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SOME ESSENTIALS OF FIREPLACE CONSTRUCTION

THE open fire of prehistoric man was an institution in his caves, a central fire around which the family gathered. It became in time a place built in the walls of the central gathering room, or chamber, to economize space and to get rid of the smoke. Down through the ages the fireplace has kept a place and in modern houses with central heating a fireplace is often built because of the *hominess* of an open fire. Today it may be merely a niche in which to place a gas stove or an electric heater, but the open light and the radiant heat have an attraction for men which cannot be resisted. The hearth, a place in front of the open fireplace on which embers might fall without causing a conflagration, is a cherished institution and typifies home. The portion of wall surrounding the open front is a place which for ages has received the special attention of architectural designers.

Fireplace in the Kitchen of Plas Mawr, Devonshire, England

However well the architectural designers did their part, the men charged with construction blindly followed precedent and fireplaces constructed a century or more ago were merely rectangular cavities in walls connected to a flue of considerable size. They were not economical and as heating apparatus were very unsatisfactory. Unfortunately too large a number built today are not scientifically built and smoke enters the room, much to the discomfort of those who occupy it and destroying in time the appearance of the walls.

The correct principles of design, in order that a fireplace may draw well and deliver the maximum possible amount of heat to a room, were first enunciated by Baron Rumford a little over one hundred and forty years ago. He prepared a pamphlet on the subject in French and it is stated as an historical fact that Benjamin Franklin brought a copy to America and the invention of the Franklin stove was a direct result of its study by the great American scientists.

The cross section of the open front should be the shape of the cross section of the room, for the shape of the fireplace should be such as to direct a maximum amount of radiated heat into the room. Pleasing proportions are desirable. The width should generally be greater than the height but 30 inches is about the minimum height consistent with convenience in tending the fire. Three feet and a half is a good maximum for height of opening unless the fireplace is over 6 feet wide. However, with a fireplace more than 6 feet wide the height of the opening should not exceed 4 feet, for the higher the opening, the greater the chance for a smoky fireplace. Curved corners should be avoided.

The sectional area of the flue bears a direct relation to the area of the fireplace opening. The area of lined flues should be a tenth or more of that of the fireplace opening. If the flues are unlined the proportion should be increased slightly

because of greater friction. Thirteen square inches of area for the chimney flue to every square foot of fireplace opening is a good rule to follow. The dimensions of the flue should be in multiples of 4 inches, because brickwork can thus be laid to better advantage.

The flue area should not be altered anywhere throughout the length of the chimney. Changes in direction should be made gradually and the full flue area preserved, or even slightly increased, in the sloping or curved portions. The average mason knows nothing about projected areas or descriptive geometry and if not watched, will consider the area all the time on a horizontal basis instead of normal to the line of the flue. Failure to provide a chimney flue of sufficient sectional

A fireplace in the Boston Architectural Club

area is, in the majority of cases, the cause of an unsatisfactory fireplace.

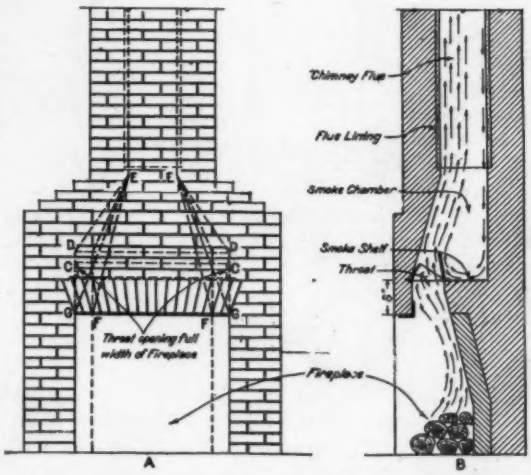
The flame is kept within the fireplace and the heat from it is reflected into the room, heating it by radiation. The back should pitch forward from a point a little less than half way from the hearth to the top of the opening and the sides should be beveled. Straight back and sides do not radiate much heat into the room.

The smoke passes from the fireplace into the flue through a contraction known as the "throat." Correct throat construction is second only to proper flue design and construction. Proper draft does not depend upon the largeness of the flue, but upon its proper proportioning to the fireplace and

A type of fireplace frequently found in the less important New England houses

throat. It is easily possible to have a flue too large and yet smoke badly. To avoid this, great attention must be paid to the design and construction of the throat.

The rapid upward passage of warm air creates a partial vacuum at the bottom of the flue and cold air falls along the outer flue wall. If the opening from the fireplace into the flue is on a straight line the cold air will drive smoke into the room. Therefore a smoke shelf must be con-



A. Top of throat damper is at DD, smoke shelf at CC. Side wall should not be drawn in until the height DD is passed. This assures full area. If the drawing in is done as indicated by lines EF and EG, the width of the throat becomes less than the width of the opening and causes the air currents to pile up in the corners of the throat, resulting frequently in a smoky fireplace. B. Correct fireplace construction

structed for the purpose of constricting the smoke opening and thus increase the velocity of the warm air. The temporary checking of the cold air causes it to pile up and the rising warm air warms it and causes it to rise.

The length of the throat should always be equal to the width of the fireplace opening. The width should be so fixed that the area of the throat will be not less than the area of the flue, but should not exceed 5 inches. A width of 4 inches is considered a safe standard. The smoke shelf should be set 8 inches above the lintel of the fireplace to give a smooth surface, for in time the plastering will dry and fall out.

A proper fireplace cannot be had without the smoke shelf and the small smoke chamber of which it forms the bottom. The purpose of the smoke shelf is to change the direction of the down draft so that the hot gases will strike it approximately at a right angle instead of head on. It should be the full length of the fireplace opening and the depth should never be less than 4 inches. The depth of the fireplace will determine the depth of smoke shelf.

Fireplace in a Dutch Colonial house in Teaneck, N. J. The mantel is dated 1763

opening. The sides of the fireplace should be vertical to a height above the smoke shelf at least one and one-half times the width of the throat. From this point the sides should be drawn in until the desired flue area is attained.

Drawing in the sides is a detail often carelessly left to the mason. The result is that a carefully designed fireplace smokes, so this detail should be carefully looked after. No curves should be permitted, the lines being as straight as those to which a mason can lay. No projections should be permitted but every brick should be cut to fit the contour of the throat. The work should be done so that plastering will not be depended upon

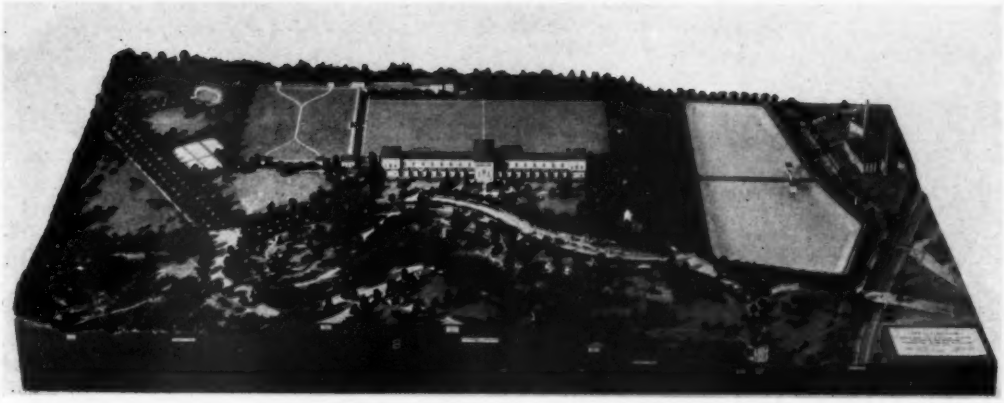
An advisable minimum depth for a fireplace in which wood is used is 18 inches. In general the depth of a fireplace is determined by the width, for in large fireplaces there will be burned large logs. A good depth for a 6 foot opening is 28 to 30 inches. A fireplace of shallow depth throws out more heat than one that is deeper, but it will take smaller logs and this means more attention, for small logs require frequent replenishing. There is more economy in small pieces of wood; coupled with more attention. The depth is usually determined by the sizes of logs to be used. Wire guards should be used in front of all fireplaces to lessen danger from brands which fall from the burning wood.

Modern fireplaces should be supplied with throat dampers installed at the level of the smoke shelf. The damper regulates the size of opening and thus regulates draft. It also helps to control the downward falling cold air and prevents the fireplace from smoking.

The final point of importance is the height of the chimney. The top should be not less than two feet above the ridge of the roof. The minimum height for a chimney in order to draw well is between 35 and 40 feet. If placed on the side of a house close to a higher house or a tree the draft will be bad. These items must be given consideration in the design of the house and the chimney placed as far as possible from trees or buildings which are higher than the top of the chimney.

Fireplace in a Cape Cod House. An early attempt to improve a rudely constructed fireplace

We are indebted to Mr. Arthur Todhunter for permission to use the illustrations of Colonial fireplaces accompanying this article.



Model of the Baldwin Filtration plant and Ambler Park, Cleveland
Albert D. Taylor, Consulting Landscape Architect
Model measures 4′ x 7′ at a scale of 40″ — 1′. Vertical scale of grounds exaggerated to 25″ — 1′

CARDBOARD MODELS—II

BY LEROY GRUMBINE

Models of Buildings

LET us consider the making of an eighth inch scale model of a house.

The first thing to do is to look over the architect's sketches carefully, get his ideas, visualize the result, and carefully plan the method of procedure in constructing the model, deciding what is to be shown and what omitted, and the means of expressing the various details in a consistent way. It is very important that each part of the work be planned in proper order and done before it becomes inaccessible. Each model presents a different problem and has to be studied individually.

A good grade of white cardboard with good drawing surface and of suitable thickness is selected. In this case we have two thicknesses, one measuring eight inches by the scale we are using, and the other three inches. We choose the thick for the walls as that is best suited on account of the window reveals. It is a good plan to shrink the cardboard first, by painting with clear water on both sides, and allowing to dry.

On the thick cardboard, the plan of the building is accurately drawn. If there are differences between first and second stories, both are drawn on the same plan. The walls are drawn just as the model is to be made, eight inches thick, in this case. Exterior corners are mitered. Interior corners can be mortised and tenoned. It is often advisable to have some inside walls for stiffness and to help hold the roof. Cornice projections, roof lines, dormers, etc., are also located on this drawing. This forms a working drawing for the model. It is afterwards cut out on the inside line of the exterior walls and used for the base.

Then proceed to draw accurately each one of the walls in elevation on the thick cardboard, including windows, sash, doors, ornamental patterns, etc., being careful that the pieces will fit accurately together. The roof is likewise laid out using cardboard of suitable thickness. If the house has barge boards, both roof and rafters are drawn on the light weight; if a cornice, probably the heavy will be more suitable, the thick edge by rounding or making a second cut, will form part or all of the cornice. A base course projecting two to four inches can be laid out separately on the thin cardboard and afterwards superimposed. Porches, steps, cornices, dormers, chimneys, pilasters, rafter ends, doors, brackets, railings, etc., should all be carefully drawn out. Round columns can be turned out of wood or plaster on a small hand lathe, though usually something can be found to fit the scale, such as pieces cut from penholders, brushhandles, manicure sticks, meat skewers, pieces of reed, round tooth picks, etc., using round and square pieces of cardboard pasted on each end for caps and bases. Cornices are built up as illustrated. Edges can be rounded with fine sandpaper.

After every piece has been accurately drawn out, the windows are numbered or lettered for identification. If the model is a complicated one, the various pieces will also have to be marked with some means of identification. Then a piece of transparent celluloid is placed over the windows and held in place with thumb tacks. The windows are traced on the celluloid with ruling pen

and white or colored ink, numbering below for identification. It is rather difficult to get the ink or water color to stick to the celluloid. The celluloid must first be chalked or cleaned with alcohol. A good show card color to which a little alcohol has been added, seems to give the best results. Balustrades, railings, grills, lattice work, marquises, are quite effectively portrayed in this way when too small to cut out or model.

After removing the celluloid, which must be carefully handled or the ink will crack off, the next step is to take a *sharp* pen knife, and with T square and triangle, start cutting each piece as marked, including window and door openings. Mitered joints and roof pieces are cut with a bevel by holding the knife at the correct angle. Cut only partially through the cardboard, or just sufficiently to guide the knife when completing the cut later on, and also to register the line in case it becomes obliterated by coloring. Always hold the T square and triangle firmly with the left hand, and bear *lightly* on the knife, going over several times until the cut is sufficiently deep. Any attempt to cut through the cardboard on the first cut is sure to result disasterously. Renew the edge of the knife on a wet stone or piece of leather after every few cuts. The knife must be ground thin and kept sharp.

Coloring comes next. This is perhaps the most difficult part of model making from an artistic viewpoint. One has to remember that light has "scale," that atmosphere and reflection do not miniature themselves to suit the model, that a large expanse of, say, brick red, outdoors in the bright sunlight, surrounded by green grass and trees, has a very different effect on the eye, from a small spot of the very same color indoors. Literal matching of colors does not give nearly so truthful an impression, as correct relationship of color, and a simulation of the effect. It is better to key the color scheme somewhat lighter to counteract the lack of sunshine indoors; and to increase the vividness, when the area is very small.

Water color wash is effective for showing stained or weathered woodwork. Tempera for painted surfaces. Wax crayon for brick. Showcard color for stone and plaster. Sometimes cheap coarse gray cardboard, such as is used for the backs of writing pads is effective for rough stone work. Jointing can be done with a blunt awl or knife point and variegated color effect obtained with wax crayon.

1/8" Scale model of a house in Cleveland, Ohio
Abram Garfield, Architect

Weatherboarding can be shown by ruling with diluted India ink, or if wide, can be modeled by making a slight cut on the laps and pressing to form with a suitable tool and T square.

Shingles can be effectively shown by scratching the surface of the cardboard in a vertical direction with coarse sandpaper, and scoring the horizontal lines with a dull knife, after which apply a water color wash.

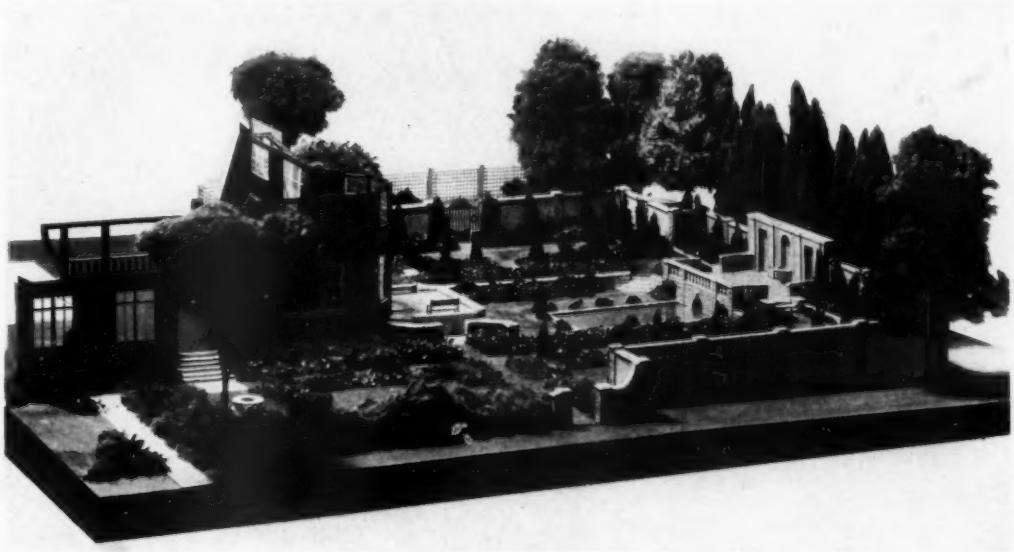
Slate roof can be shown by using the back side of carbon black photographic mounts in place of white cardboard, scoring with a dull knife point, and using wax crayon for variegated color effect.

For Spanish tile use corrugated paper. If this cannot be had in the correct scale, it can be made by pasting several sheets of thin bond paper together; first wet each sheet, use thin paste, and place in a form to dry. A couple of pieces of

rubber matting sometimes will answer for a form.

Brickwork is best shown by scoring with a dull knife and rubbing over with wax crayon, the scored lines remaining white and indicating the joints. Tapestry effect can be produced by first spotting different colors, reds, browns, yellows, purples, and then going all over with the predominating color. For dark mortar joints, water color wash can be applied. For eighth or sixteenth scales, it is sufficient to score only the horizontal courses. By scoring diagonal lines very lightly before scoring the horizontal lines, and by rubbing the crayon in a vertical direction, the vertical joints can be simulated. Soldier courses, arches, and patterns can be shown by scoring. At quarter scale or larger, the vertical joints can be shown, where necessary on the edges and reveals. Then the celluloid windows are cut out with a margin an eighth to a quarter inch larger than the window opening, and are pasted back of the window openings, using "banana" varnish as paste.

The plan which was first laid out is then cut out on the inside line of the walls, pasted or tacked on to the foundation board, and the different parts are then assembled by pasting the edges with drawing board paste. The success of this part of the work depends on the accuracy with which each piece is cut out. It is better to smooth each edge with a flat file or a piece of fine sandpaper stretched over a small block. Tiny half inch "ribbon" pins can be used, if desired, to insert through the tenons to hold them in place, and these pins can be used to



Model of a formal garden in Cleveland

Albert D. Taylor, Landscape Architect. Scale $\frac{1}{8}$" = 1'

The modeling of the house was omitted, because it was already built at the time the model was made, and also in order to obtain a view of the garden from the windows

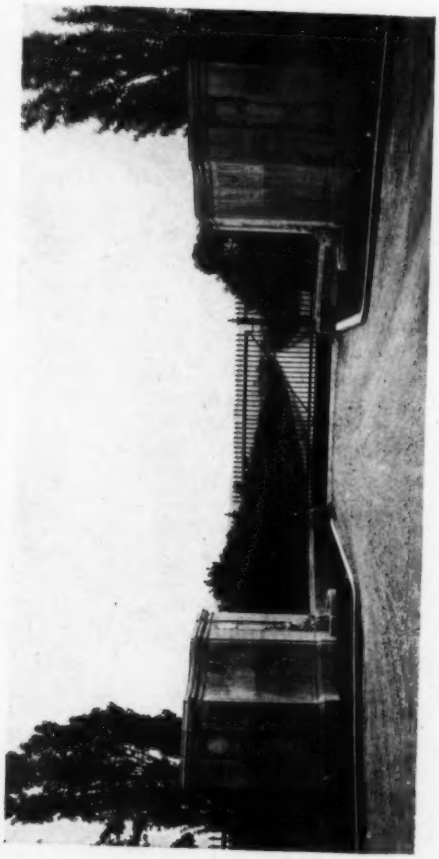
if desired, though it becomes very tedious. Scoring must be done with care as a mistake is sure to show. An adjustable portable desk lamp, placed at the correct angle so as to cast shadows, will aid the eye in scoring.

After the coloring is completed, the cardboard can be removed from the drawing board, and the pieces cut out. Care must be taken to keep each piece identified by marking on the back if necessary, as cut out. As each main piece is cut out, its accompanying pieces are cut out and superimposed, by pasting with the best grade of drawing board paste. One-edged safety razor blades and small hammer are useful for cutting thick cardboard, especially window openings. Before assembling, each piece should be gone over and colored nail pieces of thick cardboard together. The heads should be clipped off before they are entirely driven in to render them less conspicuous.

A small pair of tweezers is essential for handling small pieces, modillions, rafter ends, etc.

Ornament, when not practical to cut out or build up of cardboard, can be modeled on cardboard by applying plasteline, chewing gum, or a mixture of plaster, whiting, and glue. The latter is also useful for patching up cracks. For very fine work, thick show card color can be used. The best grades of cardboard can be carved to some extent, with a sharp knife, especially if the cardboard has previously been saturated in hot paraffin wax. Free ornament and statuary are best modeled in plasteline or carved in plaster, with duplicates

A WATER TEMPLE AT SUNOL, CALIFORNIA
WILLIS POLK, ARCHITECT



A WATER TEMPLE AT SUNOL, CALIFORNIA

WILLIS POLK, ARCHITECT

cast in plaster. Burnt shellac should be used instead of glue to attach plaster to the model.

(*To be continued*)

Thomas Hastings, Gold Medallist

(From the *New York Herald*)

IN conferring upon Thomas Hastings the Royal Gold Medal for Architecture King George has honored an outstanding figure among the leaders of the architects in America and a man who has done splendid things to build enduring and inspiring beauty into the life of his country. By custom the medal is awarded in alternate years to a British architect and to a foreign architect. The late Charles F. McKim, another great American architect, in whose office Mr. Hastings once served, received it in 1903.

Professor C. H. Reilly, who holds the chair of architecture at the University of Liverpool, has published in the English *Country Life* an analytic and appreciative article on Mr. Hastings' work, in which he marks the appropriateness of this succession. These two men, in his opinion, deserve recognition as major contributors in making American architecture a real and vital art.

The honor bestowed by King George is not the first accorded Mr. Hastings outside his own country. France and Austria have recognized him. At home the compliment of selection to design some of the most prized works projected by his countrymen has been paid to him. Among these works the American monument in Paris to the battle of the Marne will stand as representative of American architecture in a city pre-eminently beautiful.

His also were the Victory Arch and the memorial amphitheatre at Arlington Cemetery, where the Unknown Soldier is buried. The firm of Carrère & Hastings designed the New York Public Library and the New Theatre, now the Century. The Carnegie Institute in Washington was done by them, and many other magnificent structures. In all their work the good taste and sense of eternal fitness so conspicuous in Mr. Hastings' conceptions predominate. In addition to his work on public buildings and monuments Mr. Hastings has designed some of the most beautiful private residences in the country.

It has been one of Mr. Hastings' distinctions that he recognized the importance of bestowing upon each new building its own appropriate character. That has always been one of the first thoughts in his mind in approaching a new problem, and that is one of the reasons why today he receives the title of America's most distinguished architect.

Water Temple at Sunol, California

Willis Polk, Architect

A GOOD example of beauty as an interpretation of public utility service is seen in the accompanying illustrations of the "Water Temple" designed by Willis Polk, architect, and erected at Sunol, in Alameda County, California.

Development of the Alameda sources of water in Spring Valley to furnish a supply to San Francisco began many years ago. The system consists, broadly, in directing the water from its sources through many underground galleries to a central point of confluence. There the mingled waters form a cascade, dropping some forty feet into the conduit that routes the water to San Francisco. Originally this cascade was housed in a rude shed, solely designed to protect the water from contamination. Appreciating the desirability of a more dignified treatment of this important point of water control, the idea of a better designed architectural structure became dominant.

We learn from an interesting description in a pamphlet issued by the water company, that Mr. Polk's first design provided a roof supported on twenty-four columns, with a balustrade as a guard-rail surrounding the crypt. Careful re-study of the problem resulted in the very dignified structure shown in the illustrations.

It is interesting to note that in the search for scale, or to find a unit of proportion that would normally contrast with nature, a building of stature that would harmonize with environment, the dimensions and outline of a huge cottonwood tree that stood near the site, were measured and its natural proportions suggestively used for the mass of the temple.

American Architecture as Regarded by an English Professor of Architecture

PROFESSOR C. H. REILLY, of the School of Architecture in Liverpool, on the occasion of the opening of an exhibition of American architecture at the Manchester (England) City Art Gallery, spoke appreciatively of the development of architecture in the United States, as follows:

"Rupert Brooke, before the war, in his delightful letters from America to the 'Westminster Gazette,' had placed America's architecture among her five greatest achievements. Anyone who had visited America in recent years would not now hesitate to place it first of all. What were the characteristics of this great art that she had developed, and how were we to explain its growth? Obviously it could not be explained by saying the Americans were a race of artists. They were as yet hardly a race at all, and their progress in the other arts did not warrant any such assumption. It could only be explained by two things — the methods of work of their architects and the attitude of the public to whom that work appealed. In America there was a far larger public than there was in England which watched the careers of architects, and a far greater demand for architecture as a visible and noble expression of modern civilization. The most striking characteristics of modern American buildings were their simplicity and their refinement. They relied for their impact on the imagination, not on a multiplicity of features—the gables, domes, and turrets with which we were accustomed to adorn our buildings — but on the squareness and solidity of their masses and the sheerness of their flat surfaces, rising like cliffs from the pavements. Such detail as there was was designed to emphasize and enhance the mass, like the great cornice of a Florentine palace. They were not afraid, as we seemed to be, of plain wall surfaces. Their best high buildings had this same simplicity. They were simply the rectangular masses of the ordinary building, drawn out until they became campanile. As such, and when separated from each other as they were in all but the lower part of New York, they were, especially when built in white marble, objects of intense and romantic interest as seen across the town.

"In the interiors of their commercial buildings Americans seemed to set equal value on simplicity of plan. Their banks and big offices were great halls in which one saw, across a sea of clerks' heads, the presidents and vice-presidents at work. In England we seemed to prefer to do our day's work in poky rooms and ugly surroundings. This might be due to a Puritanical strain, though more probably to Victorian self-righteousness. The American, on the other hand, if he had to live in a

Addition to National Park Bank, New York
Donn Barber, Architect

wooden shack or a tiny apartment, expected to do his day's work in dignified surroundings. The result was that the interiors of banks became noble halls — they were always referred to as banking halls—on which the best architects were glad to lavish their finest work.

"The other great characteristic of American architecture was its scholarship. The American was not content to put up a building before he had studied the solutions to similar problems which the whole world had to offer. The American architect and his client felt themselves heirs to the world's architecture, and did not hesitate to use their heritage. They were Roman when they wanted to be stately and imposing, as in their great railway stations; Greek or Italian when they wanted to express refinement and scholarship, as in their museums and art galleries; Spanish, Italian, or Georgian when it was merely the domestic comforts or virtues with which they were dealing.

Addition to National Park Bank, New York

Donn Barber, Architect

"These results, however, would not have been reached in so short a time, however ample the money available or the opportunities of site and material, unless there were men equal to the occasion. The modern flowering of American architecture corresponded to the rise of the great schools of architecture in all the chief American universities. Before these arose a few adventurous spirits had been to the Ecole des Beaux-Arts in Paris and had shown the way. In their schools the American architects had learned to approach their art, not from the standpoint of one master, however good—which till recently was the English system—but from that of a group of teachers reinforced by a world-wide experience as found in their libraries. This attitude of research and criticism they carried into their offices later on. American architects combined themselves into groups, and their buildings, like our own Gothic cathedrals, were very generally the result of group work and criticism. This had no doubt meant some loss of individual character, but in their public buildings it had meant a great gain in dignity. The slightly eccentric or individual solution to a problem which might be endurable, or even pleasing, in a small domestic building, became absurd and unbearable in a big public one. The American realized this, and was willing for the good of his art to lose his soul to find it. Great architecture was always an anonymous art. The greatest buildings in the world, like the Parthenon or Chartres Cathedral, crystallized the work of many minds and crowned the striving of many generations of artists. This was the ideal American architects seemed to be approaching."

·EDITORIAL·COMMENT·

A CORRESPONDENT TO *The Architects' Journal* of London, states as his belief that "Gothic architecture is in a sorry plight unless the architect can find a Gothic Sculptor," and adds:—"If such sculptors as worked on Chartres or Wells existed today, I, for one, would never have dreamed of making any drawings for the sculpture required for our buildings."

Why should an architect make drawings for a sculptor? How does he regard a client who comes to him with drawings of his house and asks him to supply plans and such further decorative elements as he needs? Premising that the sculptor selected is a competent one, and it would be foolish to employ any other, could there be any greater retardance to the spontaneity of his art than to hand him "drawings for the sculpture" from which to carry out the architect's ideas, and not his own. That sort of supervision may be necessary for modelers or for mason stone carvers, but not for the sculptor, who may be and often is as good an artist as the architect who seeks to cramp his work by a hard and fast set of drawings.

Would any mural painter of distinction accept from an architect a set of drawings for the decorative treatment of an interior?

If there is a shortage in England of sculptors competent to supply the embellishment for Gothic work, it is quite possible that the development of such a group of men has been retarded by these "drawings for the sculptor."

The art of sculpture in this country as applied to architecture, has during the past forty years made remarkable progress. The group of men organized as the National Sculpture Society, represent in the highest degree the art of sculpture in the world. In fact, it might not be unreasonable to assume that we have men whose work is as good if not better than any England may present. This development in the United States is largely due to the respectful attitude that the two professions of architecture and sculpture hold, one towards the other. The architect in America does not hand one of these men a set of drawings, but works with him as with an associate artist. The good results may be seen on all our monumental buildings.

* * *

FROM ALL SIDES come criticisms and complaints of the modern workman and his attitude toward his work. The craftsmen of old apparently wrought with more care than do their successors of today. There were strict divisions of society into economic strata and this fixity of place in the scheme of things made men unhurried. Strong religious faith sustained them in the struggle of life and expression of this faith is found in the work they left behind. The wage seems not to have been uppermost in the dealings between employers and their skilled workmen, for men who took pains were sure of a living. The apprentice entered the family of the master with a status resembling that of an adopted son and with the affection he developed for his master came affection for his work. Quantity production was unknown.

Many critics profess to believe that the spirit of hurry, so prevalent today, reacts to make good workmanship impossible. The feeling is especially strong in the ranks of working men themselves and they are careless in assembling pieces and parts, for the generality of workmen are but assemblers. Owners and builders demand low costs and quantity production reigns supreme. With it have come hordes of imperfectly trained men to operate machines and assemble in structures the works of the machines. The power press and steam box have replaced wood carvers in many factories, mechanically operated hammers have supplanted many stone carvers, spraying machines and air brushes are formidable rivals of painters. Today when a monumental structure is to be erected or when a gentleman wishes to erect a house departing a little from patterned effects, a shortage of really skilled craftsmen apparently is felt. Standardization limits the ability of such men to live and their number seems to be small.

How are we certain that a majority of the workmen of the middle ages were better than a majority of men in the same trades today? There were good, bad and indifferent men then, as there are now and as there will be to the end of time. A small amount only of the work done in any generation is preserved and this work carries associations or it would not be preserved. Legends grow around it and the "good old times" come to have a meaning which would no doubt surprise the men who experienced them, were they to revisit the earth. J. E. Thorold Rogers in "Six Centuries of Work and Wages" as well as in his "Economic Interpretation of History" did not enthuse over the craftsmen of former days, much as he admired a lot of the work they bequeathed to coming generations.

The old apprenticeship system has disappeared, with its evils which oftentimes overbalanced its good. The old craftsman of Queen Elizabeth's day branded on his forehead with the initial letter of the name of his home city, did good work but under conditions we do not care to see return. In his place stands the trades unionist who loves

not his work, gives grudging service for as high pay as organized demand can obtain, limits the number of young men admitted to work with him and thus causes a shortage of skilled labor and consigns far too many men to labor in the ranks of the unskilled. His actions are bringing a quite natural reaction and thinking men are establishing schools for the training of craftsmen. The next generation will have no cause for complaint of a shortage of skilled workers who love their work for the work's sake. They will be well paid and be freemen and not serfs. Let us regard with satisfaction the vast amount of good work being done today by workers who live in comfort, instead of regarding the pitifully few pieces left to us of work executed long ago by men who could not write and tell us of how they lived and whether they really loved to work any better than their descendants love to work. Less criticism of today and its problems, less praise of an era of which we have but imperfect knowledge and a brave facing of the future with high hopes for the human race must be the attitude of those who have the good of the world at heart.

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APPARENTLY, THE EDITOR of the *Journal of the American Institute of Architects,* does not carefully read his copy of THE AMERICAN ARCHITECT. If he did he certainly could not be led into a statement of belief, so entirely wrong as when commenting on the conferring upon Thomas Hastings of the Royal Gold Medal of the Royal Institute of British Architects, he states in the August issue of the *Journal*: "Only once before, we believe, has the medal been conferred upon an American, when it was given to McKim."

May we be permitted to say to the editor of the *Journal,* that as stated in our issue of August 2nd, Richard Morris Hunt was elected president of The American Institute of Architects in 1888, and in 1893, the Royal Gold Medal of the Institute was conferred upon Hunt, the first American to receive it.

Had this medal been conferred on an architect not so prominently identified with the Institute, there might be excuse on the part of the *Journal* for forgetting his identity, but to lose track of an honor conferred on a former president and an architect so distinguished as Hunt, moves us to direct attention to this omission.

We are not all infallible, and to prove this assertion, we subjoin an "errata" appearing on page 268 of the August issue of the *Journal.* This errata states:

> "Due to a misprint so palpable that we hope it was obvious, we were made to say in our last issue that President Faville was the first president of the Institute to be elected from west of Chicago. Naturally it was intended to have the statement refer to Omaha, since that city is the home of the seventeenth president of the Institute, Mr. Kimball, and is a little farther west than St. Louis where lives the fourteenth president, Mr. Mauran, and whence came the tenth president, Mr. Eames. Also, by way of emphasizing the great injustice of the misstatement, let us record the fact that the seventh president, Mr. Van Brunt, came from Kansas City. We offer our regrets and our apologies."

In a recent issue of the *Journal* THE AMERICAN ARCHITECT was roundly taken to task for what it was delicately stated was interference in matters none of its affairs. We merely want to keep the history of the profession straight, and feel it is our duty to do so. The geographical inaccuracy of editorial expressions in the *Journal* do not so much annoy us, and the errata is only referred to to prove perhaps, "nor is it Homer nods, but we that dream."

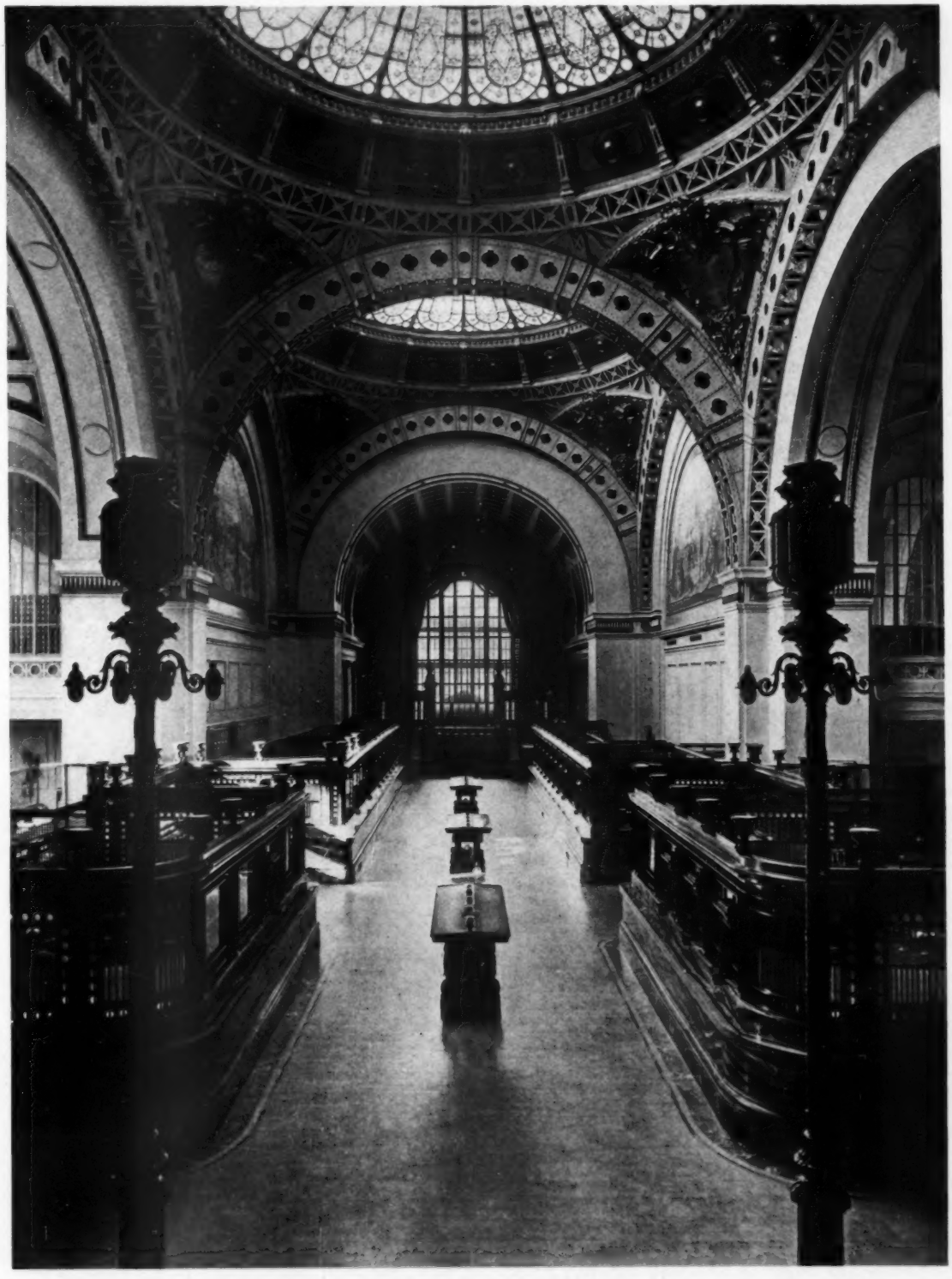
ADDITION TO NATIONAL PARK BANK, NEW YORK

DONN BARBER, ARCHITECT

STAIRWAY DETAIL

ADDITION TO NATIONAL PARK BANK, NEW YORK

DONN BARBER, ARCHITECT

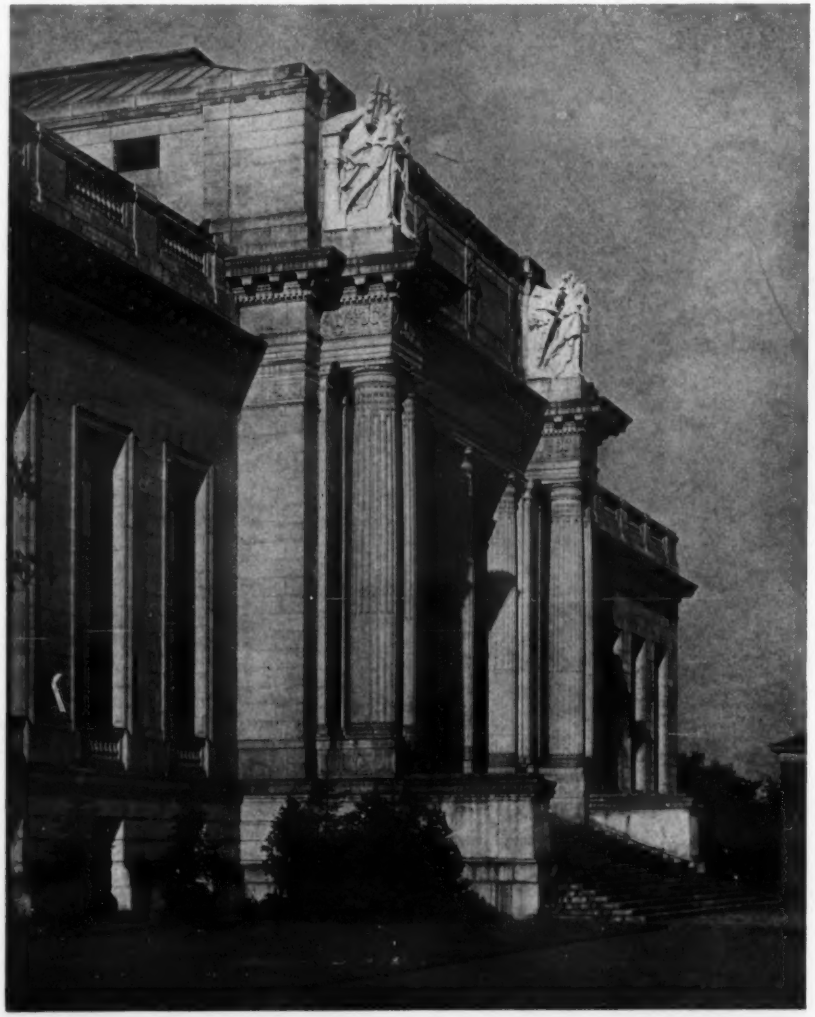


VIEW FROM NEW STAIRWAY

ADDITION TO NATIONAL PARK BANK, NEW YORK

DONN BARBER, ARCHITECT

VOL. CXXII, NO. 2400 AUGUST 16, 1922



CONNECTICUT STATE LIBRARY AND SUPREME COURT BUILDING,
HARTFORD, CONN.

DONN BARBER, ARCHITECT

VOL. CXXII, NO. 2400 AUGUST 16, 1922

LILY POND, LAKE AND OYSTER BAY

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

WATER GARDEN

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

GARDENER'S COTTAGE

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

BOAT HOUSE

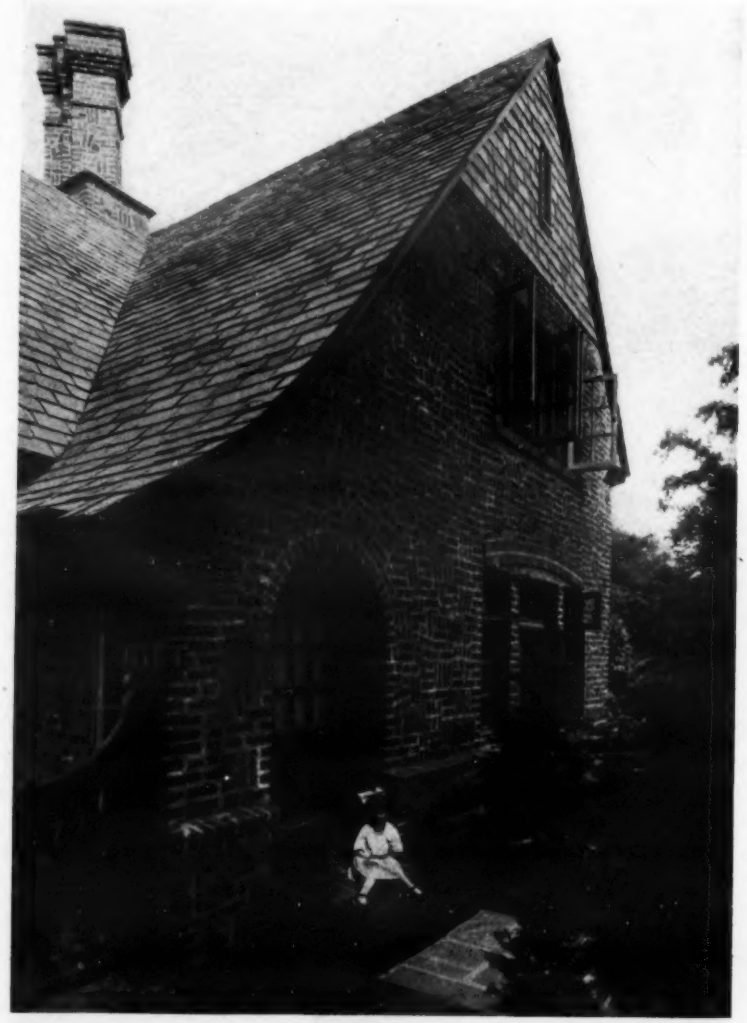
GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

TEA HOUSE IN CUTTING GARDEN

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT



ENTRANCE TO GARDENER'S COTTAGE

VIEW ON TERRACE

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ., OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

VOL. CXXII, NO. 2400 AUGUST 16, 1922

STABLE AND GARAGE BUILDING

GARDENS ON ESTATE OF H. S. SHONNARD, ESQ.,

OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

ENTRANCE TO BOAT HOUSE

BOAT HOUSE FROM DOCK

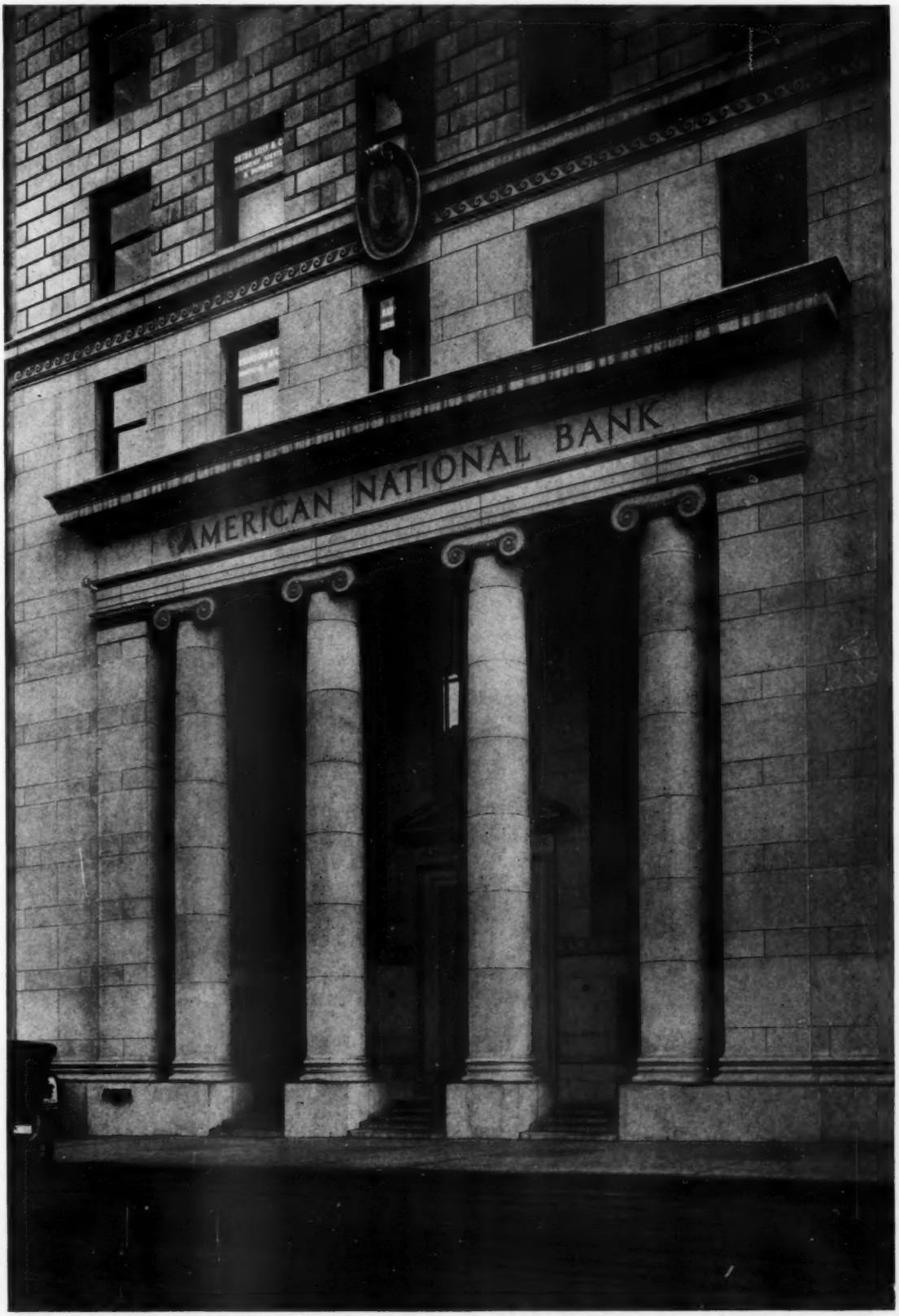
GARDENS ON ESTATE OF H. S. SHONNARD, ESQ.,

OYSTER BAY, L. I., N. Y.

DONN BARBER, ARCHITECT

AMERICAN NATIONAL BANK BUILDING, SAN FRANCISCO, CAL.

GEORGE W. KELHAM, ARCHITECT



DETAIL OF PRINCIPAL ENTRANCE

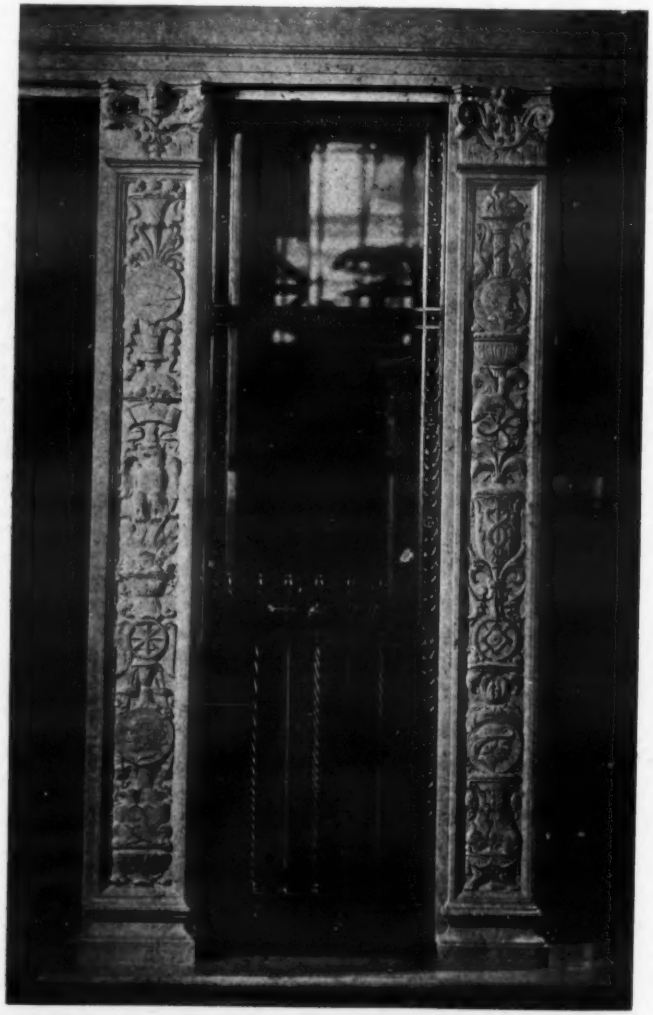
AMERICAN NATIONAL BANK BUILDING, SAN FRANCISCO, CAL.

GEORGE W. KELHAM, ARCHITECT

MAIN BANKING ROOM

AMERICAN NATIONAL BANK BUILDING, SAN FRANCISCO, CAL.

GEORGE W. KELHAM, ARCHITECT



DETAIL OF MARBLE SCREEN IN BANKING ROOM

MAIN ENTRANCE DOORWAY TO BANKING ROOM

AMERICAN NATIONAL BANK BUILDING, SAN FRANCISCO, CAL.

GEORGE W. KELHAM, ARCHITECT

XUM

COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

WHEN the Benevolent and Protective Order of Elks decided to erect a memorial to those of its members who served and died in the World War, it was finally agreed that it would afford a better purpose to combine with this memorial a permanent national headquarters building. The need for such a building, by a rapidly growing organization, has been insistently shown. The architectural possibilities of a properly located and expressed memorial hall in a building of this nature became apparent. By the introduction of such a hall, the Order might fittingly mark its appreciation of the great sacrifice by its soldier and sailor members, and give a dignified expression of that sentiment in a large building that would also enable the Elks further to carry forward the objects of its organization. A site was accordingly secured on the Lake front in Chicago, on the Southwest corner of Diversey Parkway and Lake View Avenue. This site has a frontage of approximately four hundred feet on the avenue facing the Lake and about two hundred feet on the Parkway.

In the competition that was then projected, Colonel J. Hollis Wells was appointed professional advisor and eight firms were invited to enter the competition. These were as follows:

Marshall & Fox, Chicago.
Holabird & Roche, Chicago.
Rebori, Wentworth & Dewey, Chicago.
Richard E. Schmidt, Garden & Martin, Chicago.
Henry Hornbostel, New York.
W. L. Stoddart, New York.
Egerton Swartwout, New York.
Desmond & Lord, Boston.

The drawings submitted in this competition were all of unusual merit. The award was to Egerton Swartwout of New York. Mr. Swartwout's design is, in its conception and execution, one of originality and artistic merit.

There has been among architects in this country a general acceptance of a "style" or form in design for fraternal buildings. The square or rectangular type has become usual. The general approval of John Russell Pope's Scottish Rite Building, its fine architectural character and its rectilinearity of form, set the basis of all fraternal buildings evolved since its erection. The accepted design in this competition, a round building, therefore marks a very decided change in the character of our monumental structures.

The outstanding feature as shown in the accepted design is, of course, the large memorial room on the second floor. This room is approximately seventy-two feet in diameter and seventy feet from floor to top of dome. It is surrounded by a colonnade with columns thirty-two feet high. Beneath this hall is the large lobby designed as a general meeting place or assembly.

In a low room, at rear of lobby, there are located a large reception room, the offices of the Grand Exalted Ruler, and a conference room. The offices and conference rooms are round and directly accessible from the main lobby. The wings flanking the finely proportioned central mass are low, and the same height as the wing at rear. These side wings contain two stories, and are planned as offices for various necessary purposes.

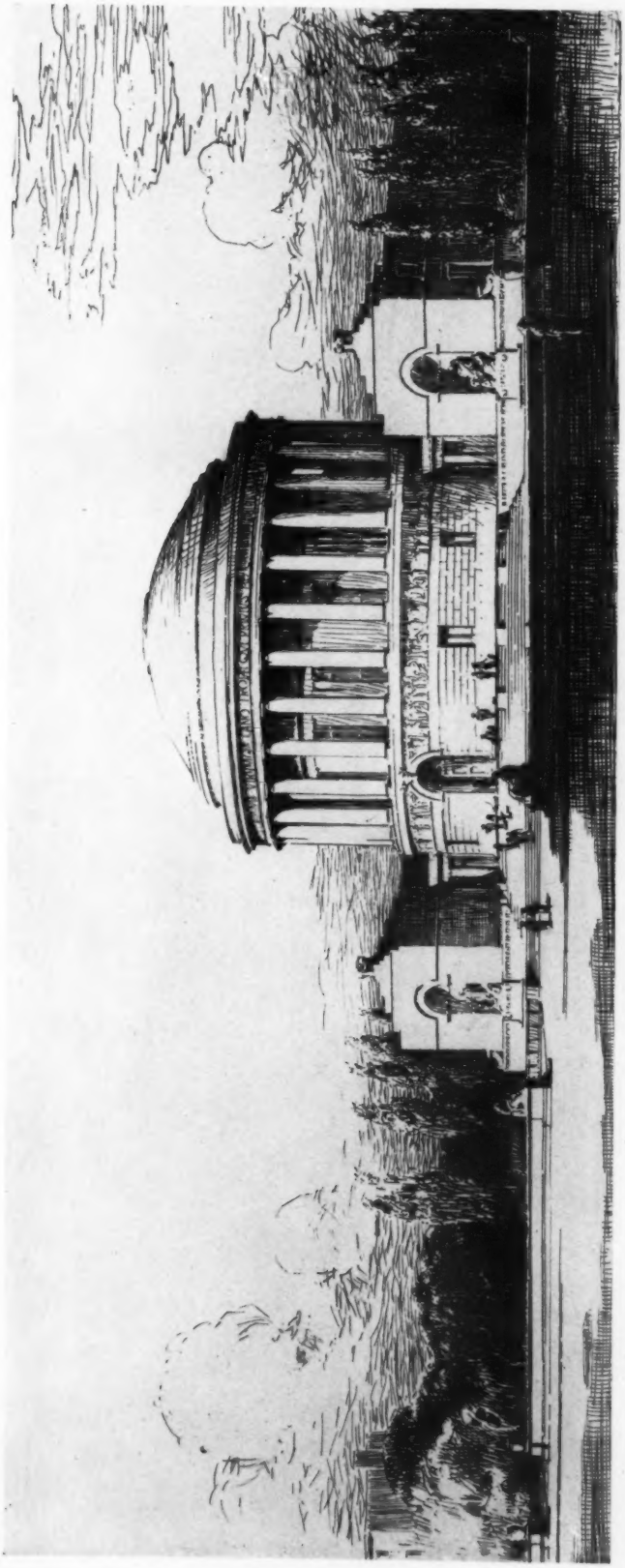
While the material has not yet been definitely selected, it will be light in tone, probably stone, granite or marble.

A dignified and artistically expressed feature of the exterior will be the great sculptured frieze which goes entirely around the building. It will be possible to present the sculptured figures in life size. The motive of the design has not yet been decided on, but an opportunity is afforded to carry out in the most beautiful manner the significance of the structure and its memorial purpose.

Ever since the signing of the Armistice, the question of memorials has been foremost. It is fortunate that the Art societies in this country saw at the outset the necessity for deliberation over these matters. Had it not been for this wise counsel, we would have had in this country a repetition of the memorial atrocities that marked the years following the Civil War. As many times editorially expressed in these columns, the most fitting memorial was one that combined a utilitarian purpose. The building, as approved by the Elks, exactly carries forward that ideal, and when, as in the present instance, designed with architectural skill, becomes a logical and much respected expression of the gratitude and sympathy of a group of men who realize their responsibilities.

ACCEPTED DESIGN

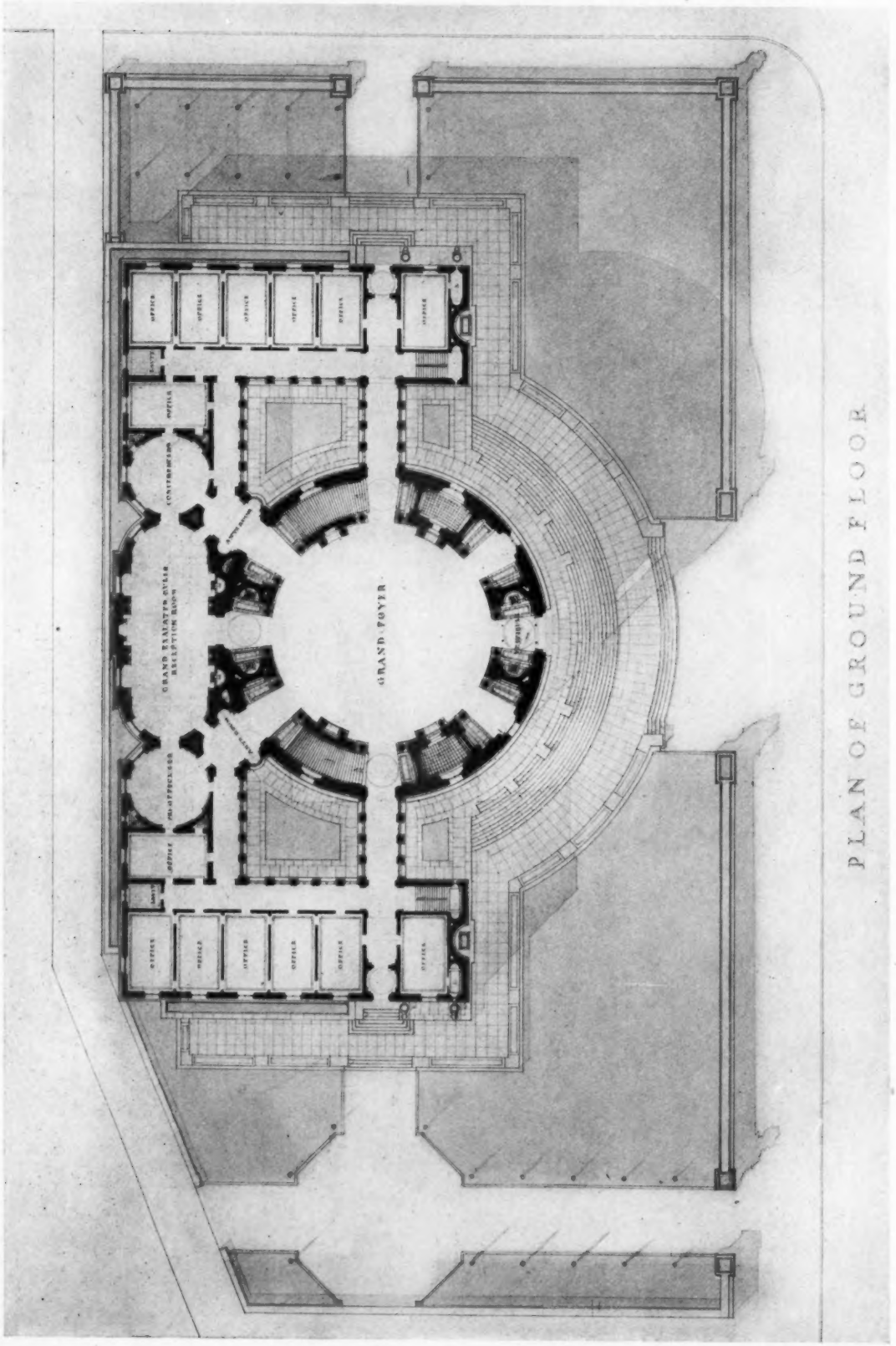
EGERTON SWARTWOUT, ARCHITECT



ACCEPTED DESIGN

COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

EGERTON SWARTWOUT, ARCHITECT

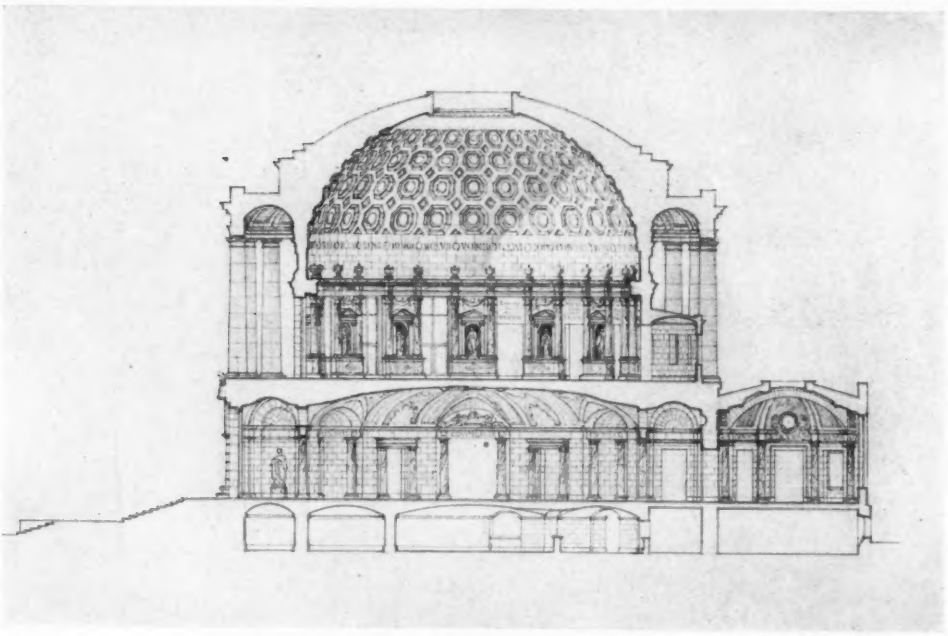


PLAN OF GROUND FLOOR

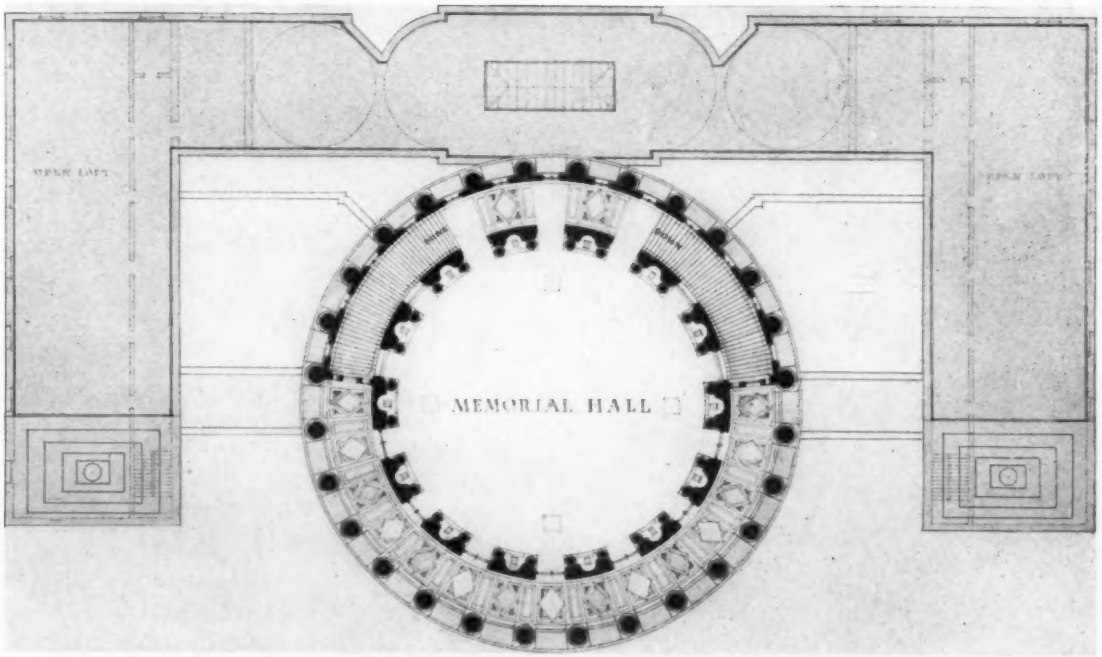
ACCEPTED DESIGN

COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

EGERTON SWARTWOUT, ARCHITECT



SECTION

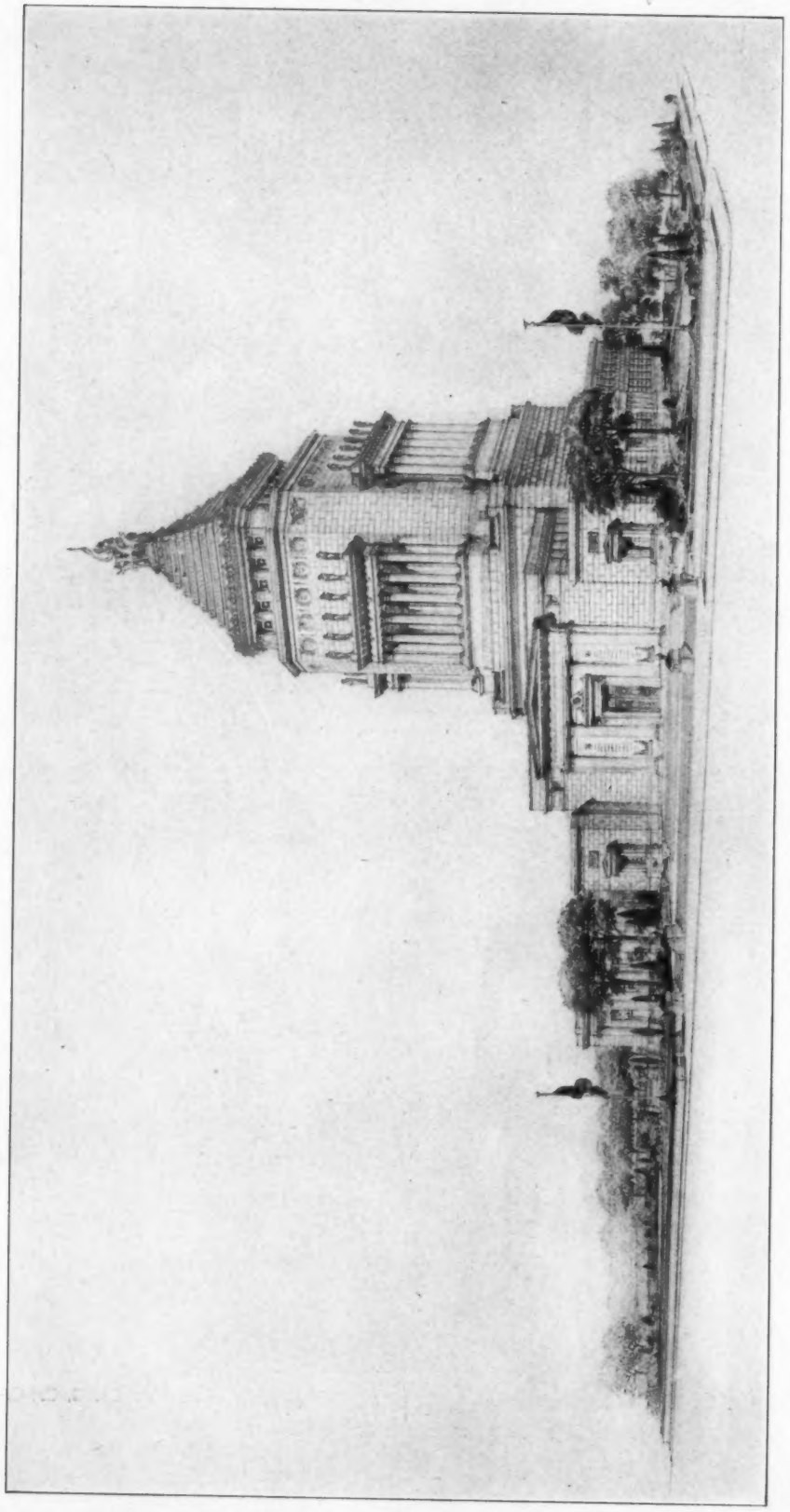


SECOND FLOOR PLAN

ACCEPTED DESIGN

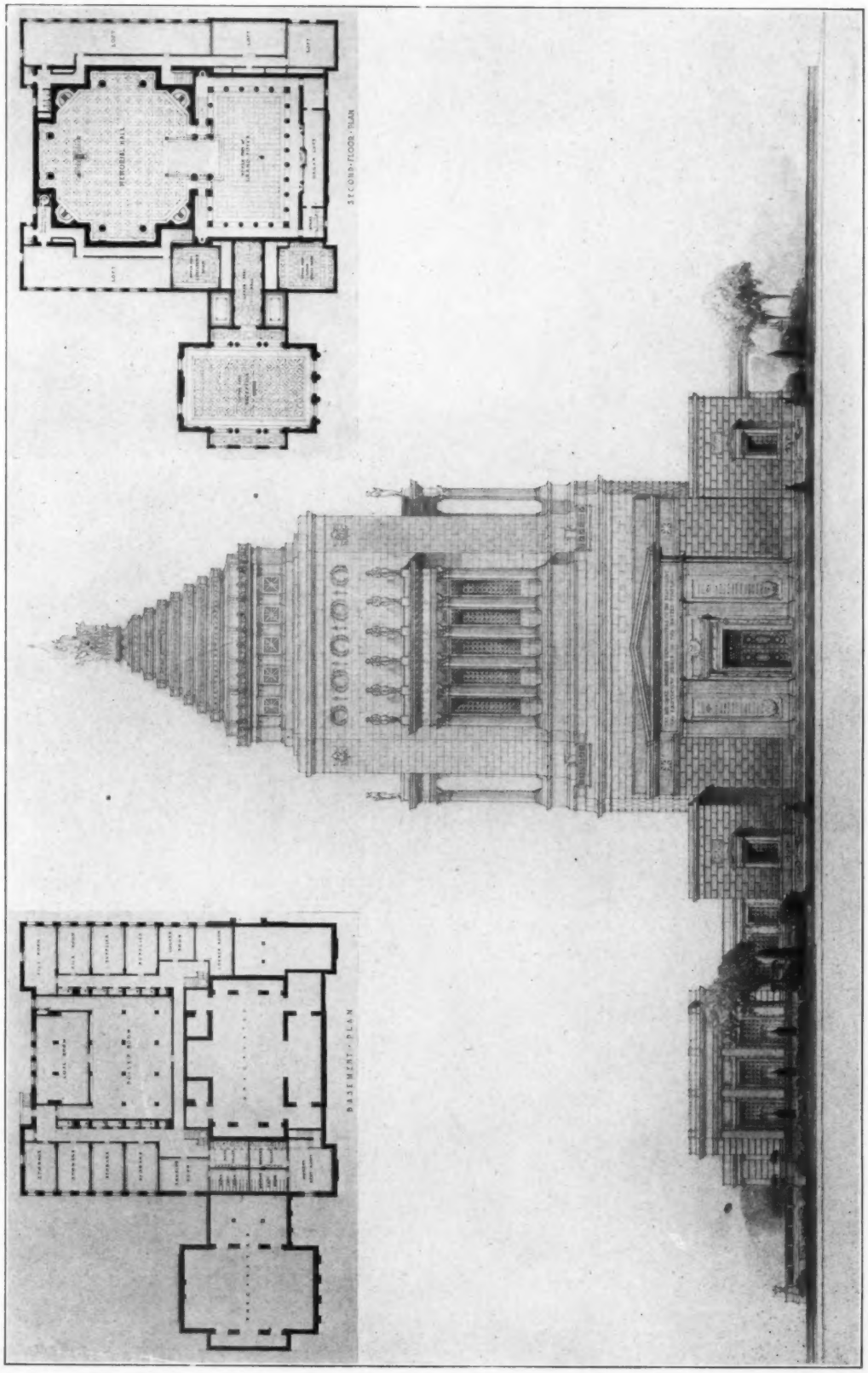
COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

EGERTON SWARTWOUT, ARCHITECT



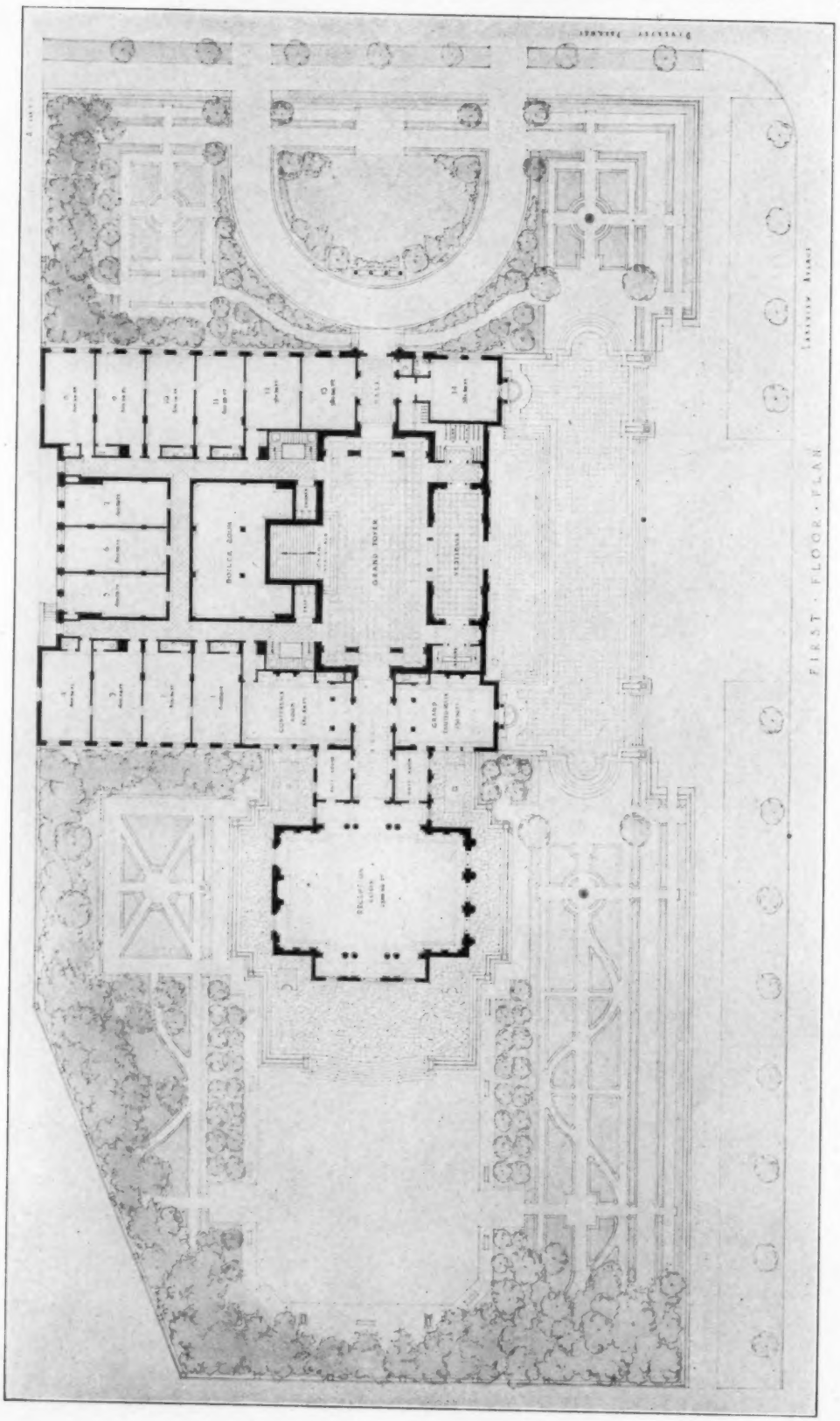
COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

DESIGN SUBMITTED BY HENRY HORNBOSTEL, ARCHITECT



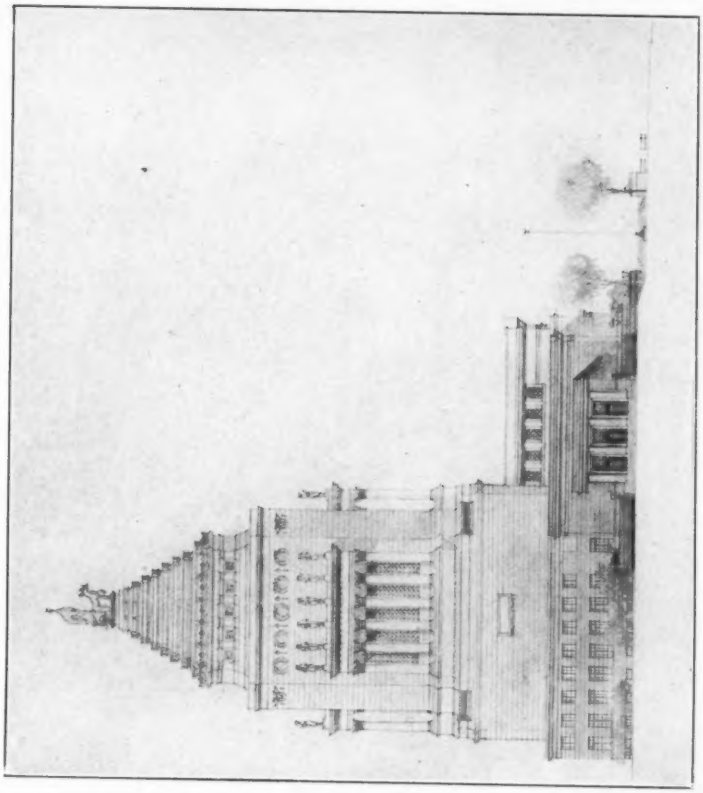
COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

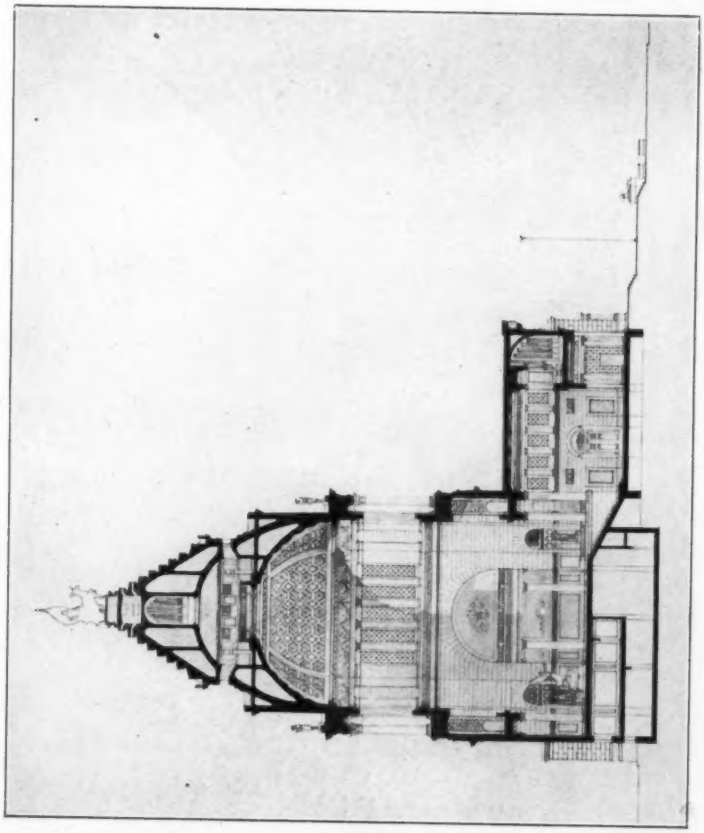
DESIGN SUBMITTED BY HENRY HORNBOSTEL, ARCHITECT



COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

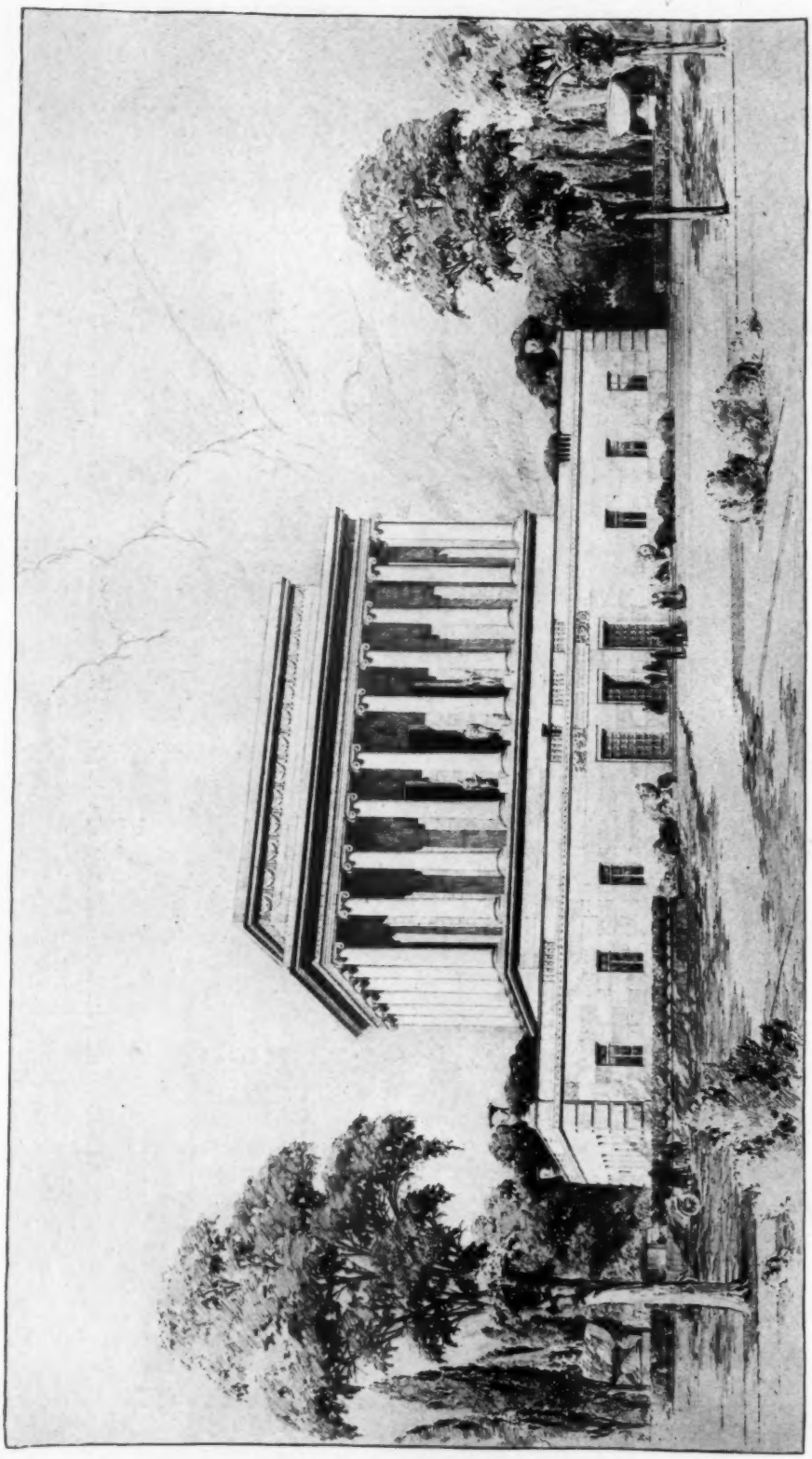
DESIGN SUBMITTED BY HENRY HORNBOSTEL, ARCHITECT





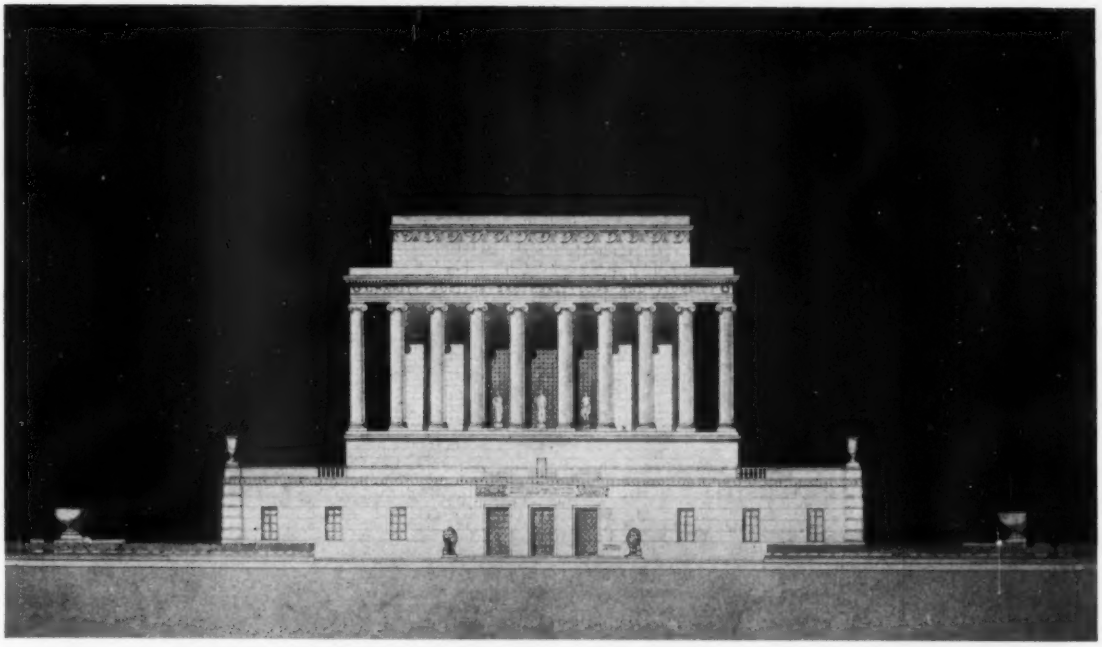
COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

