ARCHITECTURE

DECEMBER · 1933

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HUMIDITY CONTROL

Information from the Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., states: "After intensive research we are marketing a new line of room type relative humidity controllers. Built in various models providing for different electrical circuits and available with or without relative humidity indicators, this new line offers accuracy and sensitivity in the control of humidity not heretofore available in units suited to domestic or small commercial installations." Further detailed information will be sent on request.

CHIMNEY POTS

Can be interesting. At least they are made so in the latest catalogue on the subject from the Atlantic Terra Cotta Company, 19 West 44th Street, New York City. This booklet is practically a handbook on the subject and therefore will be useful to you. Dimensional drawings, illustrations of installations, and types in color are included. Samples in color are sent on request.

A NEW HUMIDIFYING RADIATOR

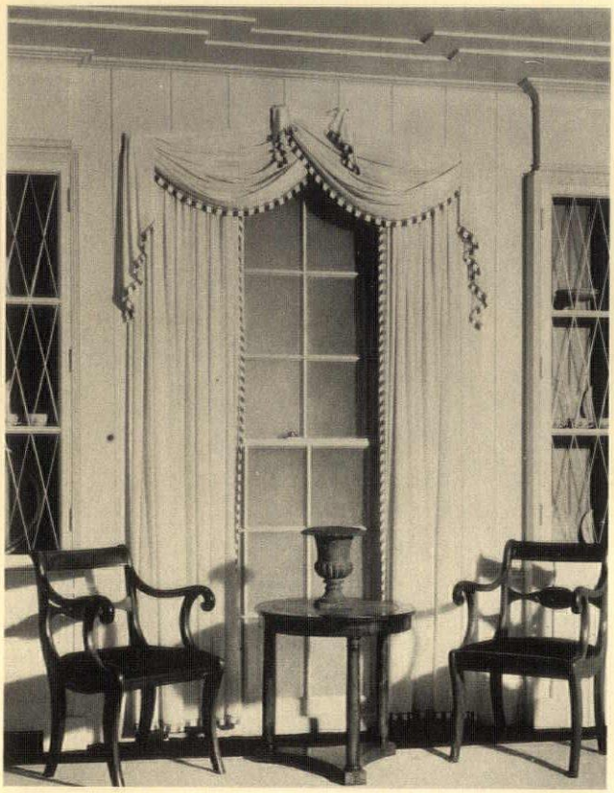
A moisture-conditioned room at all times is necessary for health and comfort. You can now obtain the proper degree of moisture automatically by means of the new Erskine "Thermoist," manufactured by the Chase Brass and Copper Co., Erskine Radiator Division, Waterbury, Conn. It is a combination of an Erskine Copper Radiator and a humidifying device for use with steam-heating systems. An outstanding advantage of the Erskine "Thermoist" is that the moisture is added to the air before heating. This insures against any approach to saturation of the air which would tend to precipitate moisture upon coming into contact with cooler surfaces in the room. Also, the moisture is supplied by using heat that would otherwise be wasted. This patented feature eliminates wasteful sprays and insures the proper amount of moisture for a given temperature. The "Thermoist" can be installed in an attractive cabinet against the wall. It can be completely recessed in the wall. Or, it can be installed below the floor level. Inquiries invited.

BAKELITE

Recent issue of *Bakelite Review* contains an interesting article on a new wall unit. Laminated Bakelite has been increasingly used in building construction. Wainscoting for bank counters, booth trim for cafeterias, and panelling for offices are a few typical examples. Heretofore you have had to use your own ingenuity in developing means of applying this material to walls. The Wooster Products Co. now simplifies this problem by supplying a clip base type of wall trim designed for rigid walls. The trim is so designed that it locks the Bakelite Laminated sheets firmly into place. Inquiries are invited. Bakelite Corp., 247 Park Avenue, New York City.

RIVETING ALUMINUM

The ever-increasing use of aluminum and its alloys for structural purposes intensifies the interest that is being shown in two recent publications of the Aluminum Co. of America, of Pittsburgh. These are the booklets on "The Riveting of Aluminum" and "The Welding of Aluminum." When maximum corrosion resistance and weight saving are essential, aluminum alloy rivets are used. Discussion is given of design proportion of joints, required strength of riveted joints, driving procedure, etc. The various preparations for welding and processes are discussed in the book on welding. Both these handy-sized booklets are well conceived and executed. To better understand the applications of aluminum you should read these books.



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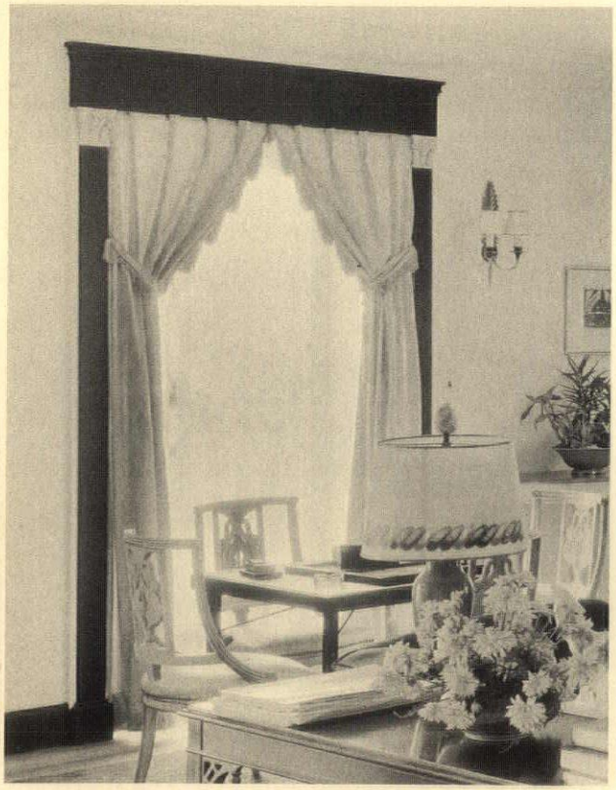

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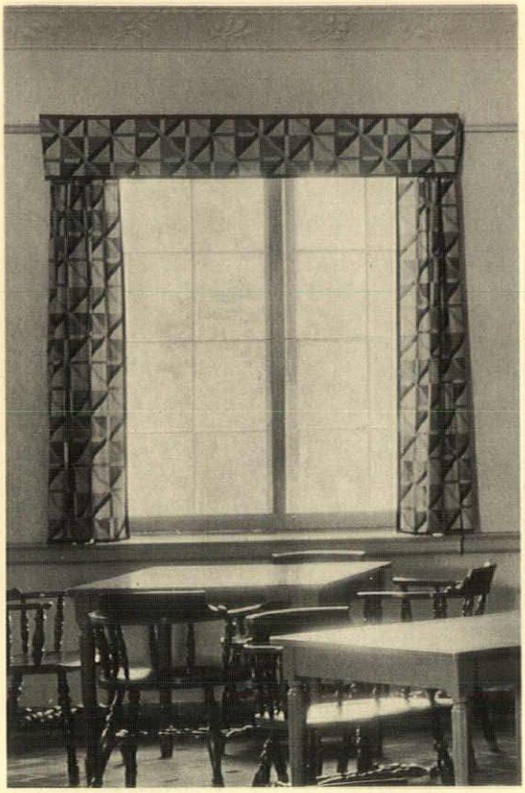

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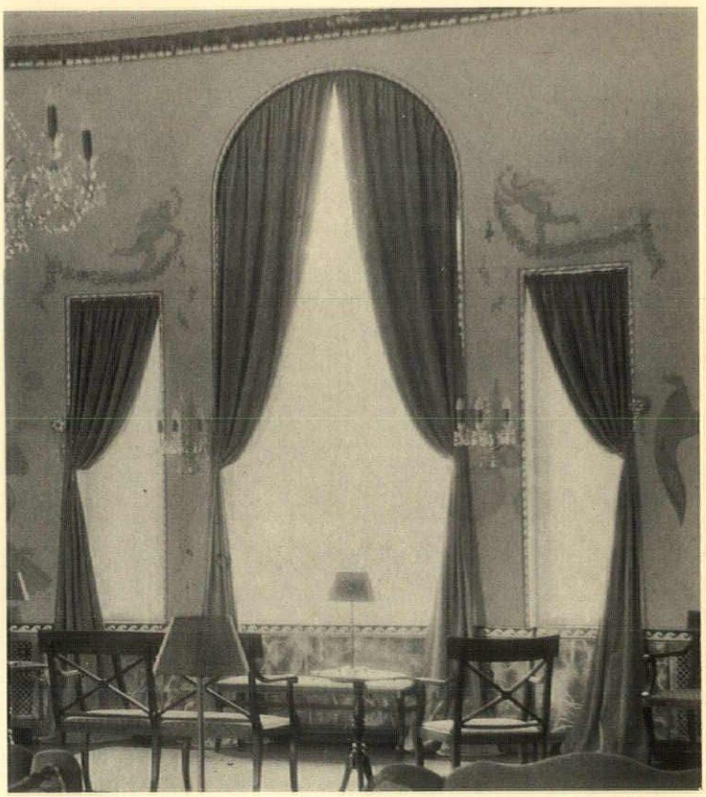

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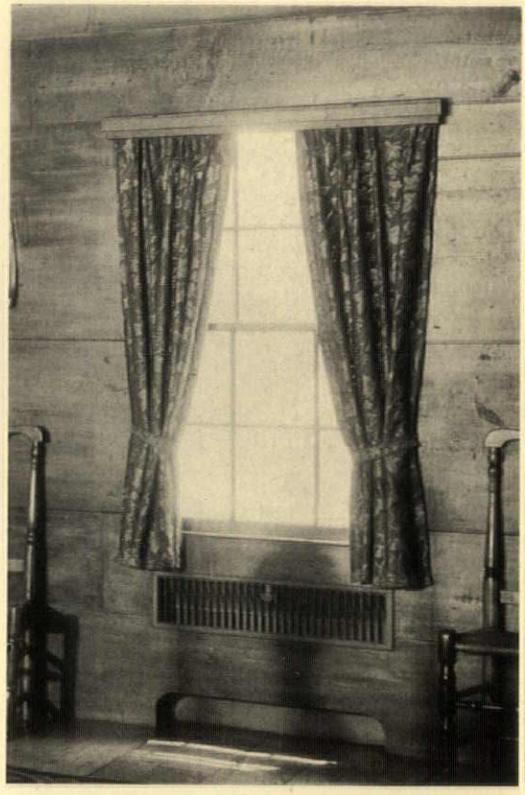

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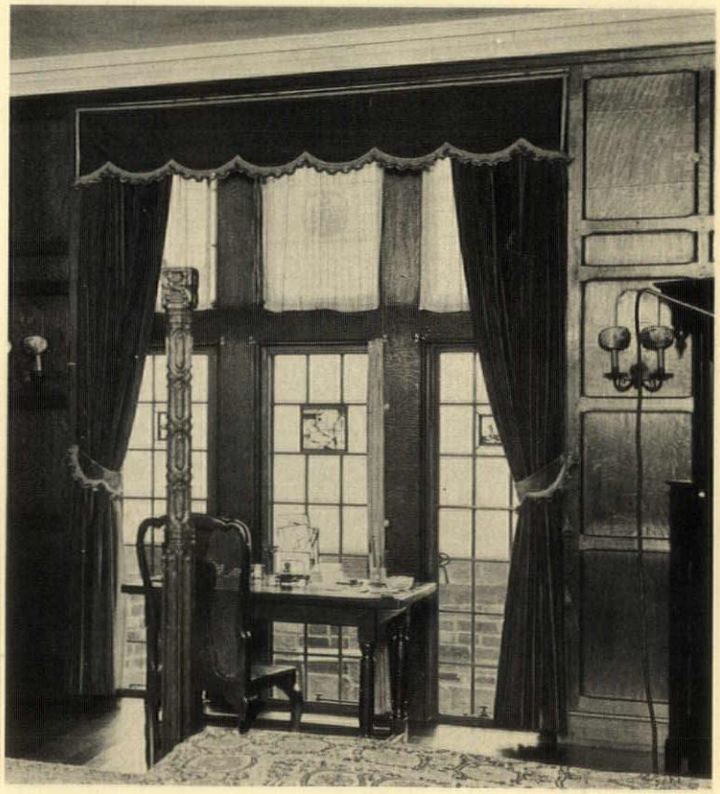

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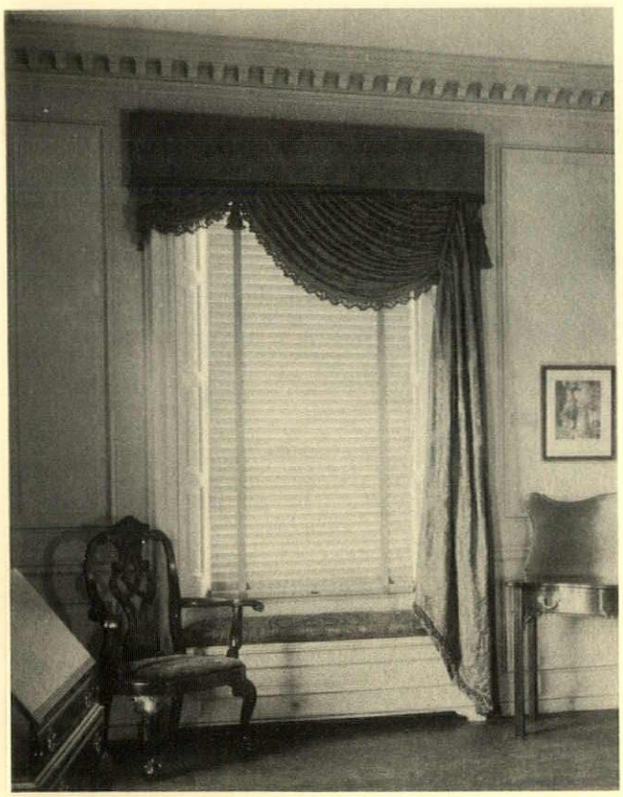

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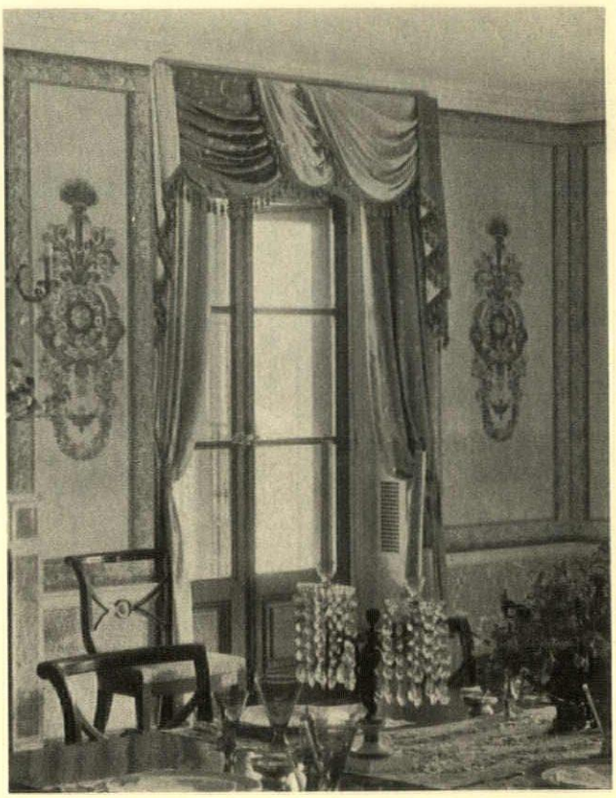

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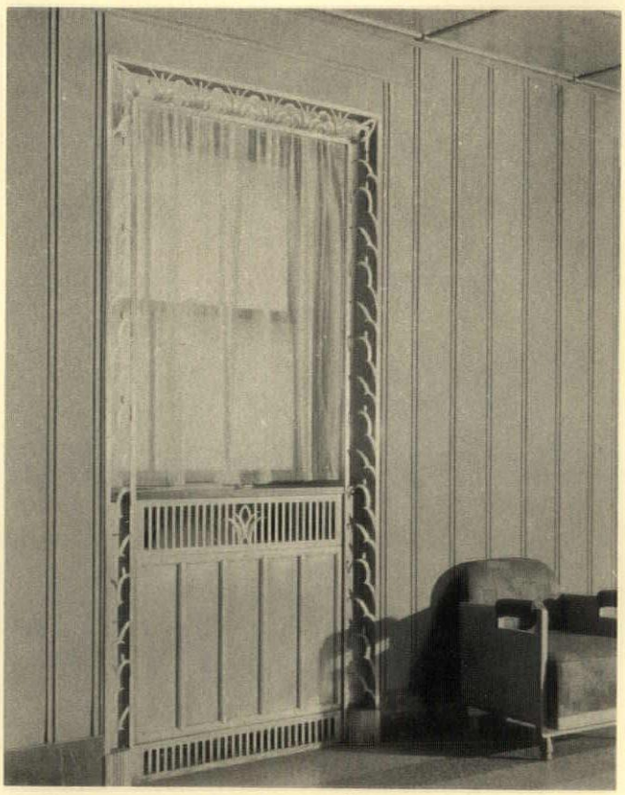

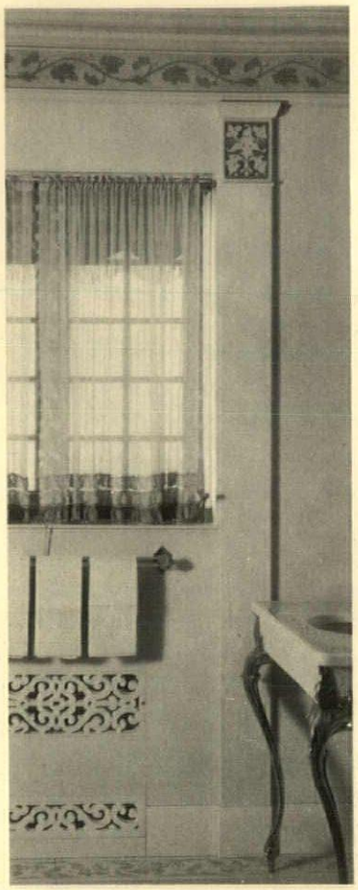

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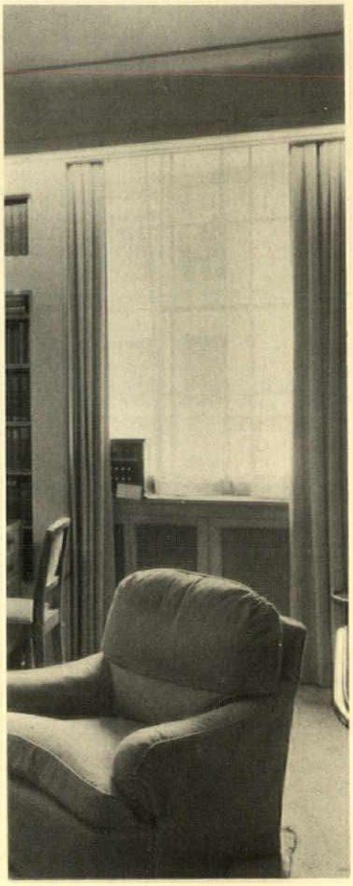

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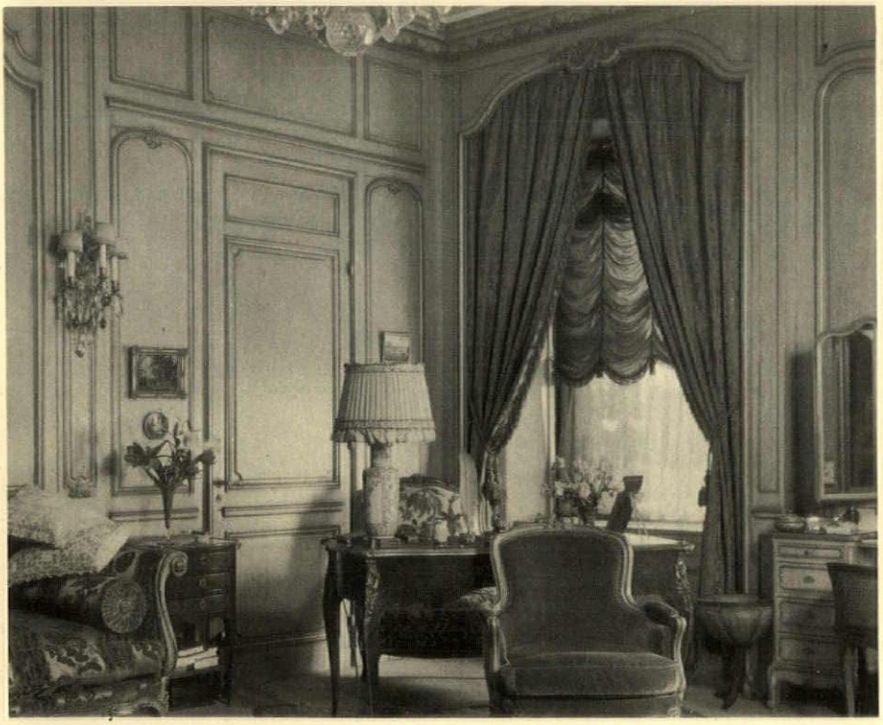

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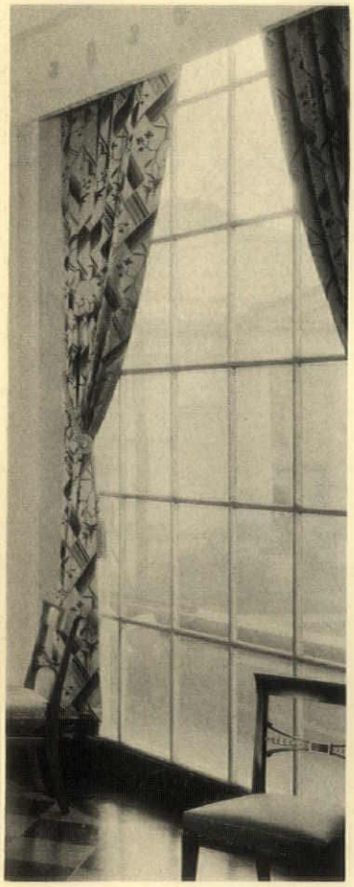

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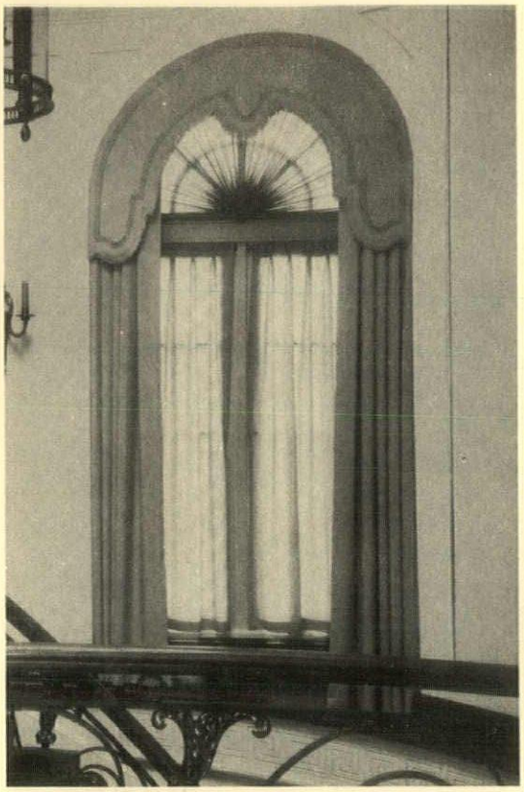

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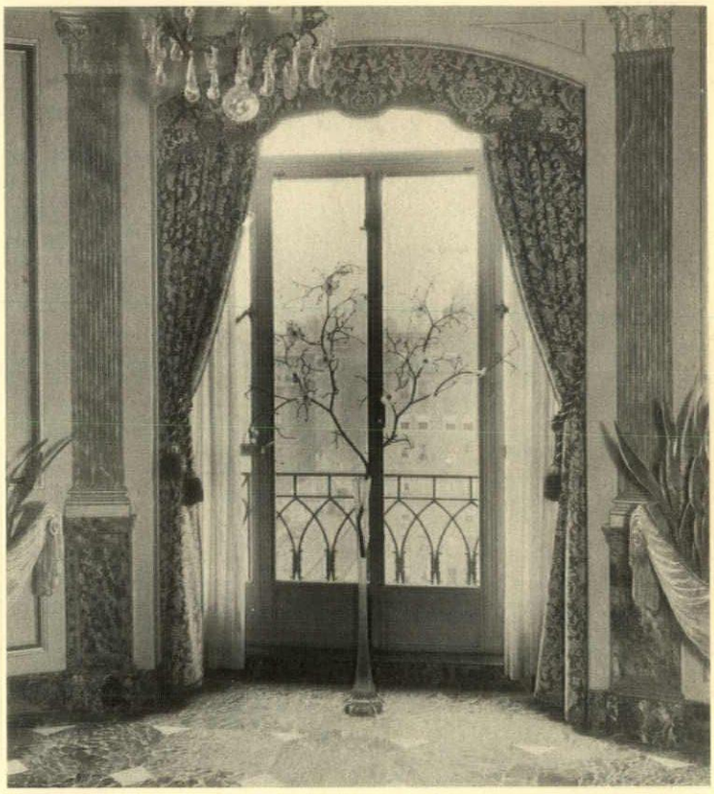

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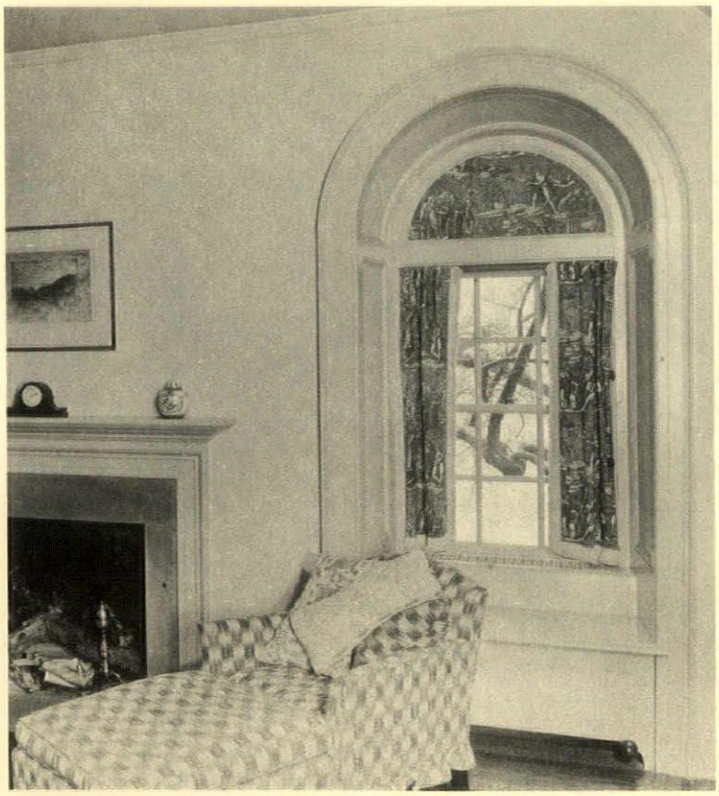

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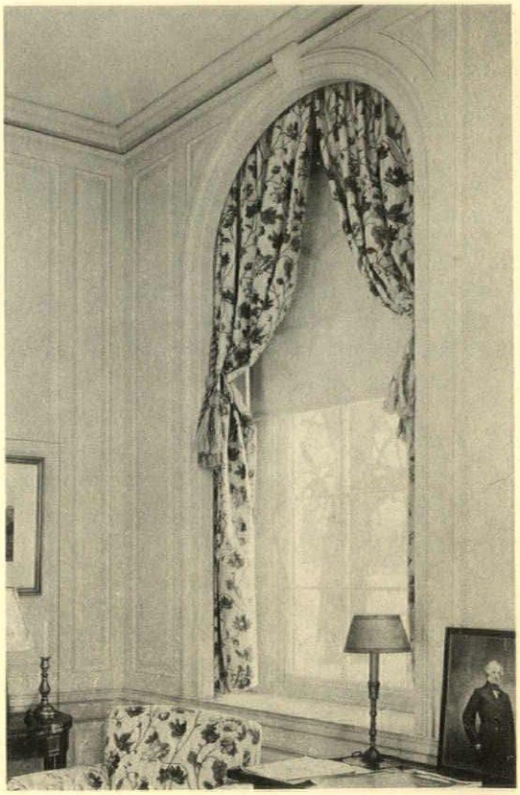

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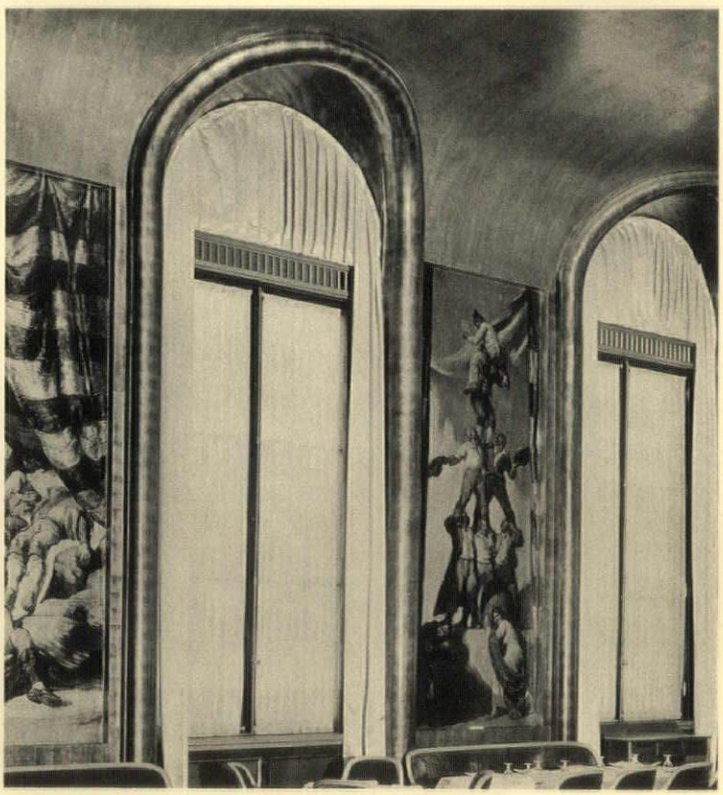

