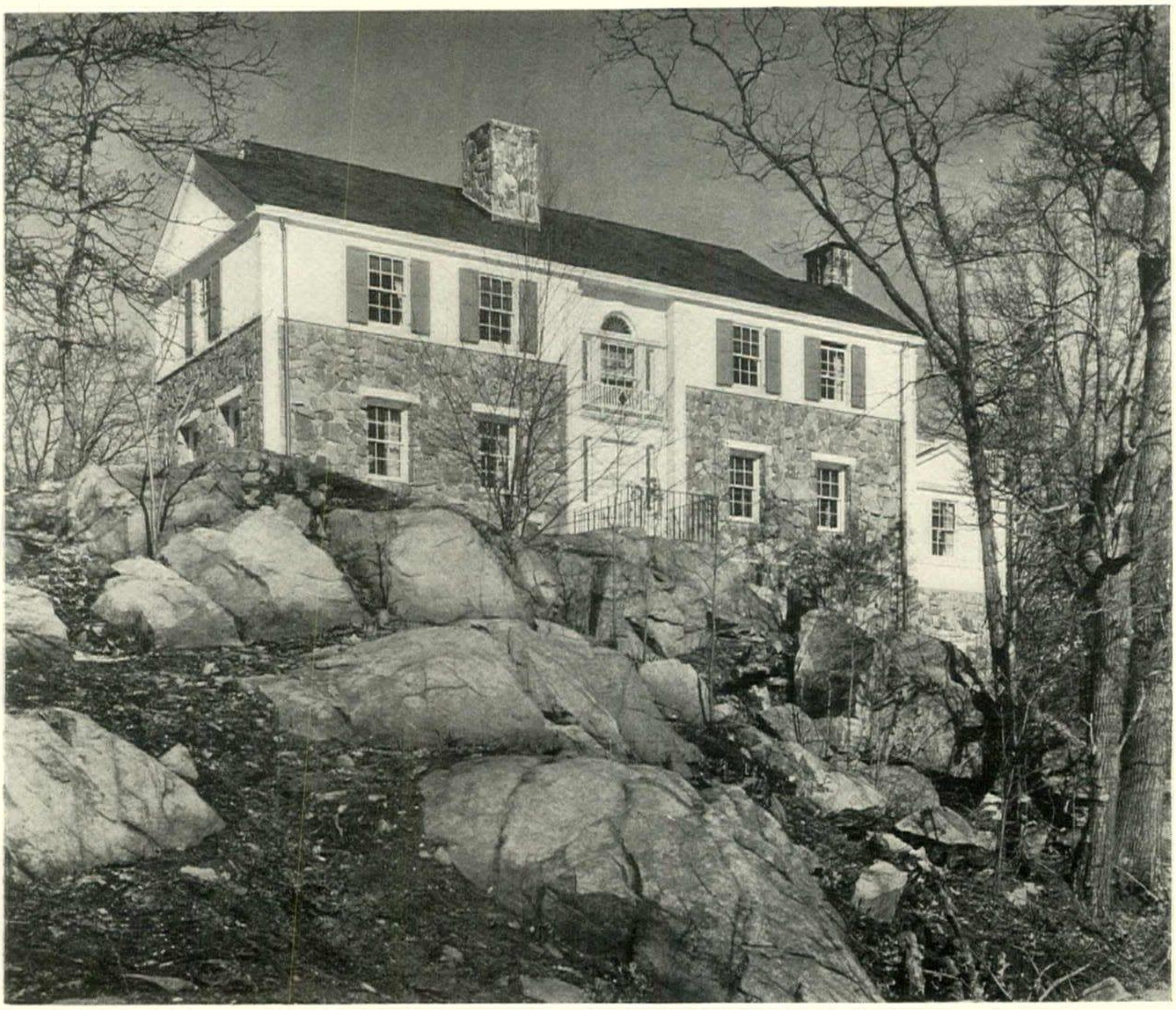