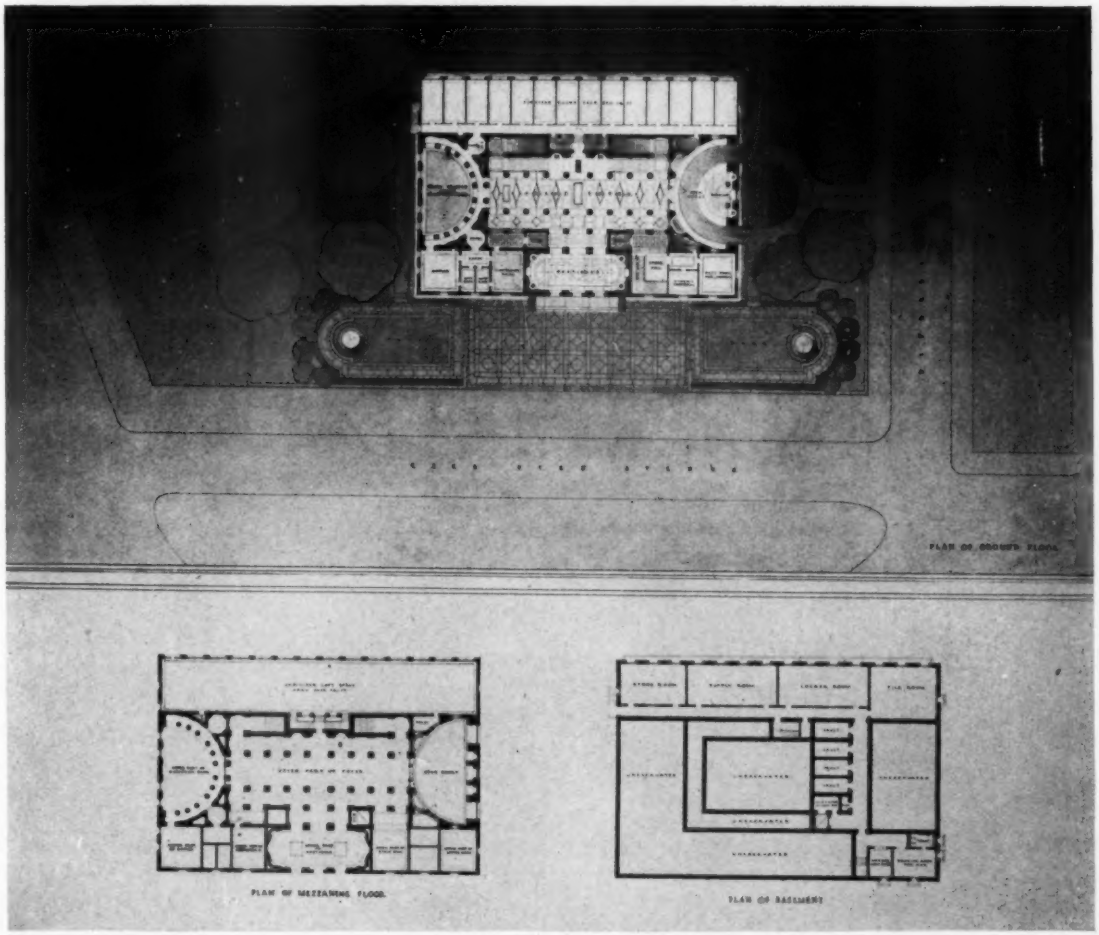
DESIGN SUBMITTED BY HENRY HORNBOSTEL, ARCHITECT



COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

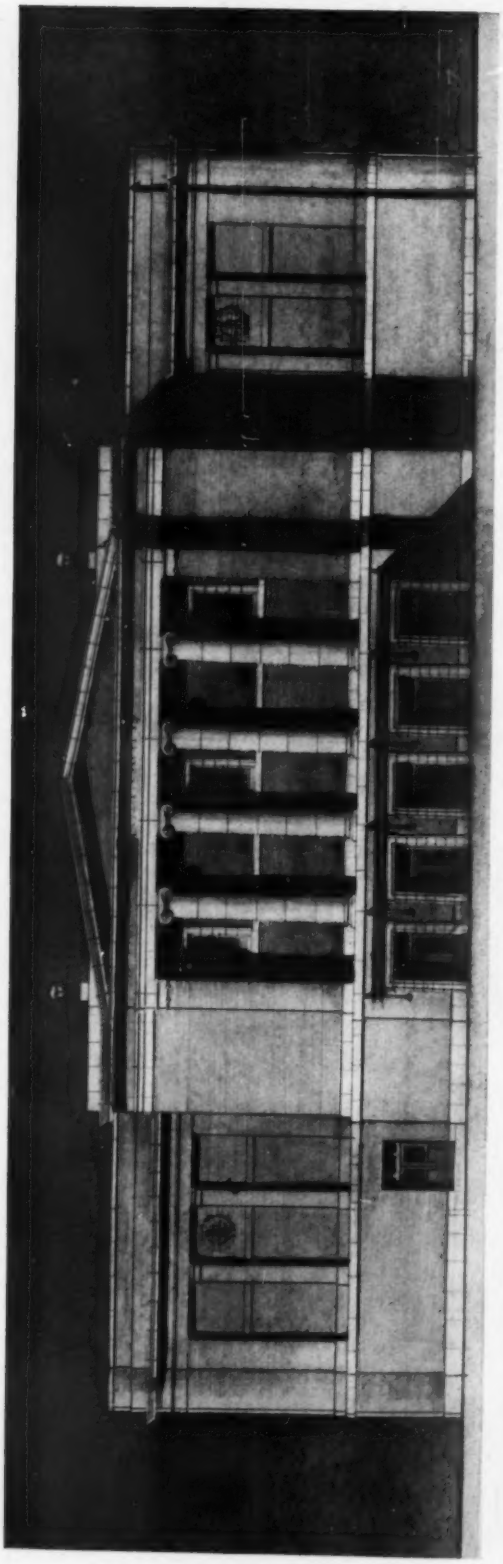
DESIGN SUBMITTED BY W. L. STODDART, ARCHITECT

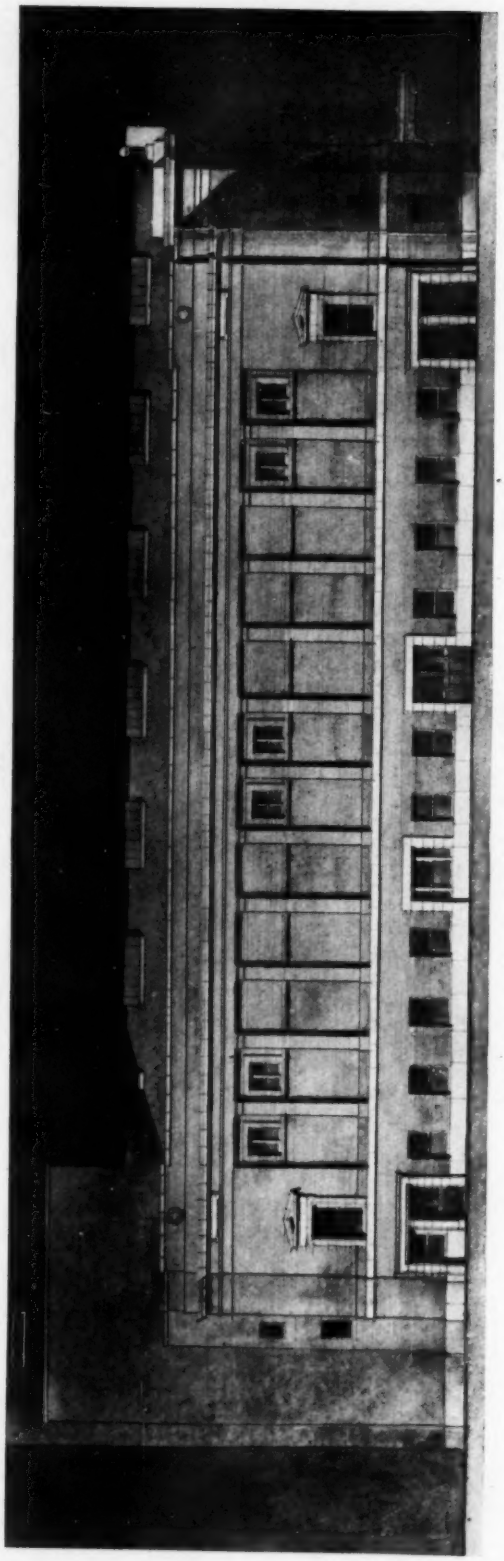




COMPETITION FOR THE ELKS NATIONAL MEMORIAL HEADQUARTERS BUILDING, CHICAGO, ILL.

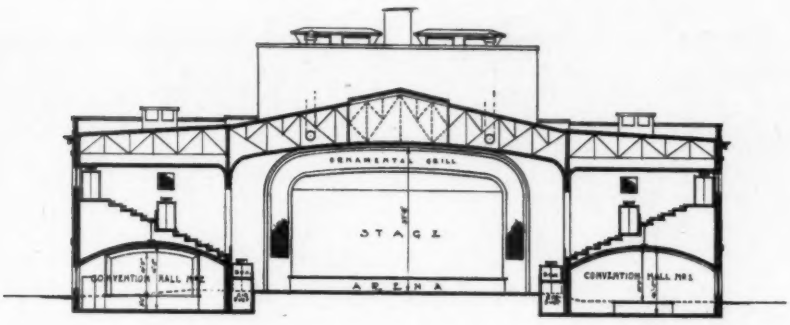
DESIGN SUBMITTED BY W. L. STODDART, ARCHITECT





MUNICIPAL AUDITORIUM, COLORADO SPRINGS, COLORADO

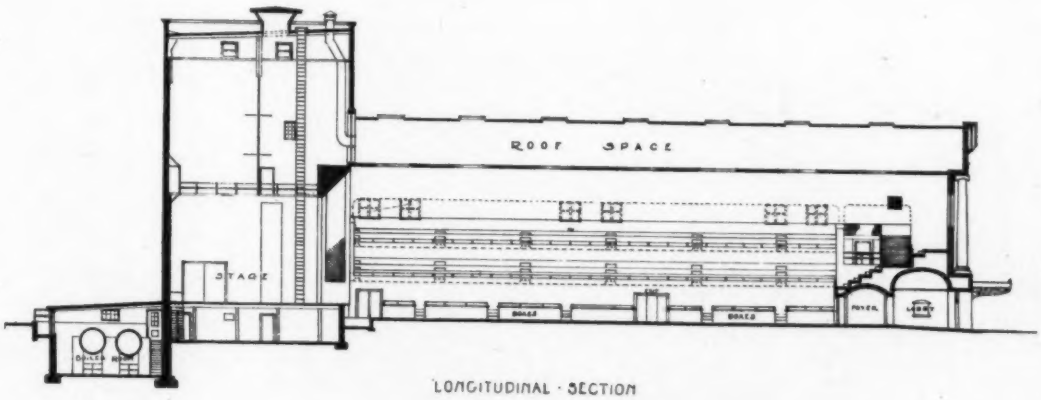
MAC LAREN & HETHERINGTON, ARCHITECTS



CROSS SECTION
LOOKING TOWARDS STAGE

THE main floor of this building accommodates in the Arena 1428. Three small convention halls accommodate 305, 225, and 50 respectively. The balcony floor will accommodate 1492, making a total, exclusive of stage, of 2920 seats for Auditorium proper.

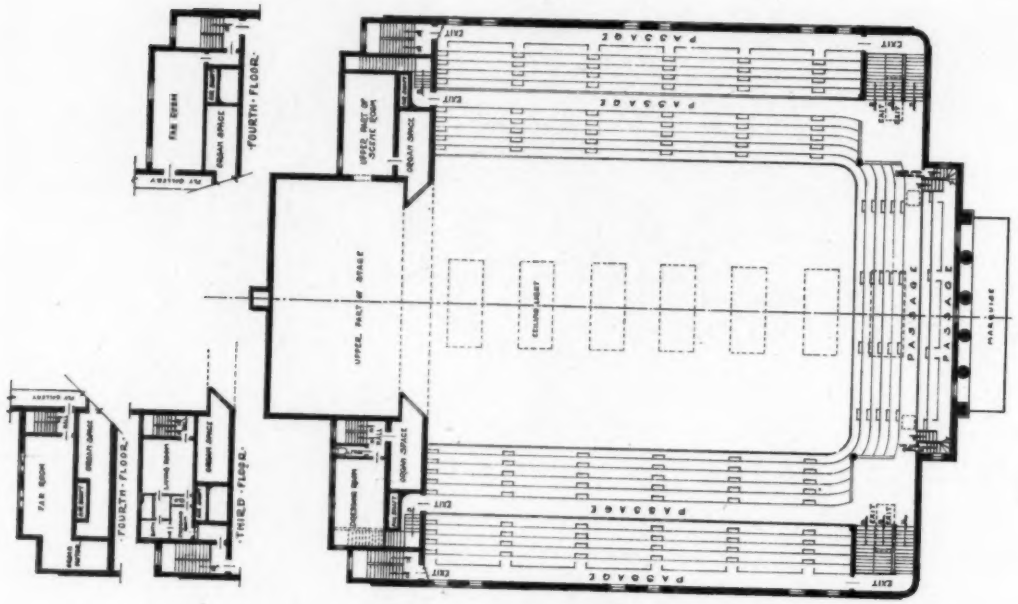
The construction will be fireproof, and the exterior will be of face brick and stone or terra cotta trim. A very complete heating and ventilating system will be installed. There will be a basement containing chair storage, rifle range, etc. The total cost will be approximately $325,000.00. The design and supervision are in charge of T. MacLaren and T. D. Hetherington, and working and detail drawings have been made by C. E. Thomas.



LONGITUDINAL · SECTION

MUNICIPAL AUDITORIUM, COLORADO SPRINGS, COLORADO

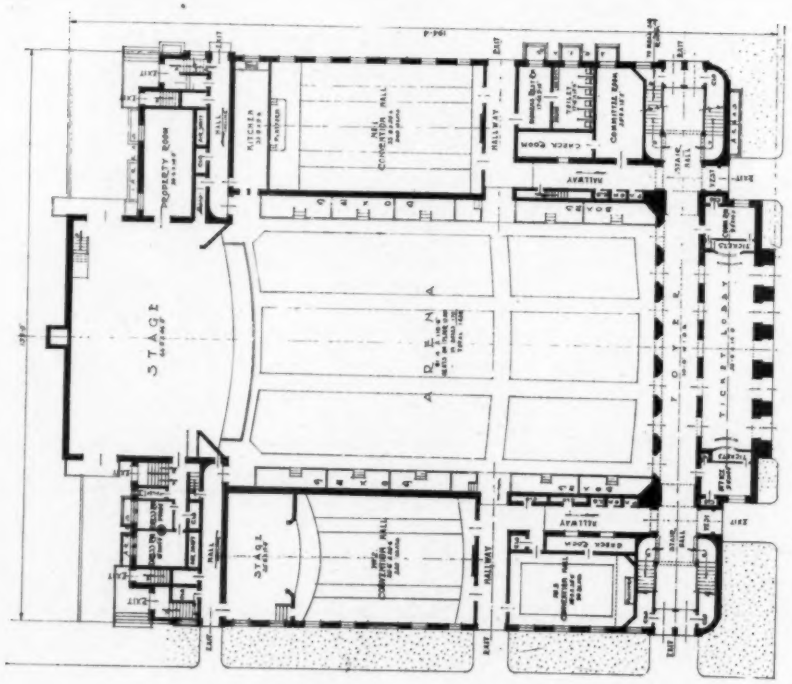
MAC LAREN & HETHERINGTON, ARCHITECT



BALCONY FLOOR

MUNICIPAL AUDITORIUM,
COLORADO SPRINGS, COLORADO

MAC LAREN & HETHERINGTON, ARCHITECTS



MAIN FLOOR

DEPARTMENT OF ARCHITECTURAL ENGINEERING

THE AETNA LIFE INSURANCE COMPANY BUILDING, HARTFORD, CONN.

DONN BARBER, F. A. I. A., Architect

An Interesting Example of Economical Enlargement and Remodeling of an old Building during a period of rising Costs

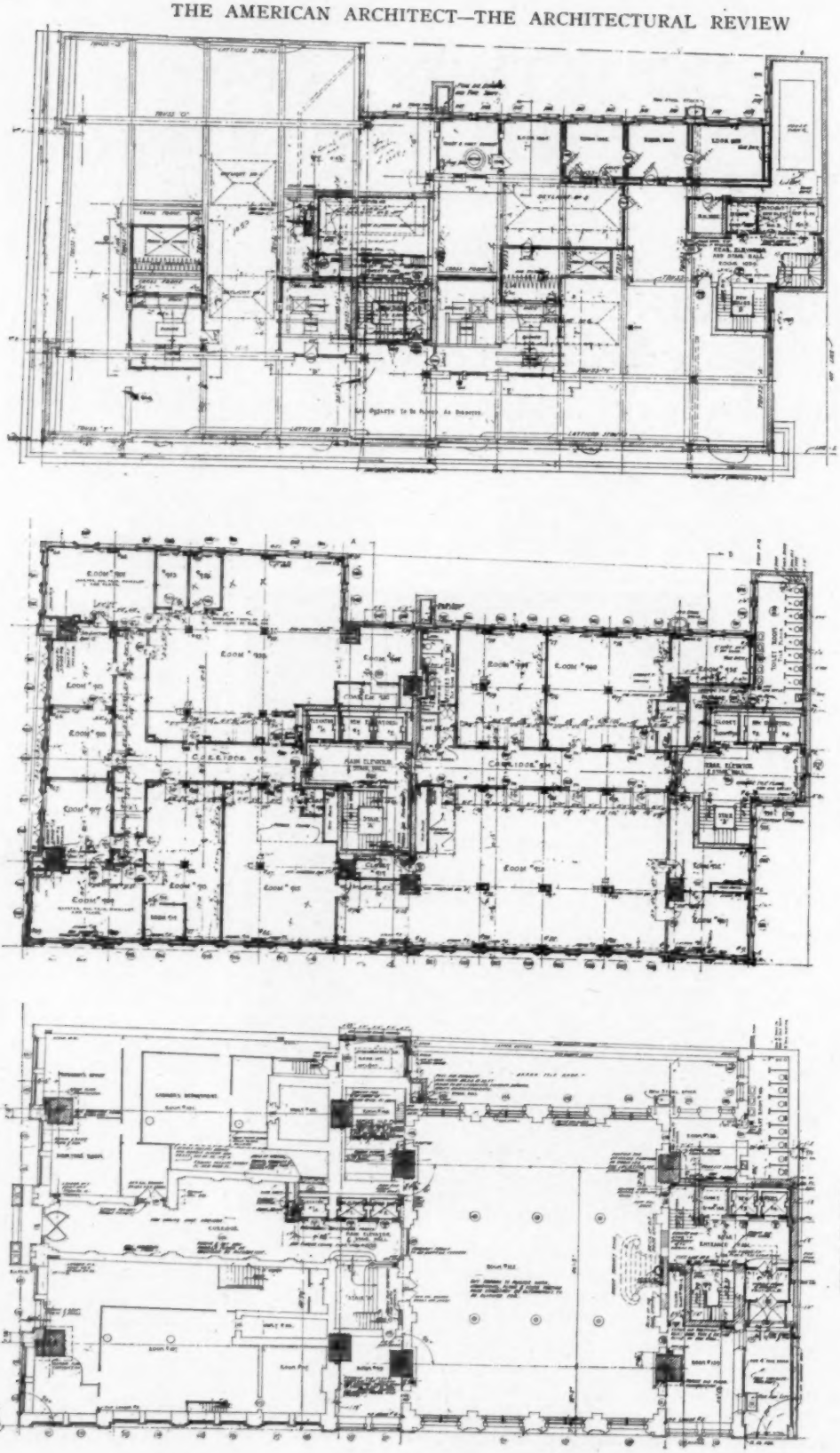
MANY years ago the Aetna Life Insurance Company acquired possession of a then important building on Main Street in Hartford, Conn., which they forthwith remodeled from an old-fashioned apartment house into an office building to serve as the home offices of the company. Years passed and the need for more room made a new building seem necessary but the then high cost of building led the directors of the company to consider the addition of two or more stories to their building as a temporary expedient. A new building could come later.