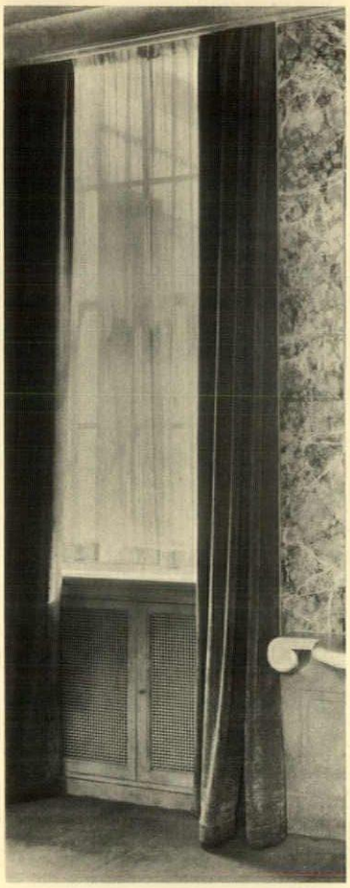

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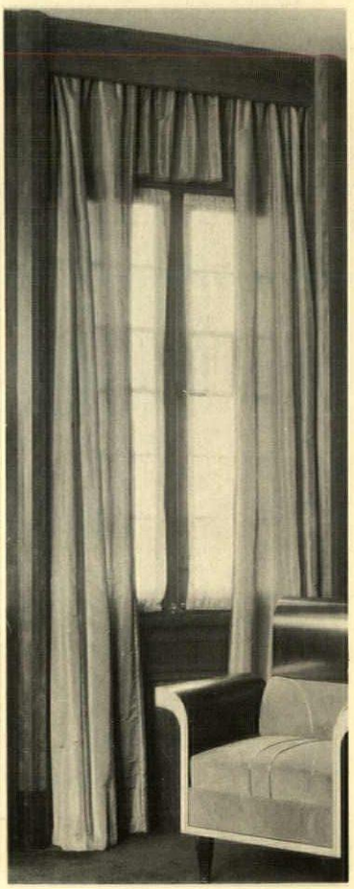

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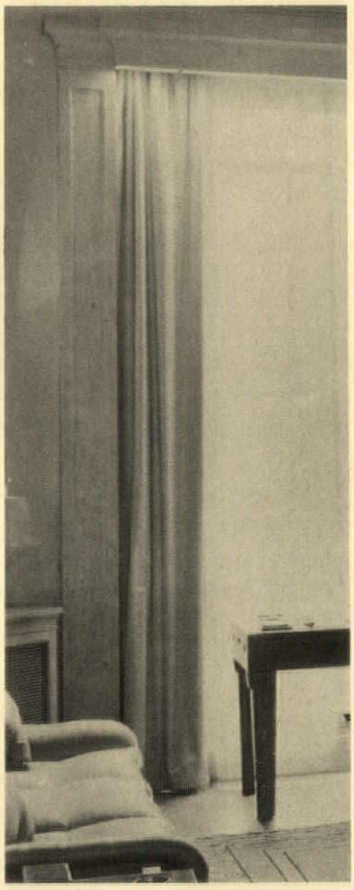

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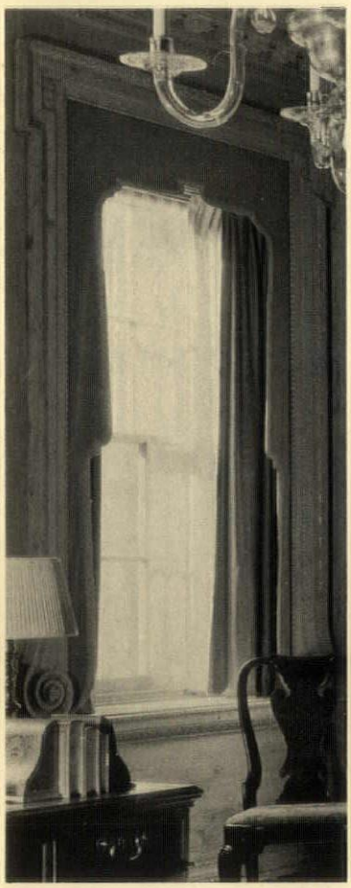

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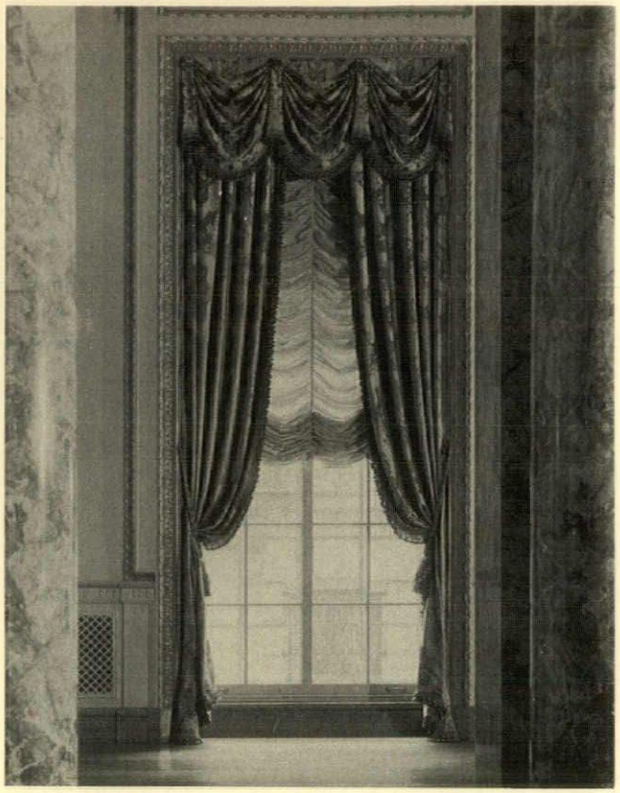

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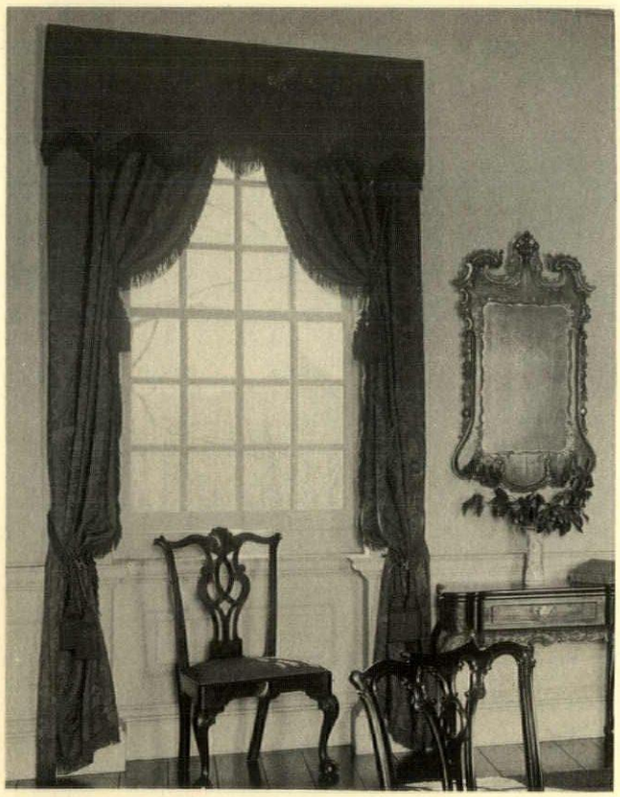
Mount Pleasant, by courtesy of the Pennsylvania Museum



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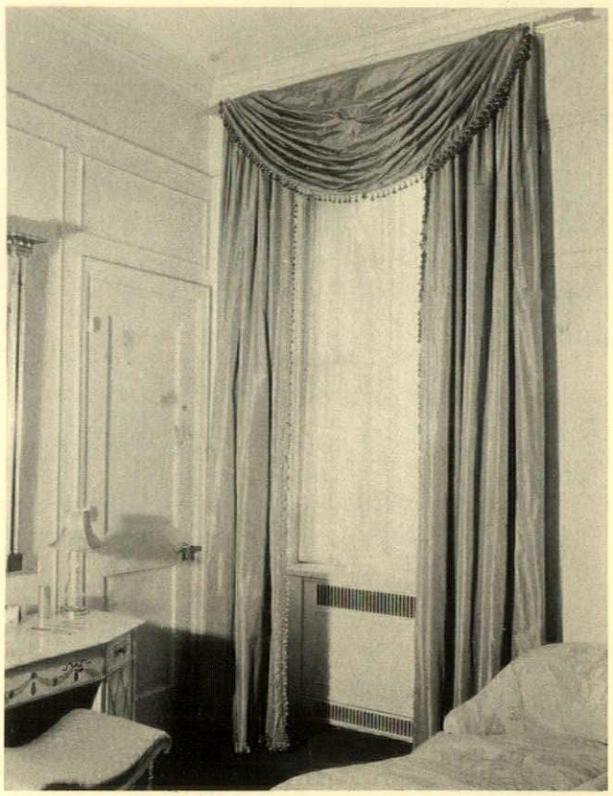

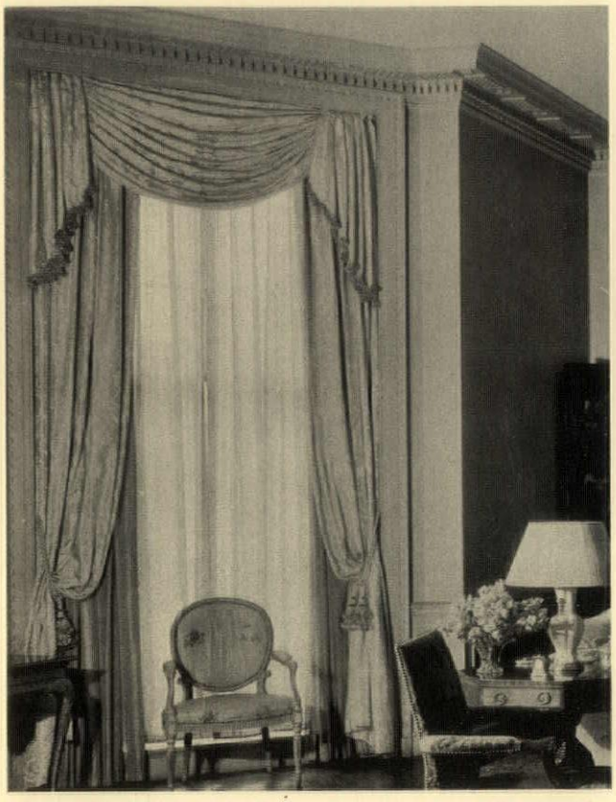

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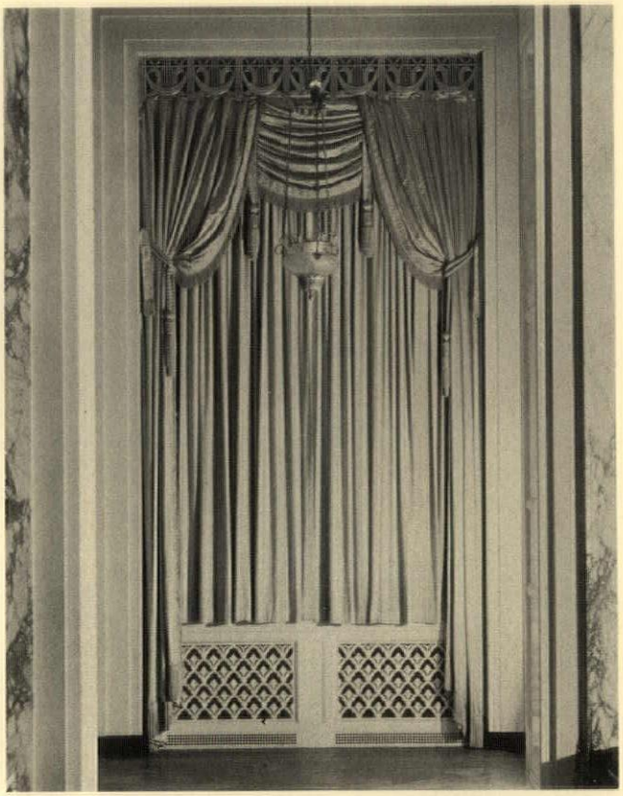

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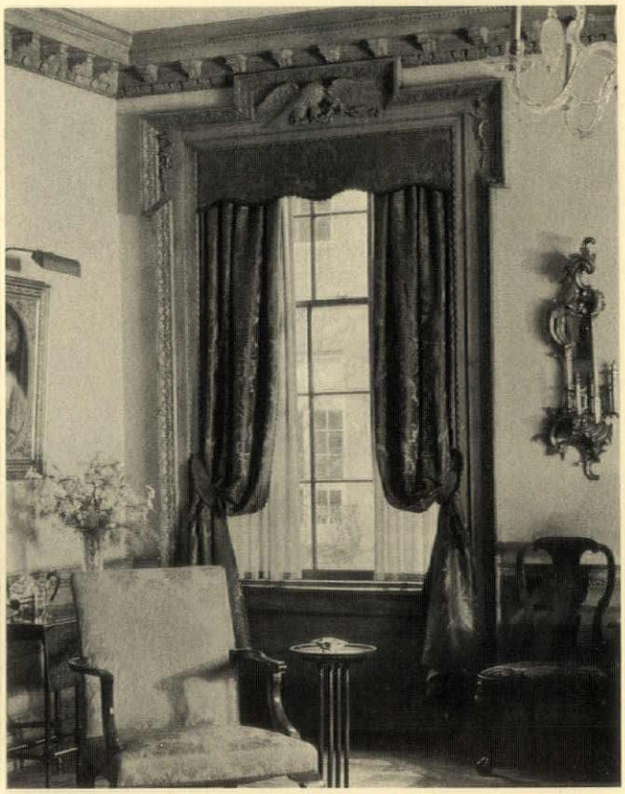

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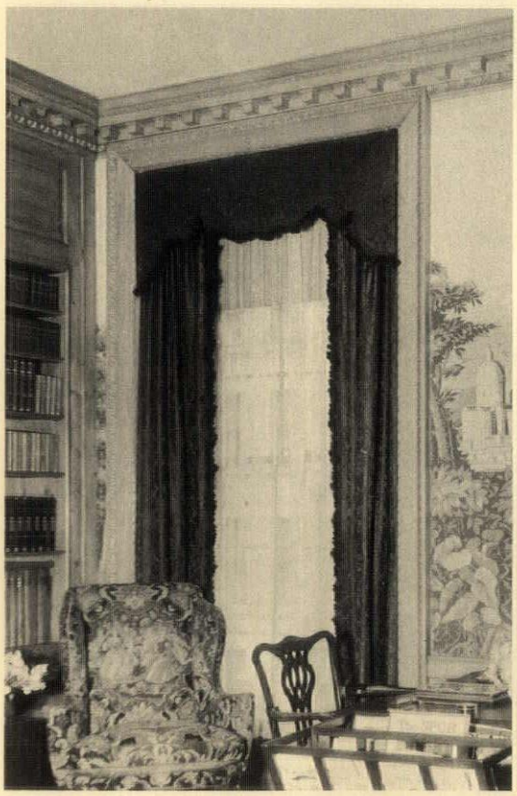

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THE EIGHTY-SIXTH IN A SERIES OF COLLECTIONS OF PHOTOGRAPHS ILLUSTRATING VARIOUS MINOR ARCHITECTURAL DETAILS

ARCHITECTURE'S PORTFOLIO OF

CURTAIN TREATMENT AT WINDOWS

Subjects of previous portfolios are listed below at left and right of page

1926
- DORMER WINDOWS
- SHUTTERS AND BLINDS

1927
- ENGLISH PANELLING
- GEORGIAN STAIRWAYS
- STONE MASONRY TEXTURES
- ENGLISH CHIMNEYS
- FANLIGHTS AND OVERDOORS
- TEXTURES OF BRICKWORK
- IRON RAILINGS
- DOOR HARDWARE
- PALLADIAN MOTIVES
- GABLE ENDS
- COLONIAL TOP-RAILINGS
- CIRCULAR AND OVAL WINDOWS

1928
- BUILT-IN BOOKCASES
- CHIMNEY TOPS
- DOOR HOODS
- BAY WINDOWS
- CUPOLAS
- GARDEN GATES
- STAIR ENDS
- BALCONIES
- GARDEN WALLS
- ARCADES
- PLASTER CEILINGS
- CORNICES OF WOOD

1929
- DOORWAY LIGHTING
- ENGLISH FIREPLACES
- GATE-POST TOPS
- GARDEN STEPS
- RAIN LEADER HEADS
- GARDEN POOLS
- QUOINS
- INTERIOR PAVING
- BELT COURSES
- KEYSTONES
- AIDS TO FENESTRATION
- BALUSTRADES

1930
- SPANDRELS
- CHANCEL FURNITURE
- BUSINESS BUILDING ENTRANCES
- GARDEN SHELTERS
- ELEVATOR DOORS
- ENTRANCE PORCHES

Below are the subjects of forthcoming Portfolios

Exterior Plasterwork
JANUARY

Church Doors
FEBRUARY

Fountains
MARCH

Modern Ornament
APRIL

Rustication
MAY

Organ Cases
JUNE

Photographs showing interesting examples under any of these headings will be welcomed by the Editor, though it should be noted that these respective issues are made up about six weeks in advance of publication date.

1930
- PATIOS
- TREILLAGE
- FLAGPOLE HOLDERS
- CASEMENT WINDOWS
- FENCES OF WOOD
- GOTHIC DOORWAYS

1931
- BANKING-ROOM CHECK DESKS
- SECOND-STORY PORCHES
- TOWER CLOCKS
- ALTARS
- GARAGE DOORS
- MAIL-CHUTE BOXES
- WEATHER-VANES
- BANK ENTRANCES
- URNS
- WINDOW GRILLES
- CHINA CUPBOARDS
- PARAPETS

1932
- RADIATOR ENCLOSURES
- INTERIOR CLOCKS
- OUTSIDE STAIRWAYS
- LEADED GLASS MEDALLIONS
- EXTERIOR DOORS OF WOOD
- METAL FENCES
- HANGING SIGNS
- WOOD CEILINGS
- MARQUISES
- WALL SHEATHING
- FRENCH STONEWORK
- OVER-MANTEL TREATMENTS

1933
- BANK SCREENS
- INTERIOR DOORS
- METAL STAIR RAILINGS
- VERANDAS
- THE EAGLE IN SCULPTURE
- EAVES RETURNS ON MASONRY GABLES
- EXTERIOR LETTERING
- ENTRANCE DRIVEWAYS
- CORBELS
- PEW ENDS
- GOTHIC NICHES

Despite the trigometrical aspect of the formula, computations are done by elementary arithmetic. However, in office work a table of values for quick reference, like the accompanying one, should be used. The commonest pairs of dimensions are soon memorized— "5, 17½," "5½, 15," "6, 13½," "6½, 12," and so on. In the table shown here the risers are given at ¼" intervals, corresponding to 2° changes in rake, and the resultant tread figures to the nearest tenth of an inch. The column of tangents—riser divided by tread, or total rise divided by total run—might be useful in selecting the best riser height for a proposed stairway where the approximate total rise and run are known.

It would seem that the mechanical processes of ascending and descending stairways are the same for normal human beings of all sizes (beyond the crawling stage), so for smaller people the dimensions would be reduced without change in proportion. This should be done in primary schools and other buildings designed for children's use. By a readjustment of constants in the proposed formula it would not be difficult to compute a series of paired values for children, say, ten years old; graphically expressed, this would lower the curve. But a simpler and equally accurate method would be to take the adult dimensions from the table and reduce riser and tread in the same proportion—for instance, three quarters of full size—using as a basis some ratio of the child's average pace to the adult's.

TABLE OF STAIR PROPORTIONS

$$T = \frac{R}{\tan (R-3)\ 8^\circ}$$

RISER (INCHES)	TREAD (INCHES)	TANGENT $\left(\frac{R}{T}\right)$	RAKE (DEGREES)
4	28.3	0.1405	8
4¼	24.1	0.1763	10
4½	21.2	0.2126	12
4¾	19.1	0.2493	14
5	17.4	0.2867	16
5¼	16.2	0.3249	18
5½	15.1	0.3640	20
5¾	14.2	0.4040	22
6	13.5	0.4452	24
6¼	12.8	0.4877	26
6½	12.2	0.5317	28
6¾	11.7	0.5774	30
7	11.2	0.6249	32
7¼	10.7	0.6745	34
7½	10.3	0.7265	36
7¾	9.9	0.7813	38
8	9.5	0.8391	40
8¼	9.2	0.9004	42
8½	8.8	0.9657	44
8¾	8.5	1.0355	46
9	8.1	1.1106	48

N.B.—Tread widths do not include nosings.

In the interest of public safety, building laws should contain quite specific requirements for stair proportions in public and semi-public buildings; perhaps more such restrictions would have existed if there had been any recognized and expressible standard. The law might accomplish this directly by including a table of recommended treads for risers of various heights and stipulating that no variation shall exceed 5 per cent. Such a table would be useful, incidentally, to architects and builders. For stairways in certain types of buildings the laws should provide, as most of them now do in theatres, limits of steepness, expressed by maximum allowable riser heights.

To summarize, it seems that adoption of the proposed new rule would be justified in view of these facts: (1) stairways are practically indispensable in almost every type of structure; (2) they may be, and often are, dangerous and uncomfortable through lack of proper proportions; (3) all commonly known and used rules for proportions are demonstrably faulty and inconsistent; (4) a better standard is highly desirable in connection with architectural practice, education and building laws; (5) the proposed new standard is simple in theory and practice, rational and consistent; under all possible conditions *it works*.

A self-supporting stairway in the house of Schofield Andrews, Chestnut Hill, Pa.

Tilden, Register & Pepper, architects. Wrought-iron work executed by The Iron-Craftsmen

Rake, Riser, and Tread: II

A PROPOSED SOLUTION OF THE STAIRWAY'S ETERNAL TRIANGLE

By Jamieson Parker, A.I.A.

WITH the elements in their natural order, the problem presents itself in this way: for every rake there is a best riser height; the tread will be determined automatically; find the law of proportion between rake and riser. (Note that in this conception there is no attempt to place a value on the unit of mechanical action by summation of riser and tread.)

Following this line of approach, a number of experiments were made. The work was done with actual examples and full-size models, plotting on graph paper the intersections of tread and riser co-ordinates observed to be good, and recording the rakes. Notes were also made of proportions which seemed undesirable. Low-riser stairways were designed from measurements of up and down strides on inclines of various angles, and the results checked by several persons. For instance, on a rake of 8° a 4″ riser with a tread of about 28″ was found extremely comfortable. (Note the discrepancy between these proportions and any prescribed by the old rules.) For a 4½″ riser a 21″ tread seemed best, the rake being about 12°. Proceeding in this way, a series of values—rake, riser, and tread—were tentatively established, which should, it was thought, be not far from an ideal standard. The plotted points seemed to follow an even curve. What was its equation? The answer came more easily than was expected. When the rake angles were laid out on a separate diagram, for risers at 1″ intervals, a simple law was apparent: THE RISER HEIGHT VARIES DIRECTLY WITH THE ANGLE OF RAKE. Further, on the basis of values assumed, *the rake increased an average of 8° for each additional inch of riser.* Now starting with the lowest point, where the 4″ riser was plotted for an 8° rake, the curve was accurately reconstructed for additional 8° increments by this method: $T_4 = \frac{4}{\tan 8°}$, $T_5 = \frac{5}{\tan 16°}$, and so on. The values thus found were never far from the co-ordinates of points assumed from practical test. Further field observation showed

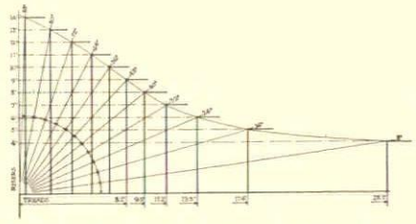


Fig. 1. A graphic representation of the derivation of the curve and the relation of the three elements for risers at 1″ intervals

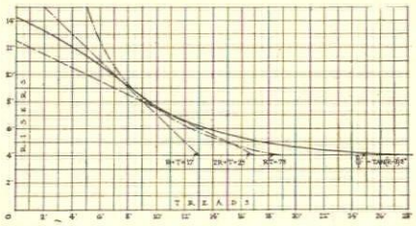


Fig. 2 (repeating Fig. 1 of Part I). The curve of Fig. 1 plotted to show its relation to the straight-line representations of the three old rules

that where differences were large enough to be sensed the new proportions were preferable.

A general statement of the above becomes the proposed rule. Given any riser, 4″ or more, the formula for the tread is: $T = \frac{R}{\tan (R - 3)\ 8°}$. It happens that each degree change in the rake corresponds to an eighth of an inch in the riser, making calculations very convenient.

Fig. 1 shows graphically the simple derivation of the curve and the relation of the three elements for risers at 1″ intervals. In Fig. 2 the same curve has been plotted together with graphs of the three old rules.

As previously stated, the ramp and the ladder are special cases of the stairway, occupying the two extremes of rake angles. Obviously, as the rake is decreased a lower limit for riser height is reached, below which it is not advisable to reduce this element, because of the need of clear visibility. Although the 4″ riser, with proper tread, is entirely practical for monumental and garden stairways, most architects will probably agree that it is a safe minimum. For this reason it is placed at the bottom of the curve, with its 8° rake. If a lower rake is necessary there are two alternatives: either a series of steeper flights with landings, or a ramp. When provided with a slip-resisting surface and protected from the weather, the pedestrian ramp is very satisfactory, especially for safe handling of large crowds as in theatres. Naturally there is an upper rake limit for ramps, depending somewhat on circumstances. The building code of this city (Portland, Ore.) allows theatre ramps up to a pitch of one in five, slightly over 11°. For a few degrees above 8°, the practicability of stairways and ramps overlap, the choice depending on conditions.

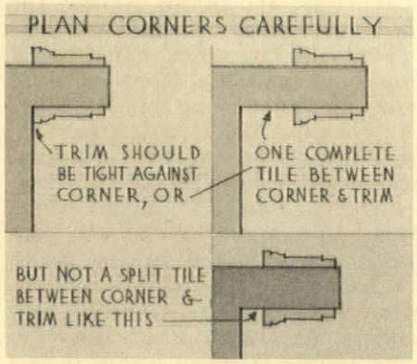
Towards the other extreme, of maximum rakes and risers, it is interesting to see where this law takes us. The experiments and deductions described above had been confined to ordinary stairway rakes with risers from 4″ to 9″. As an afterthought prompted by curiosity, the curve was checked in its upper reaches, where it was found to be surprisingly, almost uncannily, consistent. As the rake increases beyond 45° the stairway begins to lose its own character and take on more of the ladder's. At 72° it is distinctly ladderlike. For this rake the rule prescribes 12″ risers and treads about 4″ wide, which are the elements of the standard folding step-ladder. At 88° we have reached the true ladder, for vertical or almost vertical use. The curve here intersects the 14″ riser level and the tread almost disappears. The standard fireman's ladder has rungs 14″ on centres. The curve passes out of the quadrant at the riser height of 14¼″. By this unfailing consistency to the upper limit, an extension of the rule's usefulness is apparent, as very steep stairways are necessary in many cases, such as towers, factories, fire-escapes, and ships, and by the rule good results can be had at all rakes. The old rules are misguiding and inconsistent for steep rakes. If used for the ladder, allowing 1″ treads, one rule would space the rungs at 16″, one at 12″, and the other at six feet or more.

soil lines across the beams is to be avoided, as it will result in the necessity of "platforming" (raising the finished floor level) the bathroom—an undesirable form of construction.

The modern mode in bathrooms avoids running lavatory pipes to the floor, where they are a hindrance to the keeping of the floor spotless.

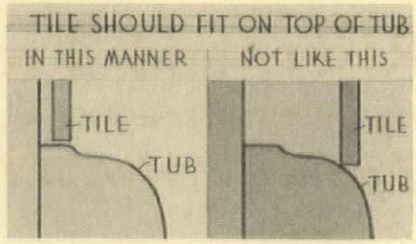
The thoughtful study of bathrooms and kitchens will not only result in a saving on the plumbing work, but will give a sense of pride in their ownership.

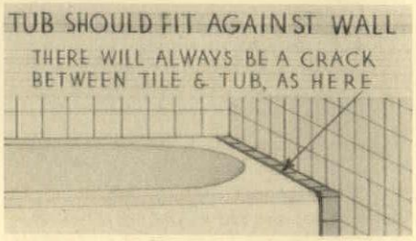
A bathtub set out near the door or entrance may make the person entering the room stumble, or at least create a fear of stumbling. Having three fixtures on the side of the room provides the most economical arrangement. If the window is over the tub there is the disadvantage that the window cannot be opened or closed without first climbing into the tub. Then, too, there is the



danger that the door may be moved too far over to the one side, with the result that only a small strip of tile is possible, or that the trim of the door must be cut. Both of the latter are undesirable features that can be avoided.

There is one potent danger that the architect must avoid when laying out a bathroom which has in it a recessed tub. Very few tubs are exactly 5′ or 5′ 6″ long. Some vary as much as two inches. Hence it is evident that the walls laid out for a 5′ 6″ tile finish would probably have to have an additional 1″ of "mud" on each side of the wall if the tile are to finish on the lip of the tub where they belong. This assumes that the tub is short, which is generally the case. And the finished tile-to-tile dimension would be 5′ 4″. To have the tile come down on the curved edge of the tub is undesirable; it is still worse to have it come in back of the tub, necessitat-

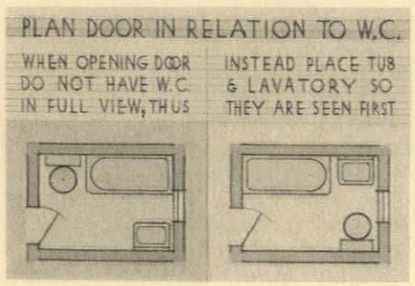




ing a band of split tile to be run between the tub and the wall. The architect should ask for, and get, the roughing size of the tub. This will enable him to do his part in laying out a workmanlike job of the bathroom.

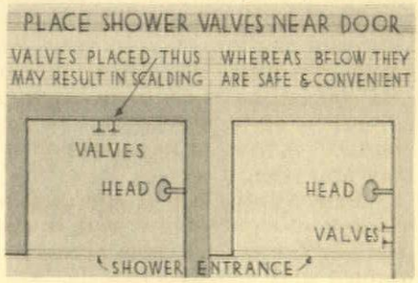
If the water-closet is opposite the lavatory, and the space is constricted, care must be taken to see that the knee room of 18″ is provided for. This is not only a legal requirement of many codes, but is also the minimum for comfort. A width of 2′ 4″ must be maintained in installing the water-closet. It is from these dimensions that the stall size, 2′ 4″ by 4′ 1″, is derived. The bowl is usually set 12″ from the wall and is itself 1′ 6″ long. Then, allowing 1′ 6″ for knee room, the total of 4′ is obtained. The added one inch is a safety factor in case the wall should be set out slightly.

By keeping the dimensions of a bathroom within reason, it is often possible for a very little additional cost to provide an extra bathroom. This of course will not only be a great convenience to the owner, but a valuable asset in making a sale. The residence with one bathroom only will soon be considered hopelessly outmoded and unsalable. An-



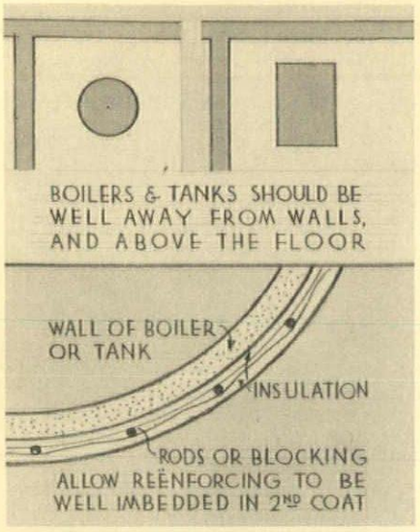
other item in the layout is the swing and position of the door. It is desirable to have it so placed that upon opening it, the water-closet is not in full view.

The shower valves should be placed so that they may be operated without one's getting wet. This will prevent scalding if the hot water is first turned on. It is a simple matter to have the valves so arranged.



The modern kitchen is a domestic laboratory, scientifically planned. The architect who has not made a study of the problem should consult with various kitchen equipment concerns, who will furnish detailed information gratis. A house is no better than its kitchen and bathroom. To have just a sink or fixture installed is not enough. The kitchen should be of a type particularly adapted to the needs of the person living in the house or apartment. It may embrace a laundry tray and sink, or a sink and drainboard, or a sink with a drainboard on each side. Then, whatever the type chosen, it should be properly located. Too often a sink is placed in one corner of the room and the china closet in a remote corner. Also the lighting must be taken into consideration. Both natural and artificial light must be located suitably. Although most gas stoves are now installed without flues, the opening in the back is unquestionably a vent, and the housewife using the oven will probably appreciate a flue to carry off the odors. A ventilating fan is now often put above the stove and is operated electrically. A rod controls an outside louver, so that it may be entirely sealed off in cold weather as desired.

In the next installment Mr. Bartels will conclude his discussion of Plumbing with a consideration of Fixtures.—EDITOR.



the cellar is flushed down. The hot-water tank should be placed so that it can be fully and easily covered. Many materials are on the market for insulation purposes. Their conductivity should be ascertained. The first layer on heater or tank is generally composed of sheets or blocks wired on. It should be at least one inch thick. Small blocks or rods should be fastened to this coat. These will keep the mesh for the second, or plastic, coat away from the first one. Being kept away from the first coat enables the mesh better to perform its duty—that of reinforcing the plastic coat. It is well to specify that a certain amount of white cement is to be mixed in the second coat so that it can be trowelled to a smooth, hard finish.

28—PIPE COVERING

The thickness of pipe covering for hot-water lines should be specified, likewise the method of fastening it. Then the quality and variety should be given attention. The specification should call for the joints to be filled. No half coverings should be permitted if it is possible to avoid it. Where exposed in a prominent place, it may be desirable to call for a canvas cover to be sewed on. Samples and weight of the covering should be submitted for approval.

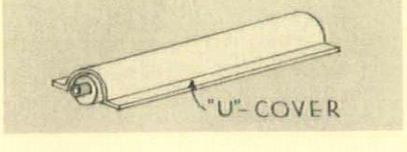
Fittings should be covered with the *same thickness* as the pipes. They should be wrapped with canvas to prevent their being knocked off or damaged. Moulded fittings are sometimes used, but they are expensive. On large work it is well to have metal lath around the fitting, both to hold the material and facilitate the removal if necessary.

Pipes subject to sweating should be covered. Particularly is this true where such lines run over hung ceilings, machinery, etc. Lines likely to sweat, due to atmospheric changes, are: cold-water lines, leader lines, and soil lines in frequent use. Remember that the *architect*, not the plumber, will be blamed for stained ceilings and damaged machinery.

At this point attention may well be called to the possible need of soundproofing for soil lines. Lines running in partitions near dining-rooms or living-rooms are apt to cause annoyance by their gurgling. So-called mineral wool is very effective in eliminating such noises.

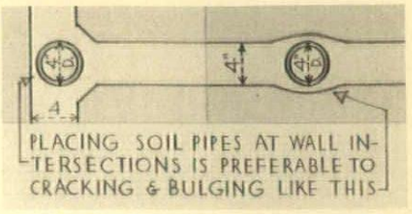
Cold-water lines in exterior walls, roof fill, or similarly exposed places, should be well protected. This is best done by having them covered with three layers of hair felt. Each layer is to be separately wrapped with building paper and securely fastened.

Another item properly coming under pipe covering is the provision of metal forms for the protection of pipe covering. These derive their name from their shape and are called "U" covers. They generally have a lip on the "U" to enable them to be fastened to the floor. These are necessary in cinder fill or concrete work, but their value "just for protection" under wood floors on concrete arches is doubtful. The contractor's superintendent can prevent damage to pipe covering if he desires to do so.

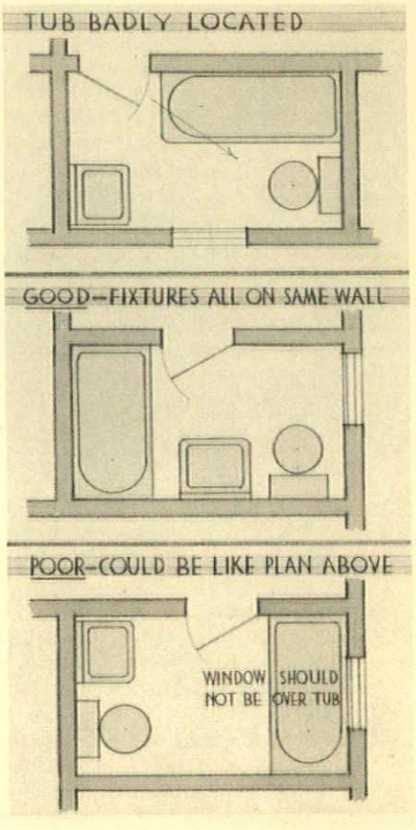


29—PLANS

Bathrooms which are far apart, or those not over the kitchen or other plumbing lines, or separate circuitous routes, not only need more maintenance but are obviously more costly to install than where lines carry through vertically. It is an advantage to place the fixtures back to back whenever this is possible. No lines needing future attention or subject to corrosion should be laid under tile, where they will be virtually inaccessible. Of course, lines will be excluded from exterior walls whenever possible. If it is not possible to do so they must be covered as specified elsewhere in this article.

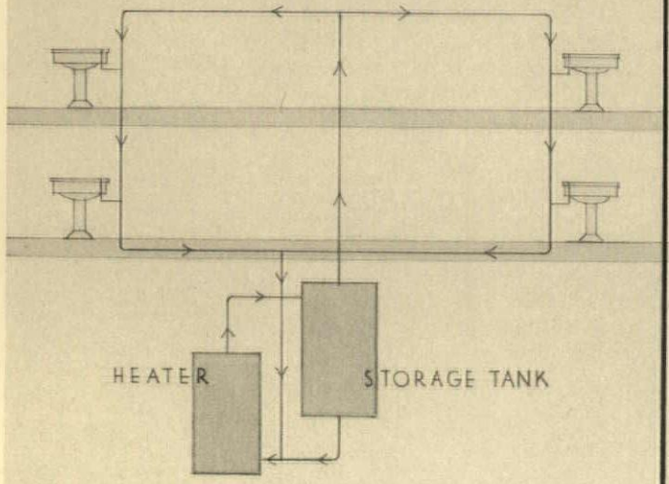


Too often lines are run in partitions which are too shallow for them. It is self-evident that a soil line with an inside diameter of 4" can hardly be concealed in a 4" partition. Sometimes it is attempted by wrapping wire lath around the pipe so that the plaster will adhere. Too often, however, when this is done cracks appear in the plaster later and the paint peels off. At best there is likely to be an ugly swell in the wall at this line. With heat changes the pipe will be sweaty, and being in direct contact with the plaster the latter will be kept damp, thus causing the paint to peel. Then, too, running horizontal vent lines in narrow partitions makes it necessary to cut the studs. Cracked plaster generally appears in these walls because this cutting reduces the wall's rigidity. The running of

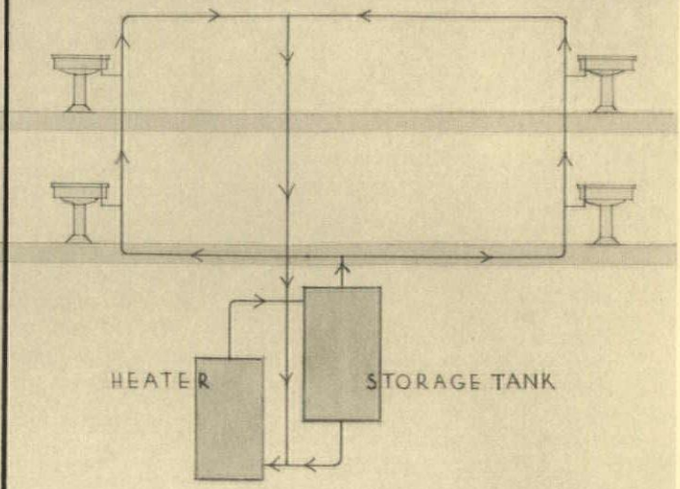


26-DIAGRAMS OF HOT WATER SYSTEMS

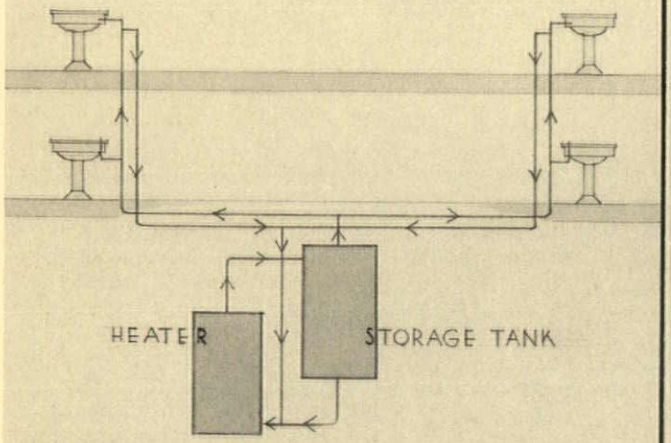
26-A DOWN-FEED LOOP



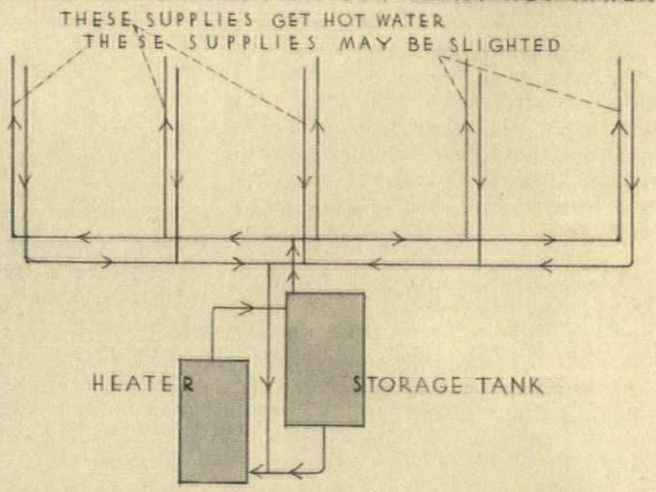
26-B UP-FEED LOOP, COMMON RETURN



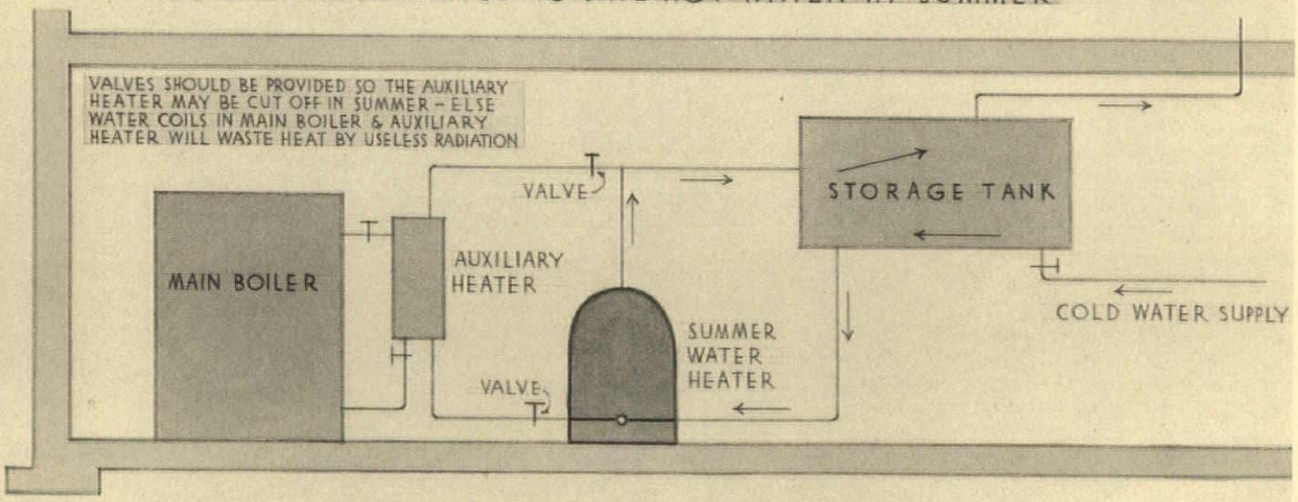
26-C UP-FEED LOOP, INDIVIDUAL RETURN



26-D DISTANT RISERS GET LEAST HOT WATER



26-E INSTALL VALVES TO SAVE HOT WATER IN SUMMER



Better Practice

By W. F. Bartels

PLUMBING (C)

By means of the paragraph numbers the reader is referred to the illustrations. Where more than one drawing illustrates a point in a paragraph the successive illustrations are also lettered, i.e., 26-A, 26-B, etc.

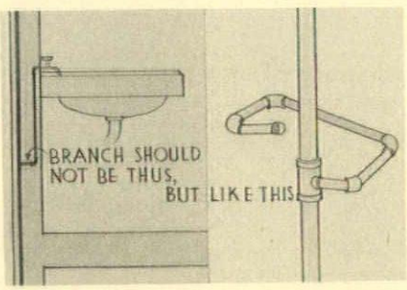
26—HOT WATER

SEVERAL large plumbing contractors, when asked what causes them the most trouble, replied unanimously, "hot water." This may seem strange on first thought. The subject is at once both simple and complicated. The architect should devote considerable time to it, and always remember the physical principle that hot water rises. This is often lost sight of by plumbers.

Horizontal runs of hot-water piping should be hung in hangers that will permit slight movement. Then, if the run is long, a swing or loop should be installed to take care of the expansion, always keeping in mind that brass pipe expands over 1¼″ for a 100° F. rise in temperature per 100′ length of pipe. In vertical risers the branches should not be taken off directly but swung off the riser. This prevents the riser hanging on the branch line. One known horizontal run of 30′ has had such a pull on it as to cause a leak at a fitting. In a high building it is of course necessary to provide for riser expansion by putting in expansion fittings, elbow loops, or swings. All lines should be run without pockets or traps, and drain to one central point at which there should be a draincock. The riser, too, should be well anchored, but of course not at both the top and the bottom unless expansion loops have been provided between them. The architect should specify a return hot-water line connected to the ends of all lines or risers so that a constant supply of hot water may be on tap.

Some systems in the small building, where there are no house tanks, are what are known as down-feed loops or systems (such as *A* in the diagrams on the next page); that is to say, the hot water is taken by one line, without branches, to the top of the building, and from there is fed down to all fixtures, the ends of the line being "tied in" to the return line to the heater. This seems to be the system favored by practical plumbers, although no definite reason can be cited for it. And, better yet, it seems to be the one which works.

The other method is the "up-feed system" where the fixtures are taken off the up-going hot-water risers. These either have separate returns going down to be tied in at the bottom, or are gathered together by one line at the top which then returns to the heater—all of which is shown diagrammatically on the following page.



Now the architect must keep in mind several things. The longer the horizontal run that the water must travel, the more sluggish the system. Elbows cause a slowing up of the speed. One advantage of the down-feed scheme is that along a horizontal run there will be as much, if not more, tendency to flow along as there is to go down. Whereas in the up-feed system, if there is a chance to go up the hot water will do this rather than flow along the level. Hence the last line of fixtures may be entirely "forgotten" by the hot water.

A check valve, where the return line enters the tank or line to the heater, will prevent any tendency of the water to flow back. On large jobs check valves are often put at the foot of each return line.

Some architects put the basement fixtures on the return line only, feeling that their use will stimulate the circulation of the hot water.

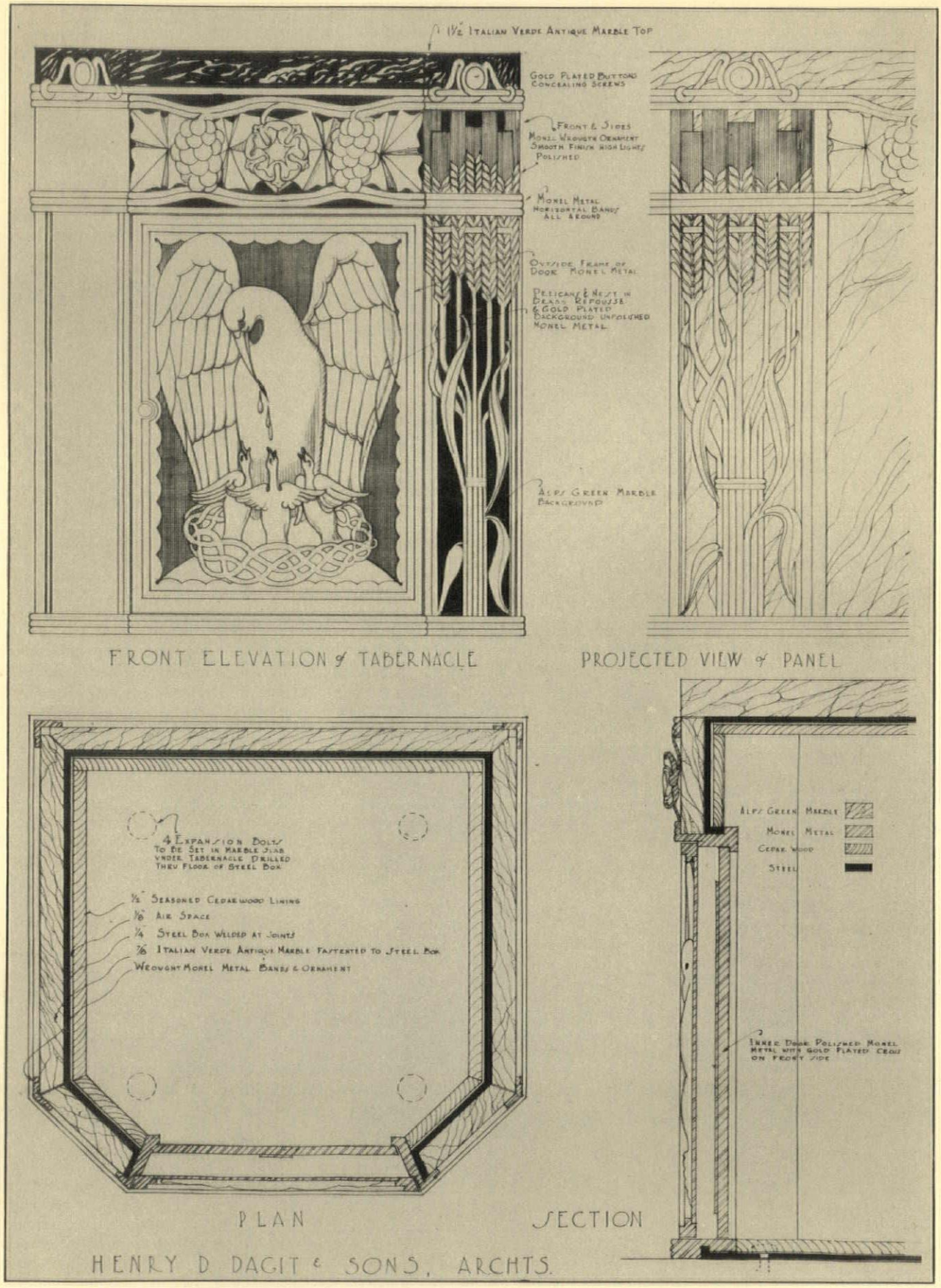
The water in most domestic hot-water systems depends for its circulation upon the fact that hot water rises. If this tendency, which is not very strong at normal temperatures, is restricted by small pipes, tortuous routes, and sections passing through cold places, it is obvious that the system will not work satisfactorily.

The components of a hot-water system are the pipes, heater, and storage tank. If a steam system is installed, there probably will be a so-called indirect heater attached to the main boiler. This should be of adequate size to supply hot water at all times, with the help of the storage tank. It should be specified to be directly connected without being bushed down (*i.e.*, the size of the outlet should not be reduced by having a bushing inserted in it). Valves should be furnished on both the cold-water supply and the hot-water outlet of this fixture so that it can be entirely cut out of the system if desired, as during the summer months or for repairs. The valve on the hot-water outlet of this fixture or of an auxiliary heater may also be used to regulate the flow of hot water. Unless a year-round oil-burner or gas system is used, a gas heater or small coal stove probably will be desirable for summer hot-water heating. In either case the water-heating element or water back should be of a non-corroding material. The client will rightly desire one of the new non-rustable storage tanks, which will probably outlive the present generation. But its purchase would be futile if the architect allowed his client to have a part of the heating apparatus inject rust into the system when it could be prevented for a very nominal amount.

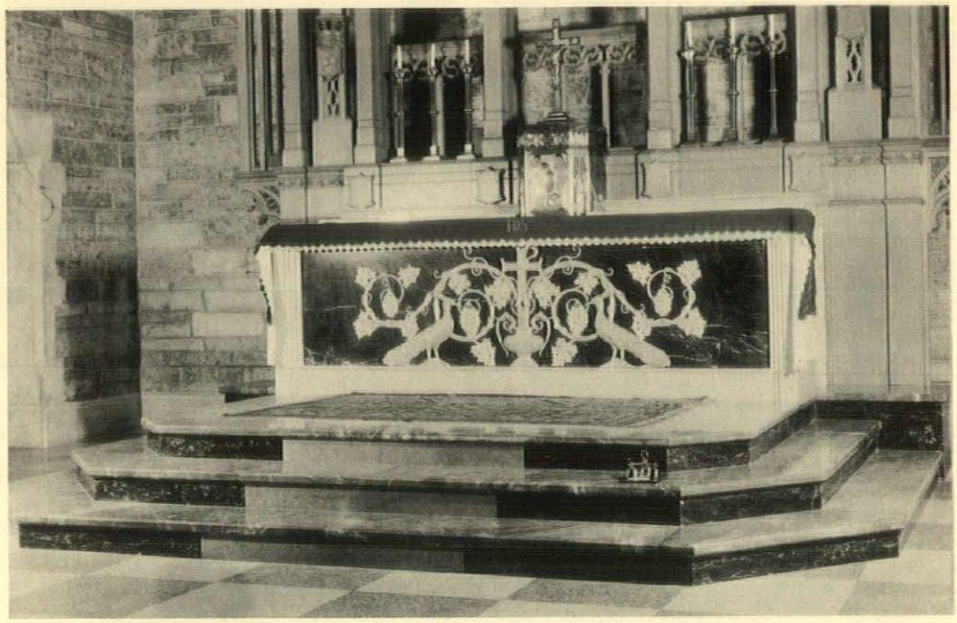
As final equipment for the system a relief valve should be called for, and a thermometer mounted in the tank so that the temperature of the water may be ascertained by the person in charge.

27—COVERING

Hot-water heaters and tanks must be well covered, not only for comfort but for economy. The architect may desire to enclose the lower part or base of the heater in masonry. This will not be adversely affected as quickly as other materials when


1½" Italian Verde Antique Marble Top
Gold Plated Buttons Concealing Screws
Front & Sides Monel Wrought Ornament Smooth Finish High Lights Polished
Monel Metal Horizontal Bands All Around
Outside Frame of Door Monel Metal
Pelican & Nest in Brass Repousse & Gold Plated Background Unpolished Monel Metal
Alps Green Marble Background
Front Elevation of Tabernacle
Projected View of Panel
4 Expansion Bolts To Be Set in Marble Slab under Tabernacle Drilled Thru Floor of Steel Box
½" Seasoned Cedarwood Lining
⅛" Air Space
¼" Steel Box Welded at Joints
⅞" Italian Verde Antique Marble Fastened to Steel Box
Wrought Monel Metal Bands & Ornament
Alps Green Marble
Monel Metal
Cedar Wood
Steel
Inner Door Polished Monel Metal with Gold Plated Cross on Front Side
Plan
Section
Henry D Dagit & Sons, Archts.

FAVORITE FEATURES



HENRY D. DAGIT & SONS

Here is another in this series of Favorite Features, a tabernacle for the Church of Saints Simon and Jude in Bethlehem, Pa. Above is a photograph of the altar with the tabernacle in place, and to the left, a detail of the tabernacle itself. The details of its design, craftsmanship, and materials —steel, marbles, monel metal, brass, and cedar wood— are made clear overleaf

In almost every piece of work that an architect designs there is, when it is finished, something that he would prefer to have otherwise. Once in a long while, however, he rings the bell so clearly that even his sophisticated eye finds it good. The architect tells himself that it worked out as he had hoped, and he would not change it if that were possible

(*Continued from page 351*)

figures made for an Italian pageant about the year 1550. They were made by Primaticcio, the Italian who decorated Fontainebleau for Francois I. If the Exhibition has as strong an international flavor as this paragraph, it should be an achievement.

Saturday, October 14.—Clarence Stein has written a masterly article for *The New York Times Magazine* of October 8, "New Towns for the Needs of a New Age." There is real vision expressed here in what we may expect of our cities in the years to come.

"These towns of the future may consist of only one neighborhood or of a small number of neighborhoods—possibly three—centring around a high school. . . . Their growth will be definitely limited by surrounding them with a wide belt of open green space for agricultural and recreational use, as has been done in the English garden cities of Welwyn and Letchworth and in the satellite suburbs of Frankfurt, Germany.

"These new communities will be located as parts of a great regional or national plan so as to develop on a more economic basis a fuller and freer life in harmony with the natural possibilities of each region. They will preserve rather than destroy the natural advantages of forest and farm land. They will develop industries that will, as far as possible, make use of the resources and opportunities of the region. They will open rich areas of the country that have gone to seed or have never been wisely or scientifically developed.

"A group of towns or neighborhoods will form a regional city. It will consist of a constellation of such unit communities separated by great areas of natural green but bound closely together by 'townless-highways.'"

Monday, October 16.—Henry Wright in with a new idea and some drawings to explain it, for his forthcoming book on housing. The trouble with a man like Wright, attempting to set down the sum total of his knowledge on housing in a book, is that the sum total increases every day, and the last increment is always one of the most important items. Perhaps the only way to get the book out is to put Wright on a desert island for three months.

Wednesday, October 18.—Frederick Heath, Jr., in from Syracuse, somewhat encouraged over the possibility of bringing the building industry together in the matter of standardized sizes of building materials. In these days when so many minds are turned toward an examination of the logic of human habits and activities, it would seem easier to focus the attention of the building industry upon the obvious necessity of working with the same footrule. In other words, there seems to be no good reason why the manufacturers of windows, brick, concrete blocks, wall board, and such things, should not be making their products in sizes having a simple least common denominator. Building, in spite of all of our efforts toward standardization, is still in the tailor-made stage, requiring cutting and fitting of too many units, whereas such cutting and fitting should be no more necessary in building than in the assembly of an automobile.

Friday, October 20.—According to John H. Millar, there is a good deal of discussion these days as to the possibility of our coming to a policy of "plowing under" our houses. I saw a newsreel film the other night in which England was putting a torch to some of her war housing for munition workers. The structures were considered no longer fit for human habitation, and were destroyed. In Milwaukee recently a hundred dwellings were destroyed. In Oakland, Calif., ten or fifteen a month are plowed under. There ought to be more of it. We are not nearly so ready to condemn and tear down sub-standard houses as we are to drive antiquated automobiles out upon the junk heap.