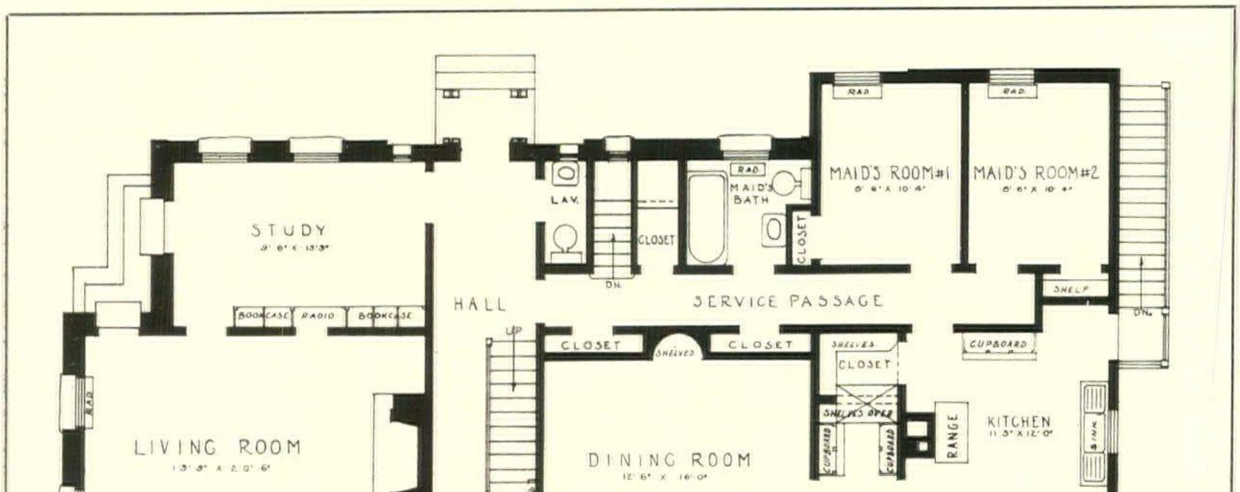