The old building, as shown in the insert on page 163, was five stories high with a sixth story in the roof. The outer walls were brick bearing walls faced with granite and there were those who believed that a couple of additional floors could easily be carried by the substantial appearing inner and outer walls which rested upon brown stone spread footings on a clay bottom. Mr. Donn Barber, F. A. I. A., was called in as architect and investigations were begun of the footings under the building. It was discovered that they were all pretty well loaded and that a definite and fairly uniform settlement had occurred. Further loading of the footings, however, was apt to have uncomfortable and uncertain results. If additional height was to be achieved it seemed necessary to carry any new stories on independent piers and columns.

One of the reasons for the adoption of the methods used in adding to the height of the Aetna Life Insurance Building, Hartford, Conn. How many foundations in soft clay would present a similar appearance were they bared for inspection?

To impose heavier concentrated loads on the clay would be apt to endanger the walls while putting in the spread bases required for the foundations of the piers, so wells were sunk to ascertain the depth to bed rock. This was found at slightly varying depths a reasonable distance below the old footings. A decision was reached to use as few piers as possible, these to rest on bed rock, and to build heavily reinforced concrete columns to about the old roof height, which would serve as supports for heavy steel trusses in the sixth story, carrying in turn, the steel work for the new seventh and eighth floors.

The estimates of the architect were found to be generally satisfactory and work was begun on the



TENTH FLOOR

NINTH FLOOR

FIRST FLOOR

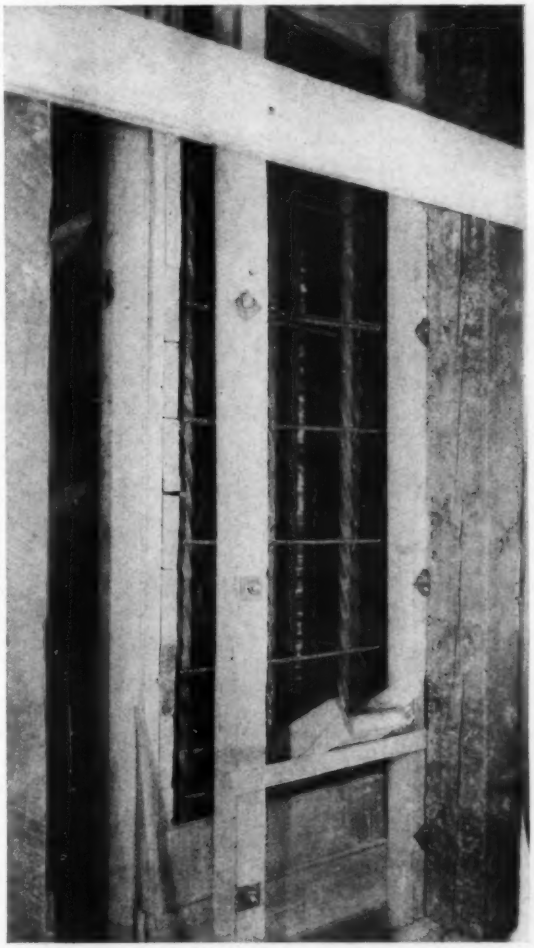
OFFICE BUILDING OF AETNA LIFE INSURANCE COMPANY, HARTFORD, CONN.

DONN BARBER, F. A. I. A., ARCHITECT

plans when, on reconsideration, a change was made. It seemed wise to add another floor and then, a little later, another floor seemed wiser still. Finally a decision was reached to make of this remodeled building the company's new and permanent office structure. The increasingly additional weights finally caused the sixth floor to be nearly filled with trusses and braces. It was thought, however, that this floor might be used for storage, file rooms and the like.

At this point Mr. Barber re-studied his problem completely in the light of newer conditions and decided, as steel is most economically used in tension, to erect steel columns on top of the reinforced columns and put his trusses in the new roof story, suspending the new floors from these trusses. This had an added advantage in that the supporting piers and columns could be set further within the walls of the old building, thus lessening the liability to disturbance of old supports and walls. The overhanging ends of the trusses could serve as cantilevers and this design furthered considerably the economical use of steel. The idea was novel on such a large scale and demonstrated that whatever a client asks for might as well be given him, for he will get it from some one of a number of ingenious men whose business is to design, supervise building work and construct buildings, where, as in this case, there is some opportunity for choice between several possible methods. In the reconstructed and remodeled building the roof story containing the trusses was arranged for storage and files, leaving the lower floors clear for business uses.

The sinking of wells for concrete piers to bed rock, placed as shown on the plans, was accomplished without disturbing the tenants of the building. Holes were cut through floors for the boxes which served as forms for the ninety foot high reinforced concrete columns, and the reinforcement was placed within the forms with a minimum of disturbance to all occupants. The heavy forms were made solid on three sides, the fourth side having an open space in each story between floor and ceiling, through which was handled the reinforcement. Short cross pieces of wood were cut to close this open side as work progressed. Above the floor level on each floor a short chute was placed through which the concrete was poured into the forms. When the concrete reached a floor level that story height was closed with the short cross pieces and the filling was resumed from the floor above. This method of procedure gave the greatest possible opportunity to work the concrete well around the reinforcement and make the pouring a practically continuous operation. The requirements of the Hartford building ordinance were followed as to stresses and the concrete was made a trifle richer than required in order to obtain an additional factor of safety. The concrete columns are a good example of careful workmanship.

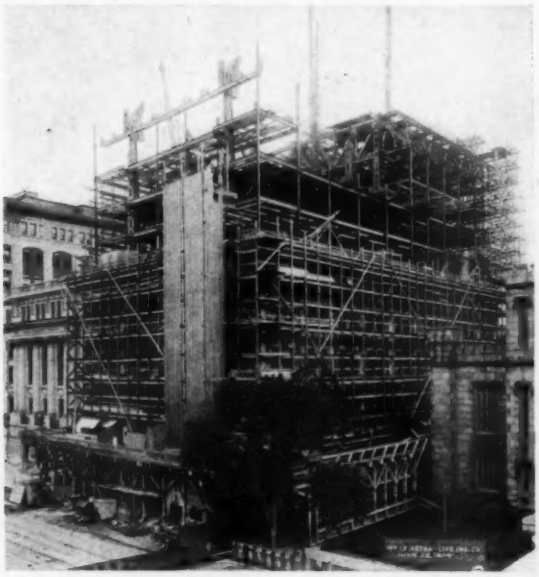


The concrete in the reinforced concrete columns was poured in story-height sections. Aetna Life Insurance Company Building, Hartford, Conn.

Donn Barber, F.A.I.A., Architect

A study of the old walls and foundations demonstrated that the weight of all the original construction above the cornice line of the old building was about equal to the weight of the steel alone for the additional stories. The roof story was therefore removed and the floor tightened to serve as a temporary roof over the building, in which all the tenants continued at work during the entire period of construction of the upper stories. Upon the new level thus prepared the new steel work was erected and when the concrete columns were finished the tapering steel columns carrying the trusses were fastened on them and all the steel work was riveted together permanently.

Scaffolding was carried up on the outside of the building with horizontal pieces resting on the window sills. This scaffolding was continued to the top of the new work and from it was placed the new stone facing which was to continue the original façade so that the building when completed would appear to be a homogeneous structure. When the upper outer walls were in place, resting on the beams suspended from the trusses, the enclosure was completed, interior partitions erected, new elevators installed and the tenants on the five lower floors were moved to the new upper floors so that the original lower building could be remodeled to conform in its character to a modern office building. The accompanying illustrations serve perhaps better than can a mere written description to show the method of doing the work. The appearance of the old outer walls was not changed except on the ground floor where the columns were rather heavily loaded. Here the spaces between the columns were partly filled in order to reduce the free lengths of the columns and thus stiffen them. The old store window spaces were narrowed and smaller windows with small panes of glass supplanted the old plate glass fronts, the effect being to add dignity and an appearance of strength to the façade. The roof was also simplified in design.



A view of the scaffolding before all steel was erected. Scaffolding was later carried to roof line in order to set stone facing. Material shaft in foreground.
Aetna Life Insurance Company Building, Hartford, Conn.
Donn Barber, F.A.I.A., Architect

The wisdom of enlarging and remodeling old buildings is sometimes questioned but during the past ten years a number of such enterprises have been carried out with good results. It is doubtful, however, if there can be found anywhere another example of five stories having been added to a building, four of which are suspended and in which the two portions of the structure are separated by a space about equal to the thickness of a sheet of paper. In the case of the building of the Aetna Life Insurance Company the auditors and accountants by the magic use of the items of obsolescence and depreciation had taken four old-fashioned walls and a roof which housed inadequately many workers and converted this doubtfully useful thing into something that on paper had comparatively little value, the destruction of which would have been merely an inconvenience. During a period of rapidly rising building costs several new floors were added and the interior of the original structure was completely modernized. The book value added to the cost of the new work gave the company a new building at about the pre-war cost of a new building equal in size and capacity. The result was satisfactory from an economic as well as an architectural standpoint.

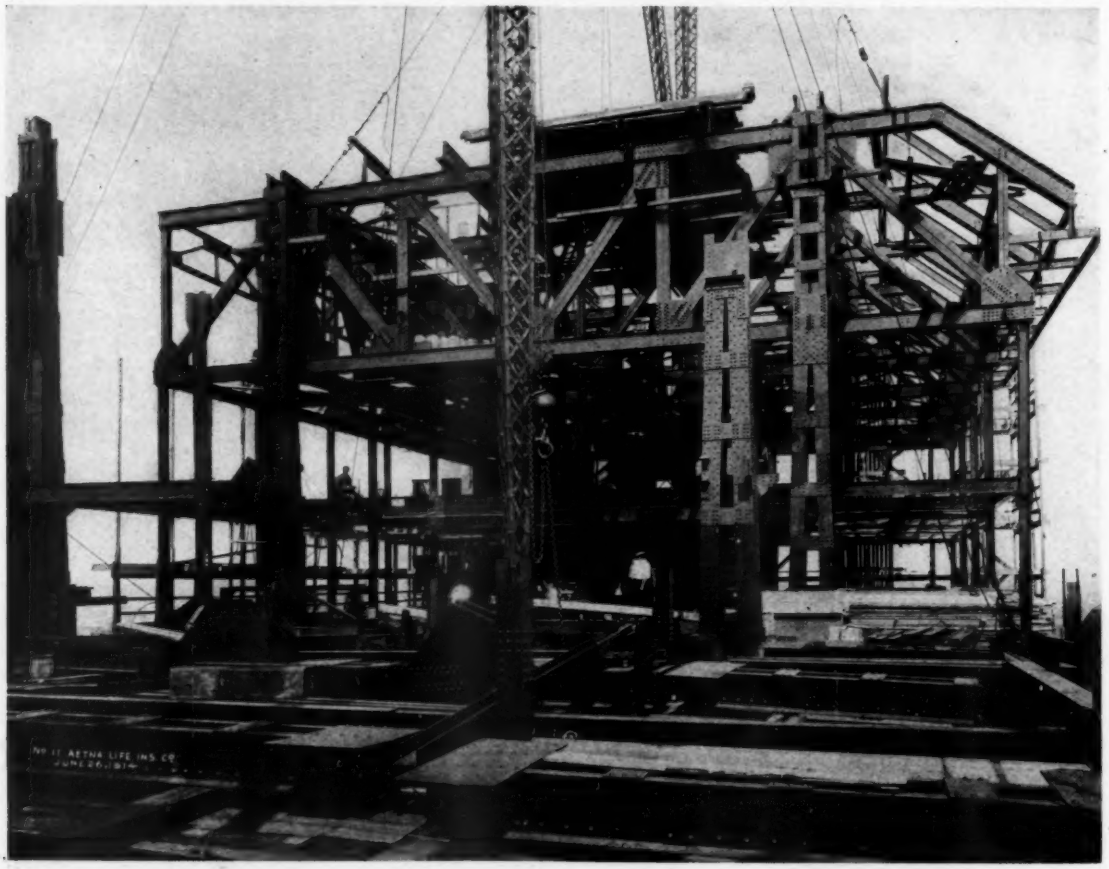
Rear view of completed building of the Aetna Life Insurance Company, Hartford, Conn.
Donn Barber, F.A.I.A., Architect

ORIGINAL BUILDING AT RIGHT
(insert)

REMODELED BUILDING BELOW

OFFICE BUILDING OF AETNA LIFE INSURANCE COMPANY, HARTFORD, CONN.

DONN BARBER, F. A. I. A., ARCHITECT



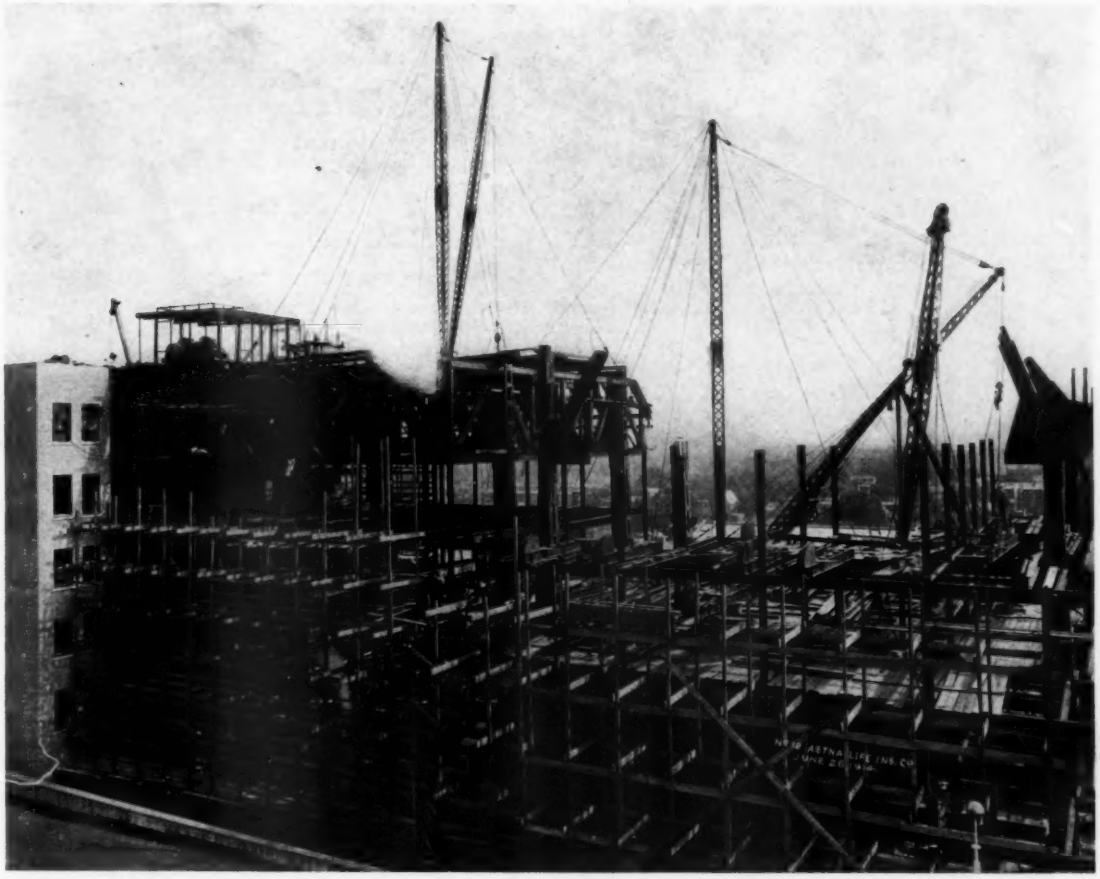
Details of trusses with overhanging end panels on tenth floor of Aetna Life Insurance Company Building, Hartford, Conn. Donn Barber, F.A.I.A., Architect. These trusses carry the sixth, seventh, eighth and ninth floors

(See article on "The Aetna Life Insurance Company Building, Hartford, Conn." Page 159)

FLEXURAL STRENGTH OF PLAIN CONCRETE

AT the 1922 Annual Convention of the American Concrete Institute, Professor Duff A. Abrams read a paper describing experiments made to determine the flexural strength of plain concrete, from which the following extracts have been taken:

The flexural strength of concrete is low as compared with its compressive strength; the use of steel bars to supply this deficiency is the basic principle of reinforced concrete construction. For many years little attention has been given to the flexural strength of concrete, due to the practice of disregarding the tensile stresses in the concrete in the design of *reinforced* concrete members and structures. With the advent of concrete roads and pavements, the flexural strength of concrete again became important; it may in fact prove the determining factor in working out a rational and economical design of slabs for this purpose. Concrete roads have presented many new engineering problems, one of which is the design of a comparatively thin slab to carry heavy rolling loads. Critical tensile stresses may occur in any direction, in either the top or bottom surface; the span length is uncertain on account of the indeterminate nature of the support. To provide adequate steel reinforcement would involve a prohibitive expense, consequently engineers have come to realize that primary dependence must be placed on the ability of the plain concrete to develop the flexural strength necessary for a proper distribution of the load over the subgrade. The exact thickness of slab necessary for this purpose cannot now be fixed by mathematical analysis, but must be determined as a result of experience. Considerable advance toward a rational design of road slabs may be expected to result from the studies of subgrade soils, the effect of moisture and temperature on the slab



Erecting steel on the upper stories of the building of the Aetna Life Insurance Company, Hartford, Conn.
Donn Barber, F.A.I.A. Architect

(See article on "The Aetna Life Insurance Company Building, Hartford, Conn." Page 159)

and the effect of impact that are now being carried out by the U. S. Bureau of Public Roads and a number of the state highway departments.