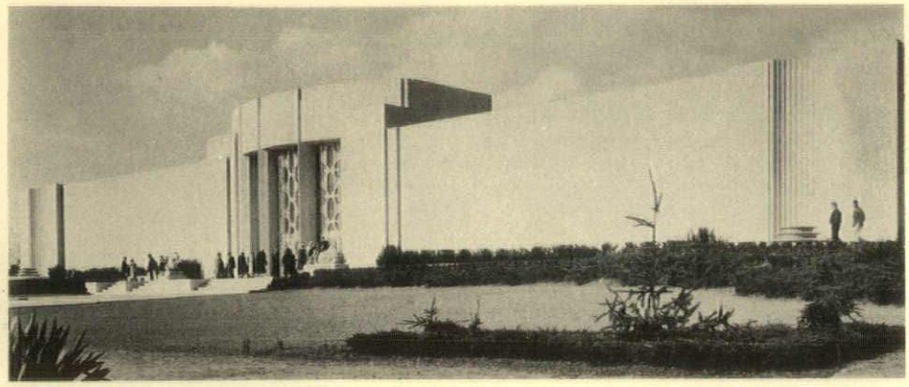
Monday, October 23.—The report of the New York State Board of Housing contains many interesting things, and among them a convincing answer to the real-estate interests who object to the building of new low-cost housing on the plea that it would bring ruinous competition for them:

"The bogey of competition vanishes when confronted with a few figures. There are in New York City 2,050,000 apartments. The projects that have been approved by the Board will add approximately 5,500 apartments. In The Bronx they would add 1,581 apartments to 370,000 that are now existing; in Brooklyn, 696 apartments to the 700,000 available; in Queens, 1,632 apartments to the 340,000 existing apartments; and in Manhattan, 1,616 apartments to the 615,000 existing apartments. Altogether the projects approved by the Board would mean an addition of twenty-seven hundredths of 1 per cent to the existing supply. Furthermore, the average annual increase in the number of suites in New York City from 1924 to 1929 was 89,097. The Board's programme would involve an increase of approximately 6 per cent of the average supply for the six years prior to the realty deflation."

Wednesday, October 25.—There is a very interesting exhibition of members' summer work at The League—most of it water-colors, but some in oils and other media. Cass Gilbert shows three of his uniformly impressive works; apparently the big subject is what appeals to him, and he is undaunted by its complexity—the three subjects hung are the west front of Notre Dame in Paris, the Arch of Titus in Rome, and the arches of the Palaces of Nero at Rome. Henry Bultitude, who sent in five or six oils, shows himself as much—or more—of a painter as he is interior decorator—and that is saying a lot. There are many other good things hung—too many in fact to catalogue, but Ernest Lewis's lovely pen drawings of the countryside stand out both on account of their own excellence and the fact that they represent the only black-and-white subjects hung.

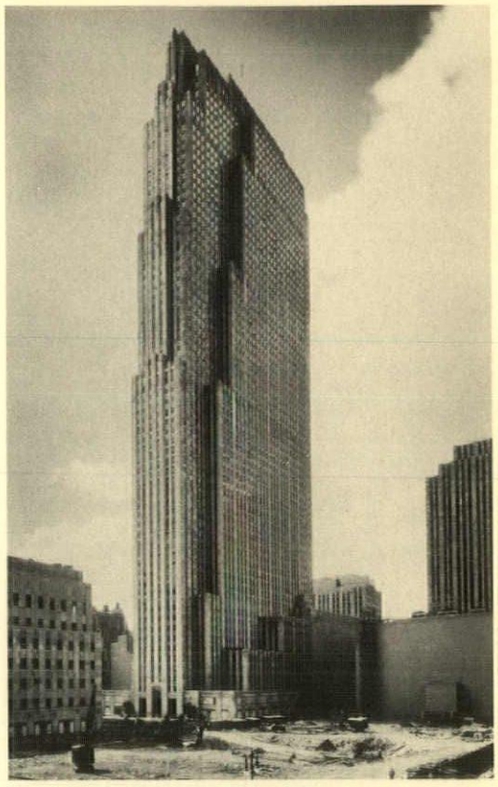
Saturday, October 28.—The Annual Report of the State Board of Housing takes another effective pot-shot at the opposition to public efforts in housing, and particularly the tax-exemption feature. The real-estate interests, of course, claim it an unfair practice to grant tax exemption to low-cost housing, thereby giving it an advantage with which commercial interests cannot compete. The Board shows, however, that during the four years ending with 1932, the City of New York granted tax exemption to the amount of but $415,200. Without such exemption, however, the projects thus aided would not have been built. Moreover, the assessed valuation of the land in the case of nine projects so aided is 53 per cent above the assessment placed on the land when acquired. The city, therefore, certainly has not lost by tax exemption.

Monday, October 30.—The Government has joined the ranks of those who are dissatisfied with the progress in the public-works programme. With money easy to borrow and, for municipalities and States, grants easy to obtain, it would seem as if there should be no lack of housing projects submitted. Nevertheless, as we have said before, the preliminary work of arousing civic interest, making good plans, and co-ordinating the whole scheme with long-range planning, has not been done, and the wheels turn, if at all, very slowly. The Administration, therefore, has incorporated a Public Works Emergency Housing Corporation, to build low-cost housing. There are only three stockholders of the corporation, Mr. Ickes, Secretary Perkins, and Robert D. Kohn, each holding one share without par value for the Government. It is said unofficially that the first sign of activity will be in the city of Washington, but that remains to be seen. The new corporation is empowered, in addition to building, to locate, lay out, construct, and maintain roads, parks, playgrounds, recreational facilities, sewers, bridges, utilities, and other incidental improvements in connection with housing projects. It may equip, furnish, operate, manage, and maintain homes and buildings of every nature. Here are broad powers and a centralized control. Something should happen.

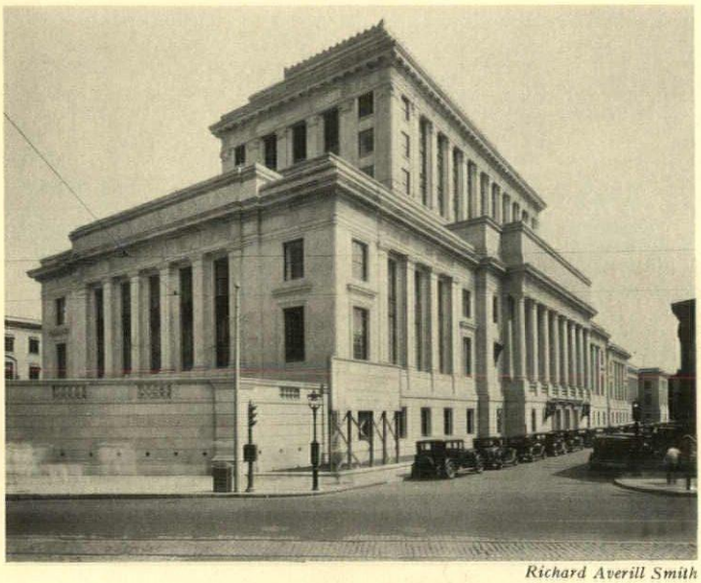


The new Art Museum for Seattle, Wash., a gift to the city. Bebb & Gould, architects

in Photographs



R. C. A. Building, Rockefeller Center, New York. Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Fouilhoux, architects

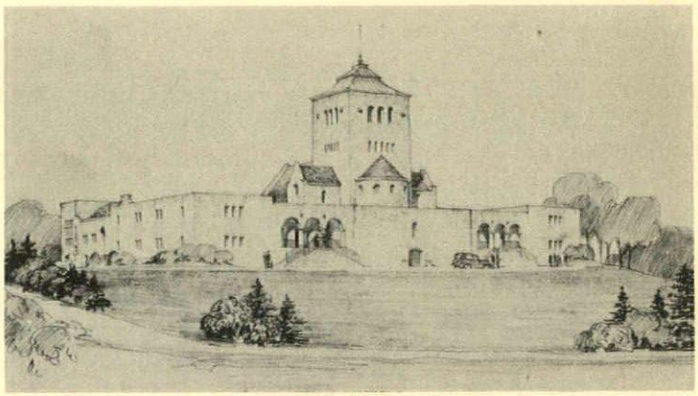


Wurts Brothers

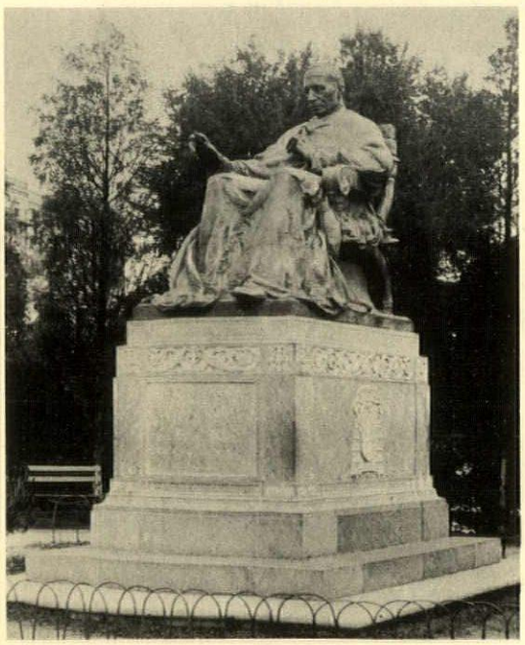
Christian Science Publishing Society Building, in Boston. Chester Lindsay Churchill, architect; Lockwood Green Engineers, Inc.

Richard Averill Smith

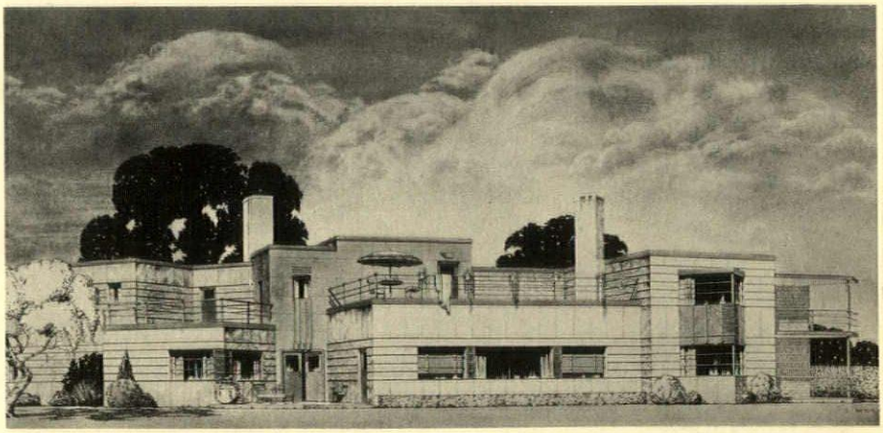
A bronze of James Cardinal Gibbons, outside the Church of the Sacred Heart, Washington, D. C. Leo Lentelli, sculptor



Cemetery Buildings for Minnesota Acacia Park, a Masonic memorial over looking the Mississippi and Minnesota Rivers. William M. Ingemann, architect

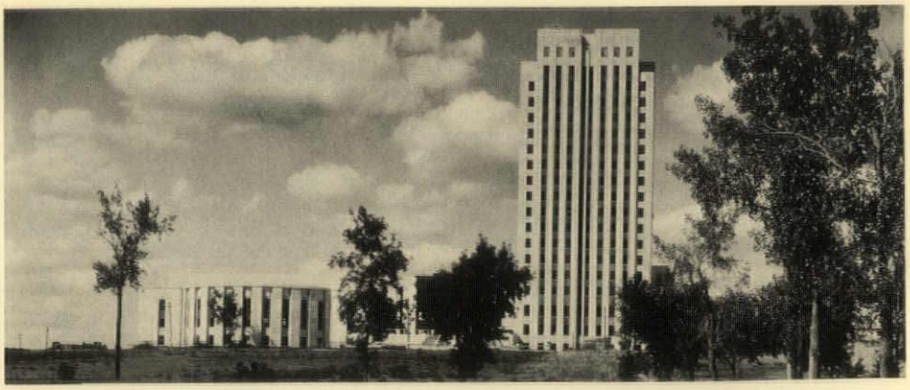


A house of steel frame and copper exterior now being erected near Rome, N. Y. Pierre Blouke, architect



Architectural News

The new Federal Building, Boston. James A. Wetmore, Acting Supervising Architect of the Treasury; Cram & Ferguson, associated architects

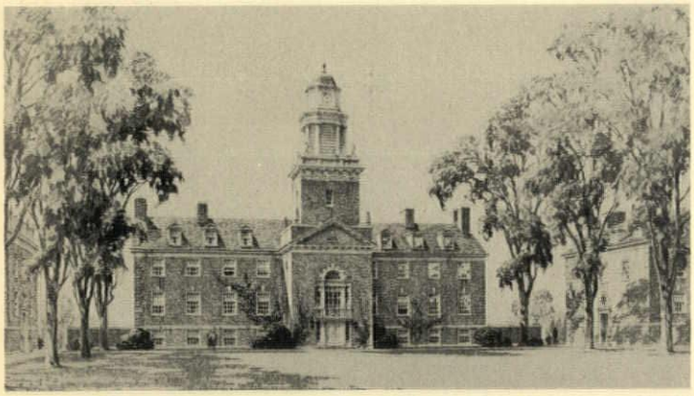


State Capitol of North Dakota at Bismarck, as yet incomplete. Bell de Remer & W. F. Kurke, architects; Holabird & Root, associate architects

Richard Averill Smith

The recently completed Providence County Court House at Providence, R.I. Jackson, Robertson & Adams, architects

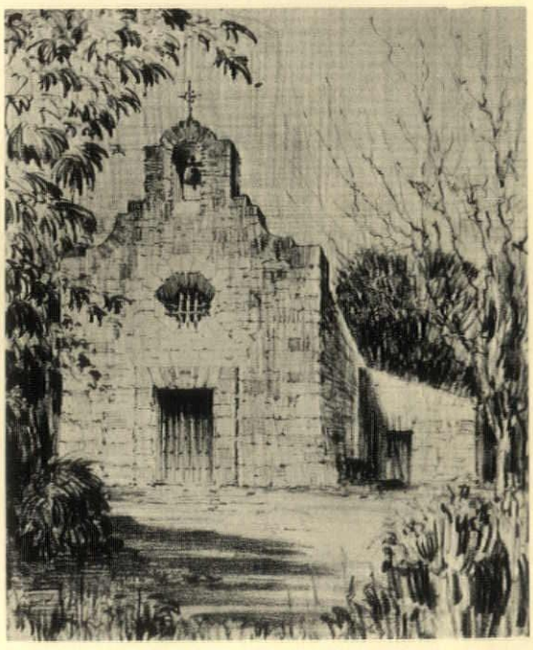
Providence Journal Photograph by Scheer



Westminster Choir School Group, Princeton, for which ground has just been broken. Sherley Warner Morgan, architect

The proposed new publishing house for the Providence Journal, Providence, R. I. Albert Kahn, Inc., architects and engineers

Proposed restoration of Mission Espiritu Santo at Goliad, Tex. Atlee B. & Robert M. Ayres, architects for the restoration



The Editor's Diary

Sunday, October 1.—Charles D. Maginnis, home from a summer abroad, is quite shocked at finding churches in the modern idiom confronting the stately and intimidating tradition of Michaelangelo in Rome. He says that functionalism in such a background carried little conviction. It looked commonplace, trivial, impudent. Incidentally, Mr. Maginnis sees a new state of mind in this country regarding architecture. He feels that we are coming to a realization of the fact that our cities would have been much better off today if the architect had been invited to plan them, rather than to dramatize some industry or a corporation in a skyscraper. The leisure resulting from new limits of the hours of work offers many possibilities. Mr. Maginnis thinks that it will stimulate a withdrawal of the workers further into the country, and will mean a great development of small housing. There is a real danger here in this urge toward the country and greater space for living, with the equally important fact that housing for the lower-income groups can be acquired, it would seem, only in large-scale operations of group dwellings.

Tuesday, October 3.—Harry F. Cunningham has worked up a great enthusiasm over the translation of Paul Valery's "Eupalinos or the Architect," by William McCausland Stewart, and has sent me his copy of its very limited edition. It is a magnificent piece of work, written in the form of a dialogue between Socrates and Phædrus, both of whom have passed over into the world of the shades. Here is deep philosophical consideration of the essence of architecture—a work so replete with deep reflection, the weighing of motives, actions, and results, that it should be read slowly and carefully by every architect. Just as a small sample; Socrates: "We have said that all visible things proceed from three modes of generation or production, which moreover mingle and interpenetrate. . . . The one kind chiefly make chance manifest, as can be seen from the fragments of a rock, or from some landscape, not specially chosen, peopled with plants that have sprung up at random. The other kind—like the plant itself, or the animal, or the piece of salt, whose purple-tinted facets cohere mysteriously, lead us to imagine a growth that is simultaneous, sure and blind, and encompassed within a duration that seems potentially to contain them. It is as though what they will be is waiting on what they were; and, further, as though they increase in harmony with their surroundings. . . . And finally there are the works of man, which, in some sort, cut across this nature, and this chance, utilizing them, but doing them violence, and at the same time violated by them. . . ."

Thursday, October 5.—The relationship between building and the machine, so often cited, is neatly expressed by William G. Newton, writing in *The New Statesman and Nation* (London) on "English Architecture Today." He says: "Apart from what they will do, these 'modern' shapes seem to ask for somewhat starker surroundings than an England peaceably lived in and lovingly tended since the Wars of the Roses, a country of villages and hedges and parks and winding roads, first made by cattle after all traces of Roman urbanization had faded away. Certainly there may be beauty in an efficient machine, but no machine has so complicated a series of unrelated functions as the machine for living—the home."

Saturday, October 7.—The question of whether slum clearance and new housing must shelter the same people in the same place is a complicated one. Eugene H. Klaber says:

"Shall new buildings in areas cleared of slums house the present dwellers in the district? It is impossible to generalize on this score. It will depend on factors of cost of living, convenience to work and play, opportunities for educational and social life, and ability to pay rent.

"Opinions on this subject are too frequently warped by sentiment; neighborhood loyalties, social, ethnic, and religious considerations. They are important but cannot stand in the face of an economic impossibility to rehouse people in surroundings that will permit a proper social and physical existence. . . .

"We cannot insist too strongly on the importance of integrated neighborhoods. They are necessary, not only for the advantages that construction may derive from their development, but also for the simplification and economy of ownership, management, and government, and for the better life they afford those who live in them."

Sunday, October 8.—Among the allotments by the Public Works Administration there is one of one hundred thousand dollars for repairing the stone work of the Washington Monument. Just about fifty years ago two stone masons, Dennis O'Leary and Thomas Purcell, laid block by block the upper portion of Robert Mills's masterpiece. Since that day no human hand has repaired this masonry, no human eye has inspected it at close range. Unquestionably it needs pointing up and repairs; fifty years of weather must have left its marks even upon the granite. The patching recently done at the base of the Monument indicates the necessity for careful inspection and repairs above.

Monday, October 9.—To Lawrence Bottomley's office to see the completed dummy of the forthcoming book, "Great Georgian Houses of America." The book consists of photographs and an unusually painstaking set of drawings made by the unemployed draftsmen, for whose benefit the book will be sold. Here are not only the well-known houses like Westover, Lower Brandon, Monticello, etc., but many which have not heretofore been published. In each, a careful effort has been made to have the elevations and details drawn up in absolute conformity to the work itself. It is a curious thing how books of "measured drawings" have been known in the past to vary considerably in their drawings of the same work.

Tuesday, October 10.—This afternoon I went down to the Lower East Side to see ex-Governor Alfred E. Smith swing a sledge upon the old so-called "lung block" to signalize the beginning of its demolition and its replacement by model dwellings. The fact was borne in upon all of us who attended the ceremonies that we are only at the beginning of a long and probably too slow process of recreating our cities. When the last wall is razed in this notorious slum, the sun will shine upon the land for the first time in half a century.

Wednesday, October 11.—John T. Cronin, of Cass Gilbert's office, in to show me some interesting facts he has discovered in measuring two or three of the stone sarcophagi in the Metropolitan and Philadelphia Museums. The evidence as to the employment of a module system in the making of these great stone boxes is irrefutable. So many of the relationships point to the use of a knotted cord in the establishment of sizes, but there is much more to it than this—a suggestion at least of some belief in simple ratio between volumes, perhaps associated in the craftsman's mind with his religious beliefs or superstitions. Why otherwise should the volume of the stone lid equal precisely the volume of the space cut out of the box itself?

Friday, October 13.—Word comes from Lee Simonson, now in Switzerland on a trip through Europe collecting material for the International Exhibition of Theatre Art, to be held in January at the Museum of Modern Art, New York. He reports that the National Museum of Sweden will lend the Exhibition a rare series of ten drawings of costume

(*Continued on page 354*)

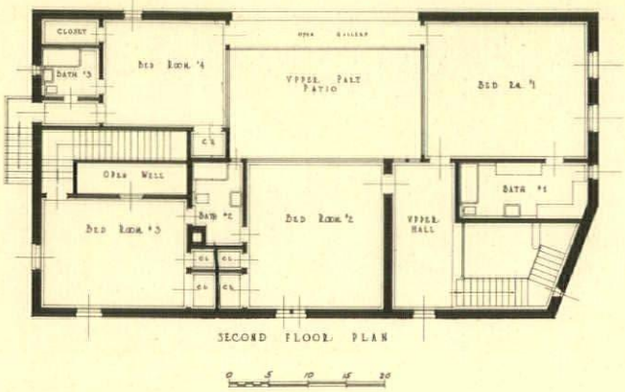
Above, the patio, looking toward the end from which a stairway leads up to the second floor. Mr. Byers depends largely on tile for the color brilliance of this outdoor living-room. Below, the dining-room, with the hall showing through the doorway beyond

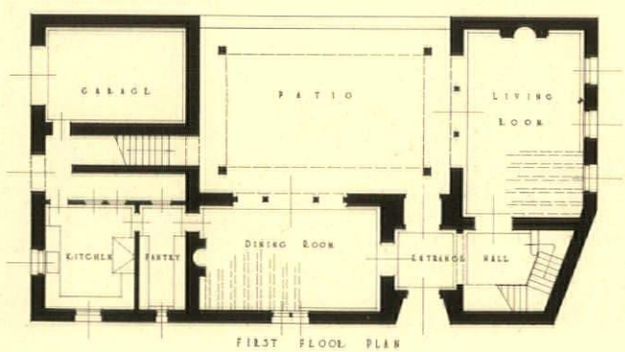
Photographs by Margaret Craig

Photograph by Miles Berné

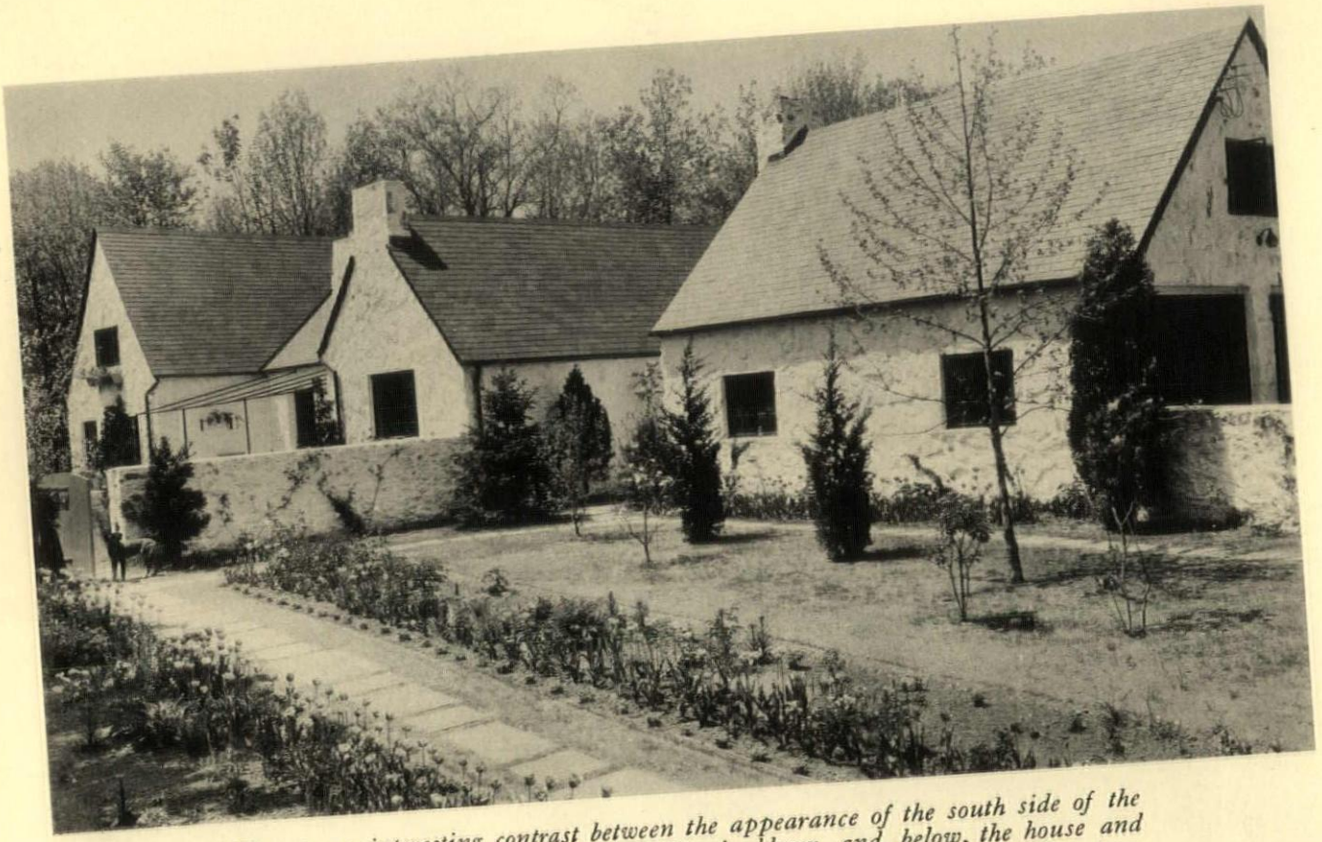
House of Lewis Bradbury
Santa Monica Canyon, Calif.