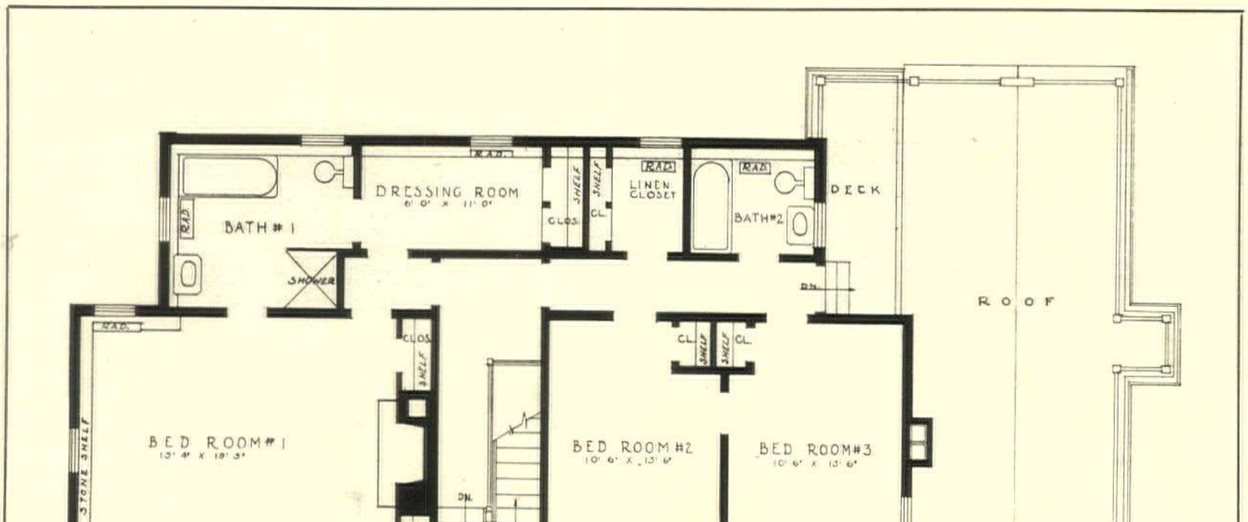
Photo by Nyholm



HOUSE OF DONALD McL. FROTHINGHAM, DARIEN, CONNECTICUT

LA FARGE, WARREN & CLARK, ARCHITECTS

Photo by Nyholm



HOUSE OF DONALD McL. FROTHINGHAM, DARIEN, CONNECTICUT

LA FARGE, WARREN & CLARK, ARCHITECTS

Photo by Nyholm

HOUSE OF DONALD McL. FROTHINGHAM, DARIEN, CONNECTICUT

LA FARGE, WARREN & CLARK, ARCHITECTS

SPECIFICATIONS

Communications relative to specifications addressed to THE AMERICAN ARCHITECT *will be answered, in the pages of this department, by H. R. Dowswell, of the office of Shreve, Lamb & Harmon, Architects.*

The New York Building Congress Standard Specifications heretofore discussed have for the most part dealt with trade divisions wherein the work has either been executed at the job, such as Excavation and Masonry, or consisted of a combination of field and shop work, as Structural Steel, Cut Stone, Terra Cotta, et cetera. Metal Windows and Steel Sash, on the other hand, consist of products more or less standardized, and finally the selection narrows down to the product of a particular manufacturer. The compilation of a standardized specification for this group is accordingly more difficult if discrimination is to be avoided. The Standards Committee therefore decided that the Congress Specification could only include descriptive clauses covering essential features and that any mention of special products must be left to Part A.

Paragraph 5 requires Part A to list the types of window frames and sash and the kinds and gauges of metal. If it is decided, instead of specifying gauges of metal, to require that bids be based on a particular product, Paragraph 9 would apply.

Very satisfactory results have been obtained by requiring, under Part A, that all estimates be based on furnishing and installing windows as manufactured by a selected manufacturer—listing the product by type number, and specifying that additions or deductions be submitted for substituting, subject to the Architects' selection, the product of certain other manufacturers. By following this practice, bulk bids are based on the same product and are therefore truly comparative and at the same time provide competition, enable the Owner to benefit by any variation in price and also leave to the Architect the final choice.

The schedules called for under Paragraph 6 provide an opportunity of checking and avoiding errors and omissions.

The paragraphs dealing with double hung metal windows, Numbers 11 and 12, mention required features in a broad way only. Details of construction are settled when a particular product is specified outright or as a base price. Each job must be checked against Paragraph 13 or 14 and the requirements fully stated under Part A.

The same remarks apply to rolled frames and sash whether of casement or factory type. The term "Casement type" is used merely as a broad classification and is not intended to apply to "Casements" only. The choice among rolled sash is so wide that it was found to be impracticable to make any narrower definition without mentioning particular products and this the Standards Committee felt should be avoided.

Paragraph 25 describes hardware common to practically all manufacturers of double hung steel sash. If any variation from this is desired, Part A must provide for it. Part A must also enumerate the requirements referred to in Paragraph 26.

On many buildings it will be necessary to amplify, under Part A, the hardware items broadly listed in Paragraphs 27 and 28.

Part A should also give detail requirements for weatherstrips. A detailed specification for weatherstrips will be published later but these will apply entirely to wood sash since weatherstrips for metal sash are practically always furnished by the sash manufacturer and are made to suit their particular sash.

Paragraph 31 covers the usual requirements for window cleaners' bolts in connection with double hung metal windows. Part A and detail drawings should indicate requirements for other types of windows.

Paragraphs 33, 34, 35, 36 and 37 will serve as a check for these items. Each job should be carefully studied and the extent of these items specified under Part A.

Paragraph 39 referring to Painting of rolled steel sash was rewritten several times before final adoption. Manufacturers' specifications were carefully checked in an effort to standardize painting, but it was found that practice varied greatly and as no agreement among manufacturers could be reached, it was necessary to leave the manner of shop painting to be specified under Part A.

Since the Congress Specifications have been issued a number of architects have asked how, with a standard specification, various grades or qualities of work can be provided for. We believe that the answer will be found outside of specifications. An architect may write quality all through a specification but the quality of the work will depend on the contractor executing it. No matter how detailed the specifications may be, if the contractor to whom the work is awarded cannot produce a high standard of work, the specifications will not obtain it. The character of the finished building is determined when the contractor and sub-contractors are chosen and not when the specifications are written.

A.I.A. DIVISION 16a2. STANDARD FORM OF THE NEW YORK BUILDING CONGRESS, EDITION OF 1929

New York Building Congress Standard Specifications for

METAL WINDOW FRAMES AND SASH

PART B.

General Conditions.

1. GENERAL CONDITIONS OF THE CONTRACT of the American Institute of Architects, current edition, shall form a part of this Division, together with the Special conditions, to which this Contractor is referred. **General Conditions**

Arbitration Clause.

2. Any dispute or claim arising out of or relating to this Contract, or for the breach thereof, shall be settled by arbitration. Arbitration shall proceed under the requirements specified in the General Conditions, current edition, of the American Institute of Architects; or under the Rules of the Arbitration Court of the New York Building Congress, or of the American Arbitration Association, and judgment upon an award may be entered in the court having jurisdiction. One of these methods of arbitration shall be chosen at the time of the signing of the Contract, or, if not then determined, the choice of these methods shall be at the option of the party asking for arbitration. **Arbitration Clause**

Scope.

3. The following requirements specify the required standards for the furnishing of all labor, material and appliances in connection with the fabrication and erection of Metal Window Frames and Steel Sash. **Scope**
4. These requirements, however, form a part of the Contract only insofar as they describe items mentioned in Part A of this specification or as indicated on the Contract drawings.

Materials and Types.

5. The types of window frames and sash, the kinds and gauges of materials, shall be as specified under Part A of this specification, subject to the requirements specified herein. **Materials and Types**
6. Schedules shall be submitted with the estimate, listing the size and quantity of each type, when so required under Part A.

Shop Drawings.

7. This Contractor, before proceeding with the work in this Division, shall prepare and submit to the Architect, for approval, prints of shop drawings, in duplicate. These shop drawings shall illustrate, in detail, the construction of frames and sash, give the material, sizes and gauges of all members and schedule the number required and size of masonry openings. **Shop Drawings**
8. The Architect may require any changes necessary to make the frames conform to conditions at the building within the limits of this specification and Contract drawings. After approval, this Contractor shall furnish two additional prints for the Architect's use, and, at cost of reproduction, any others required for the use of other trades.

Special Products.

9. Where metal windows or steel sash which are the product of a particular manufacturer are specified under Part A, these shall be furnished, unless permission of the Architect is given in writing to substitute the product of another manufacturer. **Special Products**
10. When a particular product is not specified under Part A, the windows and sash shall be constructed of materials, sections and gauges specified under Part A or indicated on Contract drawings and conform to the following requirements.

New York Building Congress Standard Specifications—
METAL WINDOW FRAMES AND SASH—*Continued.*

Double Hung Metal Windows.

11. The frames shall be constructed for double hung, vertical sliding sash provided with counter weight pockets, pendulum strips, adjustable stops and provision for ready access to weight pockets and all working parts. **Double Hung Metal Windows**

12. Sash shall be constructed for glazing with one light or divided with muntins as specified under Part A or indicated on Contract drawings. They shall be equipped with glazing beads or strips, secured in place with machine screws, and be fitted with hardware, as specified under Paragraphs 25 and 26.

13. Where windows are specified to bear Underwriters' labels, both frames and sash shall conform to the Underwriters' specifications.

14. Where, under Part A, windows are required to conform to Department of Labor or other state or municipal regulations, they shall be of a type to meet the requirements of the Department specified.

Rolled Frames and Sash.

15. Shall consist of "Casement Type" or "Factory Type," constructed of light or heavy Sections, as specified under Part A. **Rolled Frames and Sash**

Casement Type.

16. Casement type, which includes fixed, hinged and pivoted sash as indicated on Contract drawings, shall be constructed of rolled, mild steel or bronze sections, as specified under Part A, free from hammer marks and other imperfections, with all corners accurately mitered and all intersections welded or braised solid.

17. The frames shall be constructed in the same manner and of similar sections and designed for building into masonry, or to be set in cut stone openings or in steel, cast iron, bronze or wood sub-frames, as specified under Part A or indicated on Contract drawings.

18. Where frames are to be built into masonry, they shall, where so specified under Part A, be provided with steel angles with outstanding legs forming a wind break, built into masonry jambs, let into cut stone or terra cotta sills, and at the head built into masonry, or extend back of stone, terra cotta or steel lintel as indicated on Contract drawings. Anchors shall be provided at intervals on the jambs extending into the masonry beyond the outstanding angle legs.

19. Where the frames are specified under Part A or indicated on Contract drawings to be set in steel, cast iron, bronze or wood sub-frames, they shall be secured to the sub-frames with machine screws, counter sunk flush.

20. Where mullions are required, they shall consist of rolled steel or bronze sections of sizes and at intervals indicated on Contract drawings.

21. Sash shall be designed for single lights or divided with muntins as shown on Contract drawings. They shall be constructed for glazing from the inside and shall be fitted with steel or bronze glazing beads with corners mitered, set with brass machine screws and with hardware, as specified under Paragraph 27.

Factory Type.

22. Factory type shall consist of solid rolled steel sections for frames, sash and muntins. The frames shall be provided with anchors for building into masonry or be designed to engage adjoining steel framing and be firmly screwed thereto, as shown on Contract drawings.

23. The sash shall be provided with pivoted opening sections, in locations and of sizes shown, equipped with hardware as specified under Paragraph 28 and as described under Part A.

24. The glass shall be secured by copper plated spring clips and putty, of a type adapted to steel sash.

Hardware.

25. All double hung sash shall be hung on heavy sheradized steel chains over bronze bushed steel axle, cast iron pulleys, counter weighted with cast iron weights. They shall be provided, at the meeting rails, with a solid bronze sash lock. The lower sash shall be provided with two solid bronze lifts firmly secured to the lower rail. The upper sash shall have, on the outside of the meeting rail, a solid bronze grip and, on the inner face of the top rail, a solid bronze pole socket. **Hardware**

New York Building Congress Standard Specifications—
METAL WINDOW FRAMES AND SASH—*Continued.*

26. Where, under Part A, fusible links are called for, the type and installation shall conform to the requirements of the Underwriters, Department of Labor or other department having jurisdiction.

27. Casement type sash shall be hung on pivot hinges, bushed with bronze, and shall be fitted with all necessary locks, fasteners and adjusters. Sash, beyond reach, shall be provided with an opening device. All hardware shall be of solid bronze, conforming to the types and designs listed under Part A.

28. Factory type shall have opening sections horizontally pivoted on solid rolled steel butts, securely riveted through sash, and be equipped with cam latches, chains, chain catches and pulley brackets. Where special operating devices are required, these shall be furnished and installed, as specified under Part A.

Weatherstrips.