Flexural tests of mortar and concrete have been reported by Feret, Fuller and Thompson, Sabin and others, but it seemed desirable to review the subject in the light of recent developments which have led to a better understanding of the factors which enter into the scientific design of concrete mixtures, and a better appreciation of the necessity for exact control of the concrete in carrying out studies of this kind.

The tensile resistance is the limiting factor in flexural tests of plain concrete, yet a careful distinction must be made between *tension* and *flexural* stresses. Flexural stress here refers to the type of stress developed by beam action. Due to the curvilinear relation between deformation and stress in concrete and other non-homogeneous materials, the tensile stress developed in flexure, when computed by the usual methods, far exceeds the resistance of the material in pure tension. The computed unit tensile strength at which failure occurs is termed the "Modulus of Rupture" of the material. Tests by Mills showed that *tensile strength* of concrete is probably not more than 8 to 10% of its compressive strength in 6-in. cubes, whereas the tests in this report show the modulus of rupture to be 20% or more of the compressive strength. Pure tension tests of concrete are difficult to make and may give misleading results on account of non-uniform distribution of stress across the section.

While it is sound practice to disregard the flexural resistance of the *concrete* in *reinforced* concrete members, it should be noted that load tests on bridges and buildings have shown the concrete to contribute in a marked degree to increasing the load-carrying capacity of the structure.

The tests covered by this report were made as a part of a general investigation of concrete and concrete materials being carried out through the

co-operation of Lewis Institute and the Portland Cement Association, at the Structural Materials Research Laboratory, Chicago.

Scope of Tests

750 concrete beams were tested by loads applied at the 1/3 points of a 36-in. span. In general, the beams were of plain concrete 10 in. wide, 7 in. deep. In one group of tests the depth of the beam was varied from 4 to 10 in.; in another group 1 to 8, ⅜-in. round, reinforcing bars were used. In general the aggregates consisted of sand and pebbles; in one group of tests other types of coarse aggregates were used. Most tests were made at 28 days; in certain groups tests were made at ages of 7 days to 1 year.

An important feature of the report is the comparisons between flexural and compressive strength of concrete from the same batches. 750 tests of 6 x 12-in. cylinders are included.

The discussion of these tests is followed by a brief review of the relation of modulus of rupture to compressive strength of a number of other materials of construction.

Methods of Testing

Both beam and cylinder tests were made in a 200,000-lb. Olsen universal testing machine. The beams were loaded at the one-third points of a 36-in. span. They were supported and loaded in such a manner as to prevent restraint. One end rested on a roller and the other on a spherical bearing block. The load was transmitted to the beam through leather cushions which prevented concentration of the load due to minor irregularities in the surfaces.

Both beams and cylinders were tested in a damp condition immediately after removal from storage, except in the case of the group in which combined moist and dry storage was used.

(*To be continued*)

Electric Power Required For Fans

WHEN estimating power requirements for disc ventilating fans an allowance of one watt input for every 15 cubic feet of air required is ample. This is almost the exact amount required for fans delivering less than 1500 cubic feet per minute and is liberal for larger fans. For fans delivering between 10,000 and 16,000 cubic feet per minute an allowance of one watt input for every 20 cubic feet per minute is sufficient.

In homes there is a growing use of fans for:

Exhausting steam or fumes from the basement laundry

Exhausting cooking fumes or humid heat from the kitchen

Exhausting smoke from the billiard room, or air from a furnace register in any room that may not heat promptly or properly

Blowing fresh air into the laundry, kitchen, or library on hot sultry days

Blowing air into the recirculating air supply pipe of warm air furnaces

Blowing on radiators to obtain better distribution of heat

Blowing on radiant heaters to obtain circulation of radiated heat.

Sublimed Blue Lead

SUBLIMATION is a chemical process in which solids by the aid of heat are passed into a gaseous state and then by cold treatment are reduced to solid form, all without apparently liquifying. Subliming performs for solids much the same function distillation performs for liquids, in that it removes impurities.

For several years sublimed blue lead has been used to paint bridges, gasometers, oil storage tanks and other metal structures. In reply to an inquiry a manufacturer has given the following information about the pigment, of which the analysis conforms very closely to the percentages here given:

Lead sulphate	45% to 55%
Lead oxide	30% to 40%
Lead sulphide	Not more than 12%
Lead sulphite	Not more than 5%
Zinc oxide	Not more than 5%
Carbon and undetermined	Not more than 5%

Sublimed blue lead is a fume pigment. It is made by subliming lead ore (lead sulphide) under certain definite furnace conditions. It is a slate color, and produces an elastic coating that contracts and expands readily with the surface to which it is applied; its covering power is said to be considerably greater than red lead, and it bulks 50 per cent more.

Is the Radio a Fire Risk

RECENT regulations prepared by the National Board of Fire Underwriters for the installation of radio outfits have raised a storm of protest from electrical manufacturers and many electrical engineers.

It is a question that never can be determined by argument. The business is new and time alone will demonstrate whether the caution of the Underwriters is foolishness or may be an exhibition of wisdom. There was a storm raised a generation ago when the proposal was made to electrocute criminals. The electrical business today is well established and cannot be hurt by insistence upon the provision of safeguards.

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

THE last issue started the publication of the recent New York Statute covering the registration of architects. The publication of this Statute is continued in the present issue and the Statute entire will be published in these columns, so that the full text may be available for those interested in it. I have already outlined in general terms the changes which the last amendment to the Statute put into effect. The reading of the Statute itself, as published, in conjunction with the comments already given, will give to any subscriber a clear understanding of the registration requirements, as enacted by the New York legislature, and will indicate, as well, the undoubted tendency, not only in New York, but in other and widely separated states. The New York Statute is in many ways very complete, and I rather expect that it will be followed in its essential provisions by the enactment of laws in the states in which registration legislation has not yet been had and by amendment quite possibly of existing laws in other states, where the legislation already adopted has been less complete than that now in force in New York State.

The New Law For Registration of Architects in New York State

(*Concluded*)

2. Every person securing such certificate shall register in the office of the county clerk of the county in which he or she maintains his or her principal place of business, in a book kept by the clerk for such purpose, his or her name, residence, and post-office address, source, number and date of his or her certificate to practice architecture and the date of such registration, which registration he or she shall be entitled to make only upon showing to the county clerk his or her certificate and making an affidavit of the above facts, and that he or she is the identical person named in the certificate; that before receiving the same he or she complied with all of the preliminary requirements of this article and the rules of the regents and the board as to the terms and the amount of study and examination; that no money other than the fees prescribed by this article and such rules was paid directly or indirectly for such registration, and that no fraud, misrepresentation or mistake in material regard was employed or occurred in order that such certificate should be made, which affidavit shall be preserved in a bound volume by the county clerk. The county clerk shall issue a certificate giving the date and name of said registered architect preceded by the words "registered as authority to practice as a registered architect, in the clerk's office of.....county"; and shall issue to each person duly registering and making such affidavit a certificate of registration in his or her county which shall include a transcript of the registration. Such transcript and the certificate of registration may be offered as presumptive evidence in all courts of the facts stated therein. The county clerk's fee for taking such registration and affidavit and issuing such certificate shall be one dollar. Any person who, having lawfully registered as aforesaid, shall thereafter change his or her name in any lawful manner, shall register the new name with a marginal note of the former name, and shall note upon the margin of the former registration the fact of such change and a cross reference to the new registration. A county clerk who knowingly shall make or suffer to be made upon the book of registry of architects kept in his office any other entry than is provided for in this article shall be guilty of a violation of this article, punishable as hereinafter provided.

3. An architect having duly registered to practice as a registered architect in one county and removing his practice or a part thereof to another county, or regularly engaging in practice or opening an office in another county, shall show or send, by registered mail, to the clerk of such other county, his certificate of registration. If such certificate clearly shows that the original registration was duly issued under seal by the board of regents, the clerk shall thereupon register the applicant in the latter county on receipt of a fee of twenty-five cents and shall issue a certificate giving the data and name of said registered architect, preceded by the words "Registered also in.....county," and return the certificate to the applicant. A county clerk having properly issued a certificate of registration to an architect shall forward a duly attested copy of the same, and a copy of the affidavit and evidence upon which said certificate was issued, to the secretary of the board, within thirty days of such initial registration of a duly registered architect. On or before the first day of May of each year the secretary of the board shall mail to every architect registered in the state of New York a blank application of re-registration, addressing the same in accordance with the post-office address given at the last previous registration. Upon receipt of such application blank, which shall contain space for the insertion of his or her name, office and post-office address, date and number of his or her certificate and such other information as the regents deem

necessary, he or she shall sign and swear to the accuracy of the same before a notary public, after which he or she shall forward this sworn statement and application for the renewal of his or her registration certificate to the secretary of the board together with the fee of two dollars. Upon receipt of such application and fee and having verified the accuracy of the same by comparison with the applicant's initial registration statements the secretary of the board shall issue a certificate of registration which shall render the holder thereof a legal practitioner of architecture for the ensuing year. These certificates of registration shall bear date of September first of the year of issue, and shall expire on the thirty-first day of August in the year following. Applications for renewal of registration therefor must be made on or before the first day of September of each year, and if not so made an additional fee of one dollar for each thirty days' delay beyond the first day of September and up to the first day of January shall be added to the regular fee. On the first day of January of each year, or within ten days thereafter, the secretary of the board shall publish and mail to every registered architect in the state of New York a printed list of the legally registered architects within the state, and each such published list shall contain at the beginning thereof these words: "Each registered architect receiving this list is requested to report to the secretary of the board the names and addresses of any architects known to be practicing architecture whose names do not appear in this registry. The names of persons giving such information shall not be divulged." Should any architect continue to practice architecture beyond the first day of January, despite the fact that his or her name does not appear in the registry, he or she shall be counted as an illegal practitioner, and his or her certificate may be suspended or revoked by the regents, as provided for in this section. All practitioners of architecture already registered in this state at the time of the passage of this act shall make application to the secretary of the board for the re-registration blank upon receipt of which he or she shall, in like manner already described, make application for re-registration, forwarding to the secretary of the board the re-registration blank properly filled in and accompanied by the fee of two dollars. Said application and fee must reach the secretary on or before the first day of December following the adoption of this article, failing which the delinquent shall be dealt with as outlined in this section.

The fees obtained from the renewal of registration of architects as required by this section shall be remitted by the secretary of the board to the regents to be applied as hereinafter provided.

4. The regents may revoke any certificate, if such action be recommended by the board, after thirty days' written notice to the holder thereof and after a hearing before the board, upon proof that the holder of such certificate is practicing in violation of subdivision three of this section; or upon proof that such certificate has been obtained or that the person mentioned therein has obtained such certificate by fraud or misrepresentation; or upon proof that any money was paid for such certificate except the regular fees hereinbefore set forth; or upon proof that the holder of such certificate is falsely impersonating a practitioner or former practitioner of the like or different name or who is practicing under an assumed,fictitious or corporate name, or upon proof that the holder of such certificate has been guilty of a felony in connection with the practice of architecture.

§ 79-b. *Violation of article.* Any violation of this article shall be a misdemeanor, punishable for the first offense by a fine of not less than fifty and not more than one hundred dollars, and for a subsequent offense by a fine of not less than two hundred nor more than five hundred dollars, or imprisonment for not more than one year, or both.

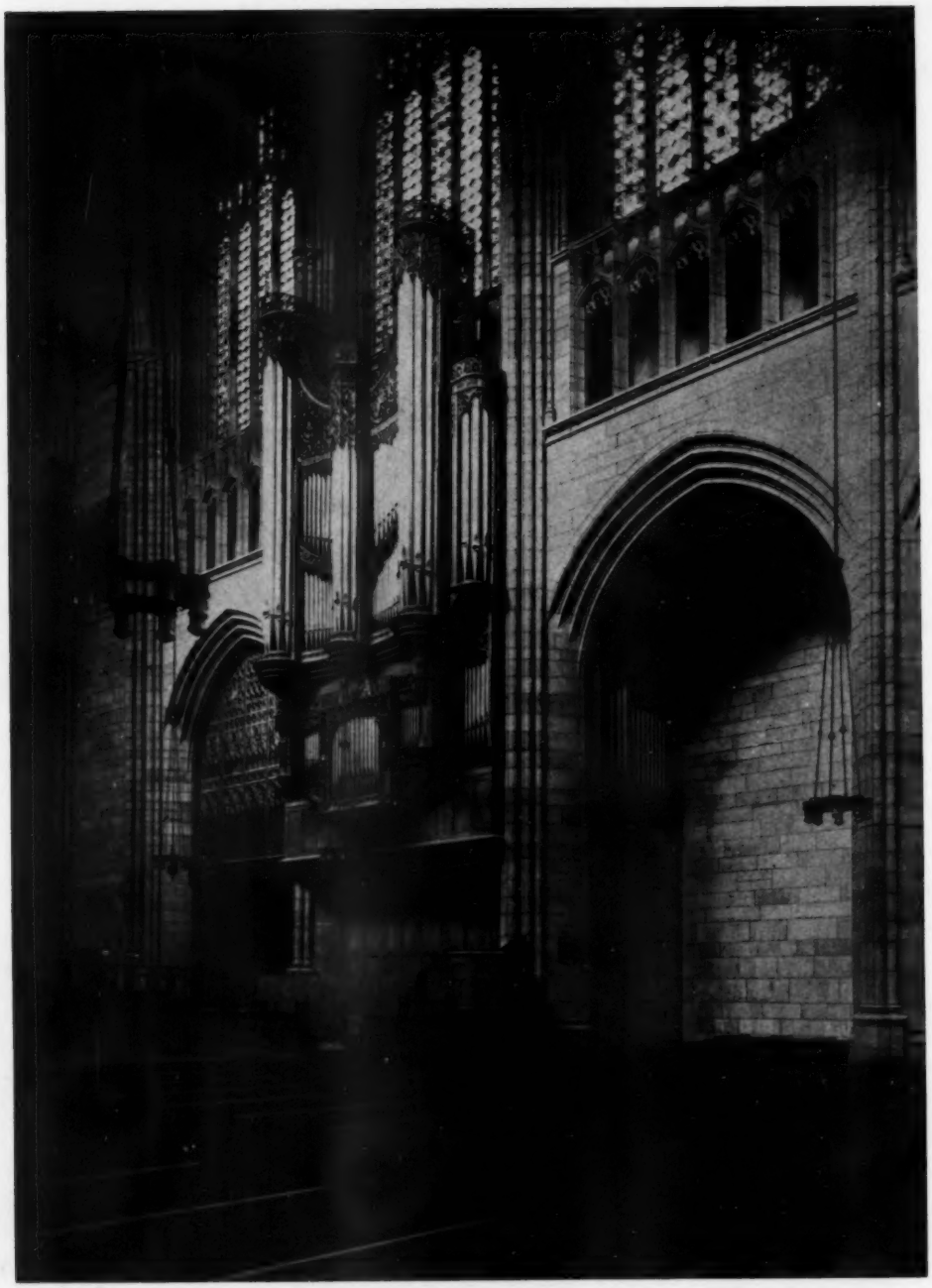
§ 79-c. *Certificate presumptive evidence.* Every unrevoked certificate and certificate of registry made as provided in this article shall be presumptive evidence in all courts and places that the person named therein is legally registered. Any registration in accordance with this article shall be lawful authority to practice architecture.

§ 79-d. *Conviction and prosecution of offenders.* All violations of this article when reported to the regents and duly substantiated by affidavits or other satisfactory evidence shall be investigated by it and if the report is found to be true and the evidence substantiated the regents shall report such violations to the attorney-general and request prompt prosecution.

The regents may appoint inspectors for the purpose of enforcing this section and the salaries and expenses shall be paid from such funds as may be available therefor.

§ 79-e. *Fees, fines, penalties.* The fees obtained from the renewals of registration of architects as required by this section shall be remitted by the secretary of the board to the regents to be applied as hereinafter provided. All fees, fines, penalties and other moneys derived from the operation of this article shall be paid to the regents, who shall account for the same and who shall pay therefrom all salaries and expenses incurred by the board, the secretary of the board and the regents, in carrying out the provisions of this act, and who shall pay into the state treasury, after the payment of these charges, any portion of such moneys remaining unexpended.

§ 2. This act shall take effect immediately.



ORGAN

ST. THOMAS' CHURCH, NEW YORK

BERTRAM GROSVENOR GOODHUE, ARCHITECT