JOHN BYERS, ARCHITECT

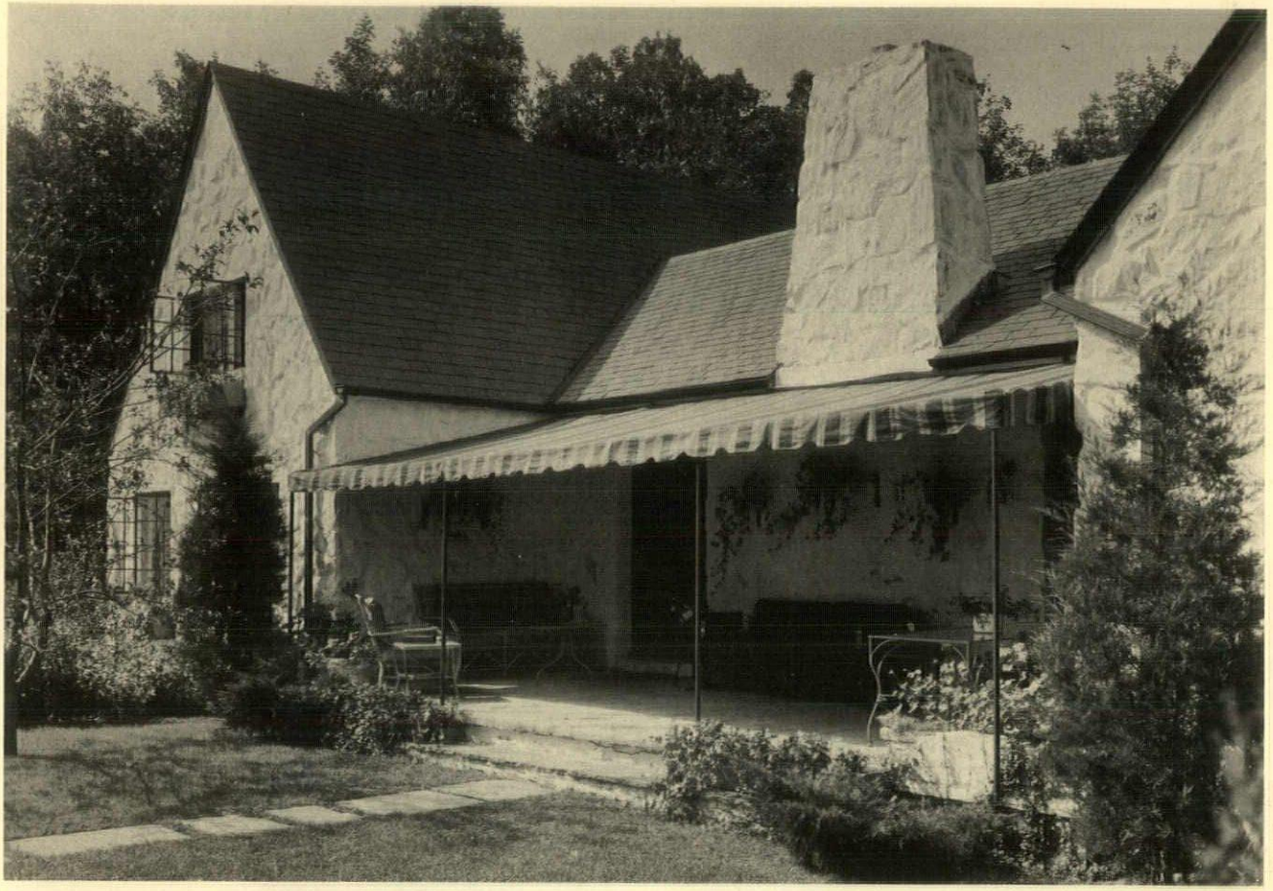




At top of page is shown the photograph of the street side of the house. Fortunately for the appearance of the building, the number of windows needed was a minimum, due to the fact that cross-draft is secured through the open patio. The house is of adobe construction. The plan differs somewhat from the finished work in that the outside wall of the patio was closed up to the level of the second-floor gallery, and a door from the garage opens into the patio



Here is an interesting contrast between the appearance of the south side of the house taken in May, with only the tulips in bloom, and, below, the house and garden in September with the flower borders a mass of color in phlox, hardy asters, salmon pink zinnias, heliotrope, and veronica

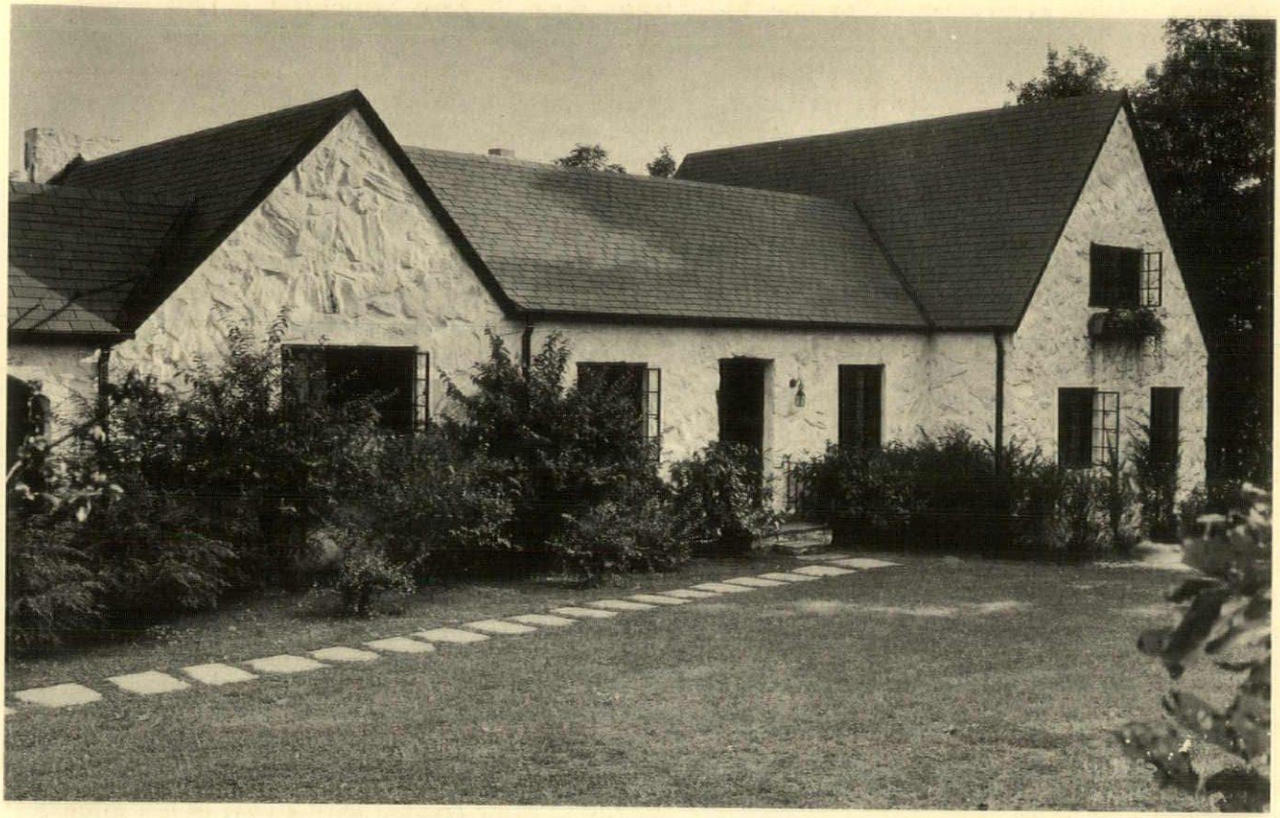


The terrace, accessible from both living-room and dining-room, opens to the south with a view across the valley, and is sheltered by an awning with green and red stripes. The stone flower boxes, holding scarlet geraniums, are worthy of note

In the living-room the wall and ceiling are a very pale gray green; woodwork, doors, and book cases, a flat black; the inside of the book cases being painted a bright mulberry red, which color is repeated in the chintz hangings; the rug is a plain gray green

A path leads through the white-washed stone garden wall from the terrace, across the lawn, and winds down over a series of stone steps to a brook

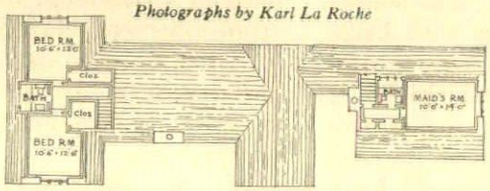
Fireplace end of the living-room, showing the simple wrought-iron stair rail, and, at the foot of the stairs, the doors leading out upon the terrace

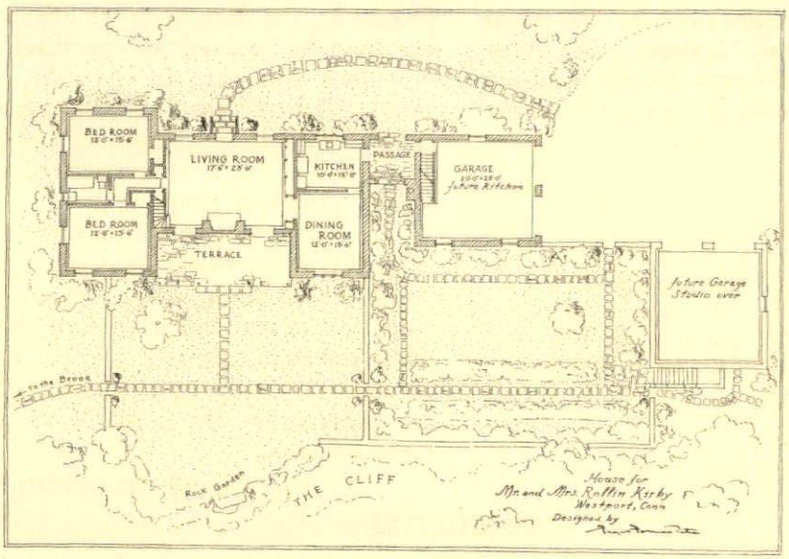


House of Rollin Kirby, Westport, Conn.

DESIGNED BY FRAZIER FORMAN PETERS

Photographs by Karl La Roche





The house is built of native field stone, whitewashed. It has steel casement windows, painted black, a black slate roof, and black trim. The window boxes are sea green. The plan shows the house as originally built. The present dining-room is to be enlarged to take in the kitchen; the adjoining passage to be enclosed to become a butler's pantry, and the garage is to be the kitchen and laundry. The new garage is to be built at the end of the garden, having an outside stairway leading to a studio or guest bedroom and bath

This is a great help towards gaining immunity from termite trouble, as an approved product by reputable manufacturers would no doubt be more effective than the average "treatments" by workmen on the job. This commercial lumber, however, is not obtainable as yet in many sections of the country, especially in small lots; and since any "treatment" is better than none, it would be desirable to have workmen treat the material on the job rather than frame the first floor of a building with lumber as it comes from the average lumber yard. Fairly effective results can be obtained by brushing on three coats of hot coal-tar creosote, allowing it to dry well between coats. Dense, heart lumber should be selected for this purpose, and preferably cut before treating. In the illustrations, it will be noticed that a "treated" skirting board is shown on all details of frame construction. This is placed on the face of the studding just above the foundation walls, and seems to the writer a very good precaution as it prevents the sheathing, which is usually untreated, from extending down to the foundation wall. In this way all wood below the first-floor level is treated lumber; it is in this area that the trouble usually begins.

Basement Construction

Buildings having full basements do not present quite the same problem as those without. Ordinarily there is sufficient light, air, and ventilation in a basement to make effective the preventive measures discussed above. The source of greatest anxiety in the buildings with basements is where this area is finished for use, and includes wood partitions, floors, and finish. It can be seen that wood in such a location is really in the happy hunting-ground of the termite. Either the entire basement would have to be made absolutely tight, or else the wood made unattractive to the termites. The most exacting efforts in the former direction would doubtless fall short of success, hence the surest protection is to use treated wood throughout, and follow certain structural details in the basement floor. These structural details largely affect the intersection of the basement floor with the foundation walls, and the bearings for posts and partitions. Where the basement has a cement floor, it is a wise precaution to leave a small groove in the cement topping along the edge of the wall for caulking with mastic. Shrinkage and settlement often cause a crack at this line, which caulking, properly applied, would avoid. The same should be done around all pipes that go through the basement floor, as well as all breaks in the basement floor caused by bearings for posts, and similar conditions. These bearings for wood posts should be formed of concrete on top of the footings of same, and extend several inches above the finished basement-floor line, so that the bottom of the post will be above the floor, and can be easily inspected at any time. The same principle of construction is recommended under basement partitions.

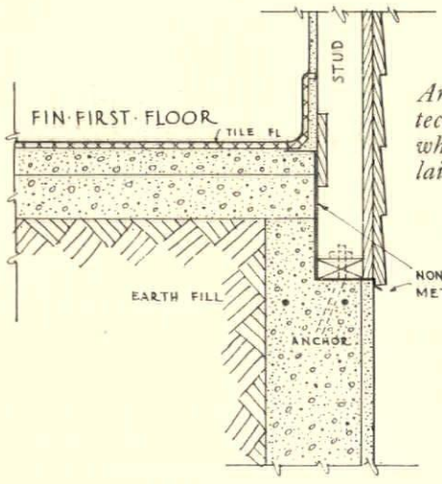
In the case of a wood-finished floor in the basement, it is important to avoid the use of wood sleepers buried in cinder concrete, as so often found. The concrete slab under the wood flooring should be a full four inches thick, and the top of same treated with a coat of hot pitch or asphalt. It is better construction to anchor the sleepers to the slab with metal clips, and leave the space between the sleepers unfilled for ventilation.

In every instance where a concrete slab is used in a basement floor, it should be of dense, stone concrete, laid on clean well-packed earth. The tendency to use cinder concrete should be avoided here. In specific cases where drainage is desired under the slab, it is better to use field or drain tile.

If no approved factory-treated wood is available, the floor sleepers and partition framing may be treated as specified above for the first-floor framing. In the case of the exposed wood and finish, the U. S. Bureau of Entomology recommends an impregnation of the wood with a two to five per cent solution of zinc chlorid, as a very practical protection.

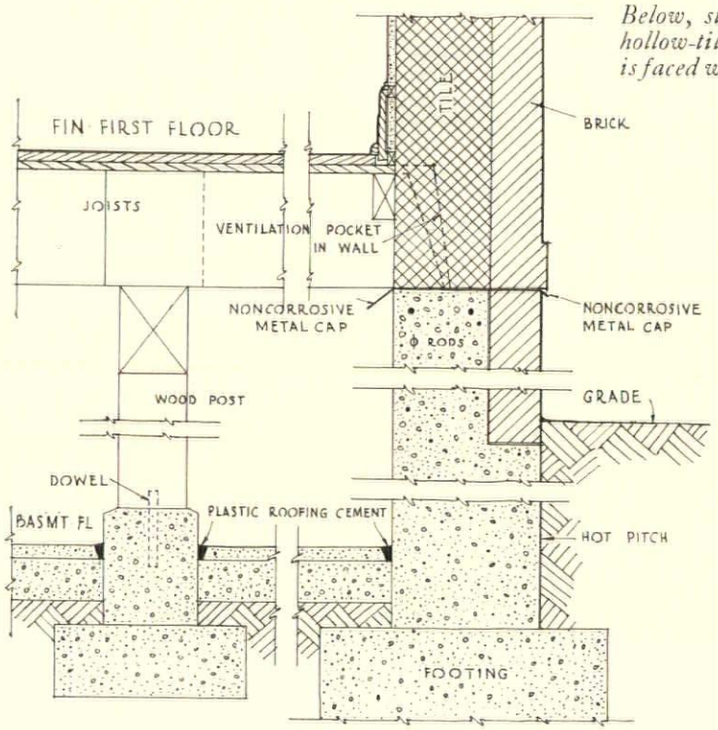
In connection with basement construction, it is well to mention here the type of building which has only a partial excavation for basement use. Conditions arise in this type of construction that require a greater amount of careful study for termite prevention than if the entire area under the house were finished in the same manner.

(TO BE CONTINUED)

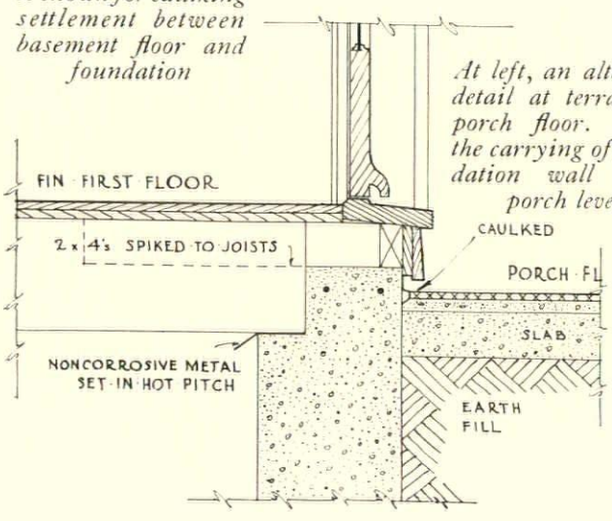


An attempt to protect wood framing where a tile floor is laid on a slab over earth fill

ther under corrective work. The many claims made by the different agencies selling insecticides, sprays, and poisons have led to real confusion in the mind of the average person. The fact of the matter is that termites can be killed by spraying with any one of a dozen insecticides bought at the corner grocery, or even with household ammonia; but the problem with lumber is to get it thoroughly impregnated with a material which possesses the properties of remaining in the lumber even if subjected to leaching, and giving permanent protection from invasion by termites, as well as other damaging insects and fungi. As to the most effective material for this purpose, all records of research agree upon coal tar creosote, but truly satisfactory results can only be obtained by treatment of the lumber under pressure, in a closed container. This necessitates factory equipment. Even if lumber treated in this manner could be secured, there are certain drawbacks to its extensive use in buildings, such as the added difficulty of handling and cutting; the problem of adequately treating the ends of cut lumber; the odor resulting from the creosote; the fact that creosote will leach, under certain conditions, through soft wood and plaster, and further will discolor and loosen any ordinary lead-and-oil paint. Other formulæ are given by the Bureau of Entomology which avoid many of the above difficulties, but unless applied under pressure or by the open-tank process, they would not prove very effective. In the attempt to cover this need, several of the large lumber manufacturers have in recent years put factory-treated lumber on the market in some sections of the United States.

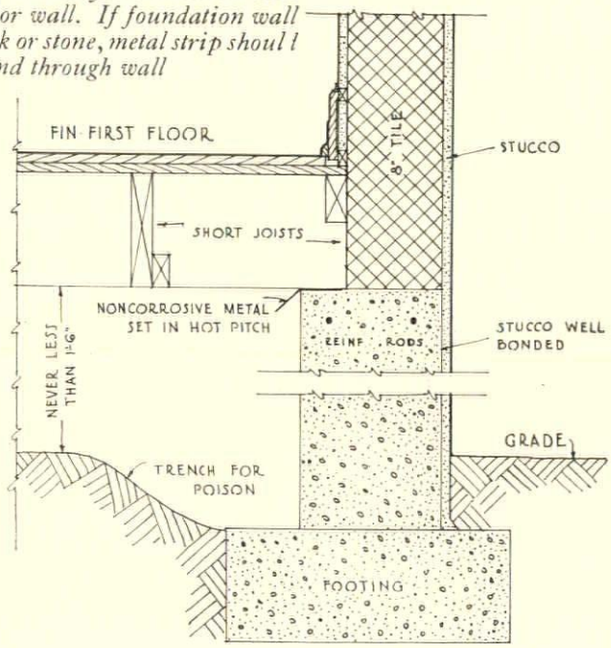


Masonry exterior walls with brick extending to grade. Metal cap shown full width of wall where concrete cap might be objectionable in appearance. Simple method is shown for caulking settlement between basement floor and foundation

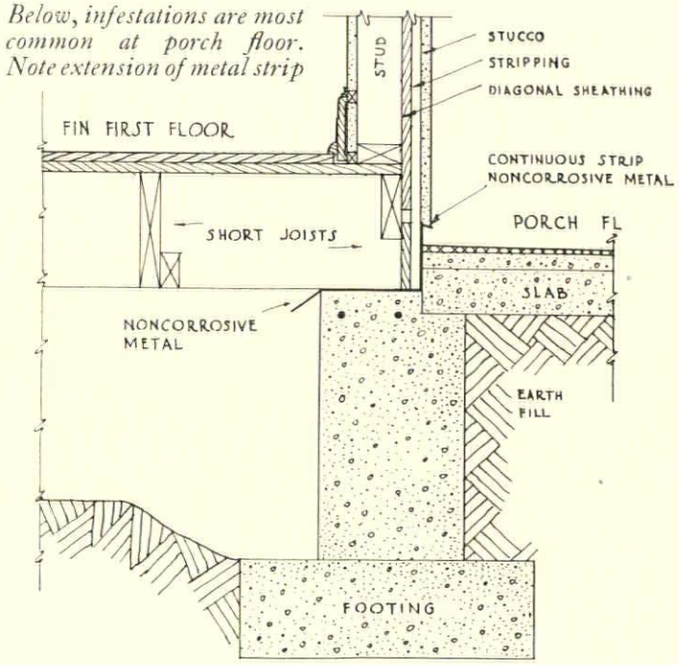


At left, an alternate detail at terrace or porch floor. Note the carrying of foundation wall above porch level

Below, standard masonry construction with hollow-tile exterior wall. If foundation wall is faced with brick or stone, metal strip should extend through wall

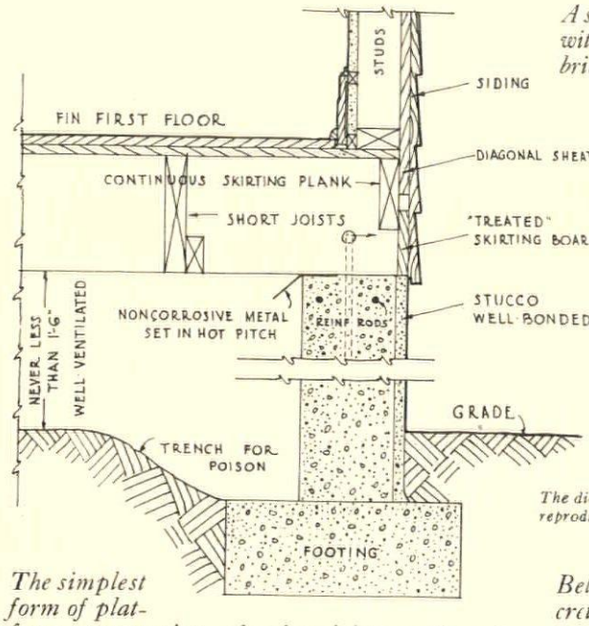


Below, infestations are most common at porch floor. Note extension of metal strip



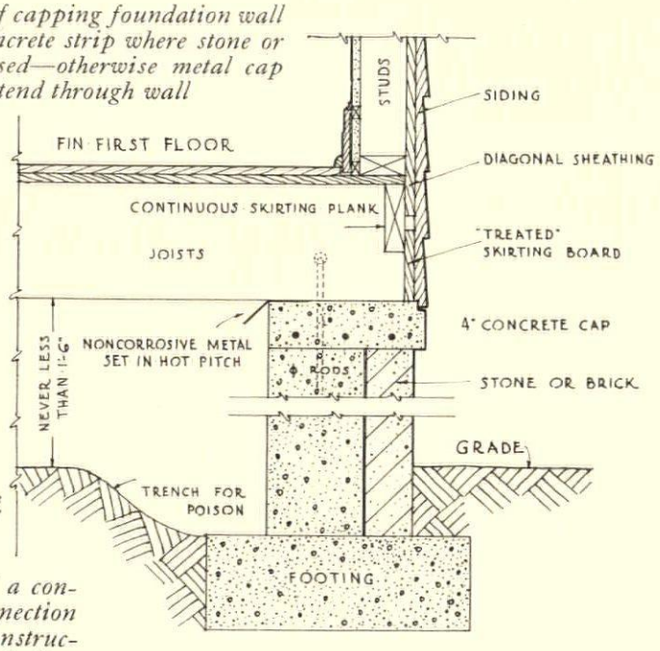
curely on the wall, and extend beyond the inner face not less than two inches, and down at an angle of approximately forty-five degrees. Some of the illustrations show special cases where the shield is carried back through the wall and turned up. It has been found that while termites may build a tunnel up to this projecting shield, they will not attempt to build around it. Necessarily, the shield must be completely bonded to the wall, otherwise cracks would exist through which the termites could work on up into the building. The illustrations call for the shield to be set in a mastic cement of an asphalt base. Experiments have also been made in setting the shield in the wall, but this complicates construction and increases expense. The metal used for this shield should be copper, zinc, or some non-corrosive material, in order to secure any permanency of results. Sixteen-ounce cornice-temper copper is one of the best metals for the purpose; the joints should be lapped and closed. No shield is contemplated for the outer face of the foundation wall, as this surface is constantly in view.

(5) The use of treated lumber throughout the entire first-floor framing will prove a great aid in checking termites at the first point to become infested, in the event that other preventives have been carelessly executed. The subject of "treated" lumber and termite poisoning, however, is one not so readily disposed of, since it is more controversial; it will be discussed fur-



The simplest form of platform construction, showing joists resting directly on foundation walls; hook-type anchor; concrete foundation wall with stucco facing

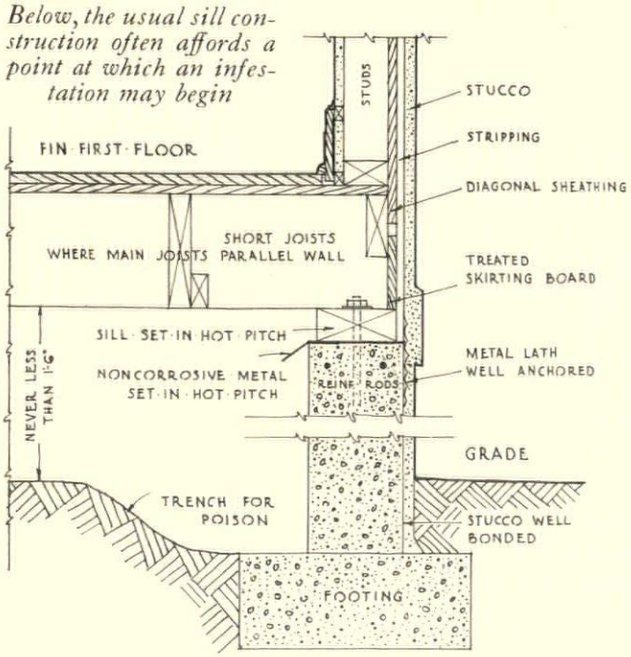
A simple method of capping foundation wall with reinforced concrete strip where stone or brick facing is used—otherwise metal cap should extend through wall

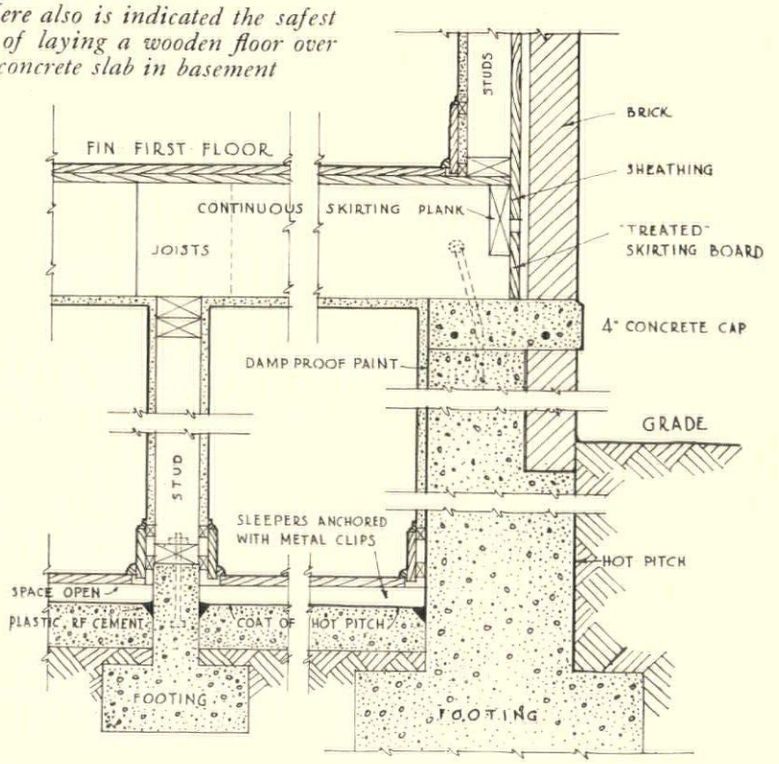


The diagrams throughout are reproduced at a scale of ¾" equals 1'

Below, the use of a concrete cap in connection with brick veneer construction. Here also is indicated the safest method of laying a wooden floor over a concrete slab in basement

Below, the usual sill construction often affords a point at which an infestation may begin





erly erected originally. In any event, it seems poor judgment not to include this protection, when the cost of same is compared to the total investment in the building, and when it is further realized that such expenditure will be less than the cost of repairing a minor infestation in the future. In addition to sanitation of the site, the remedies may be summarized briefly as: poisoning the ground around the footings; adequate height and ventilation under first floor; construction of dense, impenetrable foundation walls; the use of termite shields on the interior face of the foundation walls; and the employment of treated lumber throughout the first-floor framing. No one remedy is at all sufficient in itself; and when the uncertainty of the human element of construction is taken into consideration, doubtless many buildings where all precautions are employed will not prove impregnable to the termite.

A more complete explanation of these methods of prevention is as follows:

(1) Poisoning around the footings would be accomplished by following the recommendations given for poisoning the site; liquid orthodichlorobenzene or paradichlorobenzene in crystals, applied along the inside face of footing.

(2) Proper height and ventilation under first floor refers principally to the houses without basements. No framing should be placed closer than eighteen inches to the ground. This not only is safer for timbers, but provides sufficient height for proper ventilation, and for workmen to at least crawl under the building for repairs. The amount of ventilation recommended is not less than two square feet for every twenty-five lineal feet of foundation wall. These openings should be placed so as to provide a real movement of air and avoid "dead" corners. It is important that they should be filled with a fine-mesh non-corroding screen—not less than 18 mesh, and 20 mesh preferred; this will prevent the entrance of termites during the annual flight, as well as all the other flying insects. It is well to mention here that the custom of planting shrubbery in front of these ventilators largely offsets their value.

(3) A foundation wall that cannot be penetrated by termites would ordinarily be one that is poured of dense concrete, or else completely capped with concrete or metal. It is felt that any wall built up of small masonry units would not, in the usual process of construction, be truly solid; too many small voids are left which would serve as passages for termites, even in brickwork. Tile or similar masonry units which contain voids are not recommended for foundation work, unless solidly filled with concrete. Since brick, stone, and similar materials are often desired, however, the simplest expedient is to cap the wall just under the first-floor framing. Some recommendations state that an inch of cement mortar will answer this requirement; this seems inadequate, if the purpose is to be really served. This coating would crack open at any slight settlement or movement of a built-up wall, and further, rather invites skimping by workmen in its application, just as with the one inch of stucco always specified. As a matter of fact, this coating would inevitably be worked over before setting up, and portions doubtless knocked loose before the first-floor joists were in place. The illustrations, therefore, show four inches of concrete, reinforced with small rods, poured in such a manner that it will form an inconspicuous water-table on the exterior. The outside face could be finished so that the effect would blend with the materials desired.

It will be noticed in the illustrations that where solid concrete walls are shown, these have reinforcing rods placed at the top of the wall. Recommended by the Termite Investigations Committee, this seems a wise precaution in a continuous wall, to resist cracks, and particularly desirable at intersections and angles of the foundation walls where shrinkage and settlement cracks are likely to occur. Care should be used in placing and splicing these, just as with usual reinforcing rods.

In attempting to make a foundation wall resistant to termites, care should be given in thoroughly bonding stucco to the wall where it is applied on the outside face. Many instances have been found where a failure to do so leaves an ideal passage between the stucco and the wall for termites to travel, unnoticed, up into the wood above. In houses without basements, it is very desirable to clean all mortar droppings and debris away from the face of the wall, and begin the stucco from the top of the footing. Much future trouble will thus be avoided.

(4) The shield recommended by the U. S. Bureau of Entomology should be a continuous strip of metal, applied under the joists on the inner face of the foundation wall; this would serve as a permanent protection in the many places difficult to reach under a building. The strip of metal should be wide enough to rest se-

colony is the soldier. From all accounts, he has an ideal life. He is fed and cared for by the workers, and between fights has all the leisure of firemen between calls. As may be expected, however, with such a life of ease, the penalty is drastic; the soldier's life is at stake when the colony is broken into and he is called upon to defend the first-line trenches, for the workers wall up the passage at his back and leave him there for a fight to death. These soldiers have greatly enlarged heads, covered with thick armor, and provided with powerful jaws as weapons of defense. They are almost invincible as long as they can fight the enemy with only their head and jaws exposed from their tunnels or a protective dugout, but as soon as a free-for-all forces them into the open, they are easily outflanked by the much faster ant, and fall before his quick rapier-like passes. If one of the lanes of passage of the colony is broken open, the protruding jaws of the soldier will soon appear at the opening. The writer has often held a straw near these jaws and found it attacked so savagely that the soldier could be held out in mid-air perfectly rigid.

This well-ordered society, with its measures of protection, with an abundant food supply always at hand, appears very formidable indeed. The attempt to control them with poisons of various sorts has left no appreciable mark upon this insect world. The problem of keeping our buildings comparatively free from them resolves itself basically into a study of construction methods.

Elimination

It is not felt that any of the time-honored materials and methods used in good construction have to be avoided, or that any effort should be made to standardize types of architecture in accomplishing the desired result. Rather, it is the belief that simple and practical means of prevention can be developed that will be applicable to the different types of standard construction now prevailing.

Before considering the details of construction, however, some thought should be given to preparing the site for building. It has always been good practice to clear the site thoroughly and carefully, yet this point cannot be too strongly emphasized where the termite is to be avoided. All stumps, roots, dead wood, and vegetation must be entirely removed from the ground in the area to be occupied by the building, as well as that immediately adjacent.

It is sometimes thought desirable to poison this area of ground before erecting the building, particularly if the site is in a wooded section. The U. S. Bureau of Entomology does not feel that experiments in this field are conclusive, by any means, or that permanent results can be thus obtained, due to the fact that all poisons leach away in time. Further, some of the most effective poisons seem inadvisable, due to the fact that they are likewise dangerous to any one who comes in contact with them, and kill vegetation as well.

Nevertheless, if such a procedure is thought advisable, the most recent recommendation of the Bureau of Entomology is to saturate the soil to a depth of two or three inches with full-strength liquid crude orthodichlorobenzene. The soil should be broken up before this application, and all debris removed. If this chemical is used in a closed area, the operator is cautioned not to remain long in these fumes, and not to get the liquid on hands or face, as it burns slightly. Where this poison would reach living vegetation, it is suggested that paradichlorobenzene in crystalline form be used. This is placed in trenches, and covered with two inches of loose soil. There seems to be some hesitancy in recommending, as formerly, the use of a ten-per-cent solution of sodium arsenite, applied as a liquid; it has proved too dangerous a poison.

While discussing soil conditions under the building, it seems timely to stress the importance of removing all scrap lumber and debris, such as usually collects during construction. In short, the area under a building should, if anything, be cleaner than the yard around the finished building.

Other likely nesting places are often thoughtlessly created through the use of tile, mortar, and plaster refuse in filling in an area over which a concrete slab is to be poured, in the belief that it will all pack solidly. This will invariably cause future trouble; the same applies to the tendency of workmen to bury refuse on the premises while a building is under construction.

It is a matter of common knowledge that the cost of repairing damage by termites often runs entirely out of proportion to the amount of the original investment in the building. In fact, some few infested buildings have come under the observation of the writer which were so damaged that the only conscientious recommendation would be complete demolition. Quite true, this condition has generally been aided by inferior construction, and it would have been greatly lessened had the buildings been prop-

of travel from its colony to the point of the current food supply. These are generally in hidden crevices and inaccessible points, unless there is no concealed area for passage. In this event the termites will build a tube, or covered runway, right over the face of a wall to reach a food supply. These are composed of tiny particles of earth or wood, cemented with the excretions of the termites. A single tube is slightly larger than telephone wire; many additional branches are constructed, however, depending on the size of the colony and the food supply. Some species of the termite build free-standing nests of tubes to reach the wood, if it is not too high above the ground. The insect seems to possess an uncanny faculty for locating the food supply of wood. When it is considered that the working force of this insect has no eyes, operates entirely concealed from view through these tunnels, crevices, or tubes, and yet always "gets its wood," the accuracy of this procedure becomes rather incomprehensible.

The termite has been a matter of casual acceptance in the southern part of the United States for generations. The old back fences and outhouses periodically gave way and sagged at various angles, but it was easier and cheaper to patch them up than to make a problem of this situation, for after all, the main house, as described previously, was generally built so as to avoid similar difficulty. There, it is taken for granted that an ordinary piece of wood dug from the ground will most likely be infested with this insect. Where it has been attacked, the wood will be ragged and porous, and if broken open at once will be found swarming with small, grayish white insects about the size of an ant, scurrying hither and yon in an attempt to get away from the light. The piece of wood will show no trace of these occupants if left in the open a few minutes.

It is rather natural that the termites should have been incorrectly called "white ants." As a matter of fact, there is a surface similarity in appearance to the casual observer, but on closer examination the difference is noticeable even to the untrained eye; actually, the ant is the worst enemy of the termite. Like ants and bees, termites have highly developed social habits. They live in colonies, and have a distinct social life in which the work of the colony is divided among specialized castes. These are composed of the original king and queen, and usually three other castes—reproductives, workers, and soldiers. Each colony is not only shut off from the outside world, but from one another. This characteristic, together with their ability to operate at such relatively great distances from their base, makes the insect practically ineradicable. Their survival is made even more secure by the many reproductive adults in the colony besides the queen. At one time it was thought that the destruction of the queen would wipe out the colony; not only was this found to be a futile gesture, but further study brought out the fact that termites have the same faculty as the bees, that of producing supplementary productives when needed. These latter specimens are not like the ordinary reproductives, but are nymphs in various stages. In view of this ability, it is easily seen that each colony is potentially immortal.

As in any well-ordered society, the workers are by far the most numerous of the specimens occupying the colony. Pale, weak, anæmic-looking, with a body almost as pasty in appearance as a grub, the workers are generally the smallest in size, and totally blind; nevertheless, they perform all the labor of the colony. It is in the performance of these duties that the workers cause virtually all the devastation in buildings. While they have an inconspicuous jaw, and a soft, rounded head of the same color as the body, they are equipped with a pair of hard, sharp, toothed mandibles with which they snip small particles of wood. They can go through the hardest wood, when they have a sufficient supply of moisture. The workers are generally the specimens seen when breaking into an infestation.

The reproductive adults are much more like ordinary insects than the other castes. They have large black compounded eyes, and rather flat, dark bodies. They develop wings, and break out of the colony for their annual flight at a more or less definite time each year; either spring or fall. They mate, drop their wings, and each successful pair forms a new colony and becomes the permanent king and queen. The body of the queen becomes enlarged as time goes on, in order to lay eggs more rapidly and in greater numbers. A colony is at first slow in gaining momentum, but it can be readily appreciated that the ability to increase is amazingly multiplied as the queen grows in size, and hosts of other reproductives are added to the colony. Fortunately, only a few of the pairs are successful in establishing a colony.

Possibly the most fascinating member of the

der. In fact the "raised cottage" type of the Gulf States is a real contribution to American architecture. There has been much speculation as to the exact reasons for this height, some advancing the theory of building above flood waters, and others that it was to escape the reptiles and mosquitoes, but in the light of findings in the field of termite investigation, there is little doubt that this insect was one of the chief causes of this height and ventilation. Nevertheless, if there was a lesson to be learned from this custom, the designers and builders of today failed to get even a passing grade. In following the more recent trend of design, our houses have been built practically on the ground, the first floor framed of wood, with scant ventilation underneath. It has been a boon to the termites, for certainly it must have greatly simplified their work.

Still another contributing factor to the progress of termites in buildings is the quality of wood found on the market today. Due to the supply under changing forest conditions, it is difficult to get truly dense, heart timbers. The sapwood, the soft outer rings of the tree, seem to have no resistance to termite invasion, even of species where the heart wood has a very high resistance. In fact, this type of wood seems to be their special diet, as it will be found that they have gone all through the soft wood before attacking the denser variety. Even the heart wood of the long-leaf yellow pine shows a low resistance where the tree has been sapped for turpentine too strenuously or unwisely, whereas the real heart wood of this pine, known as "pitch pine," has remained intact over a period of years when actually placed in the ground.

The facts on which these articles are based are presented with a full realization that much has yet to be learned of the termite before a final verdict can be pronounced on the strategy to be employed in this war against its invasion. Generous recognition is also given to the many agencies carrying on the very important work of research and field experiments. Particular emphasis should always be placed upon the service rendered by the Bureau of Entomology of the U. S. Department of Agriculture over a long period of years. More recently, but no less effectively, a group of scientists, manufacturers, and others in California, known as the Termite Investigations Committee, has made extensive studies which include species of termites peculiar to that region. The departments of agriculture in different universities, as well as many individuals, have contributed their findings to aid in the control of this pest. Several years ago two very interesting papers were published in the *Journal of the American Institute of Architects*—one by Mr. Mellen C. Greeley and another by Doctor Hartley and Mr. Wagener of the U. S. Bureau of Plant Industry—on fungus and termite prevention in buildings.

The interchange of these different ideas has resulted in some very definite principles in this control work. It was the free use of these findings which enabled the writer to carry his own studies of the damage by termites and control of their activities in buildings to the stage of satisfactory accomplishment that would justify the publication of his ideas. There is no intention, however, to give the impression of original findings in this field. As a matter of fact, the only positive approach in preventing attack of timbers above the grade line is based on the development of the termite shield advised by the U. S. Bureau of Entomology, coupled with study for a practical means of securing an impenetrable foundation wall. It is interesting here to note that the termite shield dates back generations in Africa, where in some portions of that country it seems that all piers under buildings are covered with metal caps.

In describing the termite and its habits, and in offering the measures herewith illustrated, only the subterranean termite is being considered directly. The precautions taken against the attacks from the subterranean termite eliminate largely the improper structual conditions which cause devastation from fungi, so-called dry rot, borers, and other insects.

To begin with, there are two angles of the work to be considered: new construction, or preventive work; and the infestation of existing buildings, or corrective work. In combating termites in preventive work it is chiefly necessary to have a general knowledge of the colony life of this insect, its habits and methods of attack, and, of course, a genuine knowledge of construction.

The subterranean termite actually nests or has its colony in the earth. It is dependent upon a direct contact with the earth for a supply of moisture, which is necessary to its existence. This fact proves of invaluable aid in attempting to control the activities of the insect, for it would otherwise be an almost hopeless task; this is particularly true in corrective work. The subterranean termite establishes definite lanes

Termites and Buildings

PART I: PREVENTIVE MEASURES IN NEW WORK

By Jefferson M. Hamilton, A. I. A.

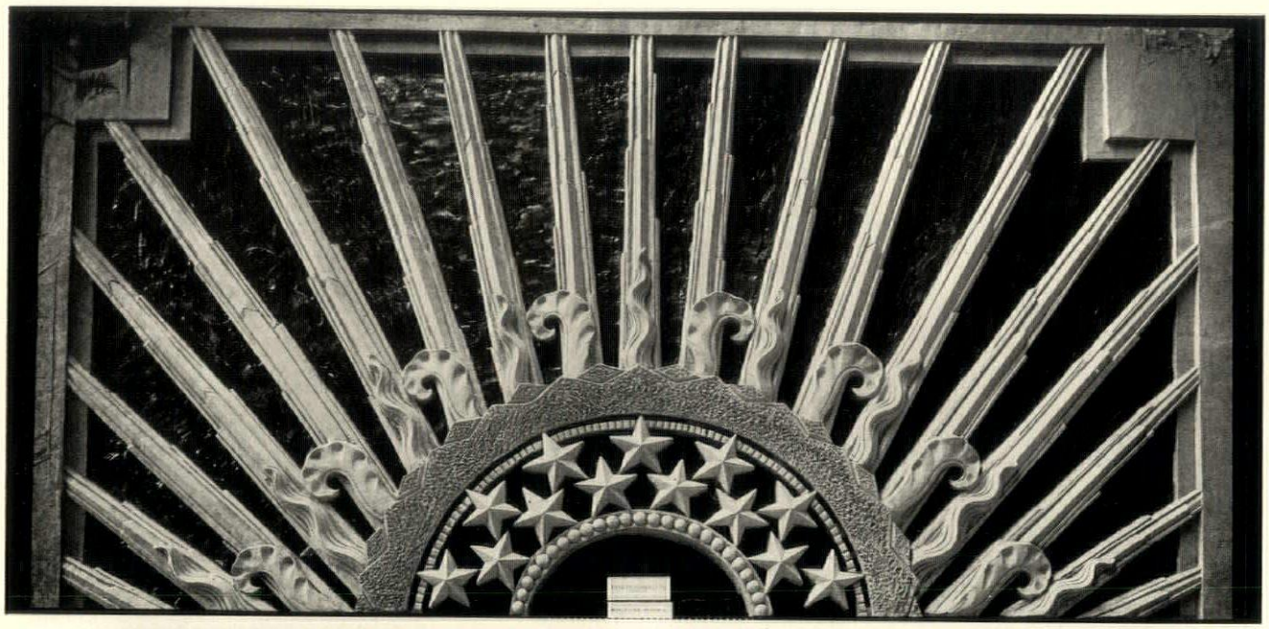
AS information concerning the devastating activities of termites on buildings becomes more widespread, the subject likewise becomes much easier to discuss by those who are studying this problem. In fact, there is a real stimulus today in presenting further developments in this field, gained from the realization that the general public not only has knowledge of but a truly personal interest in the subject. This could not be said of such recent times as the early depression days, for the most to be expected from the topic when mentioned to a chance acquaintance would be a polite, impersonal interest, and possibly a query as to what the term meant. When the fact was disclosed that they were insects, were seldom seen in the light of day, and were generally confused with flying ants at such times, it did not tend to give this information heroic proportions.

Almost overnight, however, this condition was altered throughout the eastern portion of the United States by a flood of newspaper publicity. The New York City newspapers reported a meeting at which had been discussed the marked increase of infestations and the serious damage being done by termites in New Jersey, Long Island, and the general section surrounding the metropolitan area. This resulted in an unexpected response on the part of the reading public, and the subject became one of front-page news.

Bulletins issued by the Bureau of Entomology, U. S. Department of Agriculture, as early as 1926, advised of the presence of numerous species of termites in the United States. These were divided into the two general classifications of subterranean and non-subterranean types. The subterranean type was described as the greater cause for anxiety, as it existed in nearly every part of the country. It is evident that there has been no sudden importation of these insects—they have been operating for years in most sections when discovered. In fact, it is the opinion of Doctor T. E. Snyder, of the U. S. Bureau of Entomology, that the types doing most damage are native; which offers the logical deduction that they antedate man on this continent.

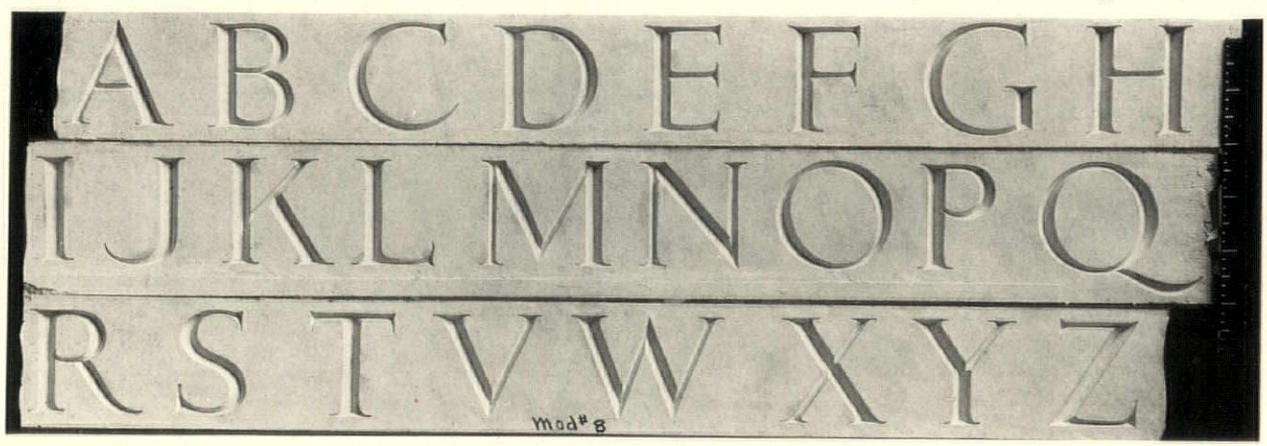
It is true, however, that there has been an evident increase in their attacks upon buildings in recent years. Scientists, in studying this phase of the problem, attribute a large measure of the cause to the continual clearing of the land, and the removal of the natural breeding places and food of the termites. This insect exists chiefly on a diet of cellulose, which is obtained from both living and dead vegetation. While in some sections, shade trees, orchards, vineyards, shrubs, and even crops have been attacked, the termite ordinarily feeds on dead wood. They have been found commonly in dead stumps, logs, and fallen trees, in lumber and sticks lying about on the ground, untreated fence posts and telegraph poles and similar locations. With these natural conditions which provide food for the termite being disturbed over a gradually widening area, it is to be expected that it will seek out the wood used in buildings. This fact could not be more clearly illustrated than in the well-known subdivisions of Florida, where in recent years whole wooded areas were cleared and built up. In a short time practically every building erected on these areas became infested with this insect.

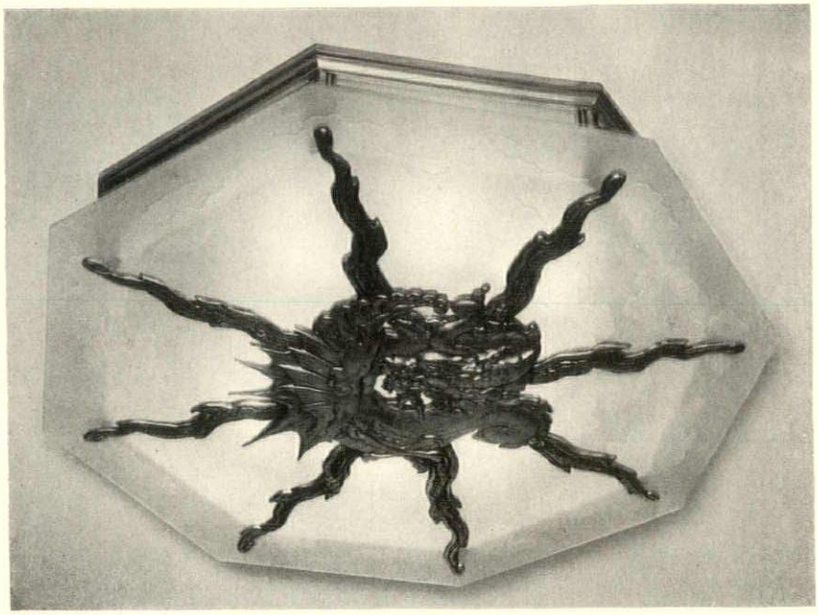
A further contributing cause is to be found in the very nature of the buildings themselves. The prevailing tendencies of our residential design in recent years seem to have evolved more noticeably around prototypes which had been built of masonry construction in other countries; close to the ground, with little ventilation under the first floor. In the United States, wood has quite naturally been used extensively in our buildings since the first settlers erected their cabins. It is an interesting commentary on this architecture of wood, however, to note that by the early part of the nineteenth century our builders had evolved a scheme of construction that generally removed the wood portions far from the ground. Along the Atlantic seaboard it was quite customary to find the living floor of the houses a full story above the grade, and the ground floor given over to service, kitchen, and storage. This level, however, had no wooden floor or baseboard. Further south, it was quite common to find the houses raised high on brick "pillars"—sometimes high enough to walk un-



Above, plaster models by René Chambellan of the sound amplification outlet above the proscenium. These were carried out in plaster

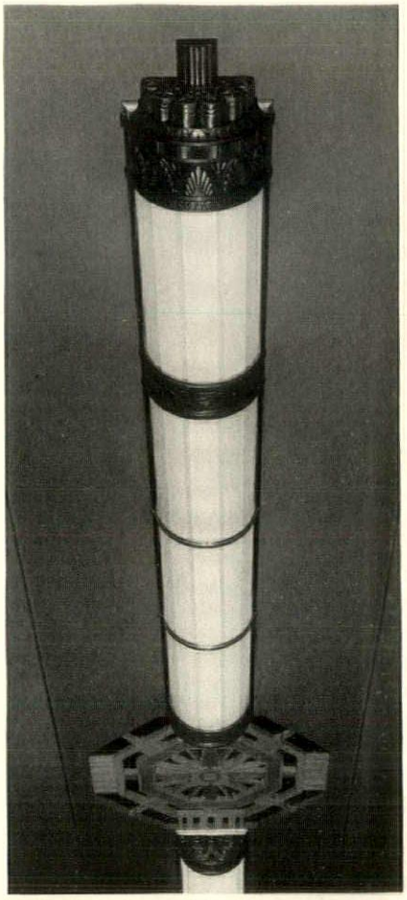
Below, Mr. Chambellan's plaster models of the lettering used throughout the building





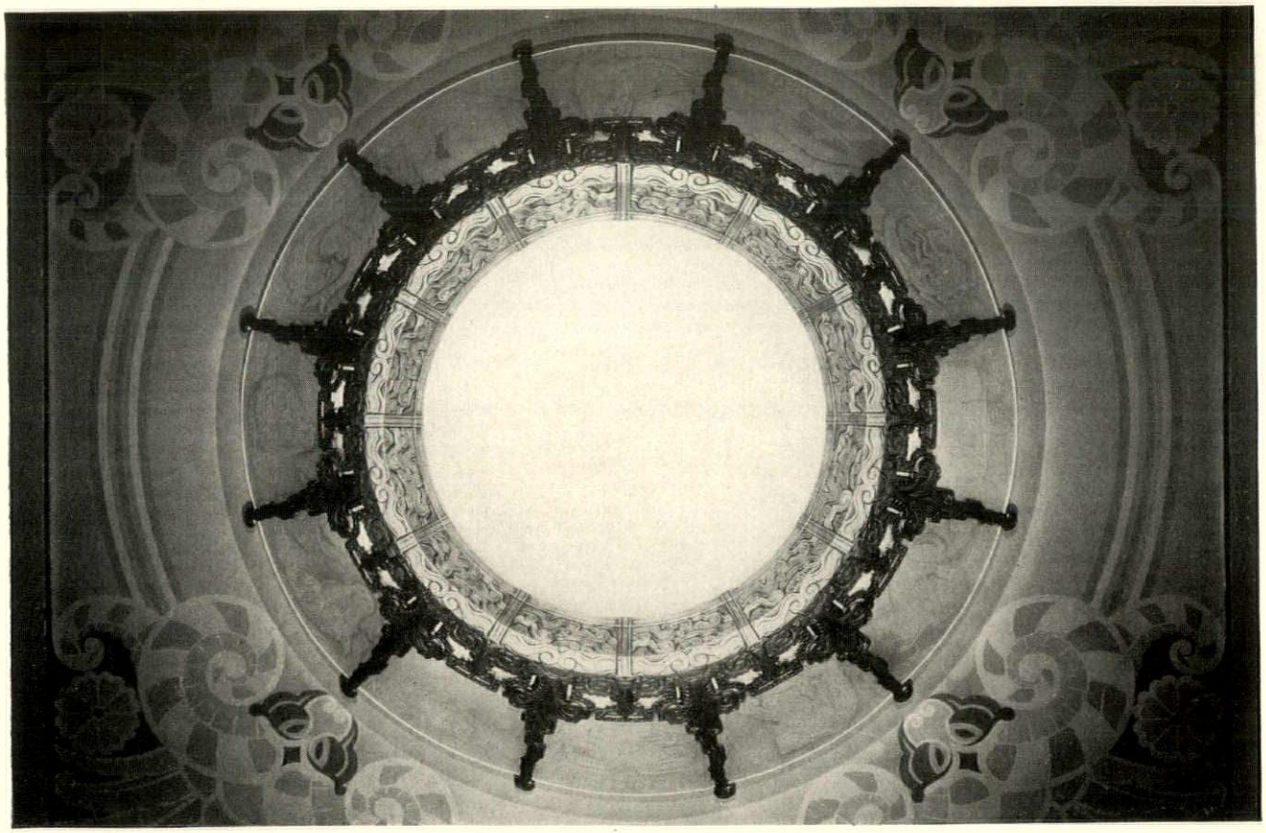
One of the smaller ceiling lights in the main lobby

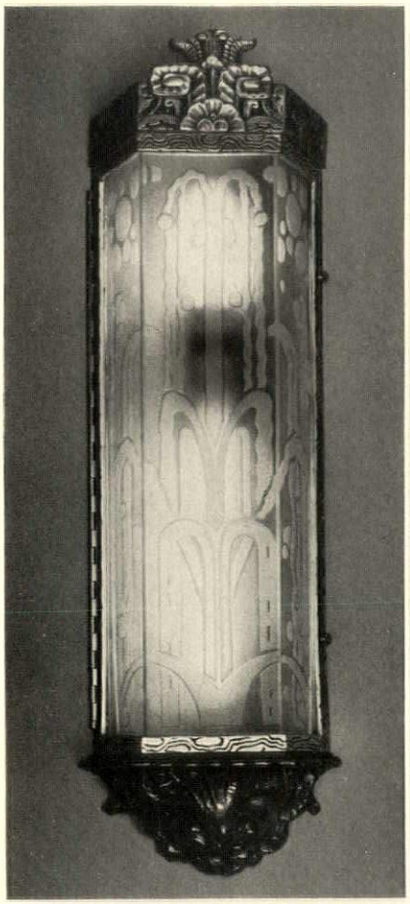
Richard Garrison



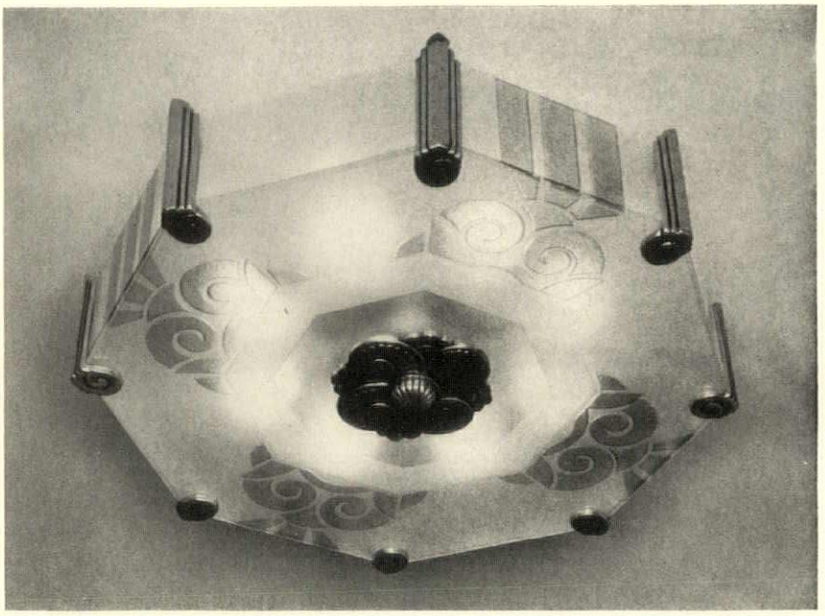
Ceiling light in the main foyer over the stairs leading to War Memorial Hall

Looking directly up at the main central ceiling light in the foyer, showing the sun amid an abstract representation of clouds, and the signs of the zodiac in the carved glass





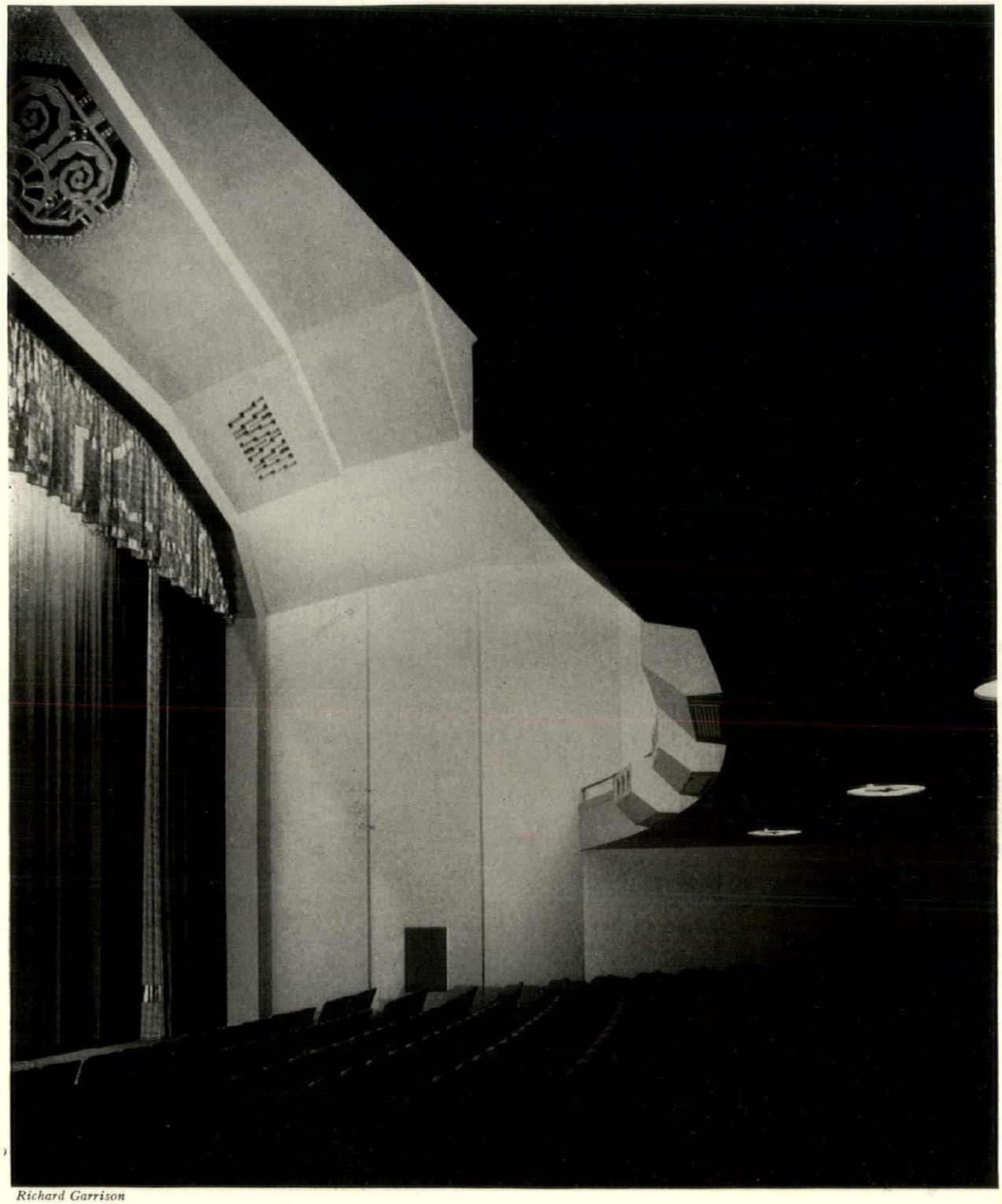
One of the side corridor lights, in bronze and carved glass



One of the ceiling lights in the side lobbies

Photographs by

The main light in the foyer, symbolic of the sun, with the signs of the zodiac

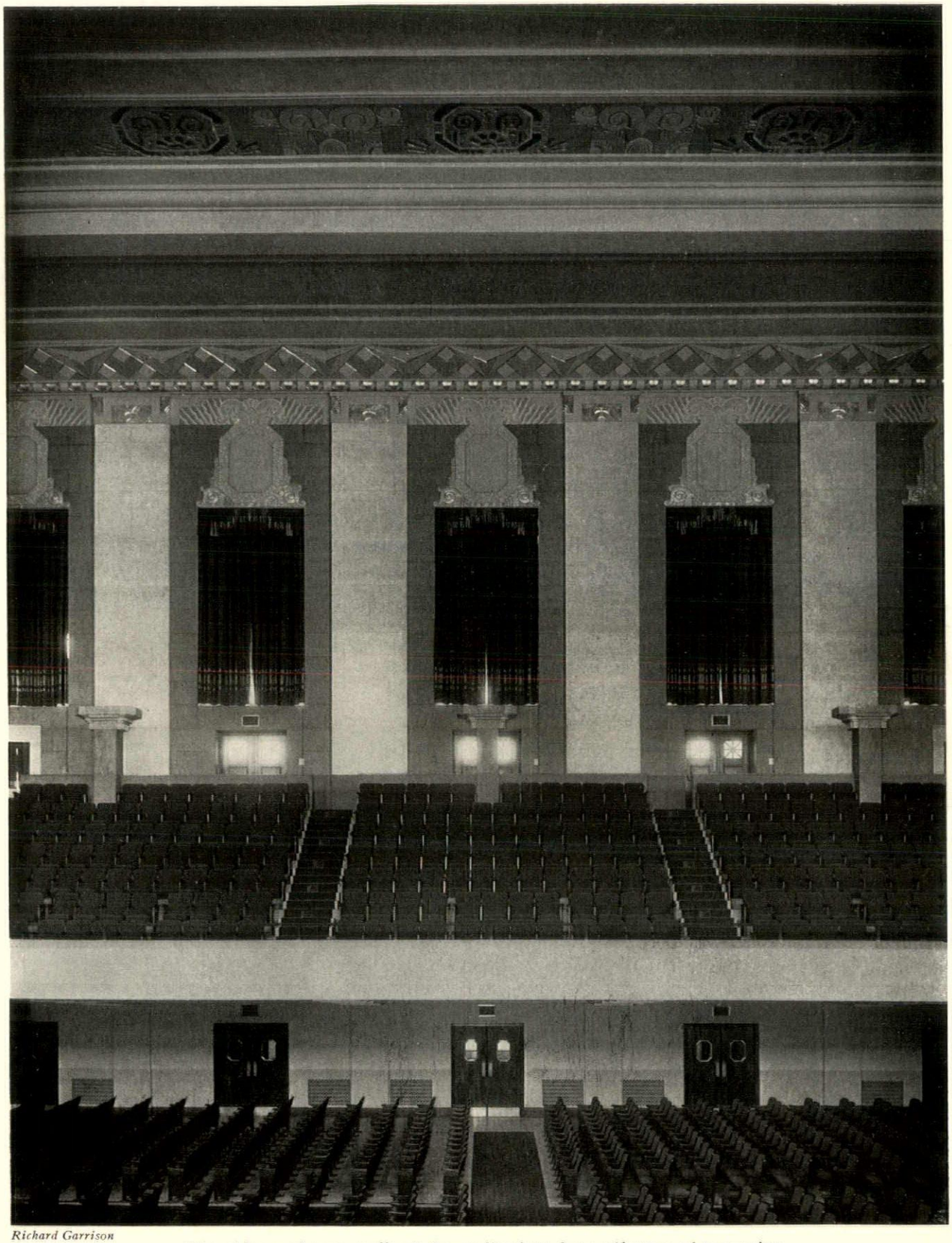


Richard Garrison

The little theatre at the west end of the building has a form approaching the parabolic, and is shallow enough, with its six hundred seventy-five seats in auditorium and balcony, to make it a playhouse of the more intimate type. The colors used are a soft gray, orange, red, and silver

Richard Garrison

In the main foyer the walls are of Lunel Fonce marble used in conjunction with travertine. The floor is of terrazzo with a central bronze insert showing the seal of Worcester—René Chambellan, sculptor

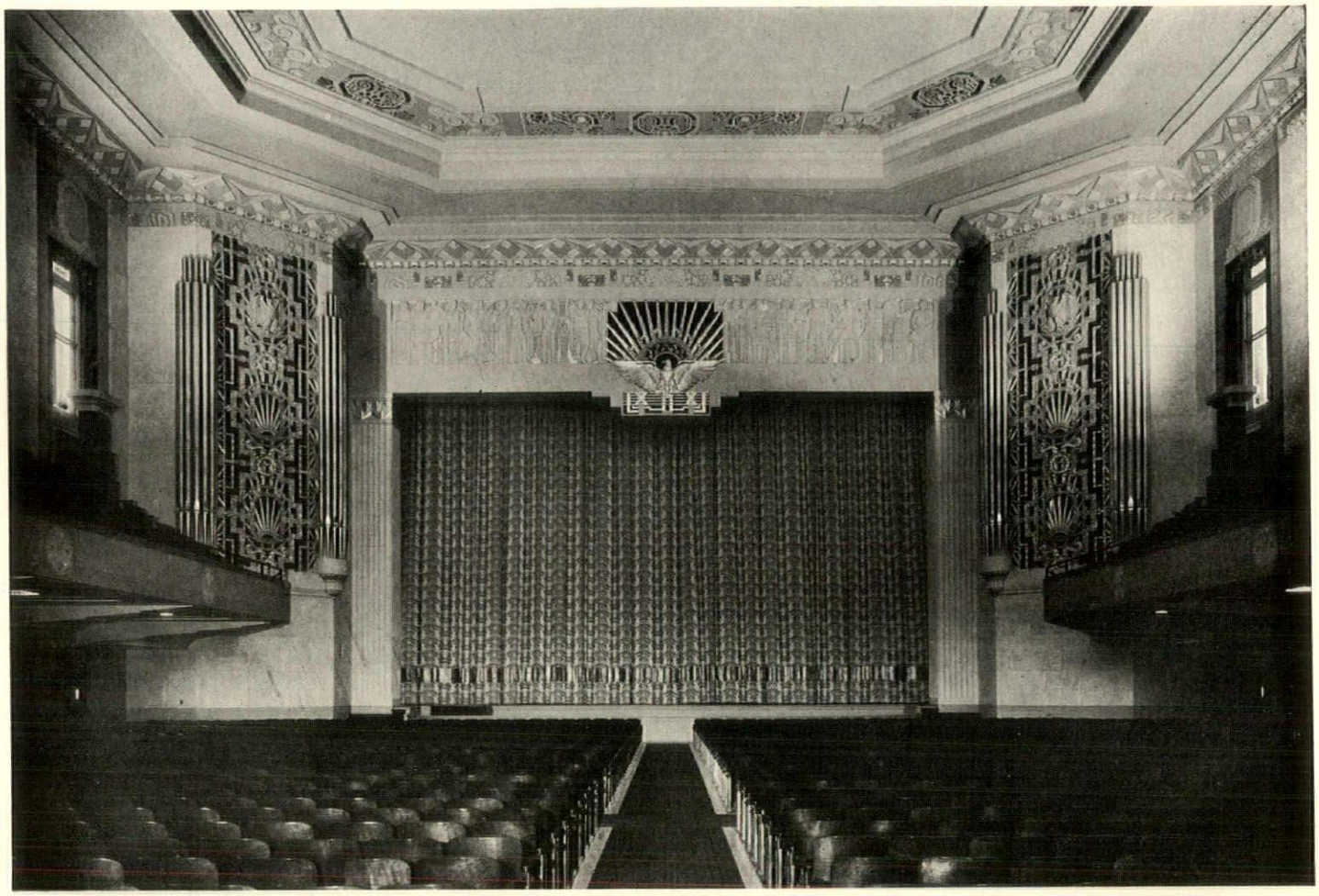


Richard Garrison

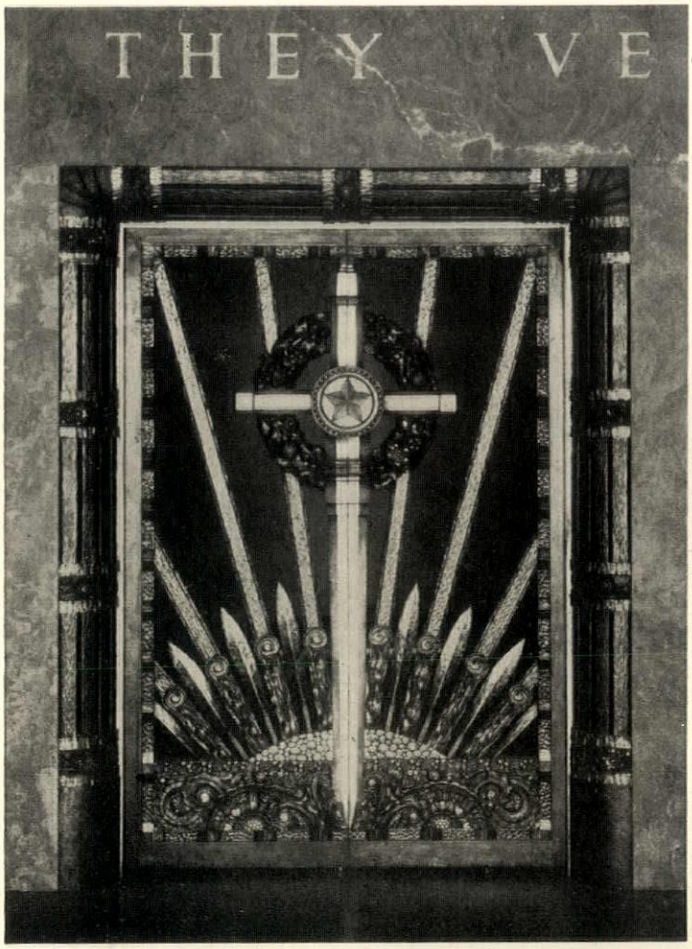
The sides and rear walls of the auditorium have pilasters of travertine with acoustical tile in the intervening bays. The ceiling here is sixty-seven feet above the floor

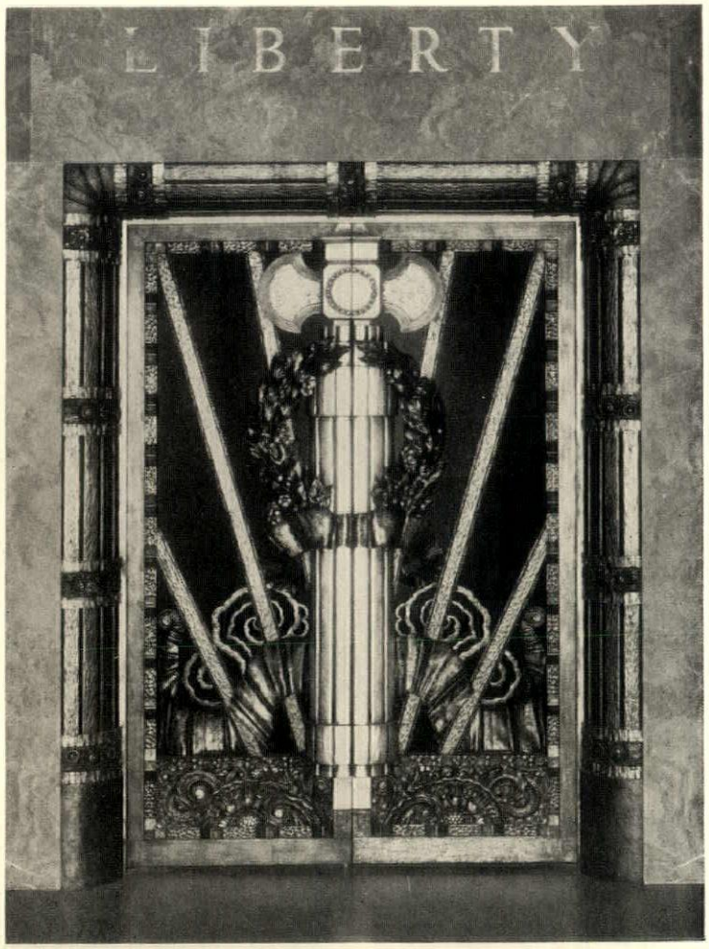
Richard Garrison

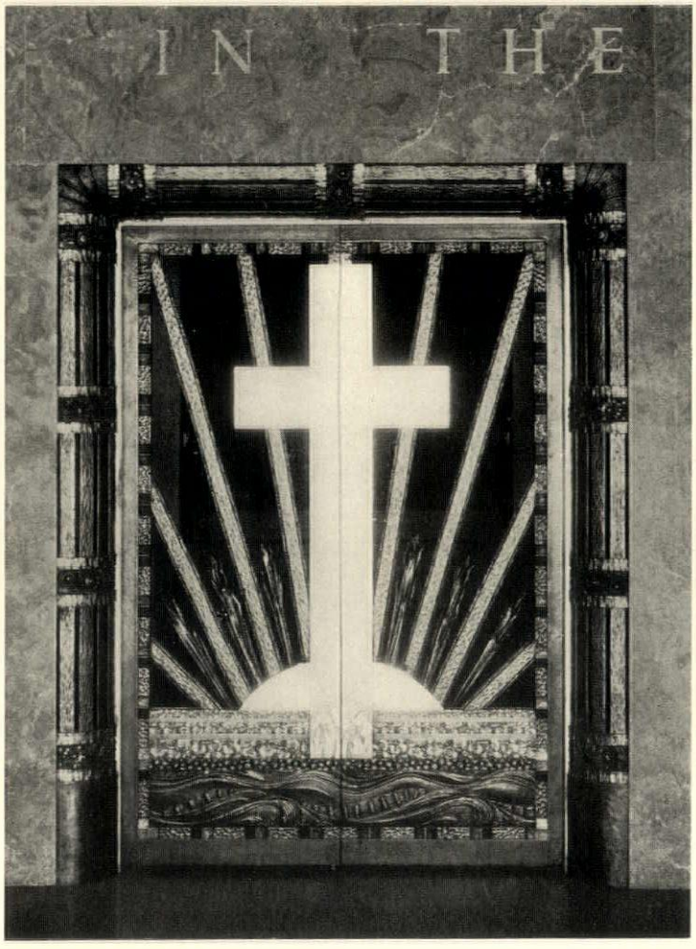
A detail of the proscenium and the organ grille in the main auditorium. The color of the draperies is a soft red trimmed with silver. The walls and ceiling are in soft grays and browns with silver



Photographs by Richard Garrison







Photographs by Richard Garrison

Details of the three wrought-iron doors in the west wall of War Memorial Hall, under the inscription, "They ventured far in the cause of liberty." The one on the left above symbolizes, in the sword and bayonets, Combat. On the right above, symbolized by the fasces and wreath, are Victory, Law, and Peace. The central door, with the Cross rising from the poppy fields of Flanders, represents Immortality. In this doorway are seen the sun setting in the west, and the conventionalized waves of the Navy's field of action and of sacrifice

On the facing page is shown the stage end of the auditorium, with its organ grilles at left and right and its sound amplification source above the proscenium. Below are shown the plaster models of the sculptor, René Chambellan, for the allegorical representation of a history of music in the frieze over the stage

Richard Garrison

A view from one of the stair landings showing, above, War Memorial Hall, and below, the foyer. The repoussé bronze urns bear figures symbolical of the army and the navy

(sound amplification); Scrimgeour Electric Company (electrical work); Cox, Nostrand & Gunnison (electrical lighting fixtures); Marjorie Taylor and Catherine Klock (draperies); Harriton Glass Company (marble and glass carving); Renner & Maras (iron gates and lighting urns in Memorial Hall); McComb, Powers & Swenson (general painting); Tory Brothers (marble); DiPaoli Mosaic Company (terrazzo); and to all others who have worked to create this building.

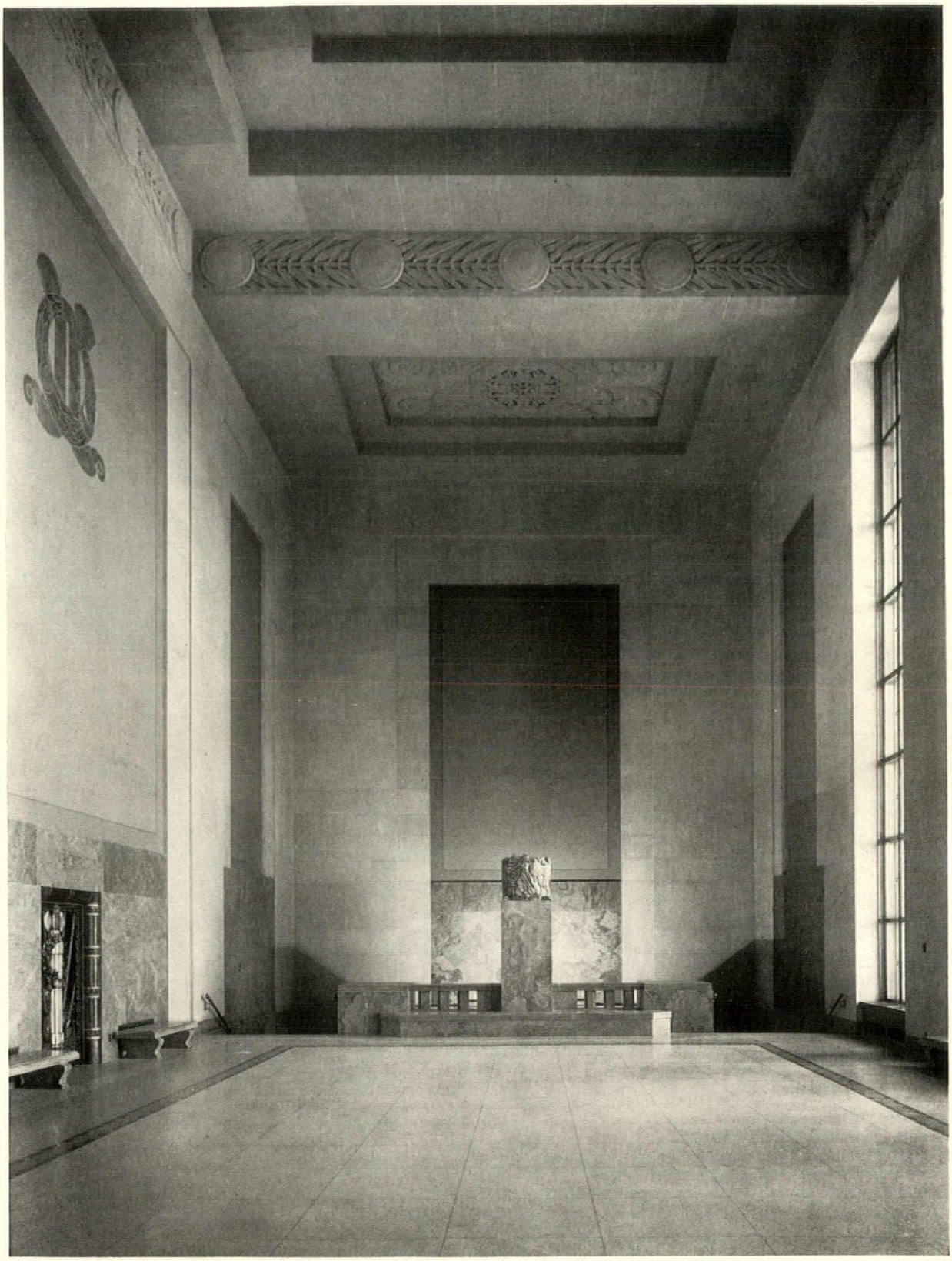
Richard Garrison

Upon a photograph of the west wall of War Memorial Hall Mr. Hirons has sketched very freely an indication of a possible future mural painting. The three doors under the mural form a particularly interesting feature of this room. They are of wrought iron, and, as will be seen in the detail photographs on page 328, have a scale and a sturdiness perhaps never before attempted in wrought iron

where one might spend the entr'actes, or, if in another mood, pass into the quiet dignity of that Hall of the Dead.

As to the exterior, here again the architects have expressed clearly and vigorously in the stone the essential fact that this is, first and last, a memorial, the tribute of a great city to those who have given it their all. No citizen of Worcester, walking past that east front by day or by night, can fail to catch the full significance of that massive Doric order and the great windows behind it, lighting, while stone and bronze shall endure, the roll of the War dead.

The architects have had little or no interest in what I might say of their work; their concern has been with the fact that a building of this kind is the fruit of many minds and many hands. Without a close and sympathetic collaboration between the architects and the other artists and craftsmen, the Worcester Memorial Auditorium could never have been created. In this thought the architects particularly request me to acknowledge for them their appreciation of the splendid services and excellent craftsmanship of the following: H. G. Balcom (structural engineering); Clyde R. Place (mechanical engineering); Dr. Clifford Swan (design and supervision of acoustical engineering); Peter Clark (stage equipment); Mack, Jenney & Tyler (decorative painting); Bludworth, Inc.

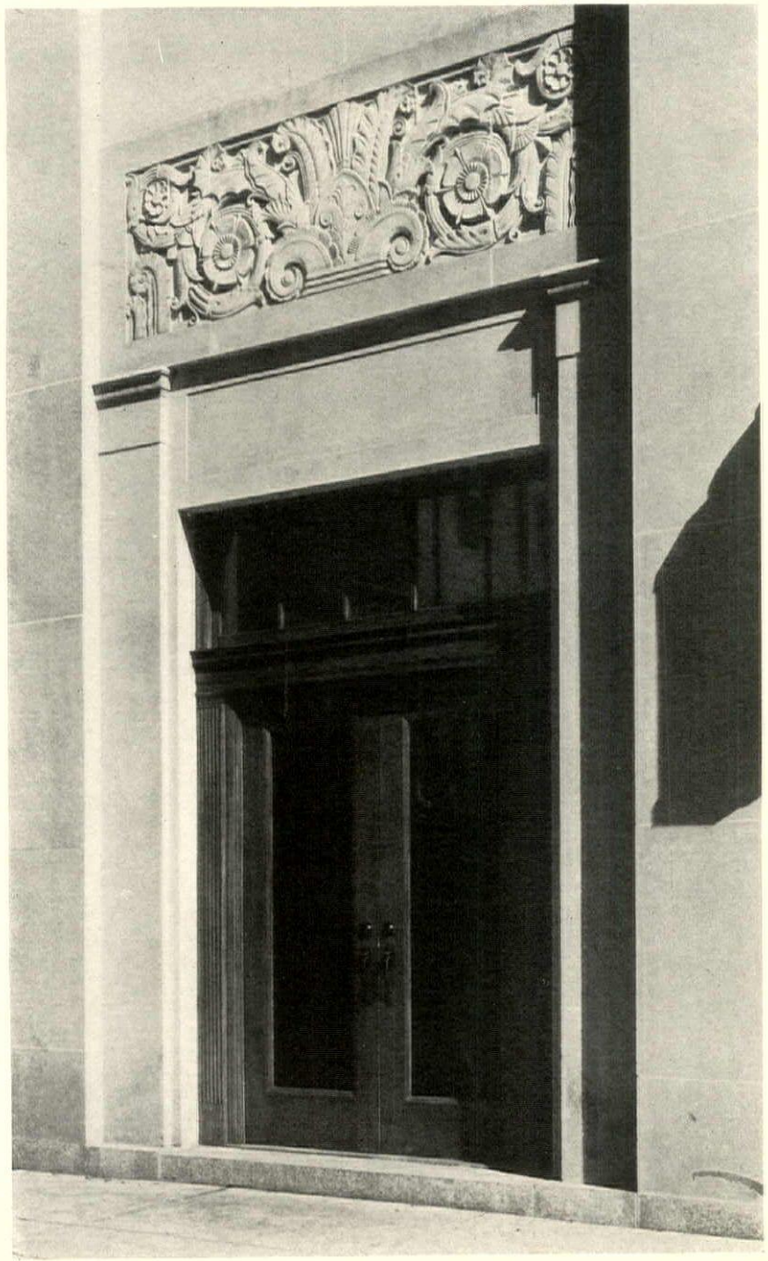


Richard Garrison

War Memorial Hall. The marble wainscoting at the left, facing the windows, is incised with the names of Worcester's war dead. The magnificent scale of the room, the restraint employed in its design, and the unusual virility of what little detail is used give to the Hall a significantly impressive atmosphere of reverence

Richard Garrison

War Memorial Hall as seen by one ascending one of the double end stairways. At the left the great bronze urn on its marble pedestal, together with a similar one at the other end, furnishes all the indirect lighting of the room, which is thirty-nine feet by one hundred twenty feet, with a ceiling height of fifty feet



Photographs by Richard Garrison

At left, detail of one of the three entrances on the west front leading to the lobby of the little theatre

At right, the upper terrace on the south side, similar to one on the north side, the three doors leading out from the gallery of the auditorium

Photographs by Richard Garrison

At left, the entrance to the little theatre as seen in direct elevation from the Art Museum across the street on the west

At right, looking across this same west end

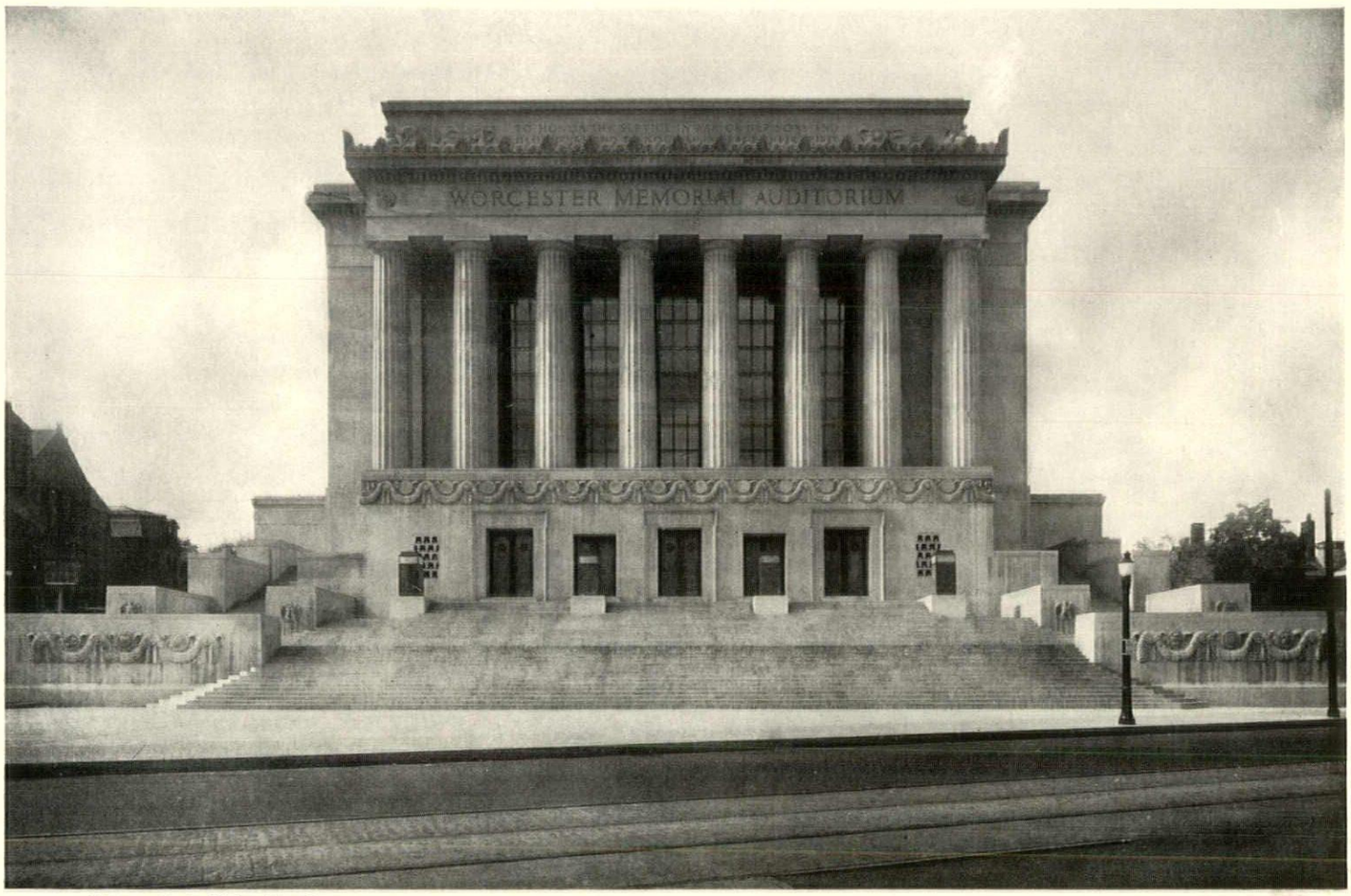
Photographs by Richard Garrison

A detail of the southeast corner, showing heavy swag motif of the colonnade repeated on the outside wall of the approach. One of the significant features of the plan was the creation of an upper terrace, shown at the top of the steps at the left, upon which the gallery exits open. At left, a detail of the stone carving at the southeast corner of the attic wall. Paul Jennewein, sculptor

Fortunately the long plot permitted the distinct separation of the little theatre, with its entrance upon another street. And this disposition of the three elements made possible the scheme of utilizing a single stage for the auditorium and the theatre—a stage of unusual size and magnificent equipment. One does not, if one is wise, attempt to look into the collective mind of an architectural jury, but it seems at least a fair guess that the decision was never in doubt after that plan made itself clear—a perfect co-ordination of the prescribed elements, with the raised terrace promenades

Richard Garrison

A detail of the entablature upon the east front, and its return at the southeast corner



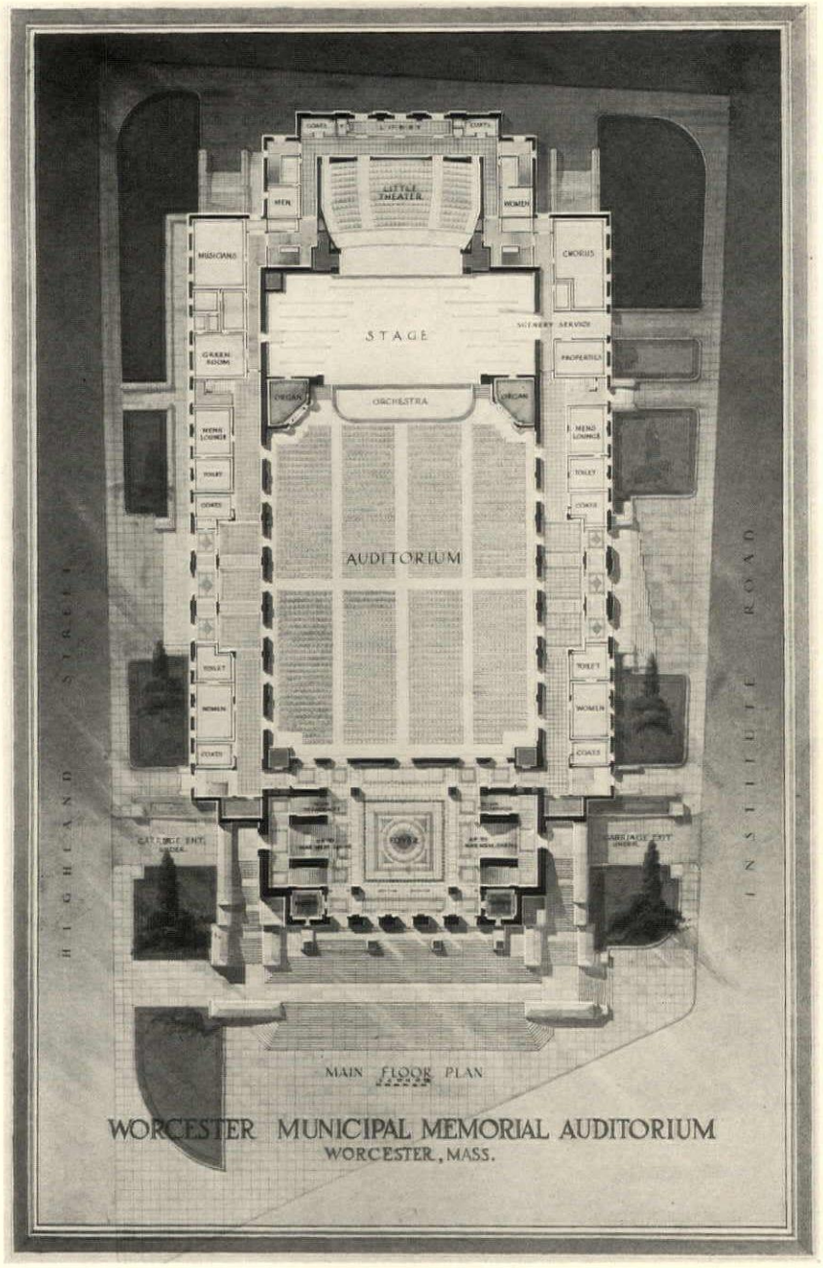
Photographs by Richard Garrison

Above, the east front. Due to the sloping site, the main floor, which is here reached by many steps, is below grade at the other end of the property. The building is of Indiana limestone above a base of Deer Island granite. The fluted Doric columns are forty feet high

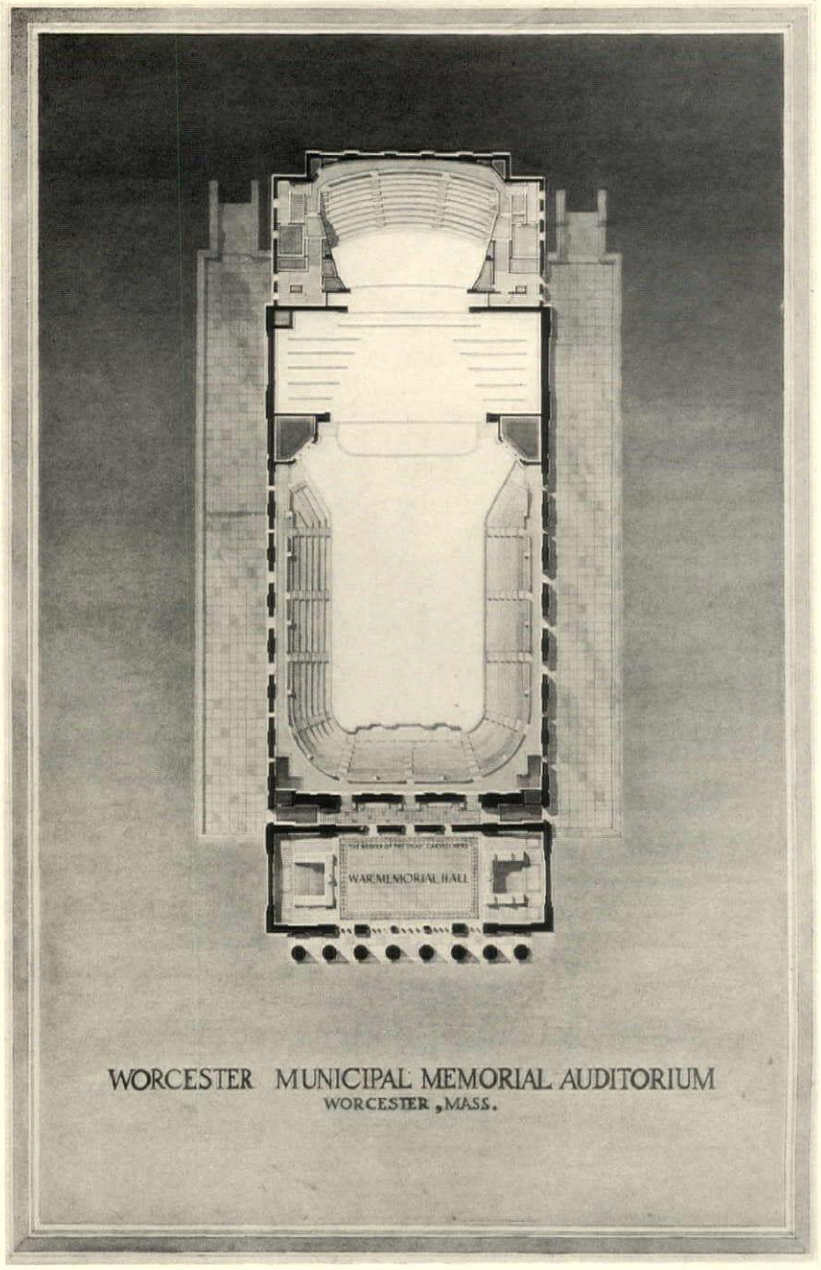
Architecturally the work derives its greatest success from a sympathetic blending of three distinct elements. It can have been no easy matter to join together under one roof a hall of the dead, an auditorium which may be used for purposes differing as widely as a Red Cross rally and an automobile show, and a small theatre. Yet the thing has been done.

The entrance foyer must have been particularly difficult. In passing through it there had to be at least a suggestion of the spirit of enjoyment, anticipation of the auditorium itself. And yet there was needed also the preparation for the ascent of those two monumental stairways to the hall of memories, where one's voice drops instinctively to a whisper, one's mind to the sad and proud spirit of homage.

At left, a detail of the east front, showing at the right one of the light sources of granite and bronze



Plans of the main floor and of the upper level. It will be seen that the Memorial is composed of several fairly distinct parts: the foyer, above which is the War Memorial Hall; the auditorium, which has a level floor and removable seats; a very large stage with the orchestra platform supported by elevators; and the little theatre which, with the auditorium, utilizes the same stage



ARCHITECTURE

VOLUME LXVIII DECEMBER 1933 NUMBER 6

The Worcester Memorial Auditorium

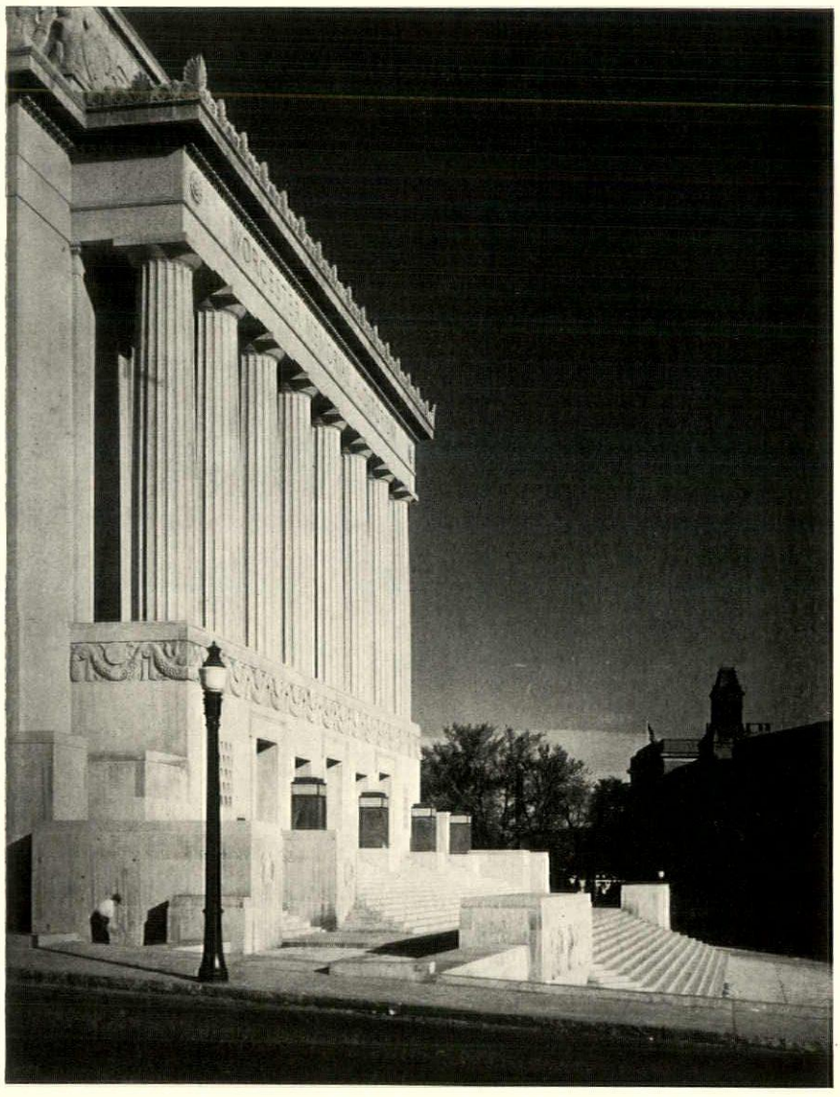
L. W. BRIGGS CO., FREDERIC C. HIRONS, ASSOCIATE ARCHITECTS

By Henry H. Saylor

AFTER the World War had slipped into the past from what had seemed to be an endless present, the thoughts of the nations turned to the question of suitable memorials. The memory of many discussions, debates, arguments on that subject is still fresh. The aftermath of our Civil War had left a crop of leaden frock-coated soldiers, naturalistic boulders, and stone chargers that looked rather more like cast concrete. That sort of thing would not do. The new social outlook was already in the making. On many sides there was the feeling that a memorial should be an object suited to community needs, a work that should promote the brotherhood of man in some more active way than merely through an emotional appeal to the eye. As against this point of view there was ranged the contention that a memorial should be of the dead, not a mere convenience for the living.

The city of Worcester, Mass., chose to combine the two conceptions. The need for a community auditorium had made itself felt as early as 1917. Difficulties with regard to a proper site and the financial burden caused long delays. Then came the sudden stimulus of an offer of land for the purpose, the proposed gift of a group of public-spirited citizens. A bond issue was floated, a competition for a design was held. Of the twenty-one designs received, number thirteen was declared the winner. It was the work of Lucius W. Briggs, of Worcester, associated with Frederic C. Hirons, of New York. Ground was broken September 10, 1931, and the memorial was formally opened on September 26, 1933. Carved in the limestone of north and south walls are these significant words, written by Chief Justice Rugg of the Supreme Judicial Court of Massachusetts:

TO HONOR THE SERVICES IN WAR OF HER SONS AND DAUGHTERS AND TO NOURISH IN PEACE THEIR SPIRIT OF SACRIFICE A GRATEFUL CITY ERECTED THIS BUILDING

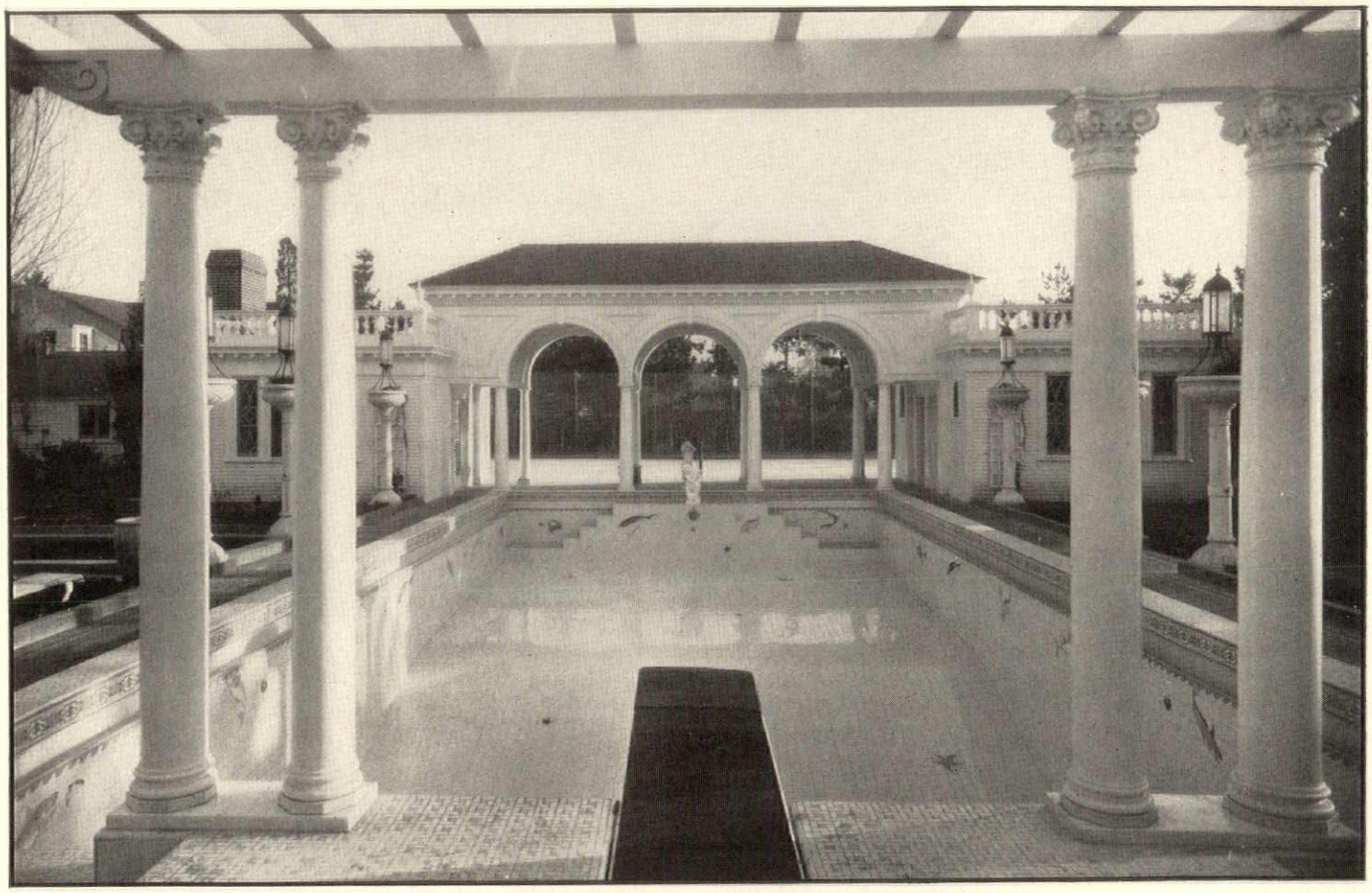


A view across the east front of the Memorial. The night lighting of the front is achieved by means of the four sources in dark marble across the steps

Richard Garrison

Richard Garrison

A detail of the northeast corner, Worcester Memorial Auditorium, Worcester, Mass. L. W. Briggs Company, Frederic C. Hirons, associate architects



The private pool of Mr. Max Straus, Beverly Hills, California. Sterilized with a Wallace & Tiernan chlorinator

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ARCHITECTURE

REG. U. S. PAT. OFFICE

THE PROFESSIONAL ARCHITECTURAL MONTHLY

VOL. LXVIII, NO. 6 — DECEMBER, 1933

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WHEN CHANGING ADDRESSES, SUBSCRIBERS MUST GIVE FOUR WEEKS' ADVANCE NOTICE AND BOTH THEIR OLD AND NEW ADDRESSES

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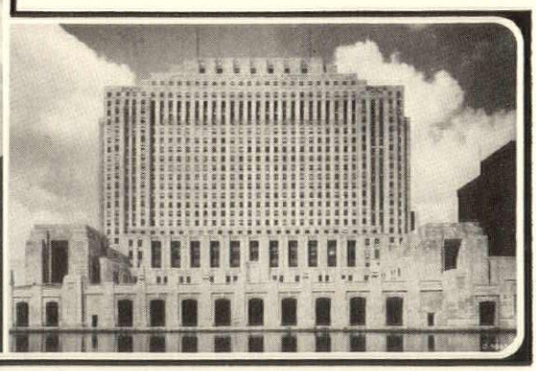

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ARCHITECTURE AND ARCHITECTURAL BOOKS

Main lobby, Worcester Memorial Auditorium —L. W. Briggs Co.—Frederick C. Hirons, Associate Architects. Tucker & Rice, Inc., Heating Contractor.

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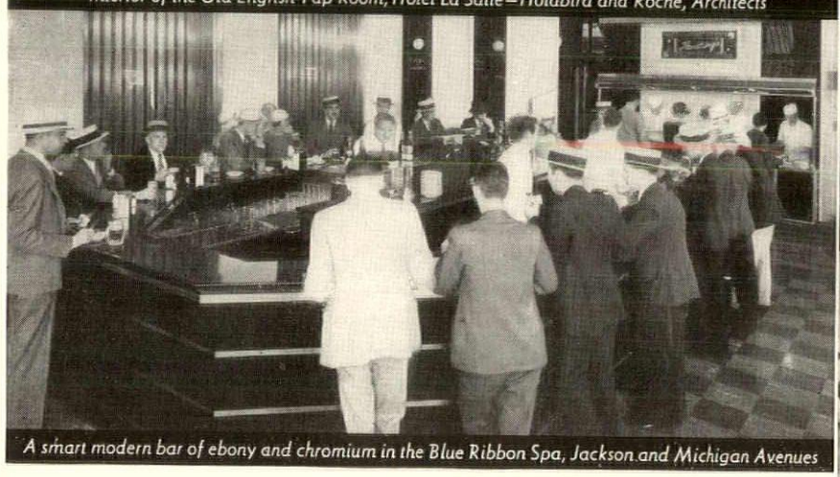

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A. I. A. REGIONAL DIRECTOR

STEPHEN F. VOORHEES, of New York City, has been elected regional director of the American Institute of Architects for the New York Division. He succeeds the late Albert L. Brockway, of Syracuse.

Mr. Voorhees, a member of the firm of Voorhees, Gmelin & Walker, 101 Park Avenue, is chairman of the Code Committee of the Construction League of the United States. He is a past president of the New York Chapter of the Institute.

P. W. A. APPROVALS IN HOUSING

UP to October 13, the non-federal housing projects approved by the Public Works Administration are as follows, the amount named representing the loan.

Boston—Neptune Gardens, Inc.	$3,500,000
Brooklyn—Spence Estate Housing Corporation	2,025,000
Philadelphia—American Federation of Full-Fashioned Hosiery Workers	845,000
Cleveland, Ohio—Limited-dividend corporation which will be organized under the auspices of the Mayor's Business Recovery Commission	12,000,000
Euclid, Ohio—Euclid Housing Corporation, a non-profit corporation, which will be formed by a group of leading citizens headed by Mayor C. R. Ely	1,000,000
St. Louis, Mo.—Limited-dividend corporation, composed of a responsible group of citizens, and sponsored by the Neighborhood Association	500,000
Borough of Queens, New York City—Slum clearance to develop plot with six-story apartment houses, to be built by Hallets Cove Garden Homes, Inc., a limited-dividend corporation	2,965,000
Bronx, New York—Four and six story apartments to be built by a limited-dividend corporation to be formed by responsible citizens of New York; proposed by Hillside Housing Corporation	5,184,000
Raleigh, N. C. — Three-story apartments adapted to house State employees and teachers and students of the State University, to be built by a limited-dividend corporation, organized by a group of Raleigh citizens	168,000
Indianapolis, Ind.—Slum clearance for Negro dwellings to be built by a limited-dividend corporation to be organized by the Indianapolis Community Plan Committee of the Chamber of Commerce	4,460,000
Philadelphia, Pa. — Hillcreek Homes Corporation, a limited-dividend corporation, for a low-cost housing project	1,290,000
Atlanta, Ga.—Techwood, Inc., a non-profit corporation for slum clearance and for two and three-story apartments and dormitory for students of Georgia Tech	$2,600,000
Atlanta, Ga.—University Housing Corporation, non-profit organization for slum clearance and erection of three-story dwellings for Negroes adjacent to Spellman and Atlanta Universities	1,212,500
San Francisco—Roosevelt Terrace Housing Development, a limited-dividend corporation for a low-cost housing project consisting of four-story walk-up apartments grouped around a court surrounding a central six-story elevator building located near the University of San Francisco and other schools	3,230,000

Many of these loans are given tentative approval subject to contracts.

METROPOLITAN MUSEUM OF ART EVENING COURSES

THE Metropolitan Museum of Art announces a series of lectures during the present winter season, all in co-operation with trade associations.

Miss Grace Cornell, assisted by Miss Lucille Arkins Thompson and various specialists, with the co-operation of Richard F. Bach, will present the basic principles of design and their application to present-day needs of designing, manufacturing, and selling.

Miss Cornell is also giving, in collaboration with the Art Directors' Club, a series of talks developing in practical form those simple principles of color that are of definite use to the worker in the field of the graphic arts.

A third course by Miss Cornell is given in collaboration with the Cotton Institute and the American Designers' Fraternity. It is planned to develop judgment and an understanding of the principles that are used in the well-designed dress and fabrics of both the past and the present.

A MATTER OF CREDIT

IN the October issue, in the article on The City of Washington Today, we published, on page 194, a photograph showing the interior court of the new House Office Building. Though the building, as stated, was designed by the Allied Architects of Washington, the layout of the court and the planting, both within and without, were the work of Harold A. Caparn, landscape architect, with the exception that the four seats in the corners of the court were added by the Allied Architects.

FRANK I. COOPER, 1867–1933

FRANK IRVING COOPER, architect and engineer, practising in Boston, died October 23, at his home in Wayland, Mass.

Mr. Cooper was born in Taunton, May, 1867, was graduated from the Chauncy Hall School, and studied engineering with Harry Keith; architecture with Henry Van Brunt. For some time he was a draftsman for Shepley, Rutan & Coolidge, architects, in Boston, and practised for two years in Pittsburgh.

His independent practice dates from 1892 in Boston. Among his better-known works are many school buildings; he received a Gold Medal for the designs of school buildings at the Jamestown Exposition in 1907. He was a member of the American Society Heating and Ventilating Engineers, and had been ex-president of the Massachusetts branch of the society of that name.

He contributed to the Encyclopedia Britannica articles on municipal planning and on secondary school architecture.

PERSONAL

Julius Grozen, architectural engineer, announces the opening of an office at 339 South Main Street, Fall River, Mass.

Irvin L. Scott and Otto Teegen, architects, announce that the firm of Joseph Urban, architect, and Irvin L. Scott, associate, is being continued under the name of Joseph Urban Associates, at 5 East 57th Street, New York City.

Robert S. Hale Company, architects and engineers, announce the removal of their office to 1432 West Lake Street, Chicago, Ill.

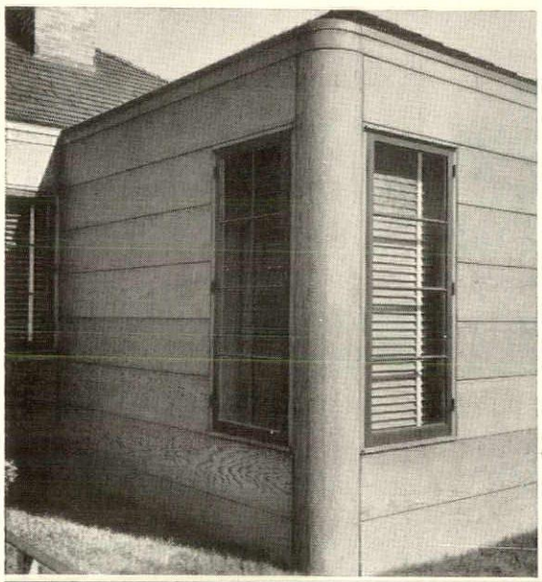
Burnham Brothers, Inc., architects, announce that Hubert Burnham will continue the practice of architecture in their present quarters in the Burnham Building, Chicago, Ill., under the present name, while Daniel H. Burnham will practise architecture under his own name with offices in the Railway Exchange Building, Chicago, Ill.

The office of Walter Thomas Williams, architect, has been moved to 2 Park Avenue, New York City.

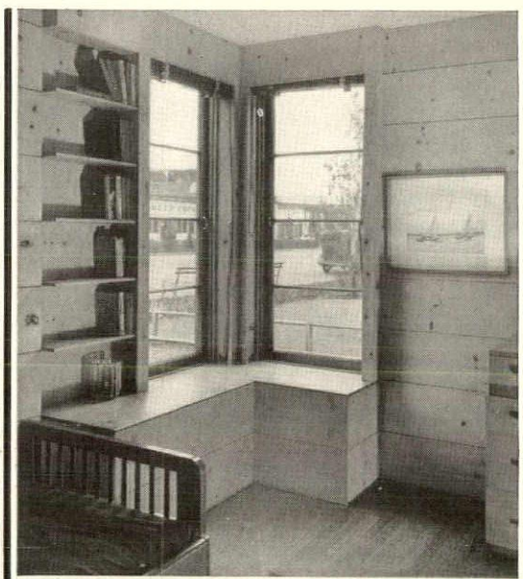
ARCHITECTURE, published by CHARLES SCRIBNER'S SONS, 597 Fifth Avenue, New York, N. Y. December, 1933. Volume LXVIII, No. 6. Published monthly on the 28th of the month preceding date of issue. Entered as second-class matter, March 30, 1900, at the Post-Office at New York, N. Y., under the Act of March 2, 1879. Yearly subscription rate to members of the architectural and allied professions, $3; to all others, $6.

● TODAY'S KEYNOTE OF BEAUTY IS GLASS ●

The skillful use of glass lends to room interiors a new and charming individuality that is fast becoming the keynote of modern residential architecture. • Architects visiting A Century of Progress saw an interesting interpretation of this modern trend in the many effective mirrors, panels, mirrored doors, table tops, decorative screens and Picture Windows that were featured in the Home Planning Section. • They saw, too, that, in a great many of those instances, as well as in practically all of the exterior glazing, the flat glass used was the product of Libbey·Owens·Ford. Such marked preference is convincing endorsement of our assertion that a closed specification for L·O·F Quality Glass will insure your clients' complete satisfaction.



● **Exterior view of a typical corner window in the Lumber Industries House at the World's Fair.**

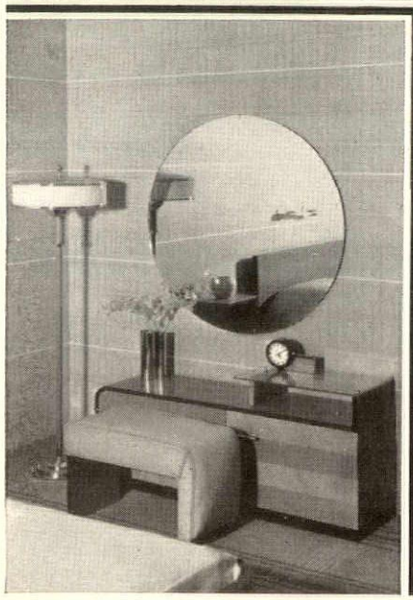


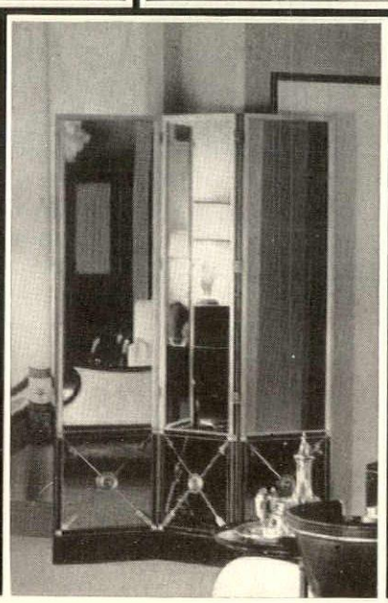
● **The same window from the inside. With this type of window, room corners become usable and wall space is increased.**

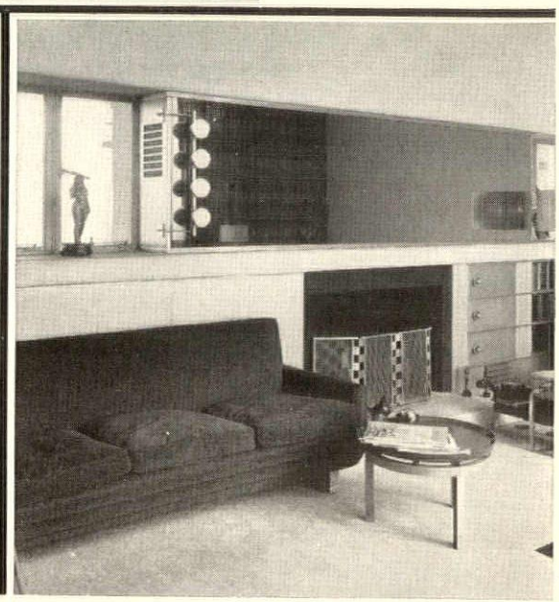
● **Pleasing decorative use of mirror and glass topped dressing table in the Design for Living House.**

● **The living room of the W & J Sloane "Home of Today" derived much of its appeal from this period glass screen in modernized Empire style.**

● **A much admired feature of the living room of the Florida Tropical House was this decorative mirror panel with attractive bluish cast.**







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