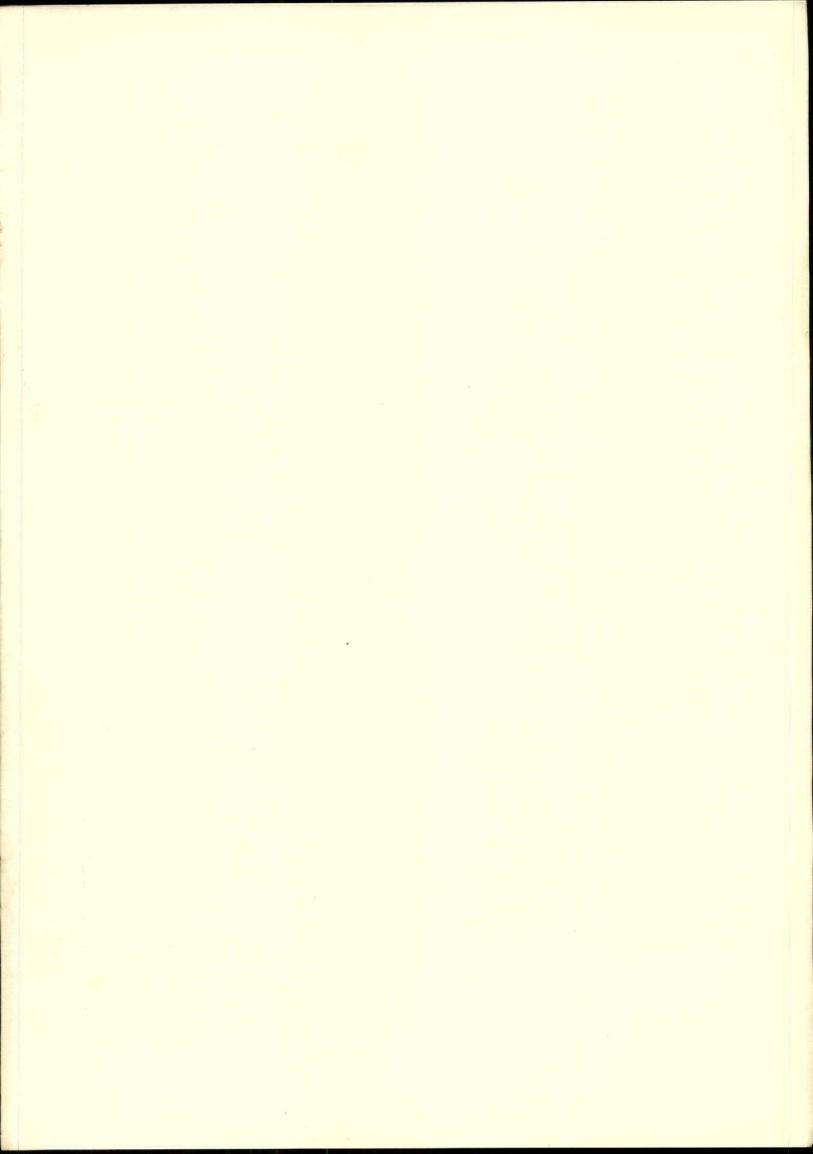


George H. Van Anda

VAN TASSEL APARTMENTS, NORTH TARRYTOWN, N. Y. ANDREW J. THOMAS, ARCHITECT

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Wurts Brothers

An archway entrance to the inner court of the Amalgamated Housing Corporation project, the Bronx, N.Y. Springsteen & Goldhammer, architects

A Designer's Notes on Low-cost Multi-family Housing By Thomas C. Stapleton

T is only within recent years that large-scale housing has received the attention of prominent architects, who have since become specialists in this field. As the fundamental purpose of this type of work is to bring to the mass of people living conditions of a higher order, encompassing greater social and recreational advantages at the lowest possible cost, the problem of design has become increasingly more important. Tenants are no longer satisfied with just a place to live, but have come to appreciate, respect, and in

many cases demand, carefully planned and welldesigned houses.

With the increasing demands to reduce rental cost per room, and at the same time accomplish the aforesaid results, there are few problems in the architectural profession which present such limitations to the designer as multifamily housing operations. Fortunately, economy of space and materials has in many cases forced the hand of the designer to a result of simplicity.

During the experience of my participation as



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Phipps Garden Apartments, Sunnyside, Long Island. Clarence S. Stein, architect

designer and co-designer of some of the largest housing developments in this country, certain fundamentals were discovered. These were used as a working basis. The preservation at all times of domestic character was strictly adhered to, and it has been quite apparent that without this "domestic feeling" the building, or group of buildings, could easily acquire an institutional or factory-like appearance.

As the low-cost projects prohibit the use of customary cornices, sloping roofs, and many other details familiar to the layman and associated with domestic architecture, it has been found necessary to concentrate upon mass, proportion, and fenestration.

With the development of planning, the area occupied by the buildings has become smaller, and the feature of gardens was introduced. I believe that this feature will become one of the designer's greatest assets. It provides a great deal of domestic atmosphere and is a practical source of enjoyment to the tenants. The heretofore more desirable street apartments are losing their popularity to the apartments which face the garden. In the large-size developments it has been found fitting to incorporate a children's playground with all its accessories. These playgrounds, generally speaking, are not particularly attractive to look at, and should be well screened where possible with adequate planting. Usually adjoining the playground, in the building, it is quite necessary to have a well-equipped nursery. At a very small added expense, this nursery may be attractively painted with juvenile decorations.

The auditorium has been found a valuable asset for the purpose of entertainments, weddings, and other social gatherings. A maple floor, sand-finished walls and ceilings, painted and glazed, specially designed lighting fixtures, a stage or platform, a supply of collapsible seats, a small kitchen, fully equipped, and a cloak room with lavatory adjoining, comprise the necessary arrangements.

In studying the wall surfaces, the single window devoid of mullions, with well-designed proportions, is found most fitting. The concentration of ornament to points that are easily observed, such as around doorways in the form of stone carving, brick design, or perhaps decorative metal work; or to points of accent in the upper portion of the building, is both economical and in good taste, and I have learned that the employment of the very best craftsmen available has been entirely justified for this work. In my opinion, a well-designed, beautifully executed lantern, or a fine piece of stone carving by a master craftsman, in the correct location, has the tendency to add quality and richness to the simplest of surrounding building materials.

As it is most economical to use brick in the construction of this type of work, I have spent much time in experimenting with both the color and the texture of this material. In our closely populated cities, where dust and smoke have to be taken into consideration, the brick that will withstand these ravages and still maintain its appearance should be chosen.

On some of the largest housing developments, brick was imported from Europe. This brick had both the desired texture and color, and a great deal of domestic character. However, the imported brick presented many difficulties. One might choose a very satisfactory sample, but, owing to the fact that the European brick factories are generally owned by individuals and run on a small scale, the brick is collected and delivered to a central shipping point.

JANUARY, 1933

Each manufacturer having a slight variation in his product, this of course becomes obvious when the brick is laid in a large building operation, and the approved sample is found to be misleading.

These conditions prompted me to comb the American market for a brick that would have the texture and color of the foreign brick. It was also necessary to be assured of uniformity. After spending considerable time and receiving splendid co-operation, brick was developed which seemed to meet all the requirements. During the process of manufacture, the face and edges were made irregular. The brick contained colors of golden browns, oranges, yellows, and a delicate rose. These colors in a solid wall form a perfect complementary to the natural greens of the garden shrubbery.

An effective method of bricklaying is to use a course of headers and a course of stretchers, alternating the joints of the stretchers (see photograph on page 5.) This produces a diamond pattern with the brick joints and has been used almost exclusively by the writer. The mortar joint is approximately $\frac{1}{2}$ " thick, depending upon the size of the brick, as the dimension of $2\frac{3}{4}$ " for one brick and one joint works out well for structural purposes. If a brick 2" can be procured, leaving a $\frac{3}{4}$ " joint, this condition would be preferable.

It is a good idea to color the mortar, either by the use of coarse yellow sand or dry pigment with the cement.

The arcade, which has been successfully incorporated in so many of the modern housing developments, provides an interesting place in which to use this same brick. Whether the ceiling be flat-arched with concrete beams, or vaulted with stucco, the effect of the brickwork has a tendency to tie the whole together. In many instances stone trim has been eliminated from the minor doorways and a satisfactory effect gained by the use of brick design with either rough-edged slate or tile laid with the edges showing.

Departure from the flat roof is not advisable, as the introduction of pitched roofs of any kind increases the cost without any material benefit; in cases where roof effects have been added, they will be found artificial and not in the cause of good design. Low-pitched roof effects are never advisable, owing to the excessive cost of construction and the difficulty of making them weather-tight. However, such effects as may be gained by the use of pitched roofs on stair and elevator bulkheads and penthouse enclosures are quite favorable.

It is especially recommended to apply individual designs to the large boiler flues and other chimneys.

At present the most economical and practical window for use in low-cost multi-family housing is the double-hung wood window with wood frame. From the design point of view, in some cases it would be desirable to use the steel casement window, but at the present time, the manufacturers have not been able to produce a window in competition with the wood doublehung window that is practical; the low-priced steel sash is of very light construction and, with the demands made upon it by multi-family housing use, it cannot be maintained weatherproof. There is also the difficulty of getting good installation with this low-priced sash, as it is found after the work has been completed that many frames have been twisted and are almost impossible to straighten. When these difficulties can be overcome, there is no doubt about the advisability of using the casement



The studied handling of fire escapes, Phipps Garden Apartments, Sunnyside, Long Island. Clarence S. Stein, architect

sash, and to be practical it should have ventilation by transom at either the top or bottom.

It is not advisable to use a double-hung window in excess of 4' 6'' wide. Double-thick American glass is recommended at all times. Careful study should be made of the proportion of the individual lights of glass in relation to the window opening. This proportion should be maintained throughout the entire operation regardless of the size of windows.

Owing to the simplicity in the general design of the multi-family housing, brick window-sills are more harmonious with the general character of the building than stone or terra-cotta sills, and if properly laid, with $3_4^{\prime\prime\prime}$ pitch and $\frac{1}{2}^{\prime\prime\prime}$ overhang, are just as practical.

Careful study should be made of the exterior painting of window frames and sash. The general tone of the building surface should be carried into the windows, to avoid the effect of burned-out holes when viewed from a distance. A harmony color, two or three shades lighter than the brick, will accomplish this result.

As it is necessary to add a coping to the



George H. Van Anda

The decorative possibilities in chimneys, Van Tassel Apartments, North Tarrytown, N. Y. Andrew J. Thomas, architect

brick walls of these flat-roofed buildings, ordinary rough-edged roofing slate supplies a free line of drawing at the top of the building which is not obtainable with the customary use of stone or terra-cotta coping. This slate should be in thicknesses of $\frac{3}{4}$ ", the width to conform with the brick wall, allowing for a slight overhang front and back, length approximately 20" to 36", laid in a bed of 1/2" mortar, with slightly raked-out joint. For the complete thickness of this coping for from one to three stories of building height, it is advisable to use three thicknesses of slate and three beds of mortar, with a total dimension of approximately 4". On buildings above three stories in height, an additional layer of slate and mortar may well be added, giving an approximate thickness of 5".

Where it is found necessary to have fireescapes, and the cost of special designs is prohibitive, the rule of painting them the same color as the brickwork will tone them down considerably.

The use of directory boards is necessary to the housing development using the street arcade and garden entrances. This directory board lists the tenants in the various buildings, and usually designates the building in which each apartment is located; it is very conspicuous and should have the special attention of the designer.

One of the most satisfactory types of numerals or lettering to be used as a designation of the entrances is a bronze concave letter, filled with a cream-colored porcelain. This letter is easily visible at all times and requires no care.

The name and push-button plates made of half-polished wrought iron, in large quantities cost but little more than the customary brightly polished brass, and contribute to the general effect.

Where the use of garden walls is needed to join buildings in one development, the same type of brickwork as that of the building is employed, with a simple coping of either tile or slate. A sturdy, well-designed oak gate is much more attractive than the usual iron one.

Inside the building, two very practical materials for the stair-hall side walls are the socalled "tapestry brick," and stucco effect, either one resisting the children's pencils. The stair-hall floor and base of oiled bluestone, variegated slate, or harmonious quarry tile, is attractive and easily cared for.

Owing to the economy in space of entrance

JANUARY, 1933

vestibules and stair-halls in this type of planning, it has been found advisable to eliminate lighting fixtures that hang from the ceiling. A simple close-to-the-ceiling fixture has a better appearance and is much more practical.

A more desirable effect is gained by painting the iron soffits, strings, and balusters of the stairs a cheerful color, harmonious with the walls, rather than the conventional dark green or gray. The handrail and newelpost caps, for practical reasons can be painted the same color in a rich dark tone. For the stair treads, inchthick slate is good.

As to heating, cast-iron radiation at the present time continues to be less expensive than other forms. Fireplaces are entirely out of the question in low-cost multi-family housing.

Kalamein doors of the apartment entrances, painted one or two shades lighter than the side walls, seem to dispel the gloom of a dark door or the artificiality of a grained one.

Single-panel gumwood doors, painted one or two shades darker than the wall color (trim to match), are preferable to staining, as the natural color of the wood is not uniform and a very dark stain is necessary to tie the whole together. With the general preference for light-colored walls, the dark stained door has a tendency to create the effect of voids in the wall surface.

A saving may be made by omitting the trim around windows, but not around the doors. The width of trim depends upon the size and scale of the rooms in the development—3'' is a good standard in this type of work.

For interior painting, a good three-coat job of the usual specification is provided, with flat paint on all rooms with the exception of the kitchen and bathroom, which receive a flat enamel. Long experience has shown that there is absolutely no economy in cheap paint. The writer has had the experience of selecting interesting colors for the various rooms only to find after a period of about three weeks that the colors had changed completely. This has been directly traced to the quality of paint. The general procedure in selecting colors for an apartment depends primarily upon its location, and the quality of light which it receives. An apartment which faces the north should receive a generous amount of the warm and lighter colors. The grays and grayed colors should be avoided. As most apartments in the new type of multi-family garden plan receive more than one kind of light, or one portion of the apartment faces north and the other east, west, or

south, the rooms on the south side can, with a great deal of certainty, be painted in attractive grays, greens, and even a carefully selected blue. Taking the rooms individually, entrance halls or foyers are best painted the same color as the living-room, which should generally be a warm color, such as a very light sienna, umber, orange, or rose orange.

These colors, of course, are all slightly grayed with their complementaries, so as to form neutral backgrounds for furniture and hangings. Where the apartment contains more than one bedroom, a warm French gray in one room and a light rose apricot in the other room give a good choice. Where the apartment contains only one bedroom, I would suggest a warm grayed ochre color. The bathrooms may be tinted slightly off the white, with an attractive green, more blue than yellow, or a slightly grayed blue. The kitchens, dinettes, servettes, etc., should be kept a bright pastel yellow, not far removed from white. All ceilings should be tinted calsomine (excepting the enamelled bathrooms and kitchens), to match the side walls, but a few shades lighter.



George H. Van Anda

Entrance detail of the Van Tassel Apartments. Making the most of simple materials

In conclusion, on the subject of painting, the writer has found that by going to the job and selecting a well-located apartment and setting up a simple palette, the colors are then mixed upon a large sheet of glass and tried on the light and dark walls of the room, which have previously been primed. These samples, when found to be satisfactory, may be sent to the paint manufacturer and duplicated in the quantities desired. This will insure a uniform result which is not obtainable by the hit-or-miss mixing method.

Side walls and ceilings of all rooms are best finished in hard plaster. This will allow for a good painting job, and is the basis for any desired effect. Panelling with panel strips not only has a tendency to make the room look smaller, but cuts the walls up into impossible divisions for the placement of furniture and decorations, and should be discouraged.

Picture moulding is generally desirable throughout the apartment with the exception of the kitchen and bathroom. Where the ceiling height is uniform and there are no structural beams exposed, it is most desirable to place the



Wurts Brothers

Details of the Phipps Garden Apartments. Making the most of brickwork

moulding close up to the ceiling and include it in the color of the room.

The general effect in the kitchen should be one of brightness and cheerfulness. A neutral linoleum floor, either in tessellated pattern or solid color, is practical. Solid panelling in the cupboards is recommended. The equipment should include a gas range of standard make, iceless refrigeration, one wash tub and sink combination at least 3' high, and a hanging clothes-dryer. Provide an adequate amount of electric outlets.

In the smaller apartments, a kitchenette replaces the kitchen. This kitchenette usually consists of a sink, range, icebox, shelves, and cupboards, all compactly placed in an area of a minimum size of 3' by 10'.

The allowance made in the budget for lighting fixtures of apartments usually means stock design. With the quantity required, it will be found entirely practical for the designer to create his own designs, and in many instances effect a saving over the cost of stock fixtures.

As to flooring, for living-rooms and bedrooms, there is a choice of many types and kinds, such as cement, rubber, cork, wood composition, etc., but experience up to the present has shown that a good grade of oak strip flooring is the most desirable from the tenants' point of view. This flooring should be given a dark stain, to tie the various natural colored strips together, and properly waxed.

For kitchens, where the budget will allow, a yellow pine strip floor, covered with a wellchosen linoleum, will prove satisfactory.

For bathrooms, a black-and-white tile floor in small basket-weave design provides a good appearance. The use of colored side-wall tile is not advisable, owing to the variation of taste of the tenants, and a good commercial grade, slightly off the white, will be more generally acceptable. The height of the side-wall tile should be approximately 4' 6" above the floor, with extra height around the tub.

Among the factors that will cause significant changes in future design are the revision of building laws, application of new materials, and the certainty of automatic elevators displacing the walk-up apartments.

Many of the recent projects show a tendency toward modern architecture. If the charm of domestic architecture can be successfully combined with modern design, the housing development of the future will, in all probability, become a distinctive type of architecture.

The Ratio-Envelope of Form

A fine sign, even to this day there remains a great mystery—the extraordinary fact that all known systems of design are based on two-dimensional ideas.

By Rutherford Boyd

In the December number Mr. Boyd launched us into a new field of thought, dealing with certain proportional relationships of volume. We were given merely a bird'seye view of these three-dimensional relationships. There is much to be revealed upon closer inspection, the main elements of which are here set forth.—EDITOR.

Copyright, 1932, by Rutherford Boyd.

The most important of these are series of continued proportions expressed in a linear method, or in proportionate areas on a plane, or in a group of planes such as the exterior and interior surfaces of any edifice.

Yet since the day when the Greeks expanded their ideas of proportion beyond the mere relations of integers, we have had common knowledge of a method of developing a consistent form-organization in three dimensions; in other words, a series of terms in a continued proportion. So, recently, the series of "ratio-volumes" have been invented. These are rectangular volumes in which the height is to the width as the width is to the thickness.

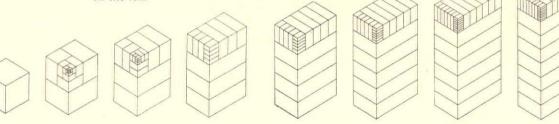
The simplest group of the ratio-volumes are those shown in the eight phases of our diagram, each drawn with the smallest or unit dimension to the left and on the same scale. Beginning with the cube as the limit (whose dimensions are in the ratio I to I to I), we develop next the "ratio-volume of bisection." If we bisect the greatest dimension of this form we produce two rectangular volumes each one-half of the original volume, each equal to the cube in mass and each similar in shape to the whole. We must emphasize this unique property: each "ratio-volume" in this group has its own spatial anatomy and no other shape has similar characteristics.

Beginning with the cube, the elemental series of ratio-volumes, all drawn in similar position and to the same scale, with the unit length to the left in each case. The cube is followed by the bisection and trisection volumes, etc., which are explained in the text So we proceed with the group: the trisection ratio-volume equals three cubes in mass and one-third of the original volume has precisely the same shape. The fourth ratio-volume equals four cubes in mass, and

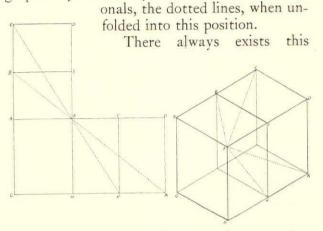
one-fourth is similar in shape to the whole ratiovolume. And so on to the fifth, sixth, seventh, and eighth ratio-volumes. The eighth is noteworthy and its dimensions are always in the proportion of one to two to four, consequently the mass is equivalent to eight of the cubic units and one-eighth of the volume equals the unit cube in mass and is exactly similar in shape to the original volume. So begins this special series of rectangular ratio-volumes, each increasingly "taller and thinner" as the dimensional ratio increases.

It is simple to remember the ratios in this series, as they are the cube roots of the integer of their division-scheme; that is, the ratio of the bisection volume is the cube root of 2, etc. This process of division can be continued indefinitely, or the ratio-volumes can be expanded in the same way. We have shown here in each one four successive volume divisions. Of course, every volume in each group is similar to the containing envelope of form, its ratio-volume.

Implicated in this tridimensional form-idea is a simple and important surface development which we will illustrate in the bisected volume. We bisect ratio-volume $A \ C \ D \ K \ H \ G$, consequently the half-volume $A \ B \ E \ \mathcal{F} \ H \ G$ is similar in shape to the whole. If we unfold the three surfaces on a plane, it then becomes evident that the end of the rectangle $A \ F \ G \ H$ is the same in each case but the largest surface $F \ D \ K \ H$ and the intermediate area $A \ C \ D \ F$ are the same in length $(F \ D)$ but different in

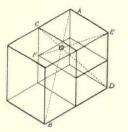


shape. We realize these two sides must be such a shape that the half of the largest side $F \in \mathcal{F} H$ is similar in shape to the intermediate side, and the half of the intermediate rectangle A B E Fis similar in shape to the largest face. This is graphically shown by their continuous diag-



unique kind of relation between the areas that form any of the rectangular ratio-volumes. Thus in any trisection volume one-third of the largest face is similar in shape to the intermediate face and the largest face is similar in shape to one-third of the intermediate surface.

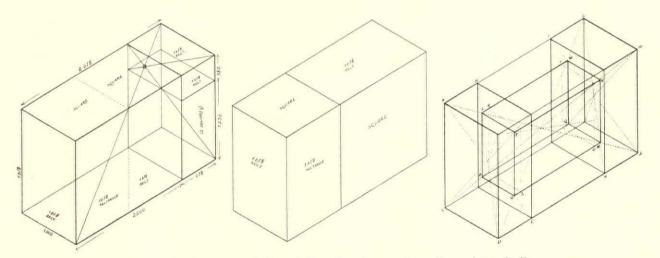
The most important points of the interior geometric structure of ratio-volumes are called the focal points. These are the eight intersections of the main diagonals and those of the



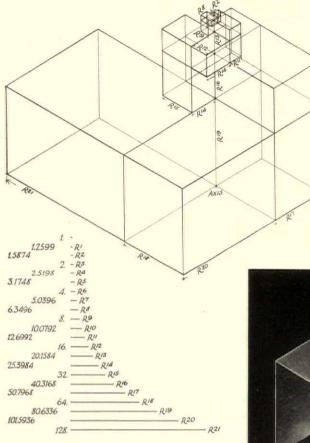
subdivisions taken in order. In this bisection volume, A B is a main diagonal intersected by the diagonal C D of the half-volume and also by the diagonal E F of the quarter volume, the next smaller in the series,

the point of intersection O being one of eight similarly situated focal points.

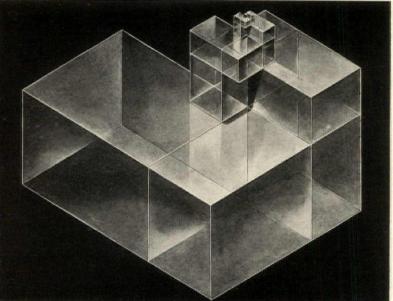
Always in any series of ratio-volumes, the largest surface of one equals the smallest face of the next larger volume in the series. This fact leads us naturally to the phenomenal development of a series of these volumes around a central axis. We illustrate this organization with the successive members of the "bisection series." This is the only possible arrangement of these volumes with the largest face of one volume coinciding precisely with the smallest face of the next larger volume. The diagram indicates that three volumes are situated around the central axis in each phase. Always the longest edge or dimension of the smallest volume becomes the intermediate dimension of the next volume and then is the smallest dimension of the largest volume. The form-organization then "steps" down to revolve around a new section of the central axis, which in this series is always twice the length of the axial section above it.



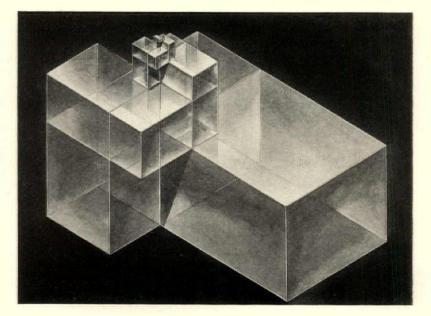
Three developments of the 1.618 ratio-volume whose dimensions, indicated in the first figure, are 1 to 1.618 to 2.618. The point O at the intersection of three diagonals is one of the eight focal-points. The surface is divided, as marked, into squares and 1.618 rectangles. The central form shows a simple area-plan of squares and on each face a 1.618 rectangle, all alike in size. The third figure shows the reciprocal forms, A B E D C and F G H J K, which are the next smaller phase in every ratiovolume. The 'focal-volume'' L M V N Q P O T has its corners in the eight focal-points. This focal-volume is identical with the reciprocal volumes which are penetrated by it at each end to the rectangular sections R S and T U



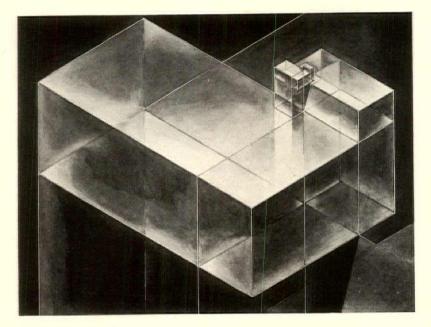
The phenomenal development of any ratio-volume series about a central axis, here exhibited in the bisection series. The successive forms are so arranged that the largest surface of each volume coincides precisely with the smallest surface of the next larger volume in the series. Each section of the axis is thus formed by three coinciding edges of three successive ratio-volumes. The dimensions are marked as powers of the ratio R and the actual linear lengths are shown in the table with the dimensions to four decimal places. These are the powers of the cube-root of two, so that every third power doubles the previous length. This is true, of course, beginning with any length in this series of ratios, which doubles the length in three terms of the series



Two isometric views of the bisection series of ratio-volumes. Each vertical section of the axis is formed by three coinciding edges of three successive ratio-volumes. Each volume is similar in shape but twice the mass of the preceding volume. Note the "clockwise turning" in the grouping and as only three forms "fit" around any axial section there is always a fourth rectangular space which is vacant. In the lower illustration the same bisection series group is shown from the exactly opposite point of view. Note again the rectangular vacancy which occurs on each section of the axis, first on one side of the axis then on the opposite side. The volumes pass through six different positions in relation to the axis and then repeat the cycle of position



JANUARY, 1933

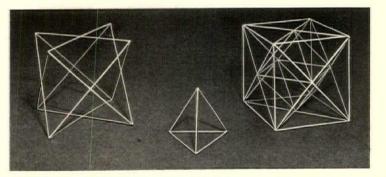


An isometric view of the axial development of the trisection-series of ratiovolumes. Each successive volume is three times larger in mass but similar in shape. This grouping continues to increase indefinitely as suggested, following exactly the same cycle of six positions in axial rotation, in the bisectionseries drawings. This method of rectangular generation is a unique property of all series of ratio-envelopes

This grouping, with its helical aspect, has some analogies with the cellular increase in spiral shells and other natural forms, but has no real counterpart in nature. In the nautilus shell, for instance, each division is similar in shape and also in position in relation to the nucleus or origin. But these ratio-volumes must of necessity assume three different positions in relation to the axis, one on its end, the next resting on the intermediate face and the next on its largest face; then the cycle of these positions is repeated.

The famous ratio of the "golden section," the so-called 1.618 ratio, generates a rectangular ratio-volume which has been discussed elsewhere, but is of even greater interest in conjunction with the series of other ratio-volumes. It has the unique property, among others, that each volume equals the "focal-volume" of the next larger form in the series. Needless to say, we can postulate other ratio-volumes with unusual spatial properties of their own. But these serve to indicate the elements of a rectangular concept in basic design.