29. Where weatherstrips are called for in connection with either double hung or "Casement Type" sash, they shall consist of zinc or bronze as specified under Part A. **Weatherstrips**

30. Where so specified under Part A, this Contractor shall submit to the Architect, with his proposal, a certified statement warranting that all sash equipped with weatherstrips of the type he proposes to furnish will limit the amount of air infiltration to not more than one-half cubic foot of air per foot of sash perimeter, per minute, when subjected to a static air pressure equivalent to the air pressure exerted by a wind of 25 miles per hour.

Window Cleaner's Bolts.

31. Where specified under Part A, all windows, six feet or more above grade or flat roof surfaces, shall be provided with cast bronze window cleaner's bolts. These bolts, where double hung windows are called for, shall be securely fastened to the frame and the frame reinforced to provide ample strength. **Window Cleaner's Bolts**

32. On other types of windows, the bolts shall be secured to the frames or furnished for building into masonry, as specified under Part A or as detailed.

Sub-Frames.

33. Where sub-frames are specified under Part A to receive steel or bronze sash, they shall be constructed of materials and gauges or thickness specified and conform to the details indicated on Contract drawings. **Sub-Frames**

Anchors.

34. Where anchors are called for under Part A, they shall consist of metal straps or angles, of sizes and spacing specified under Part A or indicated on Contract drawings. The anchors shall be built into the adjoining masonry and be secured to the frames, sub-frames or steel sash so as to be completely covered by the adjoining construction. **Anchors**

Scribe Moulds.

35. Where scribe moulds are specified under Part A or indicated on the Contract drawings, they shall consist of rolled or drawn steel or bronze mouldings, as specified under Part A, set neatly against the finished jambs and heads and be secured to the frames, sub-frames or sash with machine screws. **Scribe Moulds**

Steel Stools.

36. Where steel stools are specified under Part A to be furnished in connection with metal windows, sub-frames or steel sash, they shall be constructed of the gauges or thicknesses specified. The stools shall be independent of the frames, sub-frames or steel sash, set after plastering has been completed and secured to the frames, sub-frames or sash with machine screws. They shall be of width required by finished thickness of plastered walls, provided with nosing, and, where they project beyond finished jambs, be finished with boxed returns. **Steel Stools**

Radiator Hangers.

37. Where radiator hangers, for the support of hung radiators, are specified under Part A to be furnished under this Division, they shall consist of steel plates and angles designed to receive the type and size of radiators called for on the Heating Contract drawings. Radiator hangers shall be secured to the window stools or provided with approved anchors or other supporting member secured to the frame, sub-frame, steel sash or masonry. **Radiator Hangers**

New York Building Congress Standard Specifications—
METAL WINDOW FRAMES AND SASH—*Continued.*

Painting.

38. The surfaces of all members forming steel frames, mullions, sub-frames, sash, muntins, stools and radiator hangers shall be thoroughly cleaned of all scale, dirt, grease and rust. **Painting**

39. All members of steel "casement type," including frames, mullions, sash, muntins and glazing beads, shall be thoroughly cleaned and given shop priming coat as shall be specified under Part A.

40. All steel double hung windows, all members of "factory type," including frames, mullions, sash and muntins and all steel sub-frames, stools and radiator hangers, shall be given one coat of non-corrosive paint before shipping.

Setting.

41. Unless otherwise specified under Part A, all frames shall be set and built into the walls as the masonry work progresses. This Contractor shall arrange his deliveries in ample time so as to avoid delays to other trades. **Setting**

42. All frames shall be set by this Contractor who shall exercise care to see that they are plumb, level and true and supported until the masonry is complete.

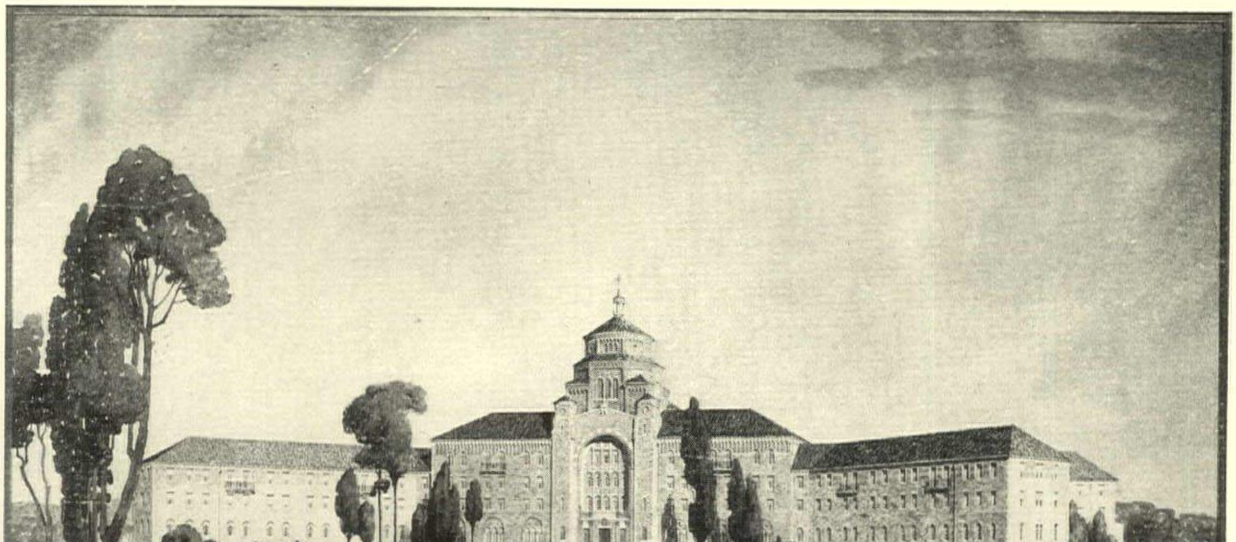
43. After completion, all joints between window frames and adjoining work will be caulked and pointed under a separate division.

Adjusting and Cleaning.

44. At completion of the work, all sash shall be carefully examined for proper balance, weather tightness and ease of operation. **Adjusting and Cleaning**

45. All necessary adjustments shall be made so that each sash meets these requirements.

△



ROMAN CATHOLIC SEMINARY OF THE IMMACULATE CONCEPTION OF THE DIOCESE OF BROOKLYN, N. Y.

ROBERT J. REILEY, ARCHITECT

CAVENDISH COTTAGES AVAILABLE FOR PRESERVATION

IN Sudbury, Suffolk, England, there stands on North Street a group of seven houses, known as "Cavendish Cottages," which date from the sixteenth century. The Society for the Protection of Ancient Buildings is at present endeavoring to find purchasers for these cottages to save them from the hands of the wreckers. It would indeed be a pity to visit Sudbury and not be able to view this snug, dignified row of cottages that adds so much to the attractiveness of the village.

The secretary of the Society for the Protection of Ancient Buildings states that the houses can be purchased and vested in a Trust and a body of Trustees appointed, whose object it would be to preserve these cottages for posterity. These cottages are in a fair state of preservation, and are at present inhabited. The entire row of seven cottages can be purchased for £ 1,421, or about $7,000, making the price of each cottage £ 203, or about $1,000. The secretary of the Society has purchasers for three cottages on the above terms.

Further information relative to these cottages can be obtained by addressing A. R. Powys, Secretary, The Society for the Protection of Ancient Buildings, 20 Buckingham Street, Adelphi, London, W. C. 2, England.

A CORRECTION

THE AMERICAN ARCHITECT Index for Vol. CXXXV, 1929, issues dated January 5 to June 20, constitutes Part Two of this issue, as indicated on the cover.

The words "In Two Parts—Part One" appeared on the cover of the July 5 issue due to a typographical error, and we apologize to our readers for including a course on the menu one day and serving it the next.

PERSONAL

A letter has been received from L. A. Desjardins, architect, saying his new address is 725, Denver National Bank Building, Denver, Colo., where he wishes to receive catalogues from a limited number of manufacturers.

CAVENDISH COTTAGES, SUDBURY, SUFFOLK

BOOK REVIEWS

THE STYLES OF ENGLISH ARCHITECTURE

THE Style of English Architecture is the title of a handbook intended to accompany a series of large scale diagrams for teaching architecture by the comparative method. The author of the handbook and the diagrams is Arthur Stratton, F. S. A., F. R. I. B. A., Reader in Architecture in the University of London and the author of several books on architecture. The charts and the handbook were prepared primarily for use in elementary and secondary schools.

The complete series consists of twenty-five diagrams and two handbooks. The present volume, Part One of the series, known as "The Middle Ages," deals with architecture in England from Saxon times to the 15th Century. The diagrams which complete the series are reproduced in small scale in the handbook. The text sets forth in condensed form the important characteristics of the architecture of various periods. The notes visualized by the diagrams are helpful in acquiring quickly the fundamentals of the English style of architecture.

The Styles of English Architecture: Part 1, The Middle Ages, by Arthur Stratton. Philadelphia: J. B. Lippincott Company. 32 pages, illustrated, size 5½ x 8¼. $1.00.

OLD COTTAGES AND FARM-HOUSES OF NORFOLK

ENGLISH cottages attract the eye because they usually have architectural merit and normally seem to be a part of the landscape. They possess individuality and a domestic quality that appeals to the imagination. There are several reasons why this is so. First of all they are simple in composition, inasmuch as they express a simple plan. The roof lines are interesting. Time has covered them with a patina that is difficult to describe. The cottages snuggle close to the earth and they are built of the materials most easily obtained in their immediate vicinity. This in part accounts for the distinct characteristics exhibited by houses in the different countries of England.

Norfolk is a country about forty miles in width and eighty miles in length. Within this area there are to be found nine or ten materials extensively used in building. Two and occasionally three ot these materials are combined in the same structure. Brick is perhaps the most common building material of the section, and shows much variety in size and color that often serves as a guide to the generation in which the house was built. Among the other frequently used materials, one finds the flints; a moulded clay and stray blocks or "clay lump"; a brown sandstone called "carstone"; lime stone; a hard chalk called "clunch"; wattle and daub; timber; roofing tiles; and thatch.

Claude J. W. Messent, inspired by the desire to preserve the fine old cottages and farm houses of Norfolk, has set forth in a book called "The Old Cottages and Farm Houses of Norfolk" the characteristics of these structures and a description of the materials employed. The volume is illustrated with pen and ink sketches made by the author. Old village shops, Dovecotes and other dependences are also illustrated. Many of these old houses are rich in historical associations. Among these may be mentioned the home of Abraham Lincoln's ancestors, Hingham.

The Old Cottages and Farm Houses of Norfolk, by Claude J. W. Messent, A.R.I.B.A. Publisher: H. W. Hunt, 14 Oxford Hill, Norwich, England. 240 pages, illustrated, size 7½ x 10½. 10s. postage extra (approximately $2.60).

THE SPIRIT OF AMERICAN SCULPTURE

THE first edition of "The Spirit of American Sculpture" was printed in 1923. The present volume is a revised edition of Mrs. Adams' well known little volume which has had much favorable comment. The book gives an interesting account of sculpture in America from its beginning in pre-revolutionary days to the present.

In the preface the author states, "We sometimes worry ourselves unnecessarily because our arts and letters are not what is called distinctively American. But being distinctively American is not in itself a merit. . . . Give our sculpture time for still further expression, and it will become as distinctively American as need be." To read this book is to obtain an intimate, close-up knowledge of sculpture in America.

The Spirit of American Sculpture, by Adeline Adams (Mrs. Herbert Adams). The National Sculpture Society, 115 East 40th Street, New York, N. Y. 196 pages, illustrated, size 4½ x 6¾. $1.60.