Out of this idea may be developed varied form-organizations in any media which should have an innate force and power that is inherent in their spatial properties. However, we must be content at present simply to introduce this new conception in tridimensional form; it may help toward unifying those two phases of human endeavor which, perhaps for want of a better understanding, we arbitrarily separate into Art and Science.



The cube, or limiting case in ratio-volumes, with a development in diagonals similar to the interior structure of ratio-volumes. In the cube all the eight focal-points, present in all other volumes in this series, have moved into the centre of the cube due to the cubical dimension ratio of I to I to I. The model on the left is formed by the twelve diagonals of the six squares on the cube and forms two interlocked regular tetrahedrons. One of these is shown in the central figure, composed of four equilateral triangles

Floating a Sketch By Fred R. Lorenz





After making reams of them, the designer had put his best into the final presentation, to go to the committee in a rush. And now for the mount. A lilting tune he whistles during the preparations—then comes the oath, and shivers up and down the room. The mount is a flop, for it *has been* flopped! In turning the dripping sketch over, he ripped the moisture-weakened corners, and paste dripped everywhere. Also there are wrinkles and ridges. Raising one corner, then the next, he tries to work the sketch flat, but cannot do! Is not that a dainty sketch to set before the jury?

As a result, I explained a simple trick I had learned, and the office boys handled the mounting after that with a good fielding average, the occasional errors being for the most part easy to redeem. I will pass it along, for I find a great many still "flop" the wet tracings over onto the mounting-board, *instead of vice versa*, which is less hazardous. The larger the tracing, the harder they "flop," under the former method.

Here is a description of the complete mounting process:

I. The following materials should be at hand:

Level working surface—a marble or glass slab, or a sheet of glossy oilcloth. Even a sheet of clean detail paper can be made to serve, in spite of the moisture-buckling. Do not tack the sheet down.

Bowl of clean water and water sponge.

Bowl of cream-thick paste—may be prepared with an egg-beater and strained through fine teastrainer or cloth.

Sponge for paste —or use wad of cheesecloth, or a brush.

Clean mountingboard—moistened both sides to retard paste absorption and to offset buckling.

6" or 12" scale, or triangle, without sharp nicks and corners.

	MOUNTING BOARD FACE DOWN AND MOISTENED BOTH SIDES	A I SMOOTH, CLEAN,
4		LEVEL, SURFACE
DROP MOUNTING		
BOARD AS SHOWN	GUAGE	GUAGE
BY ARROWS, THEN	2	
		4 /1/2
1.1/ _	100000/181	SKETCH LAID
11/ 11011	AK3/3 3012 /	WORKED FLAT WITH
4		RADIAL STROKES OF A
		PASTE-FILLED SPONGE, OR
		BRUSH. SKETCH SHOULD BE
		"FIXED" IF NECESSARY.

A roll of common buff tracing paper, width of mounting-board.

A clean towel for general purposes.

2. The sketch, previously "fixed," should be laid face down. Dip a sponge in the paste and spread it generously on the back of tracing, using strokes radiating from centre of sketch to edges, until sketch is thoroughly wet and flat, with edges in contact with working surface. Mop up with the sponge all pools of paste lying beyond the edges.

3. The mount-board, large enough to allow for trimming down later to desired size, should be placed in sloping position, shown by diagram, face down. Use no gauging marks on the mount or sketch, but on the working surface beyond the sketch, as shown.

4. Let the board down upon the tracing, the far edge resting on the working surface as a fulcrum. Give the back of board a few radial strokes with one hand, to establish adhesion with sketch, holding the other hand in centre to prevent slipping. The strokes should not be vigorous, but enough to establish a suction.

5. Lift board slowly at one corner, and if that corner of tracing is not lifting with the board, try the next corner. If none of the corners lift with the board, repeat the rubbing; or, with one finger under the corner of tracing, hold it against board and lift up, turning the incomplete mount right side up and mopping the working surface. If proper suction cannot be gotten, there is no doubt that more paste, or thicker paste, is needed. However, it is not wise to use a thick paste, but better to depend on good, generous distribution, saturating absorption by the board, and thorough elimination of air

> pockets, leaving an infinitesimal film of p a ste between sketch and board. A thick paste will stain sketch and board more easily, because lack of moisture promotes earlier drying and the paste moves more sluggishly under pres-

(Continued on page 14)



A progress photograph of the Tower of Learning, University of Pittsburgh. Charles Z. Klauder, architect

Clark Memorial Hall, the new building for the Department of Law, University of Virginia. Walter D. Blair; Taylor & Fisher; Peebles & Ferguson, architects

The new first unit in the Metropolitan Life Insurance Company's building project in New York City. This first unit is now completed. D. Everett Waid and Harvey Wiley Corbett, architects





The Edward L. Doheny, Jr. Memorial Library, recently completed for the University of Southern California, Los Angeles. Samuel E. Lunden, architect

Architectural News





Chatham Village, the new model housing project made possible by the Buhl Foundation, Pittsburgh. Ingham & Boyd, architects; Clarence S. Stein and Henry Wright, consulting architects

> The recently completed model laundry building, Long Island City, for the K n i c k e r b o c k e r Laundry Co. Irving M. Fenichel, architect

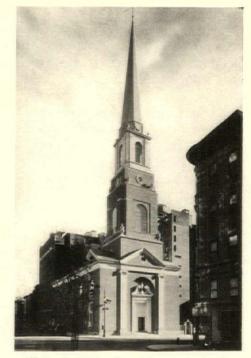




New City Hall for Newton, Mass., maintaining the classic tradition of New England. Allen & Collens, architects

in Photographs





All Souls Unitarian Church at Lexington Avenue and 80th Street, New York City. Hobart B. Upjohn, architect

The proposed Infirmary Building of the Veterans' Home at Rocky Hill, Hartford, Conn. Douglas Orr, architect; Carl J. Malmfeldt, consulting architect

> The main tower, from the north, dominating the Indiana World War Memorial at Indianapolis, Ind. Walker & Weeks, architects





Front elevation of the Administration Building in Douglas Orr's scheme for the Veterans' Home, which design won an architectural competition

The new fur salon in Hutzler Brothers store, Baltimore. Joseph Evans Sperry, architect



(Continued from page 11)

sure of the "squeegee" strokes later. It might be well to again moisten the back of board before turning right side up, so as to balance the expansion taking place on the face since coming in contact with the wet tracing. A backer sheet of same paper as the sketch is sometimes advisable to counteract the buckling effect of the sketch. This may be applied immediately before the sketch, or later when the mounted sketch has dried under the press, and with slightly thicker paste.

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To return to the operations: the pressure has squeezed out some of the paste, which, after each squeezing-out operation, should be wiped from the border with a clean wet sponge, especially if no mat or frame is to be applied over the board, so as to avoid discolorations. If paste gets on the face of the tracing, cautious patting and mopping with the sponge is necessary. This must be done thoroughly to prevent sticking to the squeeze-out papers now about to be used.

6. Now, tear off the roll a "squeeze-out" sheet of common buff tracing-paper, large enough to lap over the edges of the mountboard, and lay over same. With the scale or triangle (beware of nicks and sharp corners!) placed edge-down and inclined in the direction of the stroke, make radial strokes from centre to edge. Do not try to get all the paste squeezed out at once. Take it easy, one or twice around. I do not favor the use of the roller, as its effect is a pressure more downward than horizontal. Now lift the squeeze-out sheet cautiously at one corner. If the tracing lies well, remove squeezeout sheet by pulling toward opposite corner. Chuck it in the basket to avoid getting paste on shoes and trousers while stepping around. Mop up excess paste around edges of mount and examine the sketch. It may not be flat, but if wrinkles and blisters show, they should be ironed out cautiously by the same process given above. An especially bad fold or wrinkle may require a partial lifting of the sketch and inserting a bit of paste for safety's sake. Repeat this operation of squeezing out paste several times with fresh sheets of paper, increasing pressure each time until tracing is absolutely flat. If the first and second squeezings are done carefully and not too vigorously, hardly a wrinkle will require nursing. It is important to use the *radial* stroke at all times to avoid this. Also, speed counts, so as to get the tracing flat and without wrinkles before the moisture from the paste is absorbed to the degree where the paste begins to take hold and set. Caution: beware of holes that may develop in the squeeze-out paper; take a fresh sheet—perhaps foreign particles are under the tracings.

7. If satisfied that the mount is flat and dry enough, place in press, being sure that surface above and below sketch is smooth and level, and has no joints, such as between two books, or between two marble samples. I usually place mount on a drawing-board, protecting the mount above and below with a sheet of buff tracingpaper, and another drawing-board on top, and pile up a few heavy samples or books. The tracing-paper absorbs moisture, thereby hastening the drying, and should be replaced at five or ten minute intervals several times, then left for several hours, or overnight.

-9

8. If a mat is to be used, do all trimming after the mat glue is dry, giving a strong thick edge. It is economical to have the mat made at a picture-framing establishment, where a clean workmanlike job will be done, with or without bevel. The order for a vertical mat would be: "Upright 14¹/₂" x 23" opening, top and side borders 3", bottom border 3¹/₂"." A horizontal opening is called a "landscape." The ply should be given as single ply, double ply; and the type, such as eggshell and plain; and whether the white or cream side is the face. Individual taste may require, of course, other types and colors of mats. For the mat, LePage's glue, thinned down with hot water, is excellent. Spread evenly with brush, avoiding excess glue at the edge next sketch. After placing mat, clip or clamp it to mount to prevent sliding; then roll vigorously. Remove glue showing at edges with wet cloth or sponge. Sometimes where glue gets on a rendered portion it is best to let it dry in the press and remove later with a knife and a wet cloth, then touch up the rendering.



Today's Craftsmanship in Hand-wrought Hardware By Gerald K. Geerlings

To the left and right are two so-called double-dragon wrought-iron hinges, especially suitable for the narrow doorway

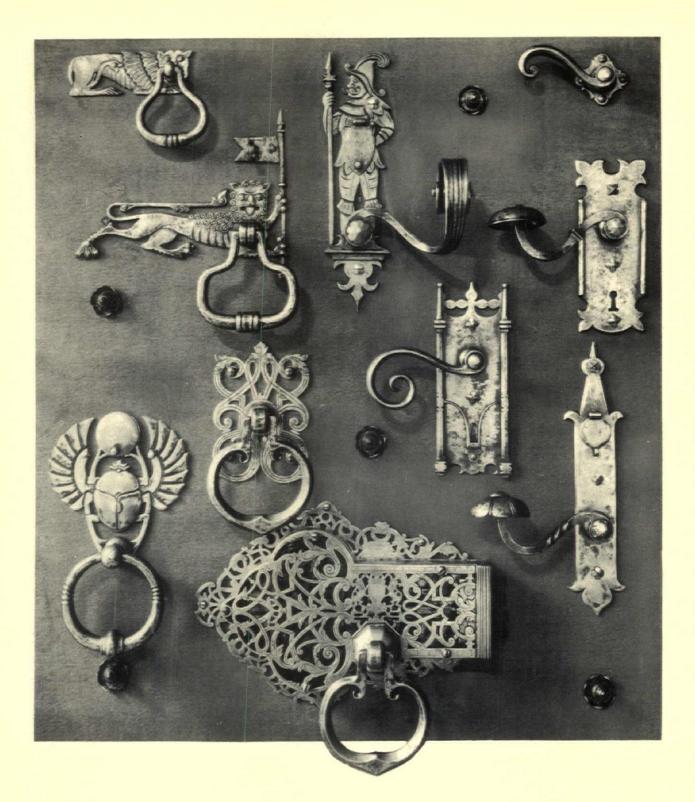
*** NE of the obvious, though little considered, differences between pre-main chine-age architecture and current * architecture is that formerly hardware good or bad was out in plain view, while now, good or bad, it is practically out of sight. Aside from the commercial buildings where this is advantageous, on residential work it is a dubious gain. Until the machine ushered in its products, hardware played an important rôle in the decoration of interiors and was not to be overlooked on the exterior. It was sensible, this pride in hardware, for after all in opening or closing any door one is sure to be conscious of its handle and hinges if they are in view. The old Colonial doors, with their naturalfinished iron hinges, made far more of an arresting pattern than our present formula of insignificant knobs and inconspicuous butts lost in a limitless sea of white.

In the modern house the hardware is apt to be relegated to a last-gasp consideration, covered by a mere lump sum in the compilation of contract costs. If the hardware is not considered by the architect to be of any greater importance than just that, quite naturally it gets no more At the top and bottom of the page are contrasting strap hinges; both texture and design ably express the material iron

favorable attention when the job is completed. But let us assume that the architect from the outset realizes that the owners of a house live the greater part of the time in its interior, and derive their chief contemplative pleasures from the things about them. He may with perfect logic conclude that the money which it might cost to ornament the cornice, or to build the walls of stone instead of brick, or brick instead of siding, might be the better spent on the interior of the house. Here the architect's decorative work will certainly be as much in evidence as that of the interior decorator, the rug salesman, and the lighting-fixture artist.

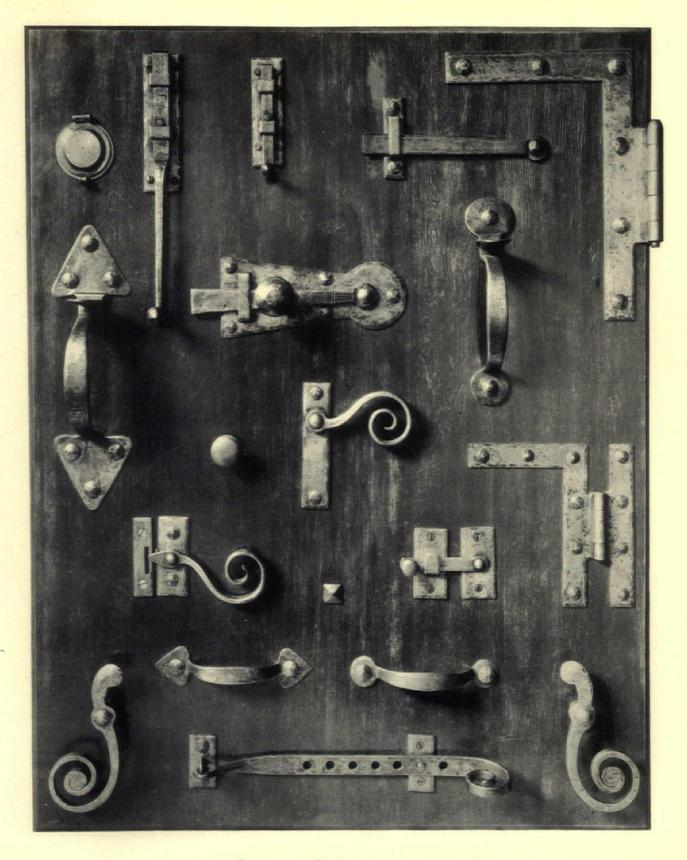
All the accompanying illustrations are from work by The Iron-Craftsmen, a very impersonal name for very personal work by two partners, William Zimmerman and James Liberi. The former does all the designing and is a product of Pennsylvania, the latter, either personally or by direction, attends to the execution of all work, and originally came from Rome. For the last twelve years they have been functioning together in Philadelphia, previous to which time both craftsmen were with Samuel Yellin's organization for eleven years.





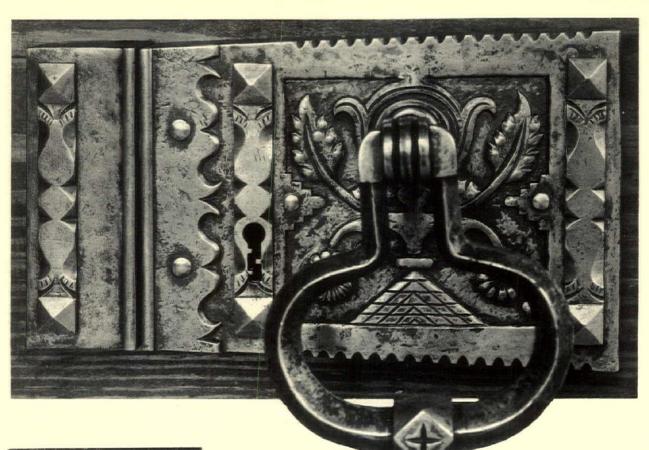
For the house with Gothic tendencies, or the English periods following shortly thereafter, this assortment of wrought-iron handles and knockers gives a good idea of what can be accomplished in point of variety. All of these are from the residence of F. B. Paterson, at Dayton, Ohio (H. T. Lindeberg, architect). An idea of the scale may be derived from knowing that it is 24 inches from the extreme left to the extreme right. In each case the escutcheons have been made to conform with the stile widths

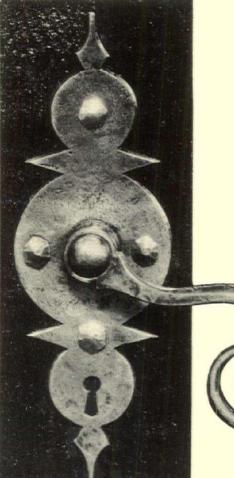
« ARCHITECTURE »



For the typically American house with early Colonial antecedents, this type of wrought-iron hardware is one of the best means to make it of distinguished quality—the client's check book permitting. All the examples here illustrated are genuinely suited to iron, having been designed with the material in mind. Whatever their expense, it is safe to assume that, since they are both utilitarian and decorative, they are of more value to the house than though a similar sum had been spent on cornice modillions

* ARCHITECTURE *





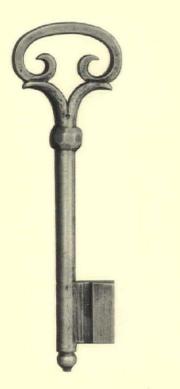
With the general acceptance of machinemade locks and their advantageous usage in commercial buildings, we have almost forgotten the decorative possibilities of the rim lock in residential work. Such an admirable example as this in wrought iron serves to illustrate, too, how colorful iron can be, especially if it has contrasting planes



If a door to a room is used and not swung back out of sight, the handle or lock probably receives more attention than any other part of the room. Consequently if there is to be architectural decoration, the money cannot be more wisely spent than for hardware which is pleasurable both to use and to see. This design has Georgian tendencies

ARCHITECTURE
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In contrast to the rim lock on the page opposite, the one above depends upon surface decoration rather than modelling. The plain surface above the keyhole is in nice contrast to the incised ornament elsewhere. A characteristic of The Iron-Craftsmen's work is a raised outline around the sides and bottom of the keyhole to act as a guide for the key



For the panelled interior door which has narrow stiles, this escutcheon and handle are appropriate. It is one of a number on the residence of Owen Moon, Jr., at Winston-Salem, N. C. (Karcher & Smith, architects). Only ornamentation characteristic of wrought iron has been employed: variations in the surfacing, chisel marks, and twisted handle The knockers below and to the right, both of German silver, are in the residence of A. F. Mc-Nichol at Greenwich, Conn. (H. T. Lindeberg, architect). The knocker below is 9 inches high over all, and 5 inches wide. German silver is easily worked, a quality which the design reflects



When it is an advantage to conceal the actual means by which the rim lock is secured to the door, the ingenious craftsman has a problem in which he revels. Often ornamented screw heads, or false screw heads, are resorted to, but here the raised leaf portions do the trick



For certain periods of architecture or furniture it is sometimes advantageous to introduce the yellow color of brass, and while this material is usually thought of as being primarily suitable for casting, it also is excellent for hand tooling, as is evidenced by this rim lock



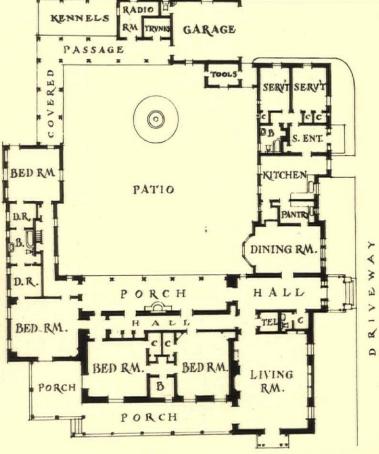
« ARCHITECTURE »



Photographs by George D. Haight

House of LeRoy Kellogg, Pasadena, Calif.

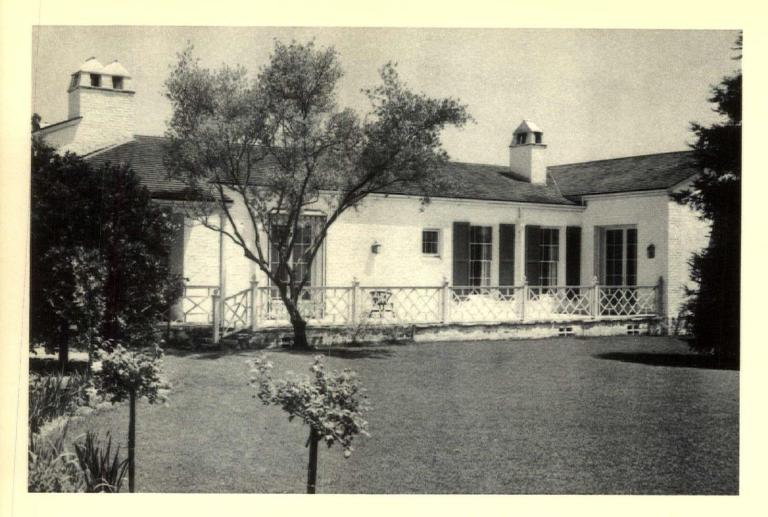
GARRETT VAN PELT, JR., ARCHITECT



Mr. Kellogg's house is built around the customary patio, which gives the designer abundant opportunity for roofing the various portions in a manner to express the elements of the plan

« ARCHITECTURE »
21

Like most successful country homes in California, the lines are long, low and spreading, in proper humility to a setting that is dominated by the surrounding mountain ranges





A porch extends along most of one end of the plan, leading from a corner of the living-room and across two of the main bedrooms. The walls are of brick, painted white

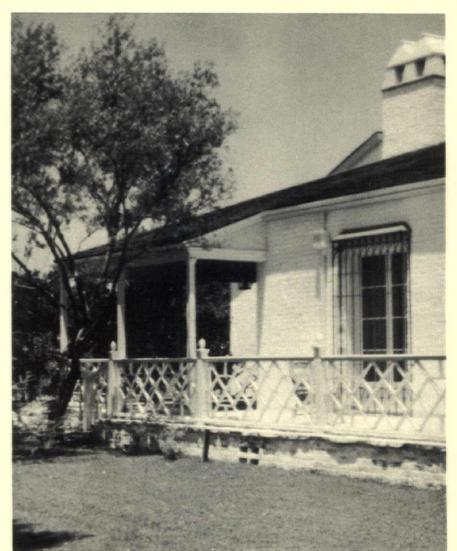
Another view of the porch. It is interesting to note the pleasing combination of the early California ranchhouse type with its woodwork, and the Spanish window grille of wrought iron



Inside the patio. At the extreme left may be seen the bay window forming one end of the diningroom. Color has been secured by the use of brick paving and a few simple tiles

Mr. Van Pelt has achieved an unusual and quite pleasing chimney top by the use of stepped-back brick supporting a cast concrete cap

ARCHITECTURE >> 23





The living-room takes its key from the furniture of English antecedents—a common concession to those who bring to California an Anglo-Saxon background

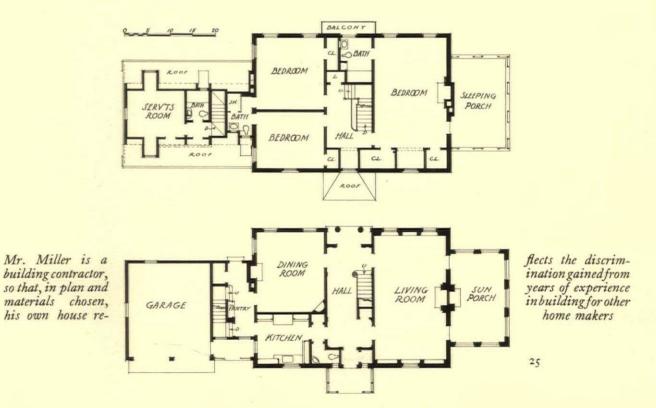
« ARCHITECTURE »

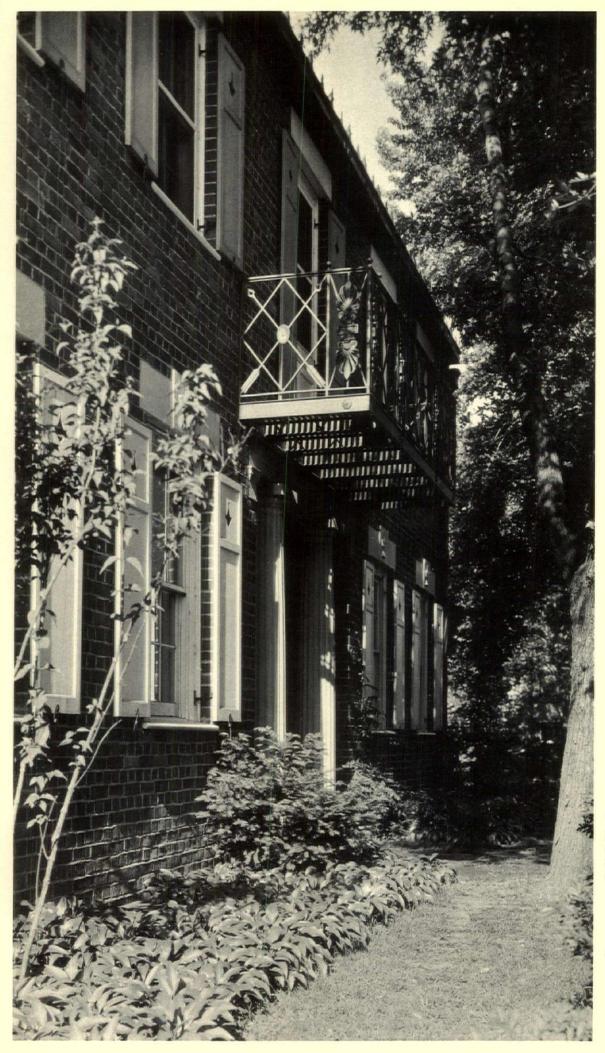


Photographs by Richard Averill Smith

House of O. F. Miller, Kalamazoo, Mich.

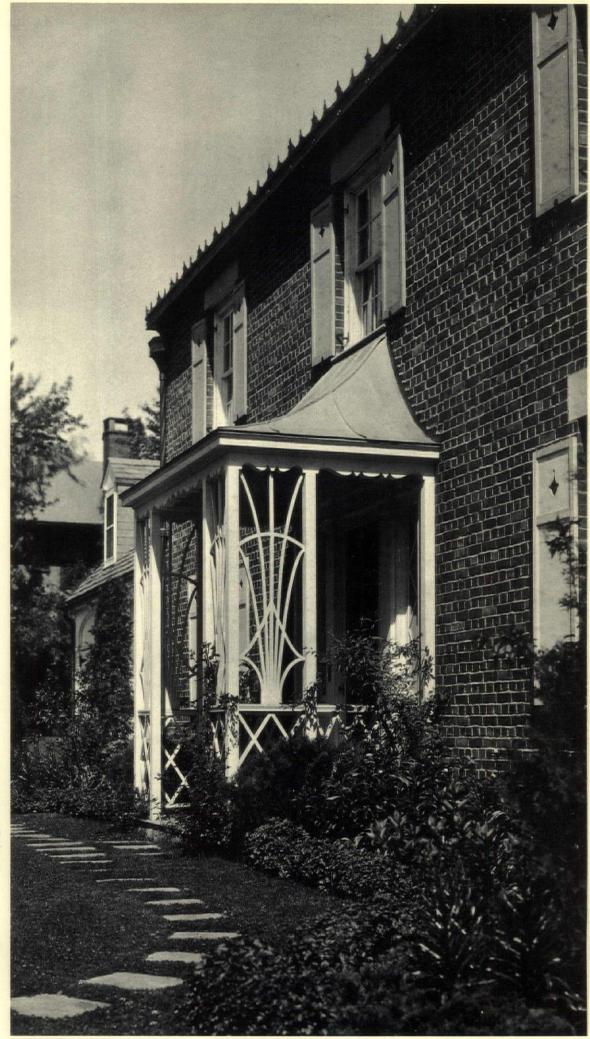
AYMAR EMBURY II, ARCHITECT





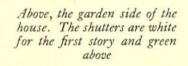
The brick is a local product in soft reds, having considerable variation of tone. A buff mortar is used to tie these together

« ARCHITECTURE » 26



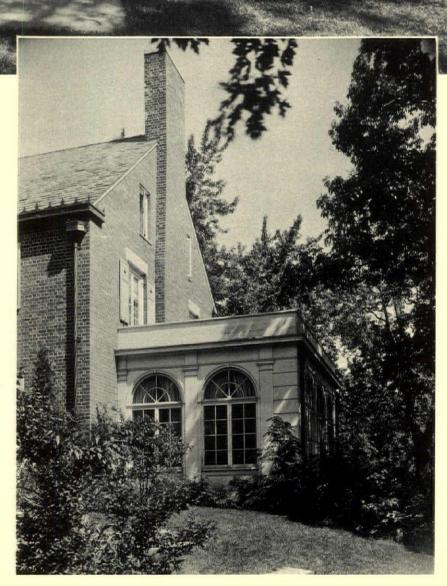
The entrance porch has always been a point of concentration for the designer's activities; here is one that shows a new and refreshing treatment of the supporting members

* ARCHITECTURE »



At right, the sun-porch end. The gutter along the eaves of the main roof is made of copper with a cut-out cresting, and the gutter is further embellished by the use of stock lead rosettes such as are used in leaded glass

« ARCHITECTURE »







Above, a pictorial wall paper is used in the dining-room, its dominating colors being grays and buff. The woodwork is slightly off the white to tone in with the paper. Inside of the corner cupboard the wall is painted a bronze yellow

At left, the main hall. Here the woodwork is a gray white, with some of the ornament picked out in gold

« ARCHITECTURE »



Above, the fireplace side of the living-room. A gray buff block-printed paper is used, the woodwork glazed over white to harmonize with it. Below, the sun porch has stucco walls of pale buff, with strong color in the hangings. The paving is of green, black, and purple slate



Fair Weather

AIR CONDITIONING AND THE OLFACTORY SENSE AS THEY RELATE TO INTERIOR DESIGN

"Everybody is always talking about the weather but nobody ever does anything about it."

-MARK TWAIN.

↓ I → such a remark ↓ I → such a remark

may have played an important part in the development of air conditioning to its present scientific prominence. Even a subtle challenge to one of the dominant primary urges, such as the obstacle to mastery implied above, may provoke worldwide forces. Subconsciously, or not, Mark Twain's quip was well put.

The prevalent reaction to a thwarted urge is to nominate it for oblivion. This we can thank for the faction that considers "fair weather" unimportant, and promotion of air conditioning a "racket." A little attention given to the investigations of the well-known climatologist, Mr. Ellsworth Huntington, reminds us that, estimating the average value of a human life as only \$7000, a sudden hot spell in June, 1925, cost the United States \$100,000,000. A reverse weather change in February, 1926, cost \$500,-000,000. In spite of the great toll of those two "snaps" of weather no one thought of relief measures! Climatologists can demonstrate the correspondence of climatic change with the decline of "the glory that was Greece, and the grandeur that was Rome." Even the layman may observe that fashion abides by the dictates of weather-if nothing else. The reason for English "bag" trousers is that the dampness of mode-setting London renders the permanence of a crease impossible!

Although mastery of sun and climate is still beyond our reach protection can be had in shelter. Scientists, physicians, engineers have "done" much "about the weather." The American Society of Heating and Ventilating Engineers and other foundations have been formed for the co-ordination and sponsorship of such work and research. Now residence, apartment, office, or other structure can number "fair weather" among its furnishings.

This inspection must, due to the size of the

By Carleton B. Ryder

Here is the second of Mr. Ryder's articles dealing with what might be called organic structure. Last month "The Neglected Sense" carried acoustics forward into esthetics. Next month we are to have a revelation of the possibilities in lighting.—EDITOR. sciences involved, confine itself to briefs of physiological cause and effect, psychological cause and effect, relation of the two to interior design, with conclusions on the indicated trend of development.

The air acts in two

ways with respect to its physiological effects: 1. As form of sustenance.

2. As aerial envelope.

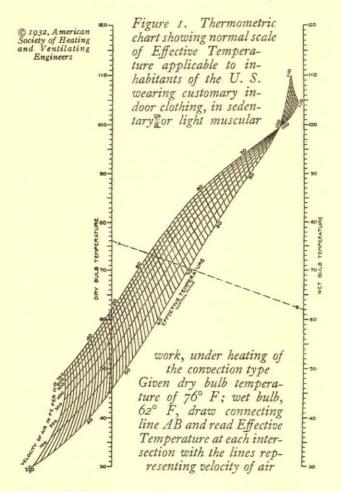
The first refers to the useful gaseous composition of the air for assimilation into energy through the lungs, also modifications of usefulness by suspended foreign matter, such as smokes, fumes, dusts, bacteria, and so forth.

The useful components are too well known to concern us here. Modifiers of usefulness are more important. The not uncommon quantity of impurities in air is evidenced by measured soot fall of over one thousand tons per square mile per year in Pittsburgh. Carbon monoxide, lead, and other poisonings following from industrial contamination are constantly detrimental and occasionally serious. Bacteria require other agencies, such as deterioration of lung action by dust or other deposit, drying up of mucous protection, and increased susceptibility due to upset bodily thermal balance, if they are to be effective. It is a common fallacy that undetermined toxic matter can be substituted for useful components through respiration. The effect of carbon diox.de in vitiated air and general pollution is relatively unimportant in comparison with optima in other respects.

The term aerial envelope refers to all effects of enveloping air upon retention of the body's thermal balance, and comprises four or more variables:

- 1. Temperature.
- 2. Humidity.
- 3. Motion.
- 4. Ionization.
- 5. Unknown

The first three may be combined into a single index (as shown in Figure 1) known as Effective Temperature index, since each contributes to the sensation of warmth felt by the human body. A physiologic sketch may explain this interrelation. The body strives to maintain a normal thermal level of about 98.6° F. Maintenance is effected by heat production and heat loss. Metabolism, the combustion of food, produces



heat which emanates from the body surfaces by radiation, convection, and evaporation. A most intricate sense-nerve-muscle sequence functions —a veritable human thermostat—to regulate this emanation by co-ordinated control of the chemical heat production, the cutaneous or surface blood circulation and operation of sweat glands.

Now, if external temperatures are low with relation to internal, constriction of cutaneous capillaries reduces heat loss. Increased adrenalin secretion facilitates internal heat production. If external temperatures are relatively high, automatic inhibition of heat-producing organs, such as the liver, follows together with expansion of surface capillaries. The sweat glands are set in operation to cool by surface evaporation of moisture, and for faster waste clearance.

As a result it follows that the rate of evaporation is regulated by the amount of water vapor already present in the air; it is further affected by the bulk of air brought in contact with the body through air motion. Convection from the body is likewise affected by air motion. Thus we see the contribution of several factors to the combined index termed Effective Temperature.

Adaptability of the body is only efficient within certain limits. Prolonged subjection to high temperatures results in abnormal rises in metabolism, body temperature, heart action, respiratory rate, rate of chloride loss in perspiration, and may lead to organic failure. At 100° Effective Temperature the human body *at rest* averages a pulse rate increase of forty beats per minute per hour, and a weight loss of 1.7 lbs. per hour. Under conditions of excessive cold equally detrimental effects take place in the unprotected organism.

The American Society of Heating and Ventilating Engineers, as the outcome of manifold research conducted in co-operation with U. S. Public Health Service and U. S. Bureau of Mines, have prepared a chart of Effective Temperatures to which are applied zones of comfort for winter and for summer. This "Comfort Chart" is illustrated in Figure 2. Other determined optima for specific types of work, and still others for effects on materials wherever shrinkage or expansion is an industrial factor, may be obtained from the publishings of the A. S. H. V. E.

Air-conditioning systems are now designed so as to maintain constant air purity, humidity, movement, and temperature at an "optimum indicated by the "comfort zones." But much study is being focused at present upon the probable importance of Effective Temperature fluctuation. The subject is being approached from two viewpoints. A group most intimately associated with practice, such as Dr. W. J. McConnell, of the Metropolitan Life Insurance Company, and C. P. Yaglou, of Harvard School of Public Health, both of the A. S. H. V. E., recognize the inability of a mean comfort line to suit every one. Another group more devoted to research, such as Dr. C.-E. A. Winslow and Dr. Leonard Greenberg, of the Yale School of Public Health, believe reasonably exercised adaptation to be of physiological importance.

The tests by which the "comfort zones" with their mean "comfort line" were determined showed considerable difference of opinion among the test subjects; also each subject's individual line of greatest comfort varied from time to time. JANUARY, 1933

The latter results from a complication of variables, such as type of work, clothing, habitual exposure, changes in the rate of metabolism. This abbreviates the need for a happy medium or some effective equivalent.

The second argument is brought out by figures that, for example, show an average lowering of the death rate during moderately stormy changeable—periods. In general, continued subjection to uniformity of temperature, such as

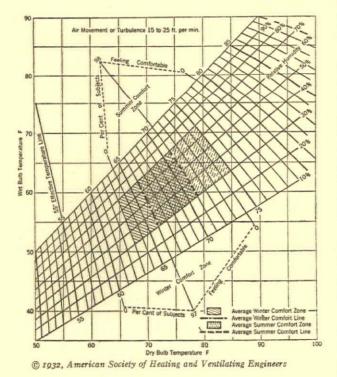


Figure 2. Comfort or Effective Temperature chart for air velocities of 15 to 25 f.p.m. (still air). This applies to inhabitants of the U. S., and the winter zone is further limited to rooms heated by systems of the convection type. Summer comfort zone is limited to homes, offices, etc., where occupants become fully adapted to the artificial air conditions—not to theatres, department stores, and the like

extended calms of warm or cool weather, develops specialization at the expense of adaptability. The result is lowered resistance. For example, decreased adaptability means delayed reactance to change. The capillaries in the mucous membranes contract during an even cool spell; a sudden temperature rise finds them unprepared to expand at a normal speed. Bacterial growth gains headway before counteractive forces are resumed. A cold may result.

Furthermore, the human body is subject to what is known as "sensory thresholds," when detecting changes in degree of sensation. A violin readily audible in a quiet room would not be heard if the player were to take up his stand upon a busy thoroughfare. The proportionate increase in sound volume is insufficient to trip the sense "relay" that delivers the violin stimulus to the brain. The same applies to variations in temperature and even differs with the direction of the shift, because the number of warmth receptors, or sensory endings, is considerably less than that of cold receptors. This characteristic intensifies the effect termed "unpreparedness," but suggests the practical means of solution.

The separation between positive and negative thresholds of temperature sensation amounts to actual degrees Fahrenheit. Therefore, fluctuation within the "comfort zone" may be so timed and so limited that it would be between conscious thresholds of most people and yet, due to sensation lag, only be slightly noticeable to extreme subjects. The effect would be maximum or near maximum comfort for every one, with imperceptibly exercised adaptation—the practical "happy medium."

A method of this nature can be applied through existing air conditioning apparatus with little further study and would probably initiate notable improvement. But a great step is imminent.

Heat may be transmitted by convection, conduction, radiation. The first two methods constitute heating of a medium, such as air or matter, by contact with the source of heat. Transmission is effected by movement of air or homogeneous contact of matter. These are the methods most employed today. They make no discrimination as to thermic *character*.

Heat may be transmitted by direct radiation, or, to be more exact, induced by the resistance set up when an object or person intercepts radiant energy of certain wave lengths or frequencies.

A radiant energy spectrum is about equally divided by the frequencies visible in the form of light. From this division, as the frequencies decrease or the wave lengths increase we traverse the "infra" side of the spectrum. Reversely, as frequencies increase and wave lengths decrease we traverse the "ultra" side. The difference in type of energy between the "dark" or low frequencied rays and higher frequencied rays may be characterized by an analogy. Dynamite drives wedges of energy into a boulder, breaking it, and hurling the fragments some distance. Fulminate would pulverize a part of the same boulder and leave the rest intact. The "dark" rays resemble dynamite. They are slower in action, appear to flow around objects or pass through fissures, longer retain their energy. These are the type of rays emitted by common heating surfaces—radiators, stoves, and so forth. The higher frequencied rays resemble the fulminate. They have great speed of action, penetrate deeper into obstructions, but sooner exhaust their energy.

It will be seen that certain rays may be fast enough to permeate the body and yet not so fast as to dissipate their energy before reaching a beneficial depth. A few of the still higher "ultra" spectrum waves cause important physiochemical reactions, near the surface of the body, having a beneficial effect upon the blood, but are ineffectual as heat producers. Both of these types of solar radiation, as expressed in the words of Professor C. P. Yaglou, Harvard School of Public Health, are "not merely desirable, but essential to life." This is the thermic character that present heating systems lack.

There is now in development a new type of electric bulb that will emit visible and invisible radiant energy similar to sunlight but exclude harmful rays. It will deliver them in sufficient intensities to be of practical use as a heating element. This offers the solution to heating and air conditioning. It may also control the fourth characteristic of air, its electrical potential or ionization.

Pure outdoor summer air approximates a potential and polarity of about 560 positive ions and 500 negative ions. This is subject to change both in sum and balance. Little is definitely known concerning the physiological effects traceable to this quality; although experiments have indicated the association of excess positive polarity with increased blood pressure and nervous decay, and vice versa. Under test, ionic potential in a room has been found to drop with human occupancy at such a rate that maintenance by change of air becomes prohibitive under at all crowded conditions. It is also probable that metal air-conditioning ducts materially affect the ionization.

With these deficiencies of prevailing systems and possible improvements in mind, the inferred design of a future air-conditioning installation may be forecast. It would employ the energy-radiant electric bulb so located as to diffuse its rays directly and indirectly throughout the room. Supplementing this, an airconditioning system will introduce properly

filtered, tempered, and humidified air in large volumes and at low velocities. Thus drafts are obviated, predicating effectual structural insulation. The convected temperature would have a mean of about 55° F. to maintain the refreshing quality of the air in contact with the body. The radiant energy holds Effective Temperature up to the "comfort" level and keeps all surfaces or objects upon which it falls at a temperature that will prevent convection to or from undesired sources. This precludes sensations of heat or cold upon physical contact or approach. Relative humidity will be fairly high, about 55 or 60 per cent, simulating the outdoor relative humidity, considered most healthful. This will also minimize dust suspension. Lastly, the previously mentioned fluctuation might be obtained through varying velocity and direction of air motion, thus varying Effective Temperature. This fluctuation should be extended to compensate for natural changes in internal heat production; there should be compensation for higher body temperatures during and after eating and toward the end of the day. In office applications the control might vary before and after hours of exposure so as to reduce the contrast between interior and exterior Effective Temperatures.

It is at this point that development of the subject proceeds from physiological to psychological considerations.

The present-day pioneers are precisely those who are advancing into the latter field of research. The human equation cannot quite be determined without the aid of psychology. The implication that the modern technical air-conditioning engineer must needs become a psychologist might by some be construed as the insult upon injury, but its truth cannot be better defended than by a review of the logic of the first paragraph.

In the previous article, "The Neglected Sense," crude generalizations on the psychological factor were given. Here it will be well to trace in greater detail the sequence from effect to cause. The sensory receptor reacts to stimulus. The reaction is then relayed through the nervous system. The nerve centre receives the impulse, classifies it, and files it for the immediate attention of other nerves whose office it is to stimulate the proper muscles for compensative or protective reaction. A single sensation impulse is not confined to a single neural path. Instead there are interconnections between almost every path. Usage is the principal determinant of the course of the impulse. The resistance to impulse flow through any particular sequence is decreased with exercise.

In the first place, organic needs determined certain sequences. In the second, heredity either confirms or modifies such primal sequences and instigates new or more complicated ones. With these two types of sequences we are born. Thereupon, environment, association, and personal habit begin to confirm or modify inherited sequences and instigate still others. It must be understood that this last process follows from exercising dormant connections.

Study of physiology and heredity has reduced the fundamental reactions or responses to well-defined constants. Inasmuch as habit, association, and environment are largely derived from heredity, the personally inherited reactions to stimuli may be determined within narrow limits; variations within these limits are almost entirely determined in childhood or youth. A study of that period of an individual's life will make it possible to predict with accuracy his reactions to any given stimulus.

This leads us to the conclusion that we have three specific types of reaction to contend with in applying the psychological hypothesis to air conditioning:

- 1. The habitual response.
- 2. The functional response.
- 3. The illusional response.

Admitted or not, the first is a name for the bane of the air-conditioning engineer's life. A highly perfected conditioning system may be installed and its benefits nullified by a personal belief that windows must be opened. Exhaust grilles may be insulted with a conviction that they are sources of drafts. The most efficient automatic controls may be rendered superfluous by an individual's opinion that he "knows better," though as a matter of fact his knowledge may be confined to politics! Frankly, the only plausible solution here is to "play politics," to concede the point openly and deny it in fact.

Definition of the second or functional response is derived from knowledge of hereditary modifications. The determination is less personal, and more easily applied. Through control of these reactions one may facilitate the pursuit of a given occupation. By association, one may reversely produce anticipation before the occupation presents itself. It is self-evident that application to air conditioning must vary to conform to the purposes of different rooms; it must also vary temporally. An Effective Temperature spectrum for functional response is derivable. Its lowest end corresponds to the highest degree of physical work or metabolism. Temperature increases with the decrease of internal heat production, is midway for mental work and reaches the highest end of the spectrum when complete relaxation or sleep is desired.

An ionization spectrum displays association of positive predominance with nervous tension, of negative predominance with nervous relaxation.

A radiant energy spectrum displays association of the lowest frequencies with general lassitude, of the higher with alertness.

An olfactory spectrum of functional reaction deserves more comment. It is by the olfactory or sense of smell that we not only evaluate the purity of the air as sustenance but qualify the condition or object accessory to the gases detected by the organs of smell. But the multiplicity of conditions or objects to which this sense may be applied is so varied that in generalizing the only common factor is appeal or repulsion to the appetitional instincts. Desirability or appeal may be associated with appetizing or fragrant odors, repulsion with nauseous or acrid odors. Specific problems of this sort are not difficult to analyze and solve chemically in the laboratory. For that reason it is entirely unnecessary that present or future generations be constrained to put up with unpleasant odors such as those of linoleum, carpet, rubber, leather, fabric, paint, plaster, and innumerable other common materials, when they can not only be deodorized, but be given odors that will promote the use to which they may be put. Dr. D. A. Laird, Director of the Psychological Laboratories of Colgate University, has gone so far as to investigate the psychological responses to perfumes and odors, and found them a material factor for commercial purposes. There is no better human barometer than sales.

The last of the three types of response, the illusional, may be defined as the manipulation of response for ulterior purposes. As previously indicated, the sequence from stimulus to response may flow through various channels. Two or more stimuli may contribute to the same response. If two stimuli have become habitually associated in producing a response, the presence of one without the other will not only produce the response, but imply the presence of the other though it be absent. This is illusion and is widely employed throughout interior design. With particular reference to the subject of air conditioning, it is possible to convey impressions of nearness of a surface by concentrating warmth upon it, of distance, by increasing its coldness. Reactions of warmth may be produced by glow, even brightness of color, and vice versa. Control of ionization may produce sensations of intimacy in a large room and seclusion in a small one though it be crowded.

To conclude, all variations for psychological reasons should be applied within the extreme boundaries of physiological comfort zones. In procedure a conditioning installation such as that described before would be adjusted for a temporally varying physiological comfort zone. Next, function will determine the comfort line within that zone and be subject to modification according to psychological needs. Then about the thus determined comfort line as a median the Effective Temperature will oscillate within the boundaries of the initial comfort zone. Lastly, radiant heat may receive additional concentration on certain surfaces, and may be controlled for illusional reasons.

The writer believes it evident that air-conditioning design is most intimately associated with interior design. The air-conditioning engineer is prepared for, and looking to, such progress. His co-operation may be considered an assured fact, and his advice should be indispensable to the interior designer.

The elaborate and novel appearance of the theory of air conditioning herein proposed and predicted must not be construed as indication of its remoteness. It can be adopted in part today, in greater part tomorrow. But the possibilities for tomorrow are the direct result of today's study. Research is only restricted by demand and that demand must come from the readers of this article. So, with emphasis again directed back to the initial importance of "fair weather," it is hoped the subject will "not be nominated for oblivion."

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C.-E. A. Winslow; W. D. Jordan; C. A. Mills; Philip Drinker; W. W. Teague; U. Miura; W. P. Yant; W. H. Carrier; Perry West; E. B. Titchener; A. I. Gates; F. E. Hartman.

Some Pitfalls in Supervision

B saddles the superintendent should check both the architect's drawings and the shop drawings. Then he should

inspect the saddles to see that they fulfill all requirements. They should be the full width of the opening, yet on many jobs one may observe saddles short of each jamb by as much as one-half inch. If, on one or both sides, the saddle is supposed to be met by marble the superintendent should check the marble shop drawing to see that this is provided for. This may avoid delay or an unworkmanlike condition of the marble being short. When being set the saddles must be carefully checked. Any deviation from the correct level or elevation will be obvious very quickly when the finished floors are laid. Many sloping stair platforms and disagreeable looking humps at thresholds can be traced to improperly set saddles. The superintendent must see that all saddles are well grouted. In the case of exterior doors it may pay to have the saddles set in mastic. This will often prevent the seepage of water underneath resulting from a stiff rain.

If the buck has been set true it will not be difficult to set the trim properly. If it has not, however, the mitres of the trim will probably be broken and will not fit the buck snugly, causing an altogether shoddy appearance. Likewise the hanging of the door must be done carefully. A certain allowance for clearance at the edges has been made in the construction of the door. Hence if the buck is properly set and the saddle is at the correct elevation the door will be hung with little difficulty. The superintendent should endeavor to prohibit the padding of hinges. This results only in an uneven ugly crack between the door and its frame.

A section of the door, as well as a full description of the materials composing the door should be furnished to the superintendent, whether it be the main entrance door or only a small access door. They may both appear on the job made of thinner or cheaper material than is called for. Then too, the finish of all doors, as well as the construction, must be carefully checked. The finish of ornamental doors often influences their construction and hence this must be checked to see that it will not be the cause of the mitres opening up or the metal covering pulling apart

By W. F. Bartels

XXVII. ORNAMENTAL IRON AND BRONZE (CONTINUED) at the edge of the door. Often to cover small defects the exterior of the door will be so burnished or ground down that very little of the metal is left.

Ornamental windows should be carefully set and aligned. The material of which they are fabricated should be checked to see that it agrees with the specifications. The mitred work should be gone over carefully to see that there are no ugly gaps, solder and welding marks, resulting from the vain efforts to pull members together which really did not fit. Some contractors will fill up gaps, cracks or holes with a form of putty or other filler, and then hope it will not be detected because of its height above the ground. The observing superintendent will not let such practice escape him, and the contractor should be required to remove the faulty unit.

All grille work coming on the job should be examined as to design, material and construction. If it is cast it should be examined to see that it has been properly machined down, if this has been called for. Then too, there should be no excessively rough spots nor too many sand holes. If the casting is a thin one it behooves the superintendent carefully to examine all parts immediately upon their arrival. Sometimes breakage in the factory is blamed upon the job. Often it will be found that a breakage has occurred and that an ineffectual attempt has been made to remedy this by welding or patching of one sort or another.

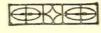
In general the inspection of bronze work, as with iron work, consists of the examination of the material and the close inspection of the execution of the work. Color texture, hardness, and many other items are amongst those the superintendent must examine and be familiar with. But before attempting the inspection of bronze work the superintendent would do well to equip himself with several good treatises on architectural metals. Otherwise he will be besieged with so many terms for the same article that he will be not only puzzled but chagrined. With the many compositions of metals on the market today the time he may spend in their investigation will be well worth while. ♦₽. ARDWARE holds an unen-H viable job in any building. If it works well it is soon apt to *** get no attention. If it causes HARDWARE

inconvenience it comes in for an excess of attention. It is expensive and annoying to replace or repair hardware, so that what seems like a high initial cost may easily prove to be cheapest in the end.

At the present time, particularly in the building trades, many manufacturers of highgrade articles are turning out products below their usual standards in order to meet the fierce price competition they have been forced into. Care must therefore be exercised to obtain the specified articles upon which the manufacturer has made his reputation, and to be sure that the quality has not been lowered.

Hardware is usually visualized as consisting chiefly of locks and door knobs. Locks should work easily and efficiently. Often the face plate, instead of being solid brass or bronze, is merely plated. The case should be cast and the springs examined to see that they are of a good grade so that they will not lose their snap or else not work at all after six months' usage. The bolts should be long enough to catch. Among the cheaper locks the bolts are apt to be short. Used in inexpensive work they are particularly undesirable, because it is in this class of work that door shrinkage, settling, and poor alignment of plate and lock most commonly occur. Hence, after a few months in such installations bolts may catch by only the smallest fraction of an inch, thus adding to the sense of insecurity. For cylinder locks it is indeed poor supervision that allows a good lock to be cheapened by plated trim on the outside of the cylinders. Bathroom locks are often operated only by a small knob on the inside. It is well to supplement this with a means of obtaining access from the outside in case of sickness, fainting, or a child's locking himself in. A key best serves this purpose.

Knobs, escutcheons, and roses are stamped, cast, wrought, or spun. Stamped types are less desirable because of the thinness of the metal, and hence less expensive-except in those cases where they are well plated and palmed off for the real article at a slightly lower price. Cast types are more desirable from every point of view. Glass knobs should be so well made as



never to come off in one's hand. The superintendent should be sure that the knobs, butts, window catches, pulleys, etc., are of the style and material speci-

fied. After proclaiming loudly that the hardware is cast brass or bronze, many a contractor has been seriously embarrassed when the superintendent has taken out a small magnet and found that it was so attracted to the "brass or bronze" that it stuck fast to them. Of course the usual alibi is: "I took my dealer's word for it." As alibis go it is a splendid one, for there is no law compelling the hardware contractor to previously test the hardware himself instead of taking his dealer's word for it.

Window pulleys should not be passed over lightly-except by the sash cords. At first glance they seem unimportant. But if their every-day use is considered it will be seen that they should be chosen with care. The common variety is stamped. These are the least expensive. Preferable are those of cast iron, brass, or bronze. After paying for high-grade sash cord (Sheridized or a similar grade of sash chain) it is false economy to jeopardize their functioning smoothly by using an inferior pulley.

Similarly, in door springs and door checks, an inadequate or inferior article should not be used. Spring hinges on apartment and office doors are subjected to heavy and oftentimes abusive use. They should be of a size commensurate with the door size and usage, and of such caliber that they will need but little adjusting and less repairing. Door checks should be chosen with due regard to the size, weight, and location of the door. Heavier doors obviously require heavier closers, and doors opening to the outside should have allowances made for the wind which may affect them. Doors opening at high elevations (penthouses, etc.) are subject to severe winds and therefore as an additional precaution should have chains bolted through the door and connected to the frame so that on opening the door in a gale it will not be torn off the check. In the installation of floor door closers it should be required that they are substantially fastened. Many mechanics are prone to use plaster of Paris in setting them, evasively stating that they will "fix them up later" or that the "floor will hold them in position." The former is forgotten more times than remembered, and the latter is only partly true. The use of plaster of Paris in a cinder fill cannot be expected to last very long.

(To be continued)





In the dining-room the plastered walls have a slightly rough parchment surface, and are painted café au lait with a trace of pink. Coved cornice and ceiling are covered with silverleaf lacquered a very pale gold. Carpet is mouse color; furniture of rather light walnut with a strongly defined grain; the leather upholstery, jade green

One end of the dining-room, with its black-glass-bordered mirror surrounded by green scagliola, with curtains of jade-green velvet

> DESIGNED BY ROBERT W. SYMONDS AND ROBERT LUTYENS

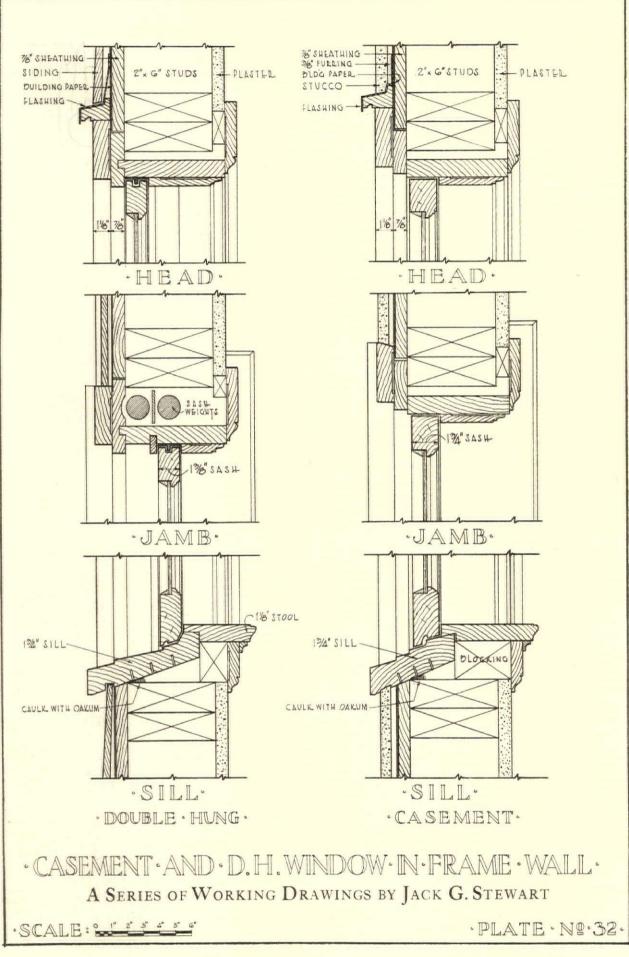
Interiors of a London House



Back drawing-room, the shape of which resulted somewhat from the fact that the work is an alteration. The semi-circular coves above the book shelves are of silver-leaf lacquered, reflecting concealed lighting. The windows also have concealed lighting diffused down from the curtain heads. Wall surfaces here too are slightly rough, painted an elusive peach, modified by parchment brown. Curtains are of apricot silk poplin. Furniture is upholstered in champagne Roman satin

> In this bedroom the plaster walls have a deep cream parchment finish; the woodwork is also cream; and the curtains blue. The ceiling is sky blue irregularly clouded with gray. Here again the lighting is reflected from the semi-circular niches above the glasspanelled cupboards





AN INTRODUCTION TO ARCHITECTURAL DRAWING. By Wooster Bard Field. 103 pages, 9 by 12 inches. Illustrations from drawings, plans and details. New York: 1932: McGraw-Hill Book Co., Inc. \$2.50.

The author, who is Associate Professor of Engineering Drawing in the Ohio State University, attempts to explain to the beginning student the various kinds of graphic representation involved in architectural practice, with the idea of aiding his decision as to whether or not he should study architecture.

AN ARCHITECT MUSES. By WILLIAM ROGER GREELEY. 98 pages, 5¹/₂ by 8 inches. Boston: 1932: The Beacon Press, Inc. \$1.60.

Concerning architecture as a necessity, as a profession, as a commodity, a business, a pastime, as the vestal of the crafts, as an inspiration, a personality, and as a prophecy. A good book to present to a client who has no clear knowledge of what architecture is and does.

ACOUSTICS AND ARCHITECTURE. By PAUL E. SABINE. 327 pages, 6 by 9 inches. Illustrations from photographs and drawings. New York: 1932: McGraw-Hill Book Co. \$3.50.

Mr. Sabine's book is perhaps primarily a textbook for students. Secondarily, but by no loss of effectiveness in presentation, it clears up for the architect and engineer the results of recent research and laboratory experiments dealing with the control of sound in buildings. The necessary mathematical treatment has been held within the compass of two years of college training in mathematics.

AIR CONDITIONING FOR COMFORT. By SAMUEL R. LEWIS. 244 pages, 5¹/₄ by 8¹/₄ inches. Illustrations from diagrams. Chicago: 1932: Engineering Publications, Inc. \$2.

The book describes the fundamentals which have to do with heating and cooling for human comfort, gives the practical formulas for computations, and stresses, throughout, the close connection between heating and cooling systems.

PLANNING AND BUILDING THE CITY OF WASHINGTON. Edited by FREDERICK HAYNES NEWELL. Foreword by ALLEN B. MCDANIEL.
264 pages, 5½ by 8 inches. Illustrations from photographs and drawings. Washington, D. C.: 1932: Ransdell, Inc., under the auspices of the Washington Society of Engineers. Retail, \$2; founders edition, \$3.

The history of Washington in its making is so full of good and bad efforts, wisdom and forgetfulness, progress and retrogression that it has never been completely told—nor perhaps ever will be. Here is a serious effort, however, through the Washington Society of Engineers, with the co-operation of the Washington Chapter, A. I. A., to put the record into available form. Alexander B. Trowbridge contributes the chapter on the "Federal Buildings and the Triangle Plan"; Colonel Grant on "Parks and Monuments."

THE DECORATION OF THE TOMB OF PER-NEB. The Technique and the Color Conventions. By CAROLINE RANSOM WILLIAMS. 81 pages, 9½ by 12½ inches, 20 plates. Illustrations from photographs and drawings in black and white and color. New York: 1932: The Metropolitan Museum of Art. \$8.

The Tomb of Per-Nēb is one of Edward S. Harkness's gifts to The Metropolitan Museum of Art. It was discovered at Sakkāreh, Egypt, in 1907, and first opened to the New York public in February, 1916. The author's researches deal with the wall sculptures and wall painting associated with the close of the Fifth Dynasty in the twenty-seventh century before Christ.

- TESTS OF CELLULAR SHEET-STEEL FLOOR-ING. By J. M. FRANKLAND and H. L. WHITTE-MORE. 31 pages, 6 by 9 inches. Illustrations from photographs and diagrams. Research Paper No. 463. Pamphlet binding. Washington: 1932: U. S. Department of Commerce. 10 cents.
- A METHOD OF PROCEDURE AND CHECK-ING SCHEDULE FOR PLANNING SCHOOL BUILDINGS AND THEIR EQUIPMENT. By John J. DONOVAN. Foreword by SAMUEL A. CHALLMAN. 361 pages, 73/4 by 10 inches. Illustrations from photographs and plans. Milwaukee: 1932: The Bruce Publishing Co. \$6.50.

The author, who is an architect, shares with his fellow practitioners a system which he has developed in an extensive practice. The work is a check list developed in great detail covering all elements of schoolhouse work.

HOME ARCHITECTURE. A Textbook for Schools and Colleges. A Manual for the Home Builder and Home Owner. By REXFORD NEW-COMB and WILLIAM A. FOSTER. 336 pages, 6 by 9 inches. Illustrations from photographs and drawings. New York: 1932: John Wiley & Sons, Inc. \$3.25.

The subtitle is almost sufficient description. The authors' plan of showing typical accessories by means of the manufacturers' catalogue illustrations would suggest an early need for revision, with the rapid march of progress.

Tuesday, November 1 .- Dropped in at The Producers' Council meeting at The Architectural League and listened to a stimulating letter from Max Dunning, but had to leave shortly thereafter to judge an archæological problem at the Beaux-Arts Institute of Design, calling for the presentation of a Spanish reja. In spite of the fact that the programme called specifically for large-scale details, many of the students had apparently gained no real consciousness of what wrought iron is. Unquestionably it is one of the hardest things to build up in a designer's mind-a real feeling for the material in which he is expressing his design. Of course, the later Spanish Renaissance work in wrought iron did get rather far away from the forge in its simulation of finely cut mouldings, depressed panels, and intricate foliage, none of which seems to come very directly from the anvil and hammer.

Wednesday, November 2.—E. L. Norberg, of San Francisco, joined the architectural editors at luncheon today to present the details of an ambitious scheme on the part of the Northern California Chapter's Standards Committee to publish a sort of bibliography, index, and guide which would correlate the technical information of the day so as to make it more readily available to the architect when he needs it.

Buckminster Fuller was also with us to tell us of the progress his magazine, *Shelter*, is making in its effort to achieve what has usually been considered impossible—a journal supported primarily by its subscribers, rather than largely by its advertising revenue. Naturally there was considerable clash between Mr. Norberg's plans to improve and further the existing system, and Fuller, whose conviction is that the whole system has proven its unsuitability to this time and people.

Thursday, November 3.—Chester H. Rowell, speaking before the architects of California at the recent Del Monte Convention, said a number of good things, one of which was: "Even the fashions of 'unfashion' are just as standardized as the old academic standards. My impression of modern art is that the standard is, no matter how well you can draw, you mustn't!"

Friday, November 4.—From all accounts, Boston has been doing a splendid job in putting unemployed architects and engineers at the job of making a really comprehensive survey of their city in connection with its need of housing. They have assigned a dozen different sections of the city to a dozen architects charged with making preliminary surveys, preparing the necessary charts, and compiling the desired statistics as to occupation and other facts concerning these districts. Taken together, these



The Editor's Diary

will constitute the first complete architectural survey of the city, and will be of immense importance to the community in future problems of community planning, better housing, slum clearance, transportation and the like.

Monday, November 7.-Hobart Upjohn, Edward S. Hewitt, and I lunched with Forest Grant at the University Club, discussing with the last named his efforts, as Director of Art in the public schools, to inculcate the students with something of art appreciation. We were encouraged in that last season, through talks given by various architects to students and teachers, we had reached a total of twelve thousand students. This year's programme provides for a continuation of the work with the emphasis upon talks to the teachers rather than to large bodies of students, allowing the teachers themselves to pass on the information in ways that are better suited to the pupil's understanding.

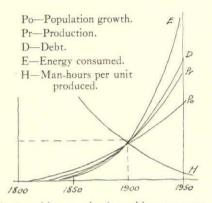
Tuesday, November 8.-I am glad to see that Joseph, Ralph and Herbert Pulitzer are going to restore the memorial to their father which stands in the Plaza at Fifth Avenue and 59th Street. Apparently the limestone which was used to carry out Thomas Hastings's design was taken from an upper stratum of the quarry, and proved to be much too The Pulitzer Memorial Fountain soft. has been a very distressing eye-sore for several years, and it is good news to learn that the sculptural part of the fountain, which was designed by Karl Bitter and, after his death, completed by Isidore Konti, will again be made good to look upon.

Wednesday, November 9.—I see that the architects of Indiana are conducting a weekly building page in the Indianapolis News. The attempts to pass on to the public some dependable information regarding architectural matters seem to be somewhat spasmodic, but slowly growing in number. Indianapolis comes on the stage as New York in its Herald Tribune page goes off. Personally I think the latter died because of too obvious special pleading on the part of the architect contributors. Thursday, November 10.—The Steel Joist Institute has just published the results of tests made at Columbia University to show relative fire endurance of a long-span, open-web, steel-joist floor protected with a ceiling of metal lath and plaster.

Friday, November 11.—A large number of Architectural League members gathered at luncheon in the clubhouse today to discuss ways and means of carrying the organization through some of the difficulties of the present emergency. Among the many emergency measures proposed there rang an unbroken note of confidence in the things for which The League stands, and which it so ably furthers. Occasions of this kind are always the more enjoyable because of the presence of many of the elder statesmen, such as Cass Gilbert, Benjamin Morris, and many others in whose affections and concern The League continues to hold a place that is unique.

Sunday, November 13.-Into a sleeper for Pittsburgh and found Robert D. Kohn, Clarence Stein, Henry Wright, Chester Aldrich, and Frederick Ackerman in the smoking compartment-all bound for the National Conference on City Planning. Ackerman has been working on some research, as usual, and has uncovered a fact which I have not heard mentioned before, namely, that technological progress is rapidly decreasing the amount of space required for industrial purposes in our cities. He cited one manufacturing concern which has not only decreased the number of employees by half within the last five years, but has also decreased the amount of space it requires one half. Coupling this fact up with the flattening out of our population-increase curve, it becomes more and more evident that our cities are not likely to need expansion about the perimeter as much as they do more careful planning and zoning in the interior.

Monday, November 14 .- The Twentyfourth National Conference on City Planning was opened at the Hotel Schenley with Charles F. Lewis presiding, director of the Buhl Foundation, Pittsburgh. Messrs. Wright, Kohn, and Ackerman spoke in the morning, pointing out the possibilities of the planner in large-scale housing, and the progress, or lack of it, that is being made in our slow efforts to profit by the R. F. C. credit. Ackerman rather stunned the Conference with some graphs for the period from 1800 to 1950, showing the following curves: population, which has increased with the square of the time; production, which has increased with the third power of the time; debt, which has increased with the fourth power of the time; energy consumed, which has increased with the eighth power of the time; and, finally, the man-hours per unit produced, which has decreased with the fourth power of the time. Ackerman



had nothing to plead, nothing to argue, merely laying before us these startling facts, some of the significance of which it would seem we should have long ago noted and by them set our course.

The Conference proceeded through a luncheon, an afternoon session, and an evening session, the interesting details of which are far too many and varied to be set down in these short notes.

Tuesday, November 15.—Between the breakfast round-table on zoning and the beginning of the morning session, I wandered over to see "The Learning Tower of Pizaburgh," Charles Klauder's dominant for the University of Pittsburgh group. It seems particularly unfortunate, in view of the beauty of this



tower, that the money for completing it has apparently ceased its flow temporarily, so that most of the base is, and perhaps will for some time remain, merely a group of bare steel columns.

Nearby is the new building for Mellon Institute, a classic pile of limestone almost entirely surrounded by huge monolithic columns; these might conceivably shelter an art museum or a sub-treasury, but surely not, without an agile imagination, a laboratory for industrial research. There are almost no windows behind the columns, but I understand that the centre of the block is an open court, and many of the laboratory activities are two or three levels under ground. I can hardly believe that Janssen & Cocken, the architects, would



have expressed in this particular monumental form a laboratory for research, unless perhaps Mr. Mellon, during his residence in Washington, became so impressed with the dignity and importance of the classic column that he felt it would be indispensable.

After another profitable session, the members of the Conference were taken out to see Chatham Village, that notable work in group housing carried out by the Buhl Foundation from the designs of Ingham & Boyd, architects, with Clar-ence S. Stein and Henry Wright consulting. I was interested to find that the houses are built of brick veneer construction, the architects believing that a brick veneer backed by asphalt-impregnated felt on a wood frame, with the plaster on a backed metal lath inside, would produce a wall tighter against moisture and air penetration than eight inches of brickwork. The houses, which are built in groups, having two to six in each, sometimes with an integral garage, others with a garage in a nearby compound, rent for from fifty-four to seventy-nine dollars a month. In some cases the dining-room is separate; in others, an end of the living-room is used for the dining-table; and still others, a dinette between living-room and kitchen. The plans are extremely compact, the buildings well executed, and they are finished with an unusual provision against the necessity for more than a minimum of maintenance costs.

After the evening banquet I had to hurry back to New York, with the more regret in that on the following day some of the Conference members were journeying to Cleveland to look over the new experimental steel house at Solon.

Thursday, November 17.—To a luncheon meeting of the New York Chapter, A. I. A., at which President Ernest Russell greeted the members.

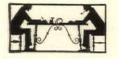
With Chester Aldrich back to his office to see what his firm is doing in an unusual architectural activity—making doll houses for Macy's store to sell. The work is being done by some of the firm's draftsmen who have been recalled from unemployment for that purpose.

Saturday, November 19.-Sydney E. Martin in from Philadelphia, telling me of the great work that has recently been finished in certain activities of the Philadelphia Chapter. As part of the plan to provide work for the unemployed draftsmen, the Chapter formed a committee to survey what is known as the Old City -an area which lies between the Delaware River on the east, Ninth Street on the west, Spring Garden Street on the north, and Washington Avenue on the Various architects were made south. responsible for certain parts of this area, their duties being to seek out any work still existing from the eighteenth century and early nineteenth, measure it, and by drawings and photographs put it into a permament record. It is gratifying to find that there are one or two whole blocks, with narrow streets, on both sides of which these early brick houses, huddled closely together, still stand. What a marvellous opportunity for Philadelphia to reclaim this old city, much of which is coming under the blight of deterioration and desertion !

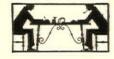
Tuesday, November 22 .- I am sorry to see that the government of Anhalt has closed Gropius' Bauhaus. It was an instructive experiment. The National Socialists have not only closed the Bauhaus, but have voted to pull down the building, which destruction, however, is postponed for lack of funds. The history of the Bauhaus, which was founded in 1920, in Weimar, is interrupted by this decree. The citizens of Weimar were unsympathetic with the experi-ment of Gropius and his students, regarding them as a profanation of their classic traditions. In 1925, the Bauhaus left Goethe's city, and the government of Anhalt and the town of Dessau placed a new site at its disposal. (Milton Lowenstein contributed an article on the Bauhaus in Architecture for July, 1929.) After Gropius conferred the directorship upon the architect, Hannes Meyer, the institution became involved in political wrangles. Mies van der Rohe became the new director, and now I hear that Berlin is offering the Bauhaus a new home.

Saturday, November 26.—I'm wondering whether there isn't the beginning of a rather spirited discussion in the fact that students in the Department of Architecture at Yale participated in a competition for a new chapel in Park Cemetery, Bridgeport. The winning design is the work of Charles M. Brooks, Jr., a graduate student. Some one will be rising up to say that bread is being taken from the practitioner's mouth not only by the Small House Service Bureau, but now also by the educational institutions.

CONTACTS



DEVOTED TO A BETTER UNDERSTANDING OF THE BUSINESS SIDE OF ARCHITECTURE AND ITS RELATION TO THE INDUSTRIES



THE question of determining what to build must be answered in the light of what families can af-ford to pay for housing facilities. This principle applies with double force to the question of the type of structure which should be erected to replace the unsatisfactory houses in slum, congested, and blighted areas. But as a matter of fact, in actual practice the question of what to build is approached from an almost opposite point of view, adopting certain specifications covering facilities, layout, and equipment, regardless of the influence of these specifications upon cost. The first step in any programme should be the determination of the amount which families are willing and accustomed to pay for housing. Within the limitations set by the answer to this inquiry, the effort should be made to provide as many facilities, conveniences, and luxuries as possible.

In most cases it will probably be found that only the bare minimum of facilities can be provided within the limitations of customary rentals. In the lower-income groups, family incomes probably do not average more than \$1500 to \$1800 annually. Their rents should not exceed \$25 to \$35 a month. For this modest return, only bare facilities, the minimum house, can be provided.

Living, as the majority of these families are, in houses that fail to provide even the essentials of health, safety, and some degree of privacy, they are not demanding tile bathrooms, electric refrigeration, and the latest frills and fancies.

Specifically, a minimum house would provide running water, with private toilet and sink in every family unit. Some sort of bathing facilities should also be provided, but it is very questionable whether installation of a bathtub would be found essential. While hot water is a convenience in domestic operations, it is by no means essential to healthful existence provided arrangements are at hand for the heating of a sufficient quantity of water in case of need. Likewise, the provision of central heating facilities is a great convenience, but is by no

The Minimum House By Ernest M. Fisher

Professor of Real Estate, University of Michigan

means essential to healthful and comfortable existence. A combination heating stove and kitchen range is widely used in England and some other European countries and is accepted as standard equipment. Electricity as a lighting device has become essential, but the appliances which go with electricity are still for the most part conveniences if not luxuries.

It will be at once objected that the provision of the minimum house would be an absurd and disastrous experiment because the house when completed would be obsolete. This argument is based upon a false premise. Instead of being an argument against the minimum house it is one of the strongest arguments that could be presented for it. The rapidity with which obsolescence occurs in any commodity is in direct proportion to the degree of luxury which it embodies. Those whose income makes their budget of expenditures rigid necessarily pay little attention to fashion. The minimum house would offer, therefore, the essentials of housing to the lowerincome groups, as long as it stood. A proper policy of maintenance and repairs would for a great many decades defeat depreciation. The capital invested in a minimum house therefore has the capacity of producing an income for a much longer period of time than that which is invested in the house that provides more by way of luxury. Instead of a life span of thirty years, it would probably have one of between seventy-five and one hundred.

It would be absurd to expect that

45

the minimum house would be produced by speculative capital seeking large returns. When it is provided it must be produced by capital seeking permanent investment at a fair rate of return. Direct operation will also eliminate the speculative profits which are secured by speculative capital building for a sales market in the hope of a quick turnover. It must be recognized that the provision of housing facilities, especially for the lower-income groups, is a capitalistic enterprise in which the capital investment is permanent.

This plea for the minimum house must be taken not as a pessimistic statement but as originating in the desire for a frank facing of facts. There is no magic by which a standard which can be maintained by income can be created, and certainly there is nothing to be gained by ignoring the direct relationship between income levels and housing standards. Income levels for the majority of families living in congested areas of our large cities are not sufficiently high to enable these families to command those conveniences and luxuries which are provided in all the new construction that is taking place. New construction should be planned definitely to meet the needs of these groups.

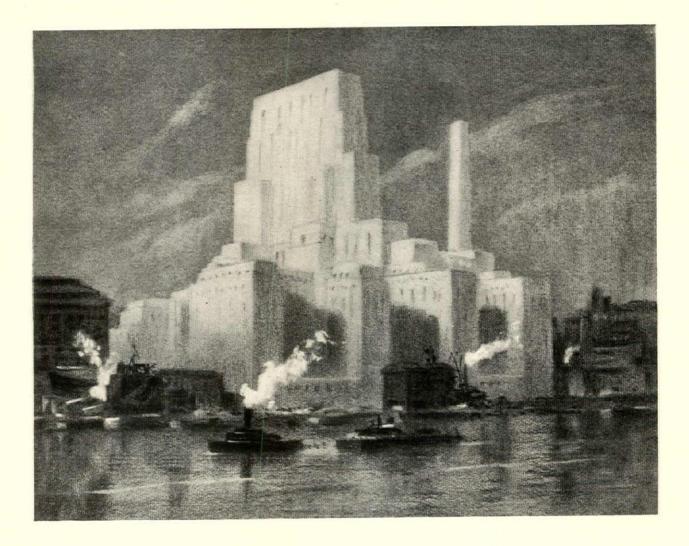
Comparative Costs

A^N unusually comprehensive ta-ble of costs, figured on the cubicfoot basis, will be found on the next page. All rule-of-thumb cost tables must necessarily be taken as general guides rather than as specific figures. Costs vary with the locality, with the season, with the size of the work, with the existing eagerness of contractors for work. The table reproduced on the following page is a compilation of the Detroit Real Estate Board, its figures applicable to Detroit, but, as is somewhat unusual, showing the variations of those figures over a period of sixteen years, and for a wide variety of buildings. Its primary purpose is to serve as a check on appraisals.

	1932 15 16 14 14 14 14 14 14 14 14 14 14 10 14 20 10 10	.29½ .19 .14	.26	.371 <u>%</u> .24	.42	.30	.32	.11 .10 .07	.371/2 .34 .23 .22	.331/2 .23 .19 .28	.17 .11 .10 .07	$\begin{array}{c} 0412\\ 06\\ 0.0914\\ 0.0914\\ 0.0312\\ 0.0312\\ 0.03\end{array}$
COST PER CUBIC FOOT IN CENTS (Copyright, 1932 by Detroit Real Estate Board)	1	.30 .20 .14¼	.27 .20½	.39	.42 % 25 ½	.32	.32	.11 .10 .07	.39 .34½ .24 .22½	.34½ .24 .20 .15 .29	.17 .11 .08	$\begin{array}{c} .04\%_{4} \\ .06\%_{10} \\ .09\%_{20} \\ .09\%_{4} \\ .03\%_{2} \\ .03\%_{2} \end{array}$
	. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	.38 ½ .25 .17	.35	.50 .32	.31	.40	45	.13 .10½ .09	.50 .45 .29 .28	.44 ¹ /2 .30 ¹ /2 .24 .20 .37	.23 .13% .13 .09	
	Jan. 1, 1929 .22 .21 .15 34 .14	.38 .25½ .27½ .17½	.34 ¾.	.49 34 32	.55%	.40	.45	.13 .10% .09	.50 .4414 .291 <u>%</u> .28	44 .30¾ .24 .26 .36¾	.22 ¼ .14 .13 .09	
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	Classification of Buildings Factories and Warehouses: Fireproof (Under 300,000 cu. ft.) Fireproof (Over 300,000 cu. ft.), Mill Construction Ordinary Frame Stores	Fireproof Frieproof Ordinary Flats (Above Ordinary) Ordinary without Basements Churches and Theaters'	Fireproof Ordinary Office Buildings:	Fireproof Ordinary Hotels:	Fireproof Ordinary Schools:	Fireproof Hospitals:	Fireproof All Steel Buildings	Under 20,000 cu. ft. 20,000 to 100,000 cu. ft. Over 100,000 cu. ft. Anartments:	Fireproof Protected Brick (Ordinary) Brick (Veneer) Residences	Brick Brick (Veneer and Stucco) Frame Frame (Not over 25,000 cu. ft.) . Cinder Concrete Block	Fireproof Fireproof Mill Construction Ordinary Frame Sheds Without Heat:	Enclosed Without Floor (Frame) Enclosed (Frame) Enclosed (Ordinary Construction) Enclosed Without Floor (Ordinary Construction) Enclosed (All Steel) Enclosed Without Floor (All Steel) Open Shelter (Frame Construction)

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NEW YORK HOSPITAL-CORNELL MEDICAL COLLEGE ASSOCIATION GROUP FROM THE EAST RIVER From the drawing in charcoal by E. P. Chrystie

« ARCHITECTURE »

ARCHITECTURE

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The Sad Story of American Housing By Henry Wright

CONSULTANT IN TOWN PLANNING AND HOUSING

◎ # ◆ # @ HILADELPHIA, "city of brotherly D * love," has many fine traditions. The The gridiron street system, laid down by among them. As a city-planning method it constituted a mistaken experiment that has since ripened into a calamitous habit. The gridiron city plan brings about the narrow attenuated lot quite as directly as the shape of a pork chop is dependent on the ribs of the hog. In Philadelphia itself, these lots were occupied full width by closed rows of the "town house"; but not even the virtues of these closed rows, such as they were, remained when the gridiron crossed the Alleghanies and migrated over the national highway, or "overland," route into the Central West.

The most extensive and natural habitat of the gridiron street, with its attendant narrow lot and sunless side alley, has not been geographic but psychological, in the real-estate operator's mind. Here these three have been lodged as tenants by perpetual lease, salamanders never to be burnt out by even the hottest fire, or perhaps even as ineradicable grooves worn into the brain. To suggest that better methods were available has made no impression. To erect physical examples, in which the superiority of other methods has been successfully demonstrated, has as yet caused hardly a ripple. There remains, then, for us to examine the product of this speculative builder himself, to see whether the recent depression-sobered past has led him to develop anything within his narrow frame upon which we might predicate some kind of an advance, however halting, toward an adequate housing procedure.

The gridiron street pattern spread rapidly over almost the whole country during the period of rapid expansion and city building of the nineteenth century. The expansion followed the great avenues of commerce. Thus we find a brick town architecture, closely modelled on the seaboard cities in form and appearance, extending to Pittsburgh, and thence down the Ohio River to Cincinnati, to Louisville, and eventually to St. Louis on the upper Mississippi River. Other traditions than those brought over the mountains may have contributed in these new cities to the arrangement of the houses in detail. But in shape and general appearance the early houses of all these cities distinctly recall Philadelphia. The row principle in itself is not undesirable; in fact, row houses properly planned constitute the most hopeful form of low-cost single-family dwelling to be found here or in Europe. It is the tradition of the narrow lot with which we are concerned.

In the Pittsburgh area the practice of continuous row grouping was continued, and again at Wheeling. Even in the small town of Mount Pleasant, Ohio, near Wheeling, where land could scarcely at any time have been worth more than a few cents a square foot, houses on the main street were built in attached rows. In one case (here illustrated) an archway was placed at the end of the group to reach the rear yard, the house wall being carried up windowless on the property line.

But an important change took place when city building reached the more open plain of the Ohio Valley at Cincinnati. Here the town house met the impact of the pioneer spirit. The house

This article is adapted from a chapter of Mr. Wright's forthcoming book, *How Shall We House*? the manuscript of which is now being made ready for the press.—EDITOR.

124

The Philadelphia row house of 1850—which with the gridiron plan and narrow lot have caused most of our housing troubles

ARCHITECTURE



In Mount Pleasant, Ohio, 1870, where the row house was continued with an archway at the end of the group to reach the rear yard



St. Louis, 1880, where our rugged individualism separated the houses by two feet—wide enough for the alley cat, but not for windows

was split from its neighbor by a narrow side yard—sometimes a mere passageway, sometimes faced by a few small windows. At St. Louis the precedent of Philadelphia is quite evident. But here the cleft between the houses divides them by only two feet—it is too narrow for passage except by alley cats, and is utilized for no window exposure; it is entirely meaningless, therefore, except as a vigorous expression of what our "rugged individualism" occasionally leads us to. Half a century has passed since this particular expression flourished; it has been discontinued on any large scale; but the fetish that inspired it has remained dominant throughout all the subsequent housing evolution.

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Let us trace this evolution through a period of thirty years in the typical building construction of St. Louis. We shall find constant change, virtually devoid of any significant progress. From the town house characteristic of the 1870– 1890 period we pass to the less stilted city house of 1890–1900. This latter is less rectangular, but it keeps to the narrow side yard. There is not yet a pressure from the rise of frontage costs that would explain such crowding.

At the turn of the century the increased complexities of street utilities have pushed up frontage costs to a point requiring more intensive use. The two-story house is evolved, with one family on each floor. This type is known generally as the "St. Louis flat," although it is by no means confined to St. Louis, since Chicago, for example, houses 375,000 families in this type of dwelling. The rectangular plan has to be lengthened, and the additional length emphasizes still more clearly the fissure-like character of the side vard.

For a decade the detached two-decker satisfied the demands of frontage economy. Then the unguided processes of rugged individualism, exemplified in neighborhoods of repetitive brick fronts, required a further contraction. The two-family unit was doubled along the party wall. This called for long dark interior halls and an exposure for most of the rooms on the narrow side yard. The arrangement of the rooms themselves in tandem, one behind the other, is an onerous one for purposes of housekeeping; yet it is the actual or at least the progenitive pattern of at least 70 per cent of the present housing in St. Louis, and of an even greater proportion in Chicago, to say nothing of Cleveland, Cincinnati, and Newark. The original Eastern row house was in itself fairly reasonable; it is the precedent which it established, of narrowlot squeezing, which has done all the damage, having been accepted ever since as a necessary accompaniment of moderate-cost dwellings.

The fourth step in the evolution in these cities (the group now expanded by the inclusion

ARCHITECTURE

MARCH, 1933



St. Louis, 1890–1900—the house less stilted, but holding the narrow side yard even at the low cost of lot frontage



St. Louis, 1900–1910—the evolution of the "St. Louis flat," with plan lengthened and narrow side yard handicaps intensified



St. Louis, 1910–1920—doubling the two-family unit on a party wall and providing long interior dark halls, still with narrow yards

of Kansas City and similar later communities) was to build up the double two-family flat to three stories. The tandem room arrangement was of course retained. The side yard remained narrow as before, and not only was its shadow deepened still further by the new floor, but, in the popular mode of the day, porches were added front and back as a still further discouragement to the feeble, smoky sunlight of these industrial cities. Nor was the situation relieved when the demands for larger dwelling space required the widening of the double unit, to gain a narrow extra room at the front and the rear. This process increased the distance in all the intermediate rooms from the inner wall to the window, which transmitted none too much light as it was.

The final decade has seen the expansion of the widened three-story double flat for service in the high-rent field. An interior court is introduced to form a U, with many of the rooms still ranged along the persistent narrow side-line courtyard. Chicago offers variations on these new atrocities, first by the introduction of the three-story detached flat (embracing about 170,000 dwellings), and then by closing up the front façade to give the effect of a nice continuous row, a procedure which just happens to cut off the already scanty circulation of air along the side courts.

Meanwhile, in many smaller cities the effort was successfully carried through to widen the standard lot. Forthwith an unguided public demand for the still more wasteful "bungalow" of one story filled up and overcrowded the lot in its new generous proportions. By 1930 even the builder himself realized that these bungalows looked somewhat awkward, jammed together. A movement then spread to camouflage the bungalow as a modest cottage. A high-pitch "cross gable" was turned across the front façade, to hide the huge mass of the house as it lumbered rearward, its main roof being kept invisible by virtue of a lower pitch. This ingenuity was cleverly manipulated in many Minneapolis examples, but botched in other cities. The ubiquitous front chimney, badly placed for living with, but easy to advertise, was also characteristic of this period.

9

Here at last was a spark of hope. Having once turned the roof, the builder might by some accident have hit on the corresponding expedient of rearranging the whole house. Having created the effect, he might have followed with the plain fact. At least he might have modified those extreme mistakes of form which had led him into the ultimate confession implied by his camouflage. But no, the spark of hope flickers and dies out. In 1929, 1930, 1931, we find the practical builder repeating the evolution that

ARCHITECTURE

MARCH, 1933



St. Louis, 1915–1925, extended the double two-family dwelling upward to three stories, retaining the tandem layout and adding porches



St. Louis, 1925–1930—the expansion of the widened tree-story double flat to the high-rent field, in which an interior court is introduced to form a "U" plan, still with the narrow side yards. Chicago followed suit with about 170,000 dwellings

had already taken place in 1903, 1904, 1905. The causes and the effects are naïvely simple.

The bungalow is popular, therefore the accommodating realty effort, "striving to please," must retain it. Keeping an ear to the ground, "understanding and interpreting the public demand," is the admitted major accomplishment of the real-estate profession. But the bungalow, particularly in its crude narrow-lot form, happens to entail waste and expense which sooner or later register themselves as "sales resistance," something which, we regret, has never been countermanded by any Eighteenth Amendment. So the resourceful mind of the speculative builder invents the "investment bungalow," with an annex on the rear attic for a subtenant who pays part of the rent. Some sacrifice is appropriately required of the owning family on the first floor. The extra stairway needed for the new upper tenant crowds the living-room of the main unit forward into the erstwhile sun porch.

The next step for the practical mind is naturally to provide more space above for more rent, and the upper dwelling is consequently expanded into almost a full replica of that below. Almost, because the new two-family structure must still masquerade as a modest bungalow—for who wishes to admit his dependence on his neighbor (above) for the lion's share of his monthly costs? Very ingeniously the public is coddled into receiving this almost final step in the undoing of its bungalow ideal very ingeniously deceptive in front, but brutally frank behind.

Finally the top story pushes itself out into a full replica of the story below-but still not quite. The effect must still be guarded by the "draping" of a false gambrel roof, which doesn't really fool any one, but makes a highly valued variation for each alternate unit in an endless row of equally dreary façades. But, prize of all! throughout this whole process the hardy resistance of the speculative builder's mind has preserved its integrity. Look down the line of these full-fledged two-flat dwellings of 1931. The "sun porch" appendage is still maintained in its distinguishing brick appliqué as the front half of the living-room, tied into the frame half of this room by the fake brick fireplace, at each side of which is the proverbial small window over the proverbial bookshelves; the get-up distinctly advertising the interior dishonesty by the fact that one window is in frame and the other in brick.

Need we introduce further evidence of the innate poverty of the whole ridiculous procedure? True enough, the public at first glance thinks it is getting the most house for its money if every available inch of the lot has something on it; but not even the general public insists on buying the largest suit of clothes in a store, or even insists any longer on the bulkiest furnace. When we consider such items as the construc-

Максн, 1933

The Minneapolis bungalow of 1930. The lot was widened, but the unguided popular demand for the one-story dwelling filled up this additional width. Here the row house is camouflaged to simulate a row of detached cottages. The badly placed but well advertised front chimney is characteristic of the period



tion wastes and the heat losses of our presentday, long, leaky barges, the calculation is less one of standards of sunlight or comfort than one of plain arithmetic; every ton of coal thrown out of the window decreases purchasing power, a part of which would have been available to the building industry. The public is ready to understand the comparative economics of the case whenever they are explained; but not so the builder. Housing progress in this country is impossible because of the inadequacy, amateurishness, and incapacity of those groups to whom it has been entrusted as a side line to land merchandising and the mortgage business. It is time here as elsewhere for a distinctly "new deal."

We are not concerned, in this discussion, with land economics or finance as such. We are interested in them only in relation to housing. Hitherto they have pretty well buried housing.

If we stick strictly to the problem before us, determining that in some fashion or other housing must be accomplished, then from our standpoint it is a nuisance that so much of the "economics" of the land is entirely distinct from its useful employment.

Progressive housing, as practised both in this country and abroad, is based on the principle of compact districts developed to their fullest use in advance of any improvement of adjacent areas—such practice permits reasonable land development and specific planning. The general American practice, on the contrary, is one which permits vast areas around the city to be bought up years in advance of any possible use and held for ostensible "ripening." Figures covering the city of Grand Rapids, and assembled by Professor Ernest M. Fisher, of the University of Michigan, show a not unusual case. During twenty-two years, 1909– 1931, covered by the study, approximately two lots were platted for every one used for building purposes. The whole number of lots used was only slightly greater than the number available and unused in 1909. "If utilization of lots should continue at the average rate prevailing between 1909 and 1931, it would require thirtyfive years to absorb into use all of the lots which are now vacant."



This statement of fact is sufficient, without further deductions, to exhibit the wildness and the irresponsibility involved. This practice of speculative holding carries a triple menace. In the first place, it prevents the assembling, at a low price, of land needed by actual developers. In the second place, it has led our cities to the installation of expensive public services, far in advance of possible use; and, what is more important, in the third place, the city plans are deprived of any real or definite objective in terms of a specific region to be used in a special way. The street pattern has therefore had to be reduced to the lowest standardized plane-a pattern of short blocks with an excessive number of cross streets requiring utilities and services. Thus we come upon the gridiron once more. No possibility has existed of foretelling which of the streets would be commercial and which entirely residential; and therefore all streets have been given the heavier construction necessary for commercial traffic.



At right, the 1929 Buffalo bungalow. Next door to it is the next step of 1930–31 —the "investment bungalow," with an annex on the rear attic for a sub-tenant. The living room of the lower unit is crowded forward into what had started as a sun porch

The development of the land as a separate operation from building has entailed excessive charges for the separate items of subdividers' overhead, carrying charges until use, and profit. The number of fees and other contributions required to bring the separate organizations along the different divisions and stages of the work into some kind of alignment has already been described in the book "Housing America" by the editors of *Fortune*.

Through these costs, plus the high taxes involved in the cities' wasteful procedure, all existing moderate-intensity housing areas have been subjected to an immense burden which has forced their conversion to more intensive uses. The more intensive use, capitalized in turn as higher land value, has imposed multi-story buildings which put further heavy demands on streets and public services, so that the vicious circle is completed, with congestion everywhere and mounting public costs. The ironic result to the citizen who works in the central business district is that city expansion, despite its high cost, has been carried beyond the point of any convenience to him in terms of location.

As to the habits of land subdivision, we shall encounter again and again the vicious effect of habits formed, all of which rest on the singlefamily house. Since the first development of an outlying area is generally in terms of this single, free-standing house, land is platted in narrow, deep lots, and this constriction of the lot remains as a disadvantage to every further step. The history of the flat is essentially the history of a potentially superior building type thwarted at the outset by the single-family lot.

THE COSTS AND COMPLEXITIES OF HOUSING FINANCE

It has been shown in frequently published studies that of the average dollar expended for home purchase in the United States, approximately twenty-seven cents go into financing and promotion charges. This is more than is spent either for construction materials or for labor on the job, and considerably more than the average actual cost of the land and its improvement. This exorbitant cost of financing arises chiefly from our system of junior mortgages, with their large element of risk accompanied by higher rates of interest, plus discounts, commissions, and renewal fees. That the risks are real is attested by the widespread bankruptcy of second-mortgage houses, and by the difficulties of finding reputable sources of junior finance.

The first step in the cure of this situation lies in the improvement of the housing product as such. Improved planning in terms of stable communities will decrease the risks of vacancies and obsolescence to a point permitting conservative sources of money safely to enlarge the scope of first mortgages. Second mortgages, if any, may then be stripped of most of their risk, and the amortization of all loans may be safely spread over materially longer periods than in present practice.

A desirable simplification would be for a larger proportion or all the mortgage money to come from a single source, a practice which can be justified for housing of demonstrated stability in use. Not even the most drastic economies achieved by skimping on construction costs could produce savings in rentals or in ownership charges equal to those to be derived from the slower rate of amortization resulting from stable financing.

MARCH, 1933

Here is the rear of the 1931 investment bungalow. It masquerades in front as a "Dutch bungalow," but drops all pretense in the rear. This is not a sporadic case, but represents the bulk of a year's building in a large city, approved for financing by reputable mortgage sources



The final goal in housing finance, however, is not merely that of improving mortgage rates, extending amortization periods, or simplifying the present complicated mess of senior, junior, and sub-junior mortgages, desirable though this might be. Large-scale housing should and must find its place as a primary investment which will attract permanent money, not temporary mortgage advances which must rapidly be withdrawn less because the undertaking is risky than because the lender has limited means. Such investment money should stand at least on a par with other public utility securities as a permanent stock subscription-negotiable as collateral, to be sure, but remaining in the general housing enterprise, as opposed to any particular housing project.* The investment of such capital by the operating company in any particular housing unit would necessarily be protected by an adequate depreciation reserve, set aside regularly and specifically to offset probable reductions in current earning power from whatever cause. That is, it would take care of possible changes in surrounding conditions, making it possible to reduce rents, to allow for obsolescence or else to reduce it by undertaking alterations and renovations, and to permit complete restoration when necessary either in the same location or in another one. This would keep the capital continuously employed, without demanding the double drain on rentals for both depreciation and amortization which now is necessary in some degree even in large-scale projects, however well planned and managed.

As long as we remain dependent on mortgages, we are particularly handicapped by another bad financial habit, which consists in appraising projects on a wholesale basis. If gross cubage is to be the only measure, then a wasteful building not only escapes punishment but is often rewarded for its waste. Better planned, better built, and, most especially, better managed and protected projects should definitely be entitled to preferential treatment, both in priority of mortgages and in per cent covered by mortgage, although such preferment is seldom encountered today.

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Quite another aspect of this subject has to do with the general extravagance and multiplicity of business charges assessed against house construction at every stage of production, from the subdivision of the raw land up to the trussing of the purchaser in his own shoe-string. It might be considered going rather far to suggest that this sort of thing is respectable rather than racketeering, were it not that so many respectable agencies are implicated at some point in the process of building, mortgaging, advertising and selling. If there is any one best reason why investments in the field of "home" building have dried up, it lies in the practices connected with nearly every phase of production. The growing insistence that the first mortgage cover a lower per cent, and the demand for bonuses, arise directly out of the fact that those who supply mortgage money know too much about the

^{*} A very able series of articles published during 1932 in *Build-ing Investment*, by Mr. Arthur C. Holden, vividly contrasts the nature of present-day real-estate investments and industrial ones.



Buffalo, 1931, the second year of the depression. The top story is extended forward to make a full replica of the flat below, but the fact must still be hidden by the draping of a false gambrelroof effect. The sun-porch appendage is still distinguished by its brick appliqué as the front half of the living-room, tied into the frame half of this room by a fake brick fireplace, on each side of which is the small window over the proverbial book shelves

inside workings of the system, and properly hesitate to loan more than the equivalent of the actual tangible assets. At the time when Sunnyside was built, there was a certain house in it that was offered at \$8,300; one of the largest and most respectable agencies building in a competitive district offered an apparently equal house at \$6,000. Equalizing the land value of the two houses by subtracting the extra cost in Sunnyside of improved vacant land, the Sunnyside house would come to \$7,650. Yet the actual expenditures going into the complete building (all payments for labor, materials, equipment, fixtures, decoration and the like, and also building overhead) were only \$2,450 for the competing house as against \$5,212 for Sunnyside. Or, stated somewhat differently, the purchase price in the two cases represented *construction* costs as against *marketing* costs in very different proportions. For the \$6,000 house, lot and improvements cost \$675; landscaping \$175; building complete \$2,450; and then came a marketing overhead of \$2,690, or about 45 per cent of the price. For the \$8,300 cost, the same items were \$1,325, \$200, \$5,212 and \$1,563 respectively—that is, 61 per cent went into building and only 19 per cent into marketing overhead.

WHAT HOPE FROM PRESENT METHODS?

Have we now reached the point at which we can summarize what seems to be the present situation? We find that our cities not only suffer from slums but are riddled with blight throughout the great range of their supposedly middle-class construction. Such blight calls for rehabilitation before we can safely engage in any further irresponsible expansion. When we examine the housing types available for such rehabilitation, we find that we have an increasing proportion of group dwellings housing more than a single family; the single-family house is doomed to a permanent recession. These multifamily houses of ours—mostly flats, and only 5 per cent of them serviced apartments—have grown up under the hand of the speculative builder. We find them still struggling, as in 1900, with the narrow, single-family lot, or derivatives that are only slightly modified. We find the enterprise hampered by excessive holding of land for "ripening," by huge city outlays for services that cannot serve, by financial charges which represent in the main a measuring-rod of the chaos. We may now look about to see whether these normal processes of real-estate and speculative building are likely to improve. The answer, unfortunately but very positively, is "No."



Parisian and Dutch Shop Fronts

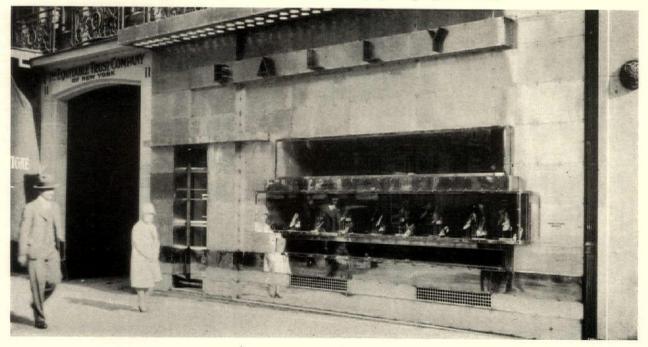


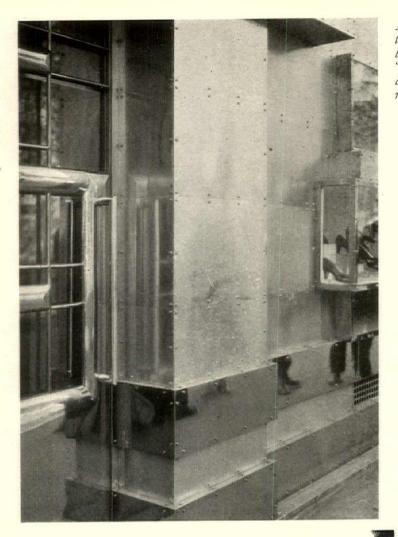
PHOTOGRAPHS AND CAPTIONS BY GERALD K. GEERLINGS

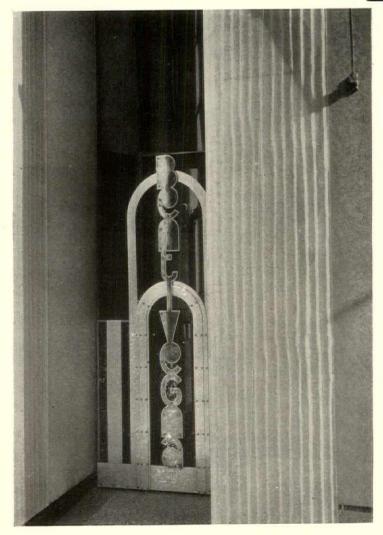


45 Boulevard Haussmann. The outer window frame, sill, base course, and basement "mullions" are of white marble with black veining. Basement grilles are dull silver in color. The broad expanse of gray semi-opaque glass above the show window is mottled, and not quite smooth. The circular sign has a silvery rim and letters, against an imitation mother-of-pearl background

Shoe shop, Boulevard de la Madelaine, a combination of polished steel with sheet brass. The simplicity and unexpected color are both good architecture and good advertising. All is steel, except for the brass base course and the band immediately below the window. Lights and reflectors are housed in the projecting soffit overhead







A detail of the Bally shoe shop, showing the two projecting brass courses at the base, and the end of the show window "set-backs." The steel plates are flush, and are held in position by cylindrical rivets (see sketch). The door is brass in color

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Rue de Faubourg Saint-Honoré. (Maurice Bizet, architect.) This design comprises a versatile union of : two Paris houses with different floor levels, the requirements of an expensive shoe shop, and a design influence imported from perhaps the vicinity of the Nile. The entrance motif is of Nile-green glass ribbed underneath, with an opaque glass panel above the entrance. The show windows have plain facias of mottled gold finish; the window backs have old-gold background and drapes, with the sides in two shades of wide yellow stripes. The base band and signs are lacquer red

A detail of the Nile-green glass pilasters, which are ribbed on their under surfaces and smooth on the outer. The base band is lacquer red. The door is of clear glass, having an aluminum-colored metal

appliqué design superimposed, and highly polished brass letters spelling "Bentivegna"

INNER SUNFACE

« ARCHITECTURE »



Rue Pépiniére. The jamb reveals of the door project several inches beyond the face of the glass of the show window, and are built up of a sheet of perforated metal applied to a solid Within the scalloped enclosure sur-

facia (see sketch). Within the scalloped enclosure surmounting the door, and on the letters of the name "Weil," there is red tubing which is illuminated at night. The banded pipe columns at the sides are silver in color; the base of the show window is black marble



Rue St. Florentin. In this conservative rendition of the modern, the T-square and triangle have seemingly played a major design rôle, but for an economic performance it does creditably. The color is particularly pleasing: the marble surrounding the window is white and red, rosy in effect, the base is of gray marble, the step of small redand-white tile, and the metal, silver in color. The presence of the second-floor windows were an unfortunate circumstance for the designer, certainly

> Boulevard Raspail. Here again the Parisian fondness for simple designs in sheet metal asserts itself. The building is of gray-buff limestone; the metal, polished silver in color. The color effect is splendid in reality, but unfortunately it does not record in a photograph. Inside the window, the wood sides and shelving are stained black, and so rubbed that the long coarse grain counts as an interesting over-all whitish design. The vertical metal ribbing in the metal below the window is a half inch in depth

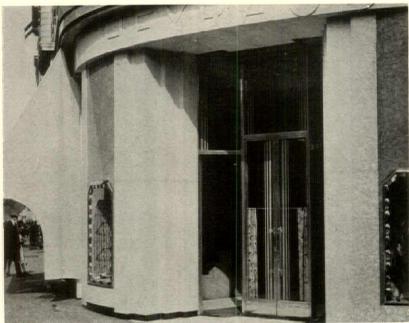






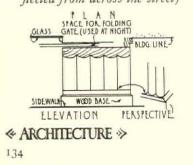
Rue Royale. Another example of the success which attends the simple treatment of a well-designed marble frame for the modern show window. This shop maintains an air of distinction on the wide Royale, which many of its more fripperied neighbors lack. Only black-andgold marble, and bronze window frames, have been used, but the profiles of the marble offsets are more effective than broadcast ornament





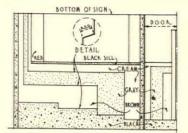
Boulevard Haussmann and the rue Lafitte. If the modern movement has done nothing more than to make us realize the possibilities in shade and shadow, it has achieved sufficient to justify some of its errors, at any rate. In this example, instead of meaningless pilasters there are simple offsets in the jamb which help to focus the interest on the actual window and entrance door. The jambs are of white marble, slightly streaked with gray; the cornice facia is of dark gray marble, with the soffit of sheet bronze; the base of black marble; the window frame is of highly polished bronze

21 rue du Val de Gràce. An admirable adaptation of the historic in terms of the modern—simplifying pilasters and entablature so that they become secondary in importance to the merchandise display. The wood has been only lightly stained and then waxed; the etched glass patterns in the transom and upper part of the windows fall below the standard of the wood details (see sketch). (In the right-hand glass a window with shutters is reflected from across the street)









Corner of Boulevard Raspail and rue Brea. (N. Vidal, architect.) Only a color photograph could do justice to this merry café. The frame of the sign is black with inner and outer red margins, the background is cream, the letters black and red. At night illuminated red tubing defines the outline of the letters. The windows have frosted glass, red mullion columns, black sill and lettering. Below the window the wall is painted as indicated in the sketch

Shoe shop, "Centraal," The Hague. This shop is more interesting for the idea it suggests for lighting, and the splayed entrance, than its intrinsic beauty. At night the space above the shop is illuminated, both the ceiling panels and the prisms toward the street. The steppedback sides of the entrance give a sense of welcome, without the cluttered, complicated appearance of many cheap shops in America. The framework of the shop is dull oxidized bronze; the lettering and window mullions polished bronze; window base is black-and-white marble; the glass "band

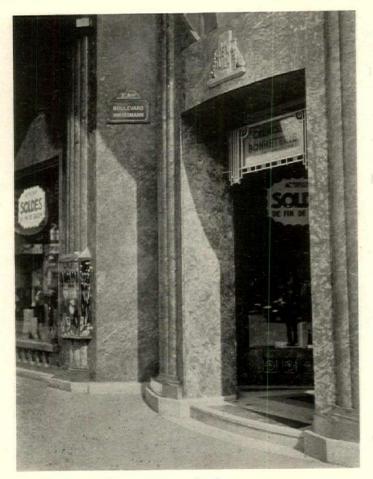
the glass "band courses" above the show windows are semi-opaque glass with small spots of blue; the upper flanking signs are blue-and-white glass

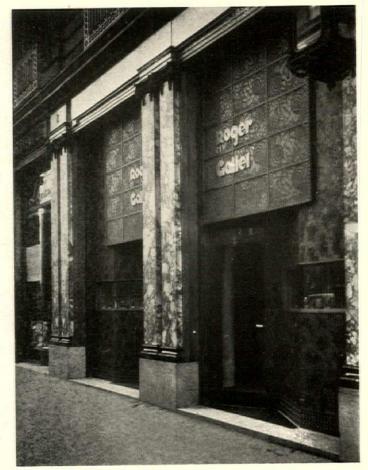
PLAN OF OPEN VESTIBULE



Shop on the Oude Gracht, Utrecht. A good example of the modern shop which depends more upon simple forms and color than ornamental abundance. Here there is a range of marble treatment due to the variety in finish, being sometimes honed, again roughened, and only occasionally polished. Corner piers are of gray marble, honed; base and entrance jambs are greenish black, highly polished, except for the shields which are definitely tooled. Above the show windows is opaque glass in black, tan, and yellow. Between this colored glass and the second-story window sills is a version of wood siding, painted a color between orange and tan

« ARCHITECTURE
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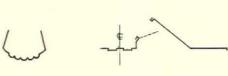


Boulevard Haussmann. Another example where the designer has taken advantage of shade and shadow, instead of relying on smallscale ornament. The corner entrance is on a gently curving sweep, with the variety of lighting further

increased by the simplified pilasters composed of five curved, ribbed segments. The marble is a pleasing gray with pink veining; the metal work, including the shield over the entrance opening, is bronze

Rue de la Paix. Even without the name of the London house one could almost know for a certainty that this restrained front was an English version of French modernism. For the unextravagant shop front which favors conservatism, this design may contribute a few sugges-

136

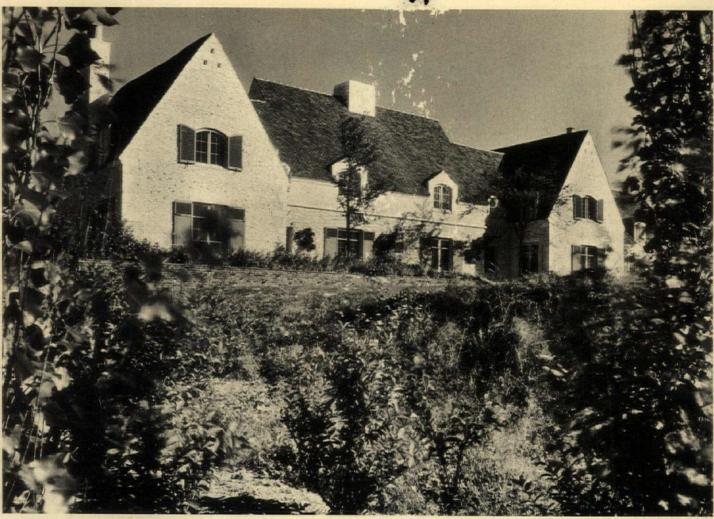




Rue de la Paix. (J. Marrast, architect, 1928.) In this case the designer was faced with the difficult problem of maintaining the existing pilasters which divided the shop into two. The accompanying sketch shows how cleverly the approaching

pedestrian is led into the shop with the door at an angle. Above the door the squared decorated area has frosted glass with a rose pattern set in a gilt frame; surrounding the small show window proper is a composition material in black and gold; the door and the base grille are of wrought iron

tions. Black-and-white marble supplies the outer frame, door stiles, and jamb reveal, while the windows are surrounded by creamcolored marble with gray veining. The window muntins and letters forming the name are of bronze; the door and the upper windows are apple green in color

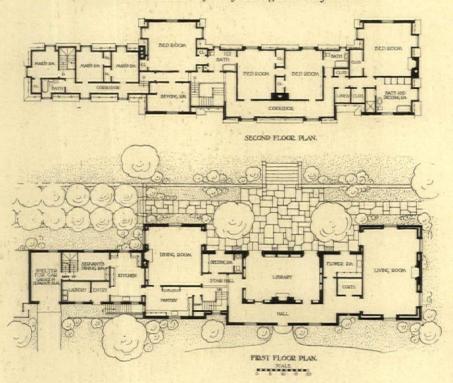


Photographs by Robert MacLean Glasgow

House of Benjamin A. Mosser, Morristown, N. J.

GREVILLE RICKARD, ARCHITECT

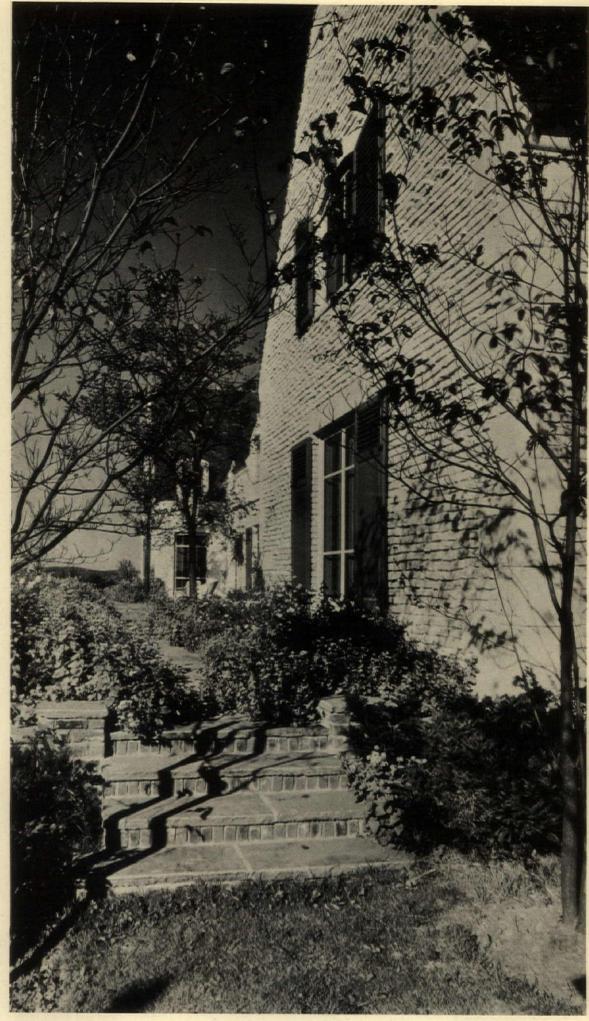
The house is built of a common brick with raked joints, liberally supported by cast concrete blocks in the quoins, on the gable rakes, and elsewhere. The roof is of variegated red flat tile





A local field stone is used for the first-story walls between the bays; this, the brickwork, and the cast concrete being covered with white wash in which there is a trace of yellow ochre. The terrace paving is of variegated flagstones

« ARCHITECTURE »



A view taken sharply across the terrace front. For the garden walls, brick capped by flagstone has been used. Shutters are bluegreen, woodwork white. Wood casements are used throughout

ARCHITECTURE >> 139



The service wing, with the garage space for a single car—there is a separate garage building elsewhere on the estate. The dormers are roofed with copper, the cheek walls being formed by the roof tile, carried across in corresponding courses. Garage doors are of natural oak. Chimney pots are natural clay color, darkening through use





Above, the library, the walls of which are of gum wood finished with a light stain, maintaining almost the natural color of the wood. All bookshelves, it will be noted, are fully recessed

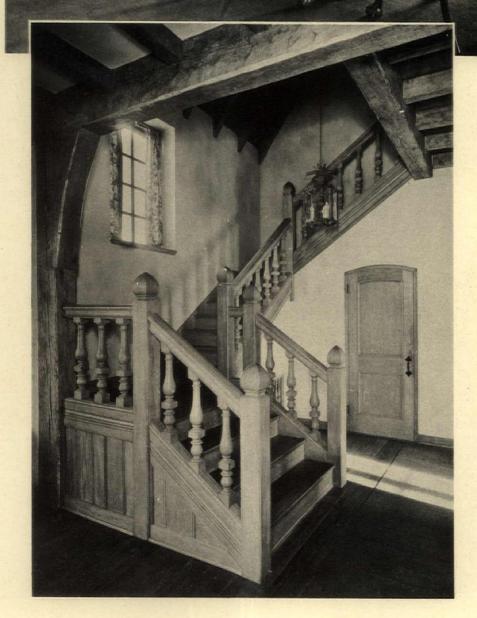
A corner of the flower room, in which a brightly colored wall-paper has been used and shellacked. The floor is of linoleum, and the sink of monel metal

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« ARCHITECTURE »
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A view through the long hall looking towards the stairway. The ceiling beams are of roughly hewn oak, the floor of oak planks, and the plaster, hand worked with an integral brown coloring. To the hangings is entrusted the task of providing strong color

ARCHITECTURE >> 142



In the dining-room the plaster walls and the woodwork are painted. There is an interesting detail here in the sawn window heads, made to cover the curtain rods. The radiation is concealed under the broad window sills

Detail of the main stairway, entirely of oak. The millwork has been given a very light stain as compared with the darker one of the rough-hewn timbering

« ARCHITECTURE »



The master's bedroom as shown in a photograph which unfortunately does not include the fireplace in the right-hand wall. The plaster walls are tinted as a foil for the bright chintz colors on hangings and furniture coverings

The building in the foreground is the garage, built throughout of the same materials as those used in the house itself





Organic Structure By Carleton B. Ryder

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"Yet, is it all one." —Translation of "Black Marigolds" from Sanskrit of Bilhana, by Edward Powys Mathers.

The reader may as well be told, before he finds it out for himself, that this is hard, slow reading. An analysis of the essence of architecture, and of the curious, distorted relation that has grown up between art and science, is, necessarily, not to be dished up as midsummer fiction, or even as sparkling entertainment. You are warned.—EDITOR.

■ T has been warned.—EDITOR. warned.—EDITOR.

Art at Harvard University, that he was the first to bring out strongly and clearly the "organic structural character of Gothic architecture."

To those who seek the reason in things, that realization is inescapable. *The logical structure is organic.*

In the past three articles of this series the reader has witnessed the advocacy of a Naturalistic, otherwise "Organic," conception of interior design. It has been typified by proposed treatments of Acoustics, Air Conditioning, and Lighting. But let the reader attempt to apply each of those three theories to the same interior, and he will find that he lacks something as important as it is difficult to define. He will realize that the naturalistic, or the physiological aspect of organics are only patterns of a principle, results of the process that shapes a logical structure's growth.

That principle is the indispensable staff of practice. It is the law of Organization: Consistency.

Today, the architectural mind is called in a thousand divergent directions. Financial stagnation and conflicting solutions have left him confidence in little or nothing. So the writer is perfectly aware that it is to a righteously dubious audience that this paper is addressed. He asks that the reader accept nothing but the evidently logical in the arguments to follow. If such logic is coherent he will have proved:

First, that the period has exceeded its application, not surpassed its necessity. It lacks only the interpreter, the Organic Technician. Second, that only by organization may architecture become a logical fabrication of the needs of the occupant—in short, Organic Structure.

Third, that commonplace use of that technique is the immediate privilege of the architect.

DEFINITIONS

The Organic principle, like many another abstract, is most evident in absence, but this characteristic is little help to the study of it. We are setting out to prove the above by examination of that principle, and its workings. Our first move must therefore be to trace its reappearances through an historical sketch of architecture. We then will have the means to its definition in terms of its effect. From the effect we can deduce the cause.

As the result of this method of reasoning we find that:

1. An Organic Structure is the effect of an Organized Cause.

2. The law of Organization is Consistency. But the fullest significance of that word must be understood.

For instance, architecture permitted an inconsistency when it attempted to associate Science and Art, although uncertain as to the relation of the two, or indeed, doubtful as to the existence of any relationship. The structure could not be consistent, could not proceed in every stage of development from a cause to an effect, and achieve a unity, if any two factors were unrelated.

It is characteristic of this most important lack of relationship that about a thousand years ago a condemned Persian poet struck off the coin of truth, the ultimate assay of subsequent doctrines, that heads this article. In other words, the universe may be resolved into a single principle, possibly that known as energy, of which matter is simply a more finite form. The single structure of science has been erected upon one sound fundamental, *i. e.*, that its coin must be the product of knowledge. And every important step of science points toward such an elemental oneness of all phenomena. The theory represents the utmost in simplicity by the very fact that it excludes the irrational. Inconsistencies cannot exist in a unit.



But two things have happened to nullify the value of Science's example.

First, Science, although its objective is the sociological increase of Man, has been so wrapt in its coils that it is forced to leave its adoption to Man himself. The latter assumed Self to be the exemplification of Man, rather than its smallest unit. So he justified the literal application of Science to the increase of Self. The two are not the same, hence the result is inconsistent and illogical. The admission of this inconsistency, like a fault in the foundation of a building, has cracked every wall.

A second inconsistency was the illogical path of Art.

Although we credit the Persian poet with the minting of the coin of truth, "yet is it all one," we must add that in the same breath he concluded, "yet is it nothing." He had called upon Art to witness his amazing dexterity at counterfeiting the coin of truth with the coin of artistry; pathos.

Pathetic, to say the least! Art apparently went away with no very clear impression as to which was the counterfeit, for its works and its wealth have only been restricted by its artifice. Built indiscriminately upon truth and error, its structure crumbles about as fast as built.

Science and Art are simply different ways to the same end, truth, but the difference is important. Science forbids exceeding knowledge, even though the lesson lags behind, while the artist often tries to make his point clear by overexpression. If his point is the apex of his knowledge, the excess may not be true.

Thus, throughout our review of architecture, we can trace every fault to a lack of consistency, principally in the loose association of Science and Art.

In this light our earliest structures were the nearest to organic, because they proceeded most directly and consistently from their cause, a need of the occupant. Then, with the growing complexity of the occupant, the unbridged initial fault was lost to view. The checks that sprang from it spread. Later cementings only divided the stress and forced the crazing further. Finally the isolated fragments of architecture's structure became the platforms of Style, the worst enemy of Organization.

Style is the propounding of an incidental unit as the universal measure. Just because the advocate of a style is cut off from the whole, he assumes his particular propensity to be the bricks of which the whole is built. One style may best suit one need, but only all styles can suit all needs. Since no two needs, more than any two men, are exactly duplicate, style is the stamp of creative poverty.

At this time we are confronted with the shame of finding ourselves out. Inconsistency on every hand has led to dismal confusion. Arbitrary canons and coinage, we find, cannot help us. We must, and we will, migrate to the only path out of the maze: *the way we came*. We must return to the simple law of Organization, Consistency, and practise it by associating only those things whose relationship can be found in a common cause.

Our structures will then proceed logically from an organized unit of cause and materialize as organic forms of theory and substance.

In summary of the first phase of our argument, recognition of the Organic is not its achievement, neither is appropriation of its forms. It is not modernism, classicism, nor any other "ism." Yet it is older than all, for it has been responsible for the elements of logic in each. It has been submerged in proportion to our conflicts; literally lost in the rift between Science and Art, because Organization is unification. We must therefore learn the relationship of every fundamental to its fellow before we attempt to relate them.

The naked knowledge that "it is all one" must be our assurance and encouragement that such relationship can be determined.

PROCEDURE

Our next step is to show how the principle of Organization applied to Architecture will produce an Organic Structure. Also that it is the most direct way to that end.

Consistency first requires a definition of the beginning and end of architecture.

Максн, 1933

Consistency requires a cause to produce an effect. On delving deeper we find that any cause is the effect of a still more elemental cause. The process is one of constant refinement. The present material effect of a process is only the stage of development that time has permitted its cause to reach. That material effect may be the nucleus of further development, while still the complex effect of a prior cause.

Consistency requires that a cause continue to generate effects until it is overcome, or limited, by a counter cause. By reason of its relation to the generating nucleus, this countercause can be likened to an envelope resisting the expansion of the nucleus.

But consistency with the idea that there is only *one* fundamental cause forces us to the conclusion that the only permanent envelope to a generating nucleus is its *rate of progress*.

Architecture, to adopt more tangible terms, is the product or effect of the nucleus, Man, and the envelope, Economics.

The often forgotten fact that Man, in the generalizing sense, or the occupant, in particular, is the sole creative cause of the house is the first result of this reasoning. The second conclusion is that architecture cannot grow, at least in conception, otherwise than outwardly from the occupant, and will thus grow in accordance with its rate of growth, Economics.

A definition of Economics may serve to make plainer the allusion to it as a rate. It is definable as the sum of methods by which conditions of life may be maintained or improved. It represents the speed with which natural and social obstacles to living are overcome. Consequently it is the tangible evidence of Man's rate of progress.

The only obstacle Man cannot conceivably overcome is his own "slowness."

Thus an analysis of Man, alone, must disclose not only the nature, but the relationship, of every factor contributing to a logical architecture. Then a co-ordinating agency can design that which the occupant would cause.



If the analysis of Man is confined to the simpler, purely physical, factors we see him as a parcel of wants impelled in pursuit of satisfaction.

Elementally these wants, instincts, appetites or motives are really few and simple. They seem entirely reducible to hunger and thirst, respiratory, thermal, recuperative and erotic appetites. They may even be reduced to the major underlying motive, perpetuation of wellbeing. But these few motives are the fulcrum upon which the ponderous pendulum of society swings. The smallest inconsistencies there will cause wide eccentricities in the arc.

222

The nature of the want is detected by innumerable subjective sensory endings, like antennæ, located throughout the body. These may not operate consciously. Association compounded upon association may result in the want reaching consciousness in terms of environment, society, and habit so remote from its instigation as to bear it no apparent resemblance. But the brain or nerve centre has, in the process, transformed the want into a sort of motive force.

The motive enlists the seven or more types of objective perceptors that are in contact with the source-of-supply of satisfaction. These are the visual, auditory, olfactory, gustatory, tactile, thermal, kinesthetic mechanisms. If the means of satisfaction is at hand, they report back to that effect, and the motive is redirected to attainment under their guidance. If the means is not immediately evident a "trial and error" course is adopted until such means is hit upon.

This may not take place outwardly but by what, through lack of space, we shall have to call "reasoning," with "experience" to guide. Rambling as the detour may be, the process will eventually reach one of the elementary want satisfactions, and the motive actuating it cease.

Such a purely physical analysis of Man is common knowledge to the physiologist. With the physiologist's prescription in quantitative form, the specializing engineer can offer precisely the degree of satisfaction a man requires of his environment.

These physical means of satisfaction that comprise the skeleton of Organic Structure are, consistent with their causes:

1. Devices for promoting ingestive and metabolic functions.

2. Air-conditioning devices for promoting respiratory and thermal functions.

3. Physical accommodations for promoting rest and action.

4. Devices for promoting efficiency of sensory functioning, such, principally, as lighting, acoustics, and textures.

From the specializing engineers, these means of satisfaction proceed into applied form. But and hereon depends the consistency of the whole organic structure—these satisfactions must be jointly applied in the same proportions of respective importance as their causes, man's physical wants.

The comprehensive understanding, from physiology to applied engineering, entailed in such a technique of co-ordination, is our first argument for a specializing agency, the Organic Technician.



So far, we have traced the logical growth of Organic Structure to the limits justified by elementary physical causes. We have avoided all complicating esthetic considerations until certain of their relationship to the physical.

The relationship of the physical and the esthetic is found to exist, and its character disclosed, by a second analysis of the nucleus, Man.

This time our method involves procedure from physiology to elementary psychology. Its logic is the most important phase of the argument, because it indicates a sound method of bridging the worst fault of architecture—loose association of Science and Art.

The workings of the complete neural system have been very logically reduced to physical processes by the late Doctor Leonard T. Troland, psychologist, and others. Their wellsubstantiated "Dynamic" theory of psychology is, in brief, much as follows:

All primary, subjective and objective, neural activity is accompanied by a secondary activity. This latter is a constant cross index of advice, favorable, neutral, or unfavorable, and respectively termed positive or negative.

Since the energy exciting the neural system has been found to abide by certain of the laws governing electricity, let us adopt an electrical analogy. Let us assume that a transformer having two windings is coupled to two circuits. The first of these is an open circuit excited by external currents. The second is a closed circuit with a fixed current, such as a battery. But this second circuit is so reflexed that its excitation is partially "fed back" into the first circuit. Now an external current may be of two types. First, that which is in phase with the current of the battery circuit, in which case the "feed-back" coupling will cause the intensity of the entire excitation to build up with time; second, that which is of opposite phase to the battery current, in which case the fed back excitation will tend to suppress or cancel the external current.

Let the fixed battery current represent the normal psycho-physiological balance of man. External currents represent physical needs (deflections of the organism from its median of balance). The circuits represent neural channels and the transformer represents the brain or nerve centre.

Then primary neural activity is accounted for by the first and second circuit; secondary neural activity by the reflex coupling. The circuit would appear to remain inactive except while stimulated by external currents, our familiar wants. Then the augmented or suppressed activity would be of intensity proportional to the time it lasts.

But in our electrical analogy we inevitably have to allow for more or less core-saturation of the transformer. This means that extended or exceptional excitation of the same phase will cause an *opposite phase* charge in the presumably inert transformer. This will discharge back into the circuit, suppressing its cause while that lasts. Its slower rate of discharge may result in its outlasting the cause. In that case it would appear as a favoring or suppressing tendency for later external currents, favoring their opposite phase and suppressing their similar phase. After the cause had ceased it might also appear as an independent internal or tertiary excitation of opposite phase to its cause.



Our complete neural systems act very much in this way. Both favorable and unfavorable primary and secondary intensity builds up to a certain level and then suffers a relative decrease when the time is further extended, exactly as though opposed by a tertiary activity that has been slower in accumulating.

This accounts for the four characteristics of Man that comprise the esthetic wants:

I. Acclimatization or decay of interest in the attendant.

2. Antipathy for the customary.

3. Favoritism for the different.

4. Appreciation of the abstract.

The first three either accompany a physical cause or follow closely enough upon its heels to be analyzed through such cause. But the fourth may be the accumulated aftermath of many physical causes, and too remote from them to be traced directly. Yet it is the most important to us, because it represents non-physical, or artistic, wants.

It must be understood that this fourth effect, after discharging into the neural system, excites it in the same manner as a want, but since it originates in the brain, or the transformer, is untraceable to subjective cause and must remain an unnamed, or undiscriminating, want.



The more promptly our wants are satisfied, the more insistent becomes the unnamed, esthetic want.

Thus a relatively constant dissatisfaction is the basic force motivating Man, our nucleus of Organic Structure. If it were not so he would merely fluctuate about his median of wellbeing. But-and this is the most encouraging conclusion-as it is he is constantly impelled to something better and even the median is pulled to a higher level.

The obvious conclusion is that the physical and the esthetic are definitely related; the former is the cause of the latter effect. The time involved in deriving physical satisfactions is literally the measure of the esthetic want.

We have only to find out what will satisfy an esthetic want.

The esthetic want, being an after-effect, may be making its demand for satisfaction in the total absence of physical want. Hence a physical satisfaction would be an excess, unfavorable and unsought. The only satisfaction that will meet esthetic requirements is one of physical appearance but no physical effect. It must be as purely mental as the want. Only promotion of others' well-being, and esthetic self-enjoyment, meet the conditions.

Benevolence and art are the means of esthetic satisfaction.

This second analysis of Man is within the accepted realm of the psychologist. His findings are the material assurance that the work of the designer and artist are not merely related, but essential to complete Organic Structure. Such findings also conclusively indicate that the importance of esthetics, in relation to the physical, will be apparent in analysis of the time intervals involved in physical satisfaction. Furthermore, that esthetic want may be controlled by regulation of such time intervals.

The esthetic means of satisfaction that clothe the skeleton of Organic Structure may now be reduced to applied form as:

1. Devices for temporal change of environment.

2. Devices for mental, sensory, and physical recreation.

3. Artistic presentations. These must be applied in proportion to the intensity of the esthetic want, as measured through physical activities, and thereon also depends the consistency of the entire Organic Structure. This carries the understanding required of the co-ordinating agency from physics through to esthetics.



In summary of the second phase of our argument, we have shown that only an architecture proceeding from the occupant can produce a logical environment for him-Organic Structure. If this is the only logical procedure it must be the most direct. By progressive analysis of the occupant we have shown that, from the physical to the esthetic, from Science to Art, such structure can grow consistently because a definite relationship exists. We have shown that the structure must comprise physical satisfactions as required by physical wants, and esthetic satisfactions as required by esthetic wants. These must be co-ordinated in structural effect as they are related in human cause. We have made obvious the necessity for a coordinating agency and the extent of his requirements.

PRACTICE

It only remains for us to point out our reasons for saying that the technique of Organization is the immediate privilege of the architect.

By necessities of space we have so far generalized in treatment of the subject. But, as we have said that no two men are exactly duplicate, so, in practice, no two organic structures are likely to be the same, for each is the effect of its cause, the occupant.

The first move in architectural practice of Organization is to segregate the occupant, collective or individual, for particular analysis. The analysis is carried out in consultation with a physiologist and psychologist. Their conclusions become the property of the specializing engineers. The products of these are turned over to the designer and artist. When the housing stage has thus been reached, the structural engineer formulates support, and the architect designs the mass.

But we have not forgotten the envelope, Economics. The requirements of the outer world and their social reflections in the occupant combine as the result of a second analysis of Man in general. Then reversely down the line of development outlined above these specific restrictions are applied.

This is the order of practice whereby the law of Organization, Consistency, may achieve an Organic Structure. It is neither impractical nor remote. It is both logical and available to the architect.

In "The Neglected Sense," the first article of this series, the importance of consistency in psychological considerations was brought out by a discussion of acoustics.

In "Fair Weather," the second article, the importance of consistency in physiological considerations was brought out by a discussion of means of maintaining the body's thermal balance through air conditioning.

In "Material Vision," the third article, importance of consistency through physical considerations was brought out by discussion of the reactions of the eye to light and color.

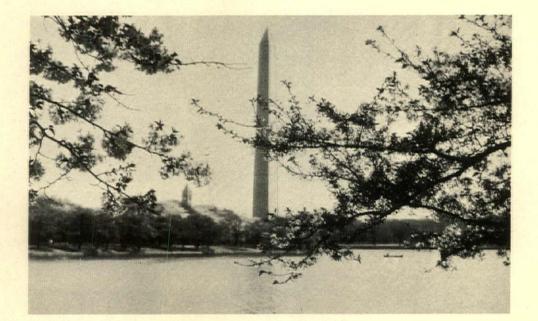
In each of these consistency alone has indicated logical improvements.

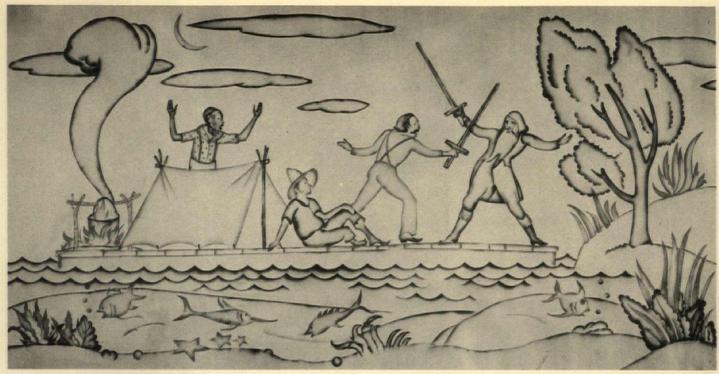
The purpose of this article has been to prove the importance of consistency in the co-ordinating of each phase of every field for production of a logical architecture.

The reader, who may now consider applying the theories advanced in the first three articles to the same interior, will realize that Consistency has acquired a tangible, useful meaning. He will have a real conception of the possibilities inherent in Organization.



Note.-The author wishes to express his gratitude to those who, by generous act and encouragement, have been much more than sources of reference: Erastus Root St. John, M. Am. Soc. C. E.; Vesper A. Schlenker, acoustical research engineer; Harold L. Hadden, electrical engineer; Wallace D. Van Etten, architectural designer; Perry West, air-conditioning engineer; Dr. Leonard Greenberg, School of Public Health, Yale University; Dr. C. P. Yaglou, Professor of Industrial Hygiene, Harvard University; Dr. W. J. McConnell, A. S. H. V. E.; J. W. Barker, Dean, School of Engineering, Columbia University; H. E. De Andrade, illuminating engineer; A. L. Powell, Chairman, I.E. S. Committee on Light in Architecture; Alston Rodgers, illuminating engineer; Dr. C. E. Ferree, Wilmer Ophthalmological Institute, Johns Hopkins University; Dr. J. A. Jastrow, psychologist, New School of Social Research; Dr. L. P. Herrington, psychologist, John Pierce Foundation, Yale Univer-sity; Dr. D. A. Laird, Director, Psychological Laboratory, Colgate University; Thomas Wilfred, artist in light; Gifford M. Ryder, artist; Edna M. Treadwell, medical technician.



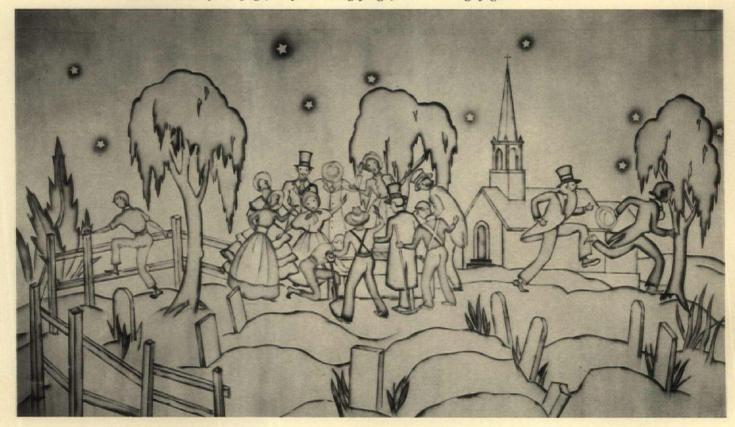


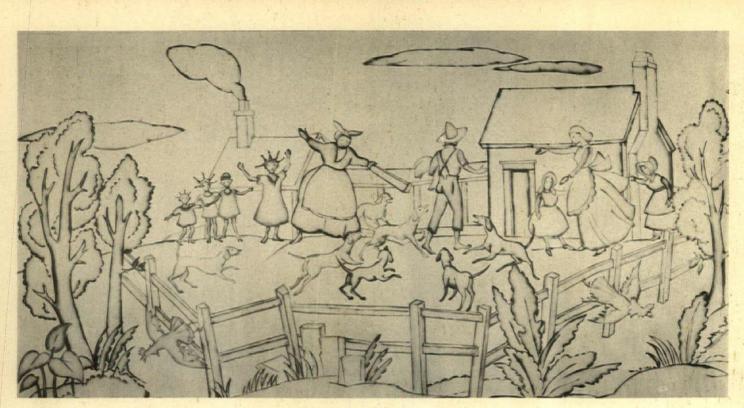
Photographs by Peter A. Juley & Son

The Adventures of Huckleberry Finn

Painted by D. Putnam Brinley

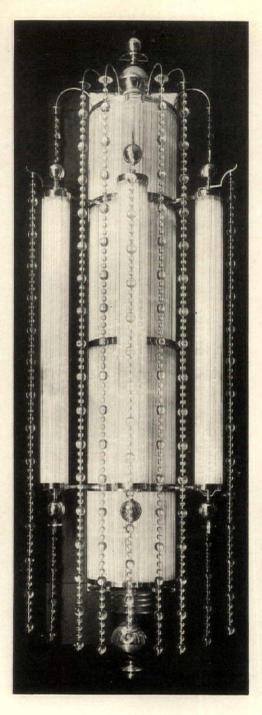
Mr. Brinley's murals are on the walls of a cafeteria in the new Home Office Building of the Metropolitan Life Insurance Company, New York City, for which D. Everett Waid and Harvey Wiley Corbett were the architects. Mr. Brinley had a large area to cover in a short time, and developed a new technique involving the use of cutouts, along the edges of which he painted with an airbrush. The series is marked by a freshness and naïveté that is evident from the portions here reproduced, handicapped as they are by our failure to reproduce the color. The incident represented above is: "The king and the duke got out a couple of long swords made out of oak laths and begun to practice." At the bottom of the page, "By the living Jingo, here's the bag of gold on his breast!"





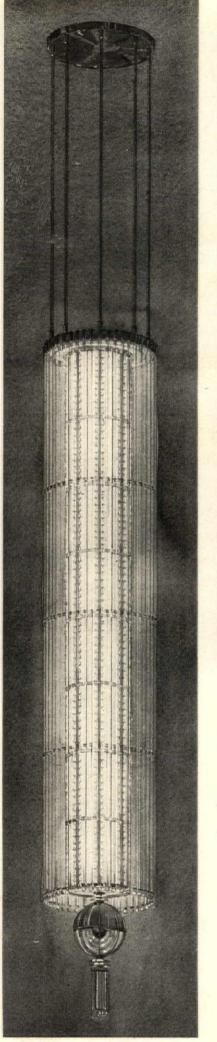
"It's you at last, ain't it?"

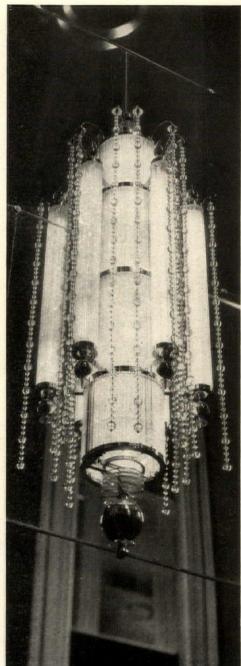




Lighting Fixtures

In the centre, one of the large chandeliers in the grand foyer, International Music Hall, developed by the architects: Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Fouilhoux, in collaboration with Edward F. Caldwell & Company, Inc., who executed the work. The total length of this fixture is about twenty-nine feet, and there are many intricate provisions, neces-





Photograph by Samuel H. Gottscho

Rockefeller Center

sarily, for safety from falling and from glass breakage. At left, one of the side-wall bracket fixtures in the main foyer, and at the

At left, one of the side-wall bracket fixtures in the main foyer, and at the right, the same fixture in place, engaged on a mirror surface. There is a Viennese sparkle in this fixture, modern and functional as it unquestionably is in its combination of heat-resisting glass and chromiumplated metal





The new Parliament Buildings for Northern Ireland, built of Portland stone on a granite base. Sir Arnold Thornely, architect

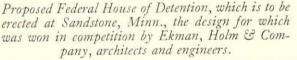
Architectural News

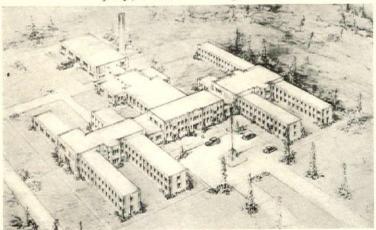
Preliminary perspective of the proposed United States Customs House and Appraisers Stores Building, to be erected at Second and Chestnut Streets, Philadelphia. Ritter & Shay, architects





At left, one of the two new wings of the Toledo Museum of Art, recently opened—a bequest of the late Edward Drummon Libbey. Above, the 1500-seat concert hall, a modernized version of a Greek open-air theatre. Edward B. Green & Son, architects





A perspective drawing of the Insurance Company of North America Building, in lower Manhattan, now in course of construction. Shreve, Lamb & Harmon, architects



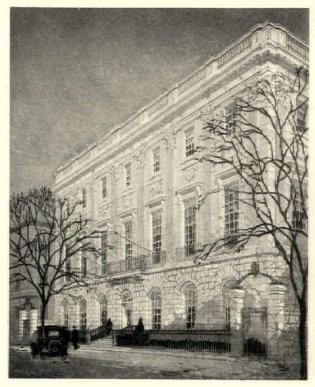
≪ ARCHITECTURE ≫
 154



Steel construction has been begun on the new Federal Reserve Bank Building, 10th and Chestnut Streets, Philadelphia, which will be an addition to the present structure. Paul P. Cret, architect

in Photographs

A preliminary perspective of the United States Legation and Consular Building, Ottawa, Canada. Cass Gilbert, architect. The drawing was made by John T. Cronin





The Hall of Religion for the Century of Progress Exposition at Chicago, to contain exhibition space for various denominations. Thielbar & Fugard, architects





Above, the new home of the Worcester Art Museum, Worcester, Mass., William T. Aldrich, architect. Below at the left, is a view in the interior court of the same museum



Munger Hall, a new dormitory being built at Wellesley College, and to be run on a co-operative basis. William T. Aldrich, architect

« ARCHITECTURE »
155

HARVARD CITY PLANNING STUDIES. IV. Urban Land Uses. Amounts of Land Used and Needed for Various Purposes by Typical American Cities. An Aid to Scientific Zoning Practice. By HARLAND BARTHOLOMEW. 174 pages, 7 by 934 inches. Illustrations from drawings. Cambridge, Mass.: 1932: Harvard University Press. \$3.50.

Here is another and particularly timely volume in the Harvard City Planning Studies. Mr. Bartholomew has a real genius for probing into the facts and trends of city development, on which facts many national schemes of city planning, or even mere zoning, should be based. The book, indirectly, is a powerful argument for making a city plan based on facts first, and art afterwards.

ROME OF THE RENAISSANCE AND TODAY. By SIR RENNELL RODD. 304 pages, 6½ by 934 inches. Illustrated with drawings by HENRY RUSHBURY. Printed in Great Britain. New York: 1932: The Macmillan Co. \$5.

Dealing in the main with Renaissance and post-Renaissance Rome, and more particularly with the rapid and drastic changes in the city during the last fifty years. Mr. Rushbury's drawings are well worthy of a place in the architect's office for themselves alone, even if they were not accompanied by Sir Rennell's authoritative text.

ENGINEERING: A Career—A Culture. A Message to Young Men, to Parents and Teachers. 61 pages, 6 by 9 inches. Illustrations from line drawings. Pamphlet binding. New York: 1932: The Engineering Foundation. 15 cents.

A pamphlet prepared by the Education Research Committee of the Engineering Foundation, outlining the professional functions of the engineer, his various spheres of action, his training, his obligations, and his rewards.

- COLUMN CURVES AND STRESS-STRAIN DIAGRAMS. By WILLIAM R. OSGOOD. 12 pages, 6 by 9 inches. Illustrations from graphs. Research Paper No. 492. Pamphlet binding. Washington: 1932: U. S. Department of Commerce, Bureau of Standards. 5 cents.
- THE VILLAGES OF ENGLAND. By A. K. WICKHAM. Foreword by M. R. JAMES. 52 pages, 6¼ by 9 inches. Illustrations from photographs and line drawings, with large geological map. Printed in Great Britain. New York: 1932: Charles Scribner's Sons. \$3.75.

A companion volume to Basil Oliver's "The Cottages of England," and a well-rendered survey which divides England into "Chalk and Clay," the limestone belt, the western midlands, the southwest, and the north, with particular reference to the materials which the local builders used, and the types which arose therefrom. The illustrations ar numerous and beautiful.

CHURCH ARCHITECTURE: Building for a Living Faith. By FRANK BRANNACH. Preface by JOSEPH HUSSLEIN. 266 pages, 53/4 by 81/2 inches. Illustrations from photographs and drawings. Milwaukee: 1932: The Bruce Publishing Co. \$3.

The author writes for the priesthood and clergy particularly, as well as for the architect and layman, sketching the main outlines of ecclesiastical architecture in the past with emphasis upon the necessity of utilizing trained architects in our church building of the present day.

RECOMMENDED MINIMUM REQUIRE-MENTS FOR SMALL DWELLING CON-STRUCTION. Report of the Department of Commerce Building Code Committee. 107 pages, 6 by 9 inches. Illustrations from diagrams. Pamphlet binding. Washington: 1932: U. S. Department of Commerce, Bureau of Standards. 10 cents.

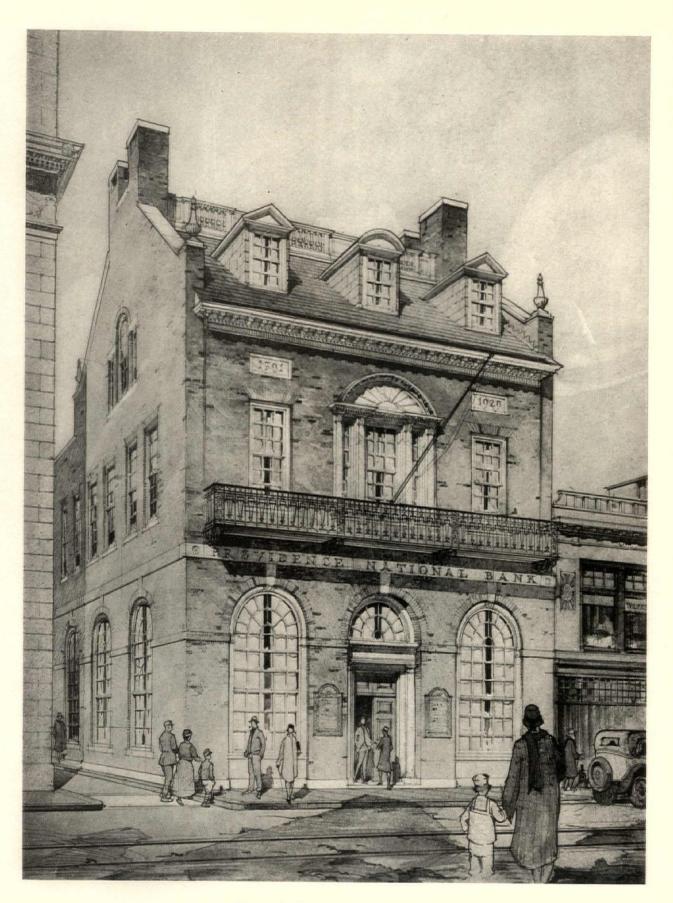
A revision of a report first issued in 1922, brought up to present-day practice.

THE CATHEDRAL OF PALMA DE MAL-LORCA. An Architectural Study. By RALPH ADAMS CRAM. 16 pages of text and 24 pages of plates, 93⁄4 by 123⁄4 inches. Illustrations from photographs and measured drawings. Cambridge, Mass.: 1932: The Mediæval Academy of America. \$5; to members of the Academy, \$4.

Doctor Cram laments the lack of authoritative material relating to this, "one of the most original and significant of Gothic cathedrals, as well as one of the largest." The measured drawings—one regrets that these could not have been reproduced at much larger scale—were made by Thomas T. Waterman, Thomas Phillips, and Charles Walsh.

HORIZONS. By NORMAN BEL GEDDES. 293 pages, 8 by 10¹/₄ inches. Illustrations from photographs and drawings. Boston: 1932: Little, Brown & Company. \$4.75.

Norman Bel Geddes is so facile in his means of presentation that the present reviewer, at least, is instantly put on the defensive. Whether the design is for an air liner, a bathroom scale, or an aerial restaurant, the presentation is always so immediately convincing that one feels an obligation to probe further into the skeleton and the intricate functioning of the creation. Unfortunately, too few of these creations of his have been executed. The refreshing stimulation of Bel Geddes's designs are largely due to his uncanny ability to view the problem objectively and with a lack of prejudice impossible in those more intimately concerned with its everyday study. The book, as its title indicates, is a look into the future over a foreground of varied achievement.



Howe & Church, Architects

Providence National Bank, Providence, R. I.

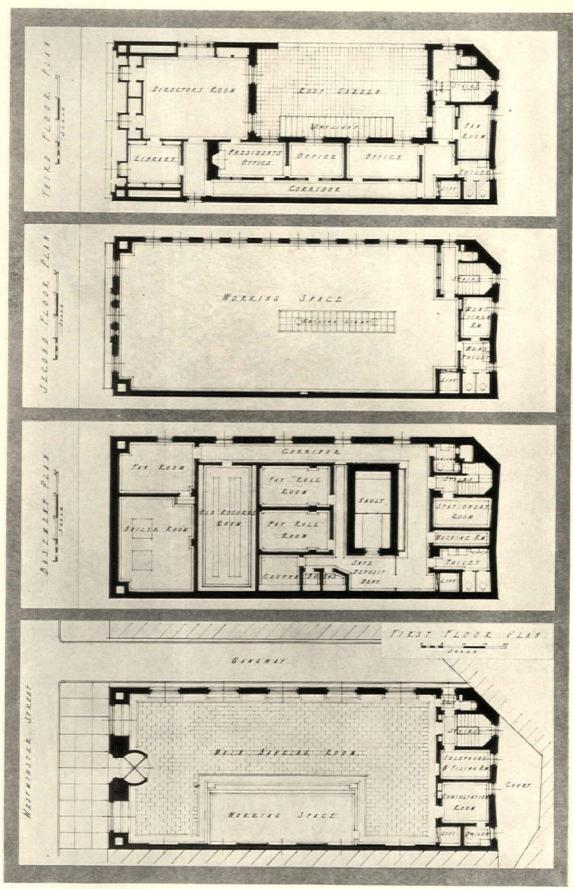


The exterior of the bank is of red brick with white marble trimmings, roof of black slate, and balcony of cast and wrought iron. On account of the narrow street on which the building stands, it is difficult to photograph; for that reason the exterior is shown by means of the architects' perspective.

In the banking room the floor is of marble, the woodwork of teak, and the metal railing on top of the low counter screen is of dull bronze

The murals in the main banking room, several panels of which are reproduced on page 160, represent the early industrial and commercial history of Providence. They are by James Monroe Hewlett, assisted by Charles Gulbrandson

> « ARCHITECTURE » 158

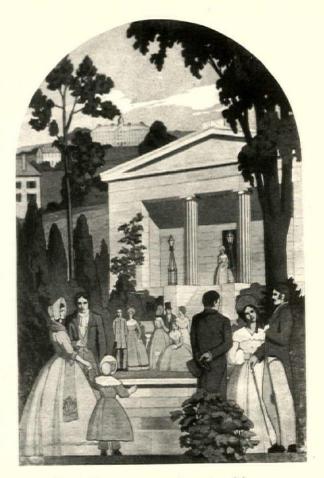


Plans of the first floor, basement, second floor, and third floor

PROVIDENCE NATIONAL BANK, PROVIDENCE, R. I. HOWE & CHURCH, ARCHITECTS

« ARCHITECTURE »





Murals in the main banking room, Providence National Bank, Providence, R. I., painted by James Monroe Hewlett, assisted by Charles Gulbrandson





 ≪ ARCHITECTURE → 160

Monday, January 2.- The papers are out with a scheme for an elevated highway around Manhattan, backed by all the weight of such names as those of Magonigle, Cross, Tilton, Kahn, Levi, Waid, and others, which really should be sufficient guarantee to make one cheer for the scheme without further examination. And yet I cannot help feel that this scheme, good as it is, com-pletely ruins Battery Park, which, even under the present régime of neglect, is a feature of Manhattan that seems worthy of preservation. I should think the elevated highway might cross the lower end of the island a little farther up-town, say near Canal Street, leaving the old Battery undisturbed. We have a habit, it seems, of reviling those who built elevated roads in the past generation, tearing them down whenever it is possible-and then conceiving new and more elaborate elevated roads for this generation to build.

Wednesday, January 4.—Robert D. Kohn tacks a picturesque title to the new steel houses resulting from largescale production, "zipper houses." He points out, as others have done, that the hope for better housing does not lie solely, nor even in large part, in decreasing costs of production. Some of the houses which have sold in the southern section of Brooklyn for about \$5,200 actually cost in work and material \$1,900, though the profit on these houses was not inordinate. The difference was swallowed up by other elements, by carrying charges, streets, financing, and so forth.

Friday, January 6.—Evidence is accumulating to bear out the contention of many leaders that we have been piling up a real shortage of housing space. Just as during the war we dammed up a reservoir of housing needs which burst upon us afterwards, so now we have built up another reservoir of large proportions. Here are the approximate totals of building in round billions, showing what has been happening. 1925, $6\frac{1}{2}$; 1926, $6\frac{1}{2}$; 1927, $6\frac{3}{4}$; 1928, $7\frac{1}{4}$; 1929, $6\frac{1}{4}$; 1930, 5; 1931, $3\frac{1}{2}$; 1932, $1\frac{1}{2}$.

Saturday, January 7.—Apparently President Hoover's rearrangement of Federal bureaus may fail of acceptance. Nevertheless, some such scheme as he has proposed for a division of public works seems logical, if not inevitable. This means that a division of public works would bring together the work now done in the Office of the Supervising Architect of the Treasury Department; of work on rivers and harbors heretofore directed by the Army Engineering Corps; and public roads, at present carried out by a bureau of the Department of Agriculture. With the consolidation of the government's building activities there would be still greater opportunity of utilizing public building



The Editor's Diary



as a balance wheel in our national economic progress.

Monday, January 9.-Lucian E. Smith, one of those architects who, having at the moment nothing in particular strong enough to hold him here last summer, took a car with him abroad for the purpose of adding to his knowledge of Europe, and particularly of rural England. He came in today, and is most enthusiastic about Liverpool Cathedral, having spent a whole month in its otherwise rather drab city, seeing the Cathe-dral at all hours and in all lights. His enthusiasm was mainly for the interior, which to him is second only to Chartres in its spiritual uplift. I was rather surprised to learn that the stone of which Liverpool Cathedral is built is a decided pink, which weathers to a brownish gray.

Wednesday, January 11.—The New York Chapter, American Society of Landscape Architects, is trying to move the national wheel off its dead centre by offering:

"To every property owner who will give men, now unemployed, work on his property at the rate paid by the local unemployment bureau, to the amount which would pay ten, or more, men for six days, a member of this Chapter will give a visit of consultation or supervision for the direction of the men's work without charge, except for necessary travelling expenses, and will give an additional visit for every similar amount so expended."



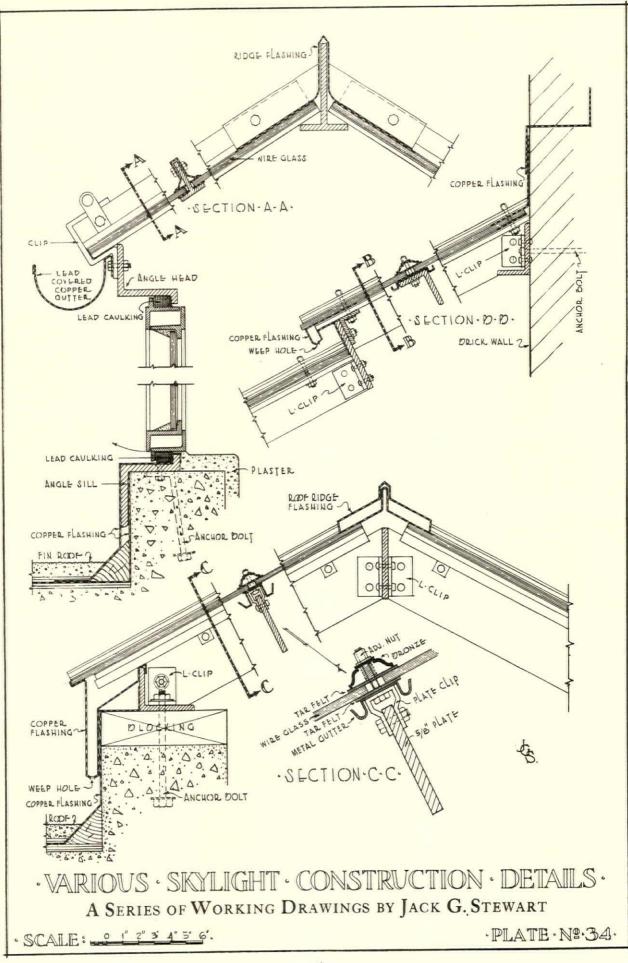
Thursday, January 12.—W. Duncan Lee up from Richmond, Va., telling me of the joy he had had in working for the past three years on the rebuilding of

Carters Grove. The unending series of revelations, coming almost daily, concerning the origins, the idiosyncrasies of workmen, the unusual uses of materials, in connection with this James River mansion, built early in the eighteenth century, must be one of the most pleasurable experiences that can come into an architect's practice. The interior wood-work of Carters Grove is thought by many to be the best in Virginia, and the problem of maintaining it undamaged when subjected for the first time in its history to artificial heat, was one of the major problems. Carters Grove, until the present renaissance, never could have been really warm and dry inside of its thick brick walls. Mr. Lee hopes to avoid shrinkage and cracking of the great pine panels through unusual care in insulation, in concealing amply protected radiators, and, perhaps what is best of all, by maintaining the temperature for a year or more at not over sixtyfive degrees—a price the owners are quite willing to pay. Incidentally, Mr. Lee succeeded in equipping the old house with seven bathrooms and a complete heating plant, without removing any of the panelling. Once removed from its original supports, panelling is rarely, if ever, returned intact.

Friday, January 13.-Harry F. Cunningham, professor of architecture, University of Nebraska, is going to conduct a small and select group of young architects, artists, and other human beings about Europe next summer. The party sails from New York on June 17, going to Liverpool first, to Chester, to Oxford, to London, to Winchester, and across the Channel from Southampton. At Le Havre they take a big bus and circle around part of France, including five days in Paris under the additional guidance of some of the local architects, who will show them all the new sights-and perhaps some of the old ones. Thence the party has a five-days' rest and conference at Oetz in the Austrian Tyrol, passes on down the Rhine, crosses Belgium and sails back from Antwerp. Gene Robb, of 55 West 42d Street, is managing the business end, and the cost is \$400, all of which is almost as good as reading next year's seed catalogue.

Saturday, January 14.—Here's a crusade I'd like to join. Ely Jacques Kahn is chairman of a committee just organized to awaken the public to a need for better ventilation in railway and subway trains, street cars, buses, taxicabs, and private automobiles. Personally I think if they succeed in improving conditions only in the first two, the crusaders will deserve the thanks of most of the present population and of that to come.

Monday, January 16.—The 1930 census picked up a lot of information, some of which is interesting, some not so much



Максн, 1933

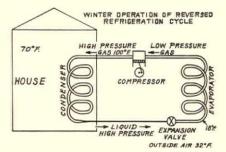
so-as for example, how many families have radios. The figures on rents and on values of owned homes are significant. Of the 10,503,386 owned non-farm homes in the United States, the median value is \$4,778-18.1% valued under \$2,000; 33.4% between \$2,000 and \$5,000; and \$5,000; and \$5,000; and \$10,000; and \$10,000; and \$10,000; and \$10,000 or over. There are more rented non-farm homes than those owned-12,351,549, for which the median rent is \$27.15. These figures vary widely for the State, the median rent in three Southern States being under \$10, while in New York it is \$41.94. In spite of the inroads made in recent years by the apartment-house, 76.4% of all American families still live in one-family dwellings. Here is an interesting comparison-the percentages of home ownership, classified by color and nativity, are as follows: for all families, 46.8%; for native whites of native parentage, 48%; foreign and mixed parentage, 51.6%; foreign born, 51.8%; and Negroes, 23.9%. Homes having telephones run from 84.2% in Iowa to 3.8% in Louisiana.

Tuesday, January 17.-I had the pleasure of seeing today Thomas H. Benton's murals in one of the upper rooms in the Whitney Museum of American Art. It really does not seem proper to call these murals-to my mind a mural is a quiet, unassuming background that is rather flat in color and not at all insistent upon the story, if any, it has to tell. Benton's paintings, called "The Art of Life in America" do not fit this definition of a mural. He has a lot to say, and says it boldly and convincingly. The paintings are called, "Murals for a Reading Room." I doubt whether anyone could read in that room-the paintings are far more vociferous in demanding attention than any reading matter could possibly be. One who goes into the Whitney reading room will do well to leave all printed matter behind. An-other traditional characteristic of the accepted mural type is scale, and here again Benton has jumped to a scale that makes the room itself seem puny and inadequate. The paintings, if they have the strength of appeal for others that they had for me, will eventually demand another room, an adequate room.

Wednesday, January 18.—Edwin B. Morris, Editor of The Federal Architect, paid us a luncheon visit at The Architectural League today. Even living in the midst of the steadily growing mass of government buildings in the Capital, and thereby being able to absorb their bulk and magnificence gradually as they are being built, he seems to be uncertain as to the ultimate result. Once more I find myself asking whether we are building another Rome in Washington, a Rome which by reason of its vast areas and overwhelming piles is going to be depressing rather than inspiring.

Friday, January 20.—Thomas T. Waterman, joint author with the late John A. Barrows of "Domestic Colonial Architecture of Tidewater Virginia," dropped in today on the first lap of a trip abroad which will take him to Spain, and finally to dwell indefinitely in Malaga. The island of Majorca seems to have attracted so many artists and architects as a solution of the present problem of living that it is, I hear, becoming overcrowded. The American bar and the contract bridge parties may ruin it in a very short time. Waterman thinks that Malaga, on the other hand, is as yet unspoiled.

Monday, January 23.—The Westinghouse engineers are working on an interesting phase of combined heating and cooling. W. C. Goodwin is directing the research, which has not yet reached a stage where it may be commercially employed. The scheme is shown graphically in the accompanying diagram.



Vapor from the outside evaporator is compressed, thereby raising its temperature. Flowing through the condenser indoors, the gas becomes a liquid, radi-ating heat. Reaching the expansion valve in the circuit, pressure of the liquid refrigerant is so reduced that it boils, and, in vaporizing, makes the evaporator cooler than the outside air. Heat, therefore flows from the outside air to the refrigerant, and the vapor is again drawn off by the compressor to complete the cycle. The scheme, while seemingly a paradox in that heat is brought indoors from a cool air, seems to be theoretically sound. Since the heat is not generated. but merely transferred from outside to inside the house, there is a high degree of efficiency obtained. The electric current consumed in pumping produces three to five times as much heat indoors as if the same electricity were directly converted into heat. Of course, this system, if sufficiently developed, serves for both winter heating and summer cooling, since the process described above is no more nor less than reversed refrigeration. In the summer the equipment would absorb heat from inside the house, pump it to the outside, and discard it.

Tuesday, January 24.-A. Lawrence Kocher and Albert Frey have gathered together some material for exhibition at The New School for Social Research. The thesis presented is that architecture, both in America and abroad, is in a transition period, to which we will all agree. The material shown in the exhibition compares very instructively an overdecorated theatre interior, for instance, with a clean functional one. The two make the obvious point that it is foolish to overload with ornament surfaces that, if not altogether out of the range of vision, are certainly not the focal point for which the interior was constructed. The comparisons, of which this is but a sample, are convincing, but when further exhibitions fall almost exclusively into the purely functional type of thing-boxlike structures of glass and metal-it seems to me that in striving to be functional they lose at least one of the essentials of building, which is beauty. As has been said, it is not enough for a building to satisfy the demands of shelter, light, air-conditioning, acoustics, circulation, sanitation, and the like; it must also satisfy man's demand that he be given a pleasing environment. There are other ways of making this environment pleasing than by overloading most of the structure with meaningless decoration, of course, such as we did a generation ago, but in his present state of development I think it is not achieving a pleasant environment if we merely place man in a box of steel and glass and let it go at that. Architecture is not living up to its name if it is merely a machine in which to live.



Wednesday, January 25 .- Dropped in at the Museum of Modern Art to see a chronologically arranged exhibition of Chicago's contribution to modern architecture as developed by Major Jenney, Richardson, Sullivan and his school, Burnham and Root, Holabird and Roche during the period 1870-1910. I think this is the first time that so complete a presentation has been made with the actual photographic evidences of buildings that have long been forgotten, if not entirely overlooked. The story of the illustrations is a graphic history of the displacement of self-supporting masonry walls by the steel skeleton frame and its curtains, a story of such historic significance in architectural history as to deserve being put into a comparatively permanent record between book covers.

Incidentally, Whistler's portrait of his mother is still here, loaned by the Louvre. It is going, I believe, to San Francisco, Toledo, and, for this coming summer, to the Art Institute of Chicago, where it may be seen by visitors to the Fair before it goes back to the Louvre in the fall.





By gilding the principal lead lines of this stained - glass window, the D'Ascenzo Studios and Zantzinger, Borie & Medary sought to emphasize the structural quality of the design, and create an effective decoration, both in transmitted and reflected light. The window is in the chancelof St. Paul's Church, Chestnut Hill, Pa.



Stained Glass for Night and Day

Some Pitfalls in Supervision By W. F. Bartels

M tin, iron, lead, or copper. The superintendent must check the materials to see that they comply with the specification

as to weight and gauge. Specifications for tin or iron often call for painting on the underside, while copper and lead do not. When laid on the roof the sheets, of course, should have a good bearing, so that any subsequent walking on the roof will not bend or injure the metal. If a copper-bearing iron or steel is used, it should bear the stamp of the manufacturer and also one showing the amount of copper contained. Tin sheets should be uniformly coated with tin. Copper, of course, should be the soft variety, leaving the hard copper only for leaders, gutters, etc. The soft sort will suffer much less fatigue" due to expansion or contraction. Seams that conform to a good specification and conscientious supervision will result in a watertight roof.

In addition to wood shingles there now are those of metal, asbestos, and various compositions. All of these must be properly laid if they are to perform satisfactorily. Improperly done, the work will cause great distress. In shingling, nails should be used that will not be affected by the weather. And, it might well be added, care should be taken that there is no ground work provided for electrolysis by having copper nails in zinc flashing, nor zinc nails on copper roofing. Then too, copper nails should be distinguished from copper-clad nails, which are really only copper-plated. Zinc flashing should not be allowed to come in contact with a copper gutter or vice versa.

Slate roofs, while now little used in the cities, have not lost their picturesqueness, and are in demand for country and suburban homes. Slate roofs should be well flashed and the superintendent should see that the slates are properly nailed. They must not be left loose nor yet nailed so tightly so as to be squeezed, because this will cause the slate to split when the temperature rises. Obviously the nails must be long enough so that they penetrate the wood at least an inch. The nails should of course be of nonrustable material.

Composition roofs are generally laid on

XXIX. ROOFING AND SHEET METAL (CONTINUED) wood or cement foundations. In any case the surface should be cleaned thoroughly before the laying of the roof fabric is started. The superintendent should see that the first layers

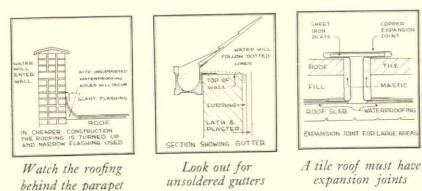
are securely nailed down in the case of a wood base. If the base is concrete it will be swabbed with pitch or tar, and into this will be rolled the first layer of felt. On top of this first layer will be added the others. The number of layers should be carefully checked against the specification, as well as the amount which each sheet should overlap. Successive layers should be well-rolled and brushed into the pitch. If the weather is cold there should be no lengthy expanse of pitch left to cool before the felt is rolled into it. The method generally used is to cut several lengths of felt, swab the pitch on the roof and then "walk" them down. This usually consists of one man taking two or three steps to make sure that the felt is stuck in as many places. Such a method does not insure the felt being in close contact at all points, particularly in cold weather. The argument is then advanced that "the heat from the other layers will penetrate the lower ones and cause the pitch to stick to the felt." The superintendent may convince himself of the folly of this practice if on a cold day he will pull up several layers after they have been laid down thus. However, by rolling the felt out and sweeping it down with a broom, a good job may be obtained. Any spongy roof should be condemned because the chances are all in favor of its eventually leaking. Sponginess is caused by small airpockets and shows conclusively that the pitch is not binding the sheets of felt together. No felt should come in direct contact with another sheet of felt. If pulled up, individual layers should clearly demonstrate that pitch has been well spread between them. Where the felt turns up against the wall it is well to see that it fits snugly into the right-angle intersection, and does not form a curve against the wall with resultant air space, unless this space is filled with a solid puncture-proof material. Of course, if this curve is desired, blocking may be used to obtain it. Otherwise an unsupported roofing material cove will be a certain cause for leaks when some one walks too close to the wall.

EXPANS

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MASTIC

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If the roof is to be walked upon the top sheet should present a tough, wearable surface. If slag or gravel is used, a final thick layer of pitch is the usual prescription. If the roof is flat and tile is to be used, the superintendent must see that the proper number and kind of expansion joints are used. Expansion joints should be used around the entire edge of the roof, and of course no area greater than four hundred square feet, nor a distance longer than twenty-five feet, should be laid without a proper joint. After the tile has been laid this joint will be cleaned down to the pitch and a good grade of pitch or a stiff mastic used to fill the voids. These joints will take care of the usual roof size, but if a large area is covered it is better to make larger joints of metal as shown on the accompanying sketch. The superintendent should inspect the laying of the roof tile closely. He should have the day's work to end on a beam, or preferably on an expansion joint. If this is not done a noticeable crack will show up later where each day's work was stoppedand there will probably be a crack showing up along the beam line anyway.

A fill to which a topping is added is often put down for the tiles to be laid upon. The screeding of this topping must be checked to see that there is enough pitch and that it is in the proper direction so that the water will flow off properly. If cork or other similar material is used for insulation it must be laid smoothly and be all of uniform thickness. Failure in this respect will result in small pools forming on the roof after a rain. When the final check-up is made the roof should be looked over for puddles and for any other evidence that the roof does not drain properly. Such places can generally be discovered even several days after a rain, as the dirt and sediment is still visible even though the water has evaporated. Chipped or cracked tile should of course be removed and replaced with perfect ones.

Flashing is one of the most important items in a building and vet its entire execution is often left dependent upon the tinsmith's ability and integrity. True, this man may be experienced and know how to do his work thoroughly, but it seems a long chance for a superintendent to neglect this important supervision. Flashing may be zinc, galvanized iron, copper, lead, and,

on the more expensive jobs, lead-coated copper. The latter has an added advantage of protection against the acids and gases prevalent in the atmosphere of large cities. Lead more nearly matches gray stone work, preserves its original color, and prevents copper salts from discoloring the stone work. Where the top of a sidewalk vault is flashed to a building, scrupulous attention must be given to the work. The flashing must be well attached to the waterproofing fabric, and the metal run through the wall and turned up on the inside of the wall at least three inches above the top of the finished sidewalk. In fact, turning it up five inches will do no harm. The tinsmith is prone to regard such a margin as a waste of money-to turn up flashing to that height when the water will more readily go under or over the saddle of a door if present, rather than flow uphill over a three-inch turnup. Also, when the flashing is being run, there is generally no finished sidewalk laid, by which the amount of flashing turnup may be judged. Hence, it is better to have the flashing an inch or two above the required height than to have it below the top of the sidewalk. Then too, it is much more satisfactory, if there is a leak, to know that you must look for it at a door opening, rather than to tear out many running feet of decorated walls before discovering its origin. It is always advisable to use a soft metal for flashing, since there is less danger of its breaking under the continuous bending due to expansion and contraction. If the superintendent is "on the job" and watches the details carefully there is no excuse for a leak at the saddle of any door. But if there is, it is a sign of poor workmanship, construction, or supervision-generally the first named. The sheets of flashing should be soldered to one another. After being turned up on the inside, care should be taken to see that they are not subsequently beaten down by accident.

(To be continued)





HOUSE OF HERBERT ALLEN, JR. LOS ANGELES, CALIF.

> ROLAND E. COATE, ARCHITECT

The profession as a whole continues to marvel at the restraint and the courage which moves the Southern California architects to produce asymmetrical façades that, on the drawing-board, must appear of questionable success, but which, in the final setting, so seldom fail of achieving beauty

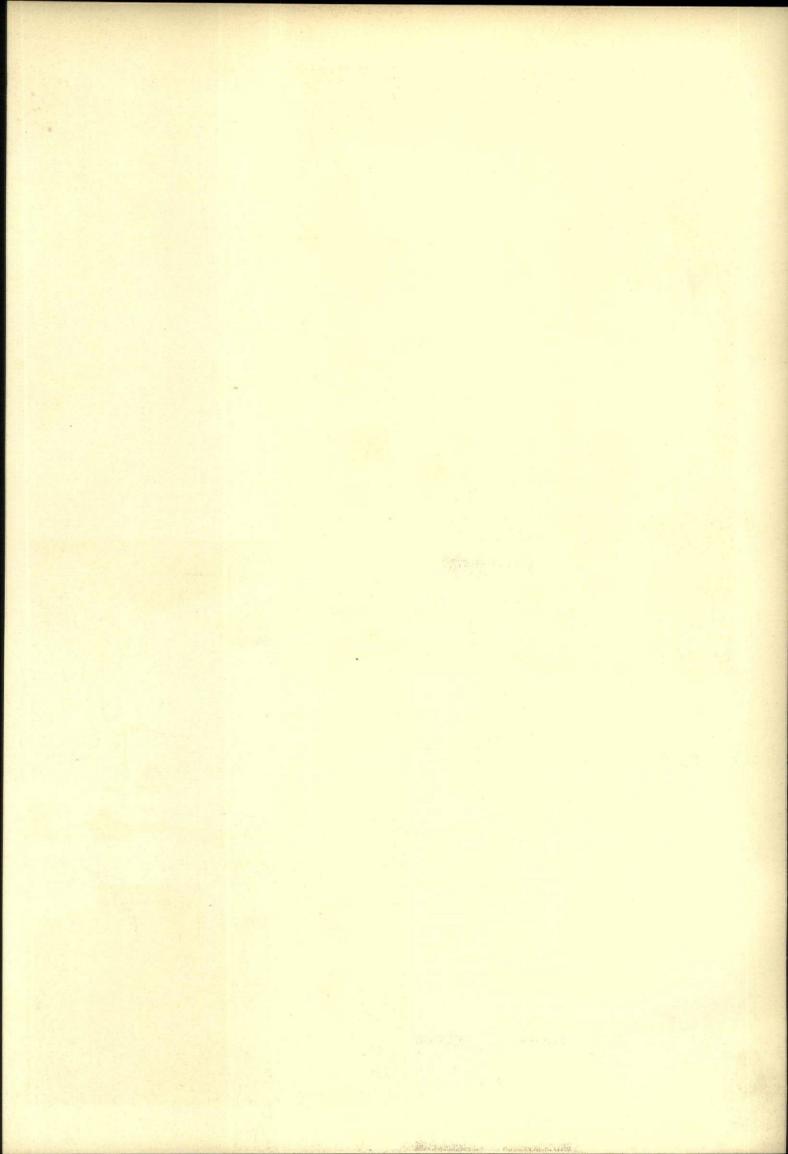
167

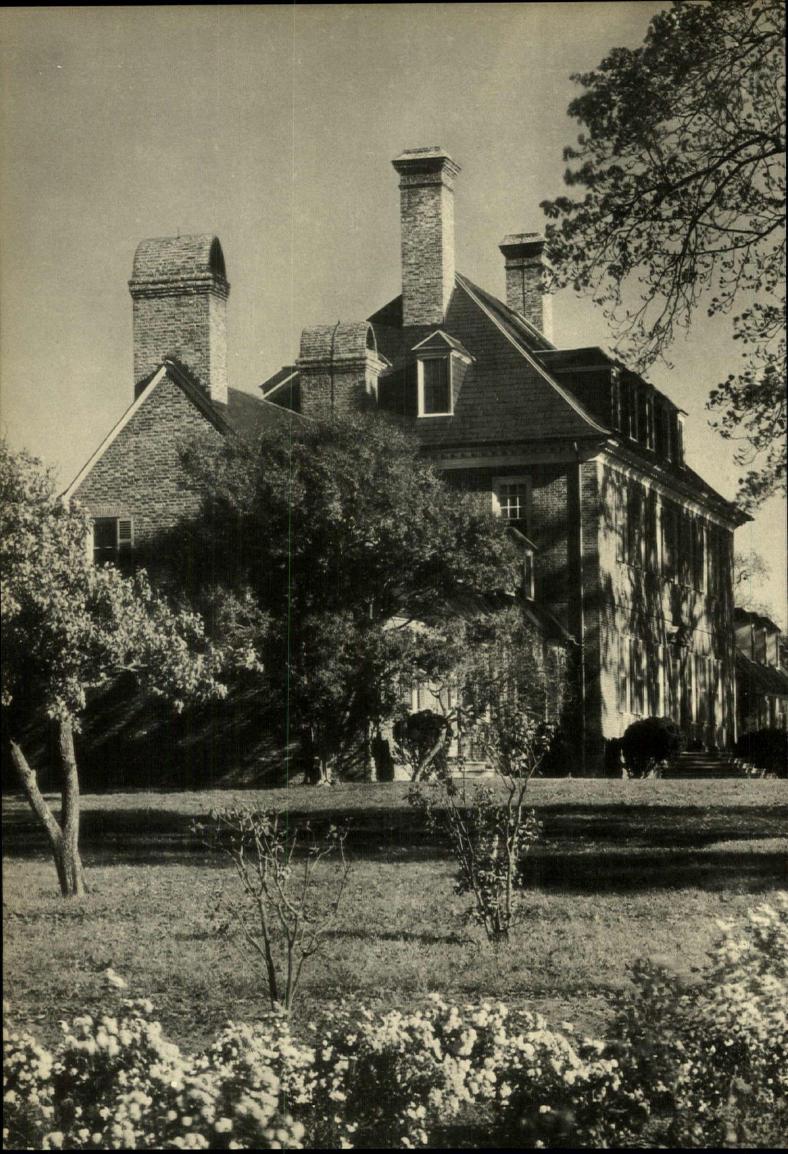


Below, a corner of the living room in the Allen house, bringing indoors some of the feeling for strong contrasts and broad, unbroken areas that mark the exterior

To those who would say that planting, sunlight and shadow are responsible for half the success of Southern California architecture, we would reply that the architects have learned the foils for that wealth of sun and luxuriance : the unbroken wall area of stucco or painted brick, the proper overhang for tile-edge shadows, the drawing closely together of house and its garden so that the two become one







ARCHITECTURE

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The Renascence of Carter's Grove

ON THE JAMES RIVER, VIRGINIA, NOW THE HOME OF MR. AND MRS. ARCHIBALD M. McCREA

By W. Duncan Lee

Photographs by Robert W. Tebbs

STARTED to head this "The Restoration of Carter's Grove," but I feel that the word "restoration" has been stretched far out of shape and I don't want to start an argument right at the beginning. An old building can be and should be faithfully restored, and left at that, if it is to be used for museum purposes solely, but if a person buys an old house, pays a lot of money for it, and intends to use it as a year-round home, he is not going to be satisfied to take his bath in a tin foot-tub and go to bed with a candle in one hand and a warming-pan in the other just for archæological reasons.

So, the job has got to be a "restoration plus," and the plus is a great big part, like the plus in those cost-plus contracts. What is there must be brought back to its original condition. What has been destroyed must be replaced in keeping, and the whole preserved for the future. This we may call "restoration." Where enlargements are absolutely necessary, a precedent of the period should be found and followed, and while this cannot be truthfully called a restoration as applying to this building, it is still a restoration of a condition of the time as shown by other examples.



Where the building is to be adapted to modern living conditions, much equipment must be installed for which no provision was made in the original structure, and this is where the "plus" comes in. In the first place, this whole establishment contained only four bedrooms. It's true there was a large up-stairs hall, bigger than any of the bedrooms, but you just can't sleep 'em all over the floor now as they did in old times. Then, too, there had to be room for some baths and closets without cutting up the original bedrooms. This wasn't so bad, though, for there was a space of twenty-five feet between the main house and the wings on each side; this had to be filled in anyhow, to bring the kitchen in touch with the dining-room and to make the office of use as part of the house.

This kind of a gap between the house and wings never existed in Maryland. The houses there, of the same period as Carter's Grove, were built in five units, and the idea began seeping into Virginia from the Maryland border toward the close of the eighteenth century, as evidenced in Woodlawn in 1799. If Burwell, of Carter's Grove, did not intend from the first to connect up his three units, it is very probable he would have done it eventually if he had not moved from here to Carter Hall about the time Woodlawn was built.



The Burwells started their building operations just at or before the beginning of the eighteenth century, with the erection of the building which later became the kitchen wing. Some years later, the owner stepped off one hundred and twenty-two feet due west and built another building exactly like the first, and it later became the office wing. From this we believe he knew at the time just what size building he would erect between the two as his main dwelling. We might be justified in going further and assuming that when he recovered from his third building operation, he would go on and connect the three units up, as has now been done, with a stretch to the whole of a little over two hundred feet from end to end.

Anyhow, filling those gaps helped to provide much additional space, but what was still needed was all those things which man has been



The river front, which looks out upon the James under the protection of the two giant tulip poplars. The present additions to the old mansion are the connecting links between end buildings and the main house

able to devise in the past two hundred years for his own comfort and satisfaction and which we now call "modern conveniences." To provide these with the minimum of disruption to the original work and still preserve the atmosphere of an eighteenth-century house was a real problem, and something which I think we have accomplished. Even more important than the additional room and modern conveniences, however, was to make certain of the structural safety of the building, to overcome two hundred years of deterioration, to safeguard against further ravages of time, and, as far as possible, to secure protection from fire; and all done with the least possible removal and no injury to the original. Of course, this could have readily been done by taking down all panelling, removing all plaster and taking up floors, but to do this

where it could be avoided seemed a sacrilege. However carefully old panelling may be removed and replaced, in the doing something is lost that cannot be recaptured.



The problem here, then, became one of four parts: First, enlargement; second, structural restoration; third, period restoration; and, fourth, modern equipment. The owners and I visited the property several times before the purchase was made, and since the possibility of enlargement in keeping with the period was one of the conditions of purchase, this was fully discussed and agreed upon so that the first set of sketches, with minor changes, was ac-



The little end building in the foreground—the kitchen wing—was the earliest of the group. Some years afterwards the other end building was built, directly in line with it, and finally the main house. Possibly Carter Burwell intended a group of three buildings, but just as probably he might have eventually linked them together

cepted. Thus, the first part of the problem was practically settled. On the same visits, an attempt was made to determine what structural restoration was needed, but this, so far as the main house was concerned, was impossible, since no structural members were exposed except in the cellar. The office wing, on which no repairs had ever been made, and the kitchen, were in bad shape except for the walls. A connection between the main house and kitchen had been built some twenty years ago. This we did not like and decided to replace. The examination in the cellar of the main house showed all timbers so rotten from one to three inches on the bottom that they could be pinched off with the fingers, and a worse condition where these went into the wall was suspected. But the house was such an exceptional architectural ex-

ample, so adaptable to the owners' requirements, and so ideally situated, that the purchase was decided on.

As to the period restoration part, the first visit to the place settled that. Even the terrible walnut and mahogany stains, high-gloss varnish, and china-white enamel could not hide the beauty of that panelling. The detail so closely followed the Georgian oak rooms of the time that I felt convinced that the builder, brought over from England to do the work, had carefully selected his wood and did not intend it to be painted or stained. The great temptation was to order, at once, carloads of varnish remover and dozens of painters and get down to the surface of that mellow old Virginia pine that we knew was there. But somebody remembered that the plumbers and steamfitters were yet to



The dining-room, the woodwork of which is in old ivory—all the original panelling. When the present restoration was contemplated, the fireplace had been bricked up. For this interior and others shown in the following photographs the decorating was done by O. E. Mertz & Company

come, and varnish was a good protection from greasy finger prints, so this had to wait; but eventually we were rewarded with a revelation of even greater beauty than we had suspected.

As to the fourth part of the problem, well, there was a fair-sized family and there would be plenty of guests, so there had to be baths and lots of them—not makeshifts, but real baths with all the trimmings. Heat everywhere, twohundred-foot run of pipes and eight floor levels, and, to save that panelling, automatic control for every radiator. Electric lights of course, 'phones most everywhere, electric refrigerators, electric cooking, insulation, etc., etc. It began to look as if we had bought four walls, a roof, and some lovely panelling, and somewhere under and between these we had to hide a lot of things that Burwell got along without and never missed.

In three years of slow and painstaking work, it was done, and there are eleven bedrooms, seven baths, ten other rooms, a subcellar heating plant and a super-attic storage space. The equipment is as complete and the house, I believe, is as structurally sound as if it had been built entirely new. No panelling was removed from the walls for the purpose and only a few floor boards taken up, but every pipe, radiator, wire, and even electric switch, is completely hidden. Except for the thermostats



This is the New Room, added by W. Duncan Lee to join the main house to the old office building, the interior of which may be seen through the doorway at the left. Here, too, the woodwork is old ivory

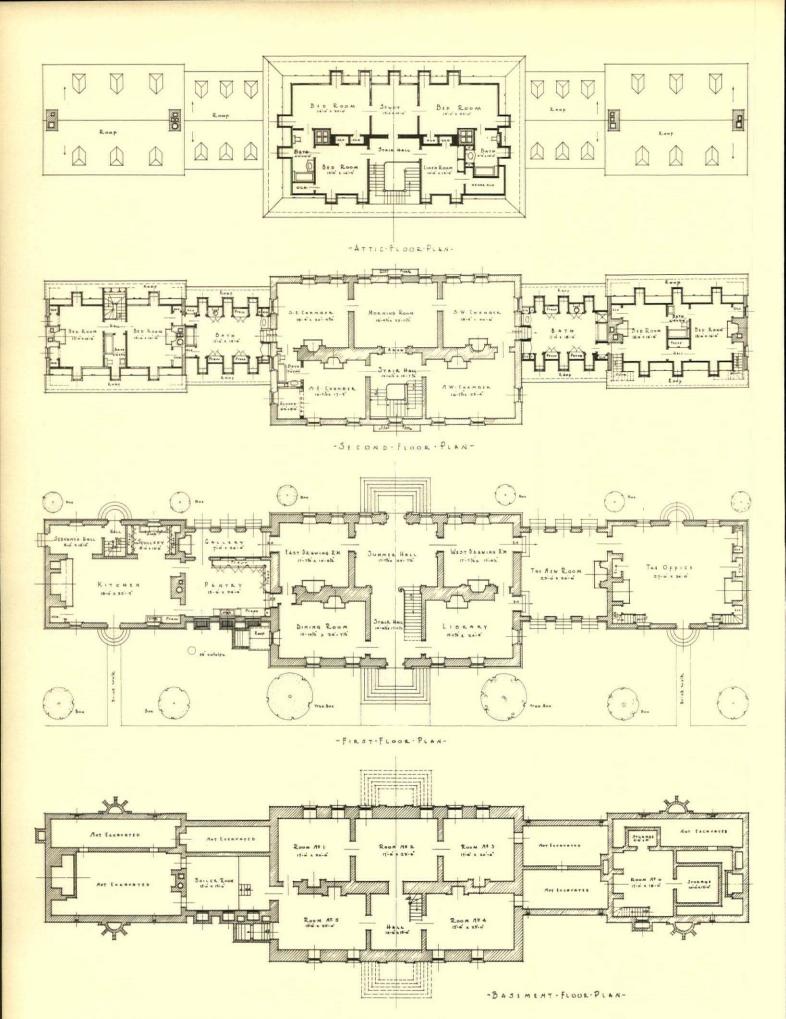
and electric bulbs in the fixtures, there is nothing in evidence that was not there in the early part of the eighteenth century.

The purchase of the property was made just before Christmas, 1927. Survey and plans of existing buildings were started January 2, 1928, and sketches were completed and approved January 27. Working plans were completed February 28, 1928. Before plans were completed, arrangements had been made with a builder, himself an expert mechanic and craftsman, to take charge of the work at the site on a salary basis. Work was started March I, with a small picked force which was increased as required. All carpentry, painting, and miscel-

« ARCHITECTURE »

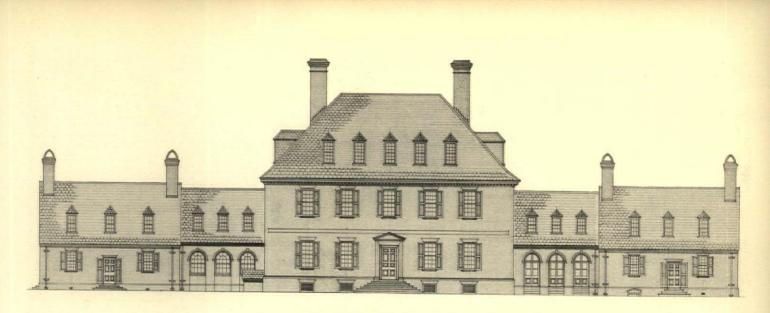
laneous work was done by selected men, all payrolls and bills for material being approved by the foreman, superintendent, and architect, and then paid by the owner. Separate specifications were prepared for each trade, and bids were taken and contracts awarded as their work was needed. This method avoided many changes and consequent extras after contracts were awarded. No sub-contractors were allowed to do any cutting into old work.

On completion of the three years' work, it was found that the entire amount paid out for overhead, profit, and administration on construction work was a fraction less than five per cent of the cost of the work.



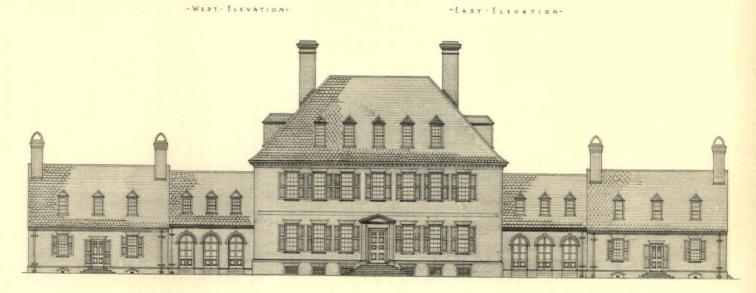
Floor plans of Carter's Grove on the James River as restored, 1928–32, for Archibald M. McCrea by W. Duncan Lee, architect

190



-/ ORTHOR LAND · ELEVATION.



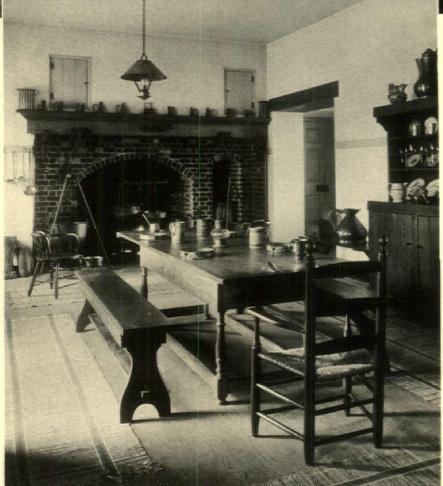


-SOUTHOR-RIVER-ELEVATION-

Elevations of Carter's Grove on the James River as restored, 1928-32, for Archibald M. McCrea by W. Duncan Lee, architect

191





The hall. The stair treads and risers are of pine, the treads having a walnut nosing nailed on, and these countersunk nail heads are covered by plugs of holly or box in five different designs

The kitchen. Mr. Lee built the fireplace and chimney on the original foundations. There is a curious local custom to be observed here in the heavy timber lintel over the corner opening, this timber carrying a brick wall

« ARCHITECTURE »

The West Drawing-room. The panelling of pine had not been painted until 1907. It has in the present restoration been cleaned off and left in the original natural finish. The marble is the original, probably brought over from Italy

The East Drawing-room. Floor and panelling of pine are entirely the original work. The flooring, incidentally, is of boards 1¼ to 1¾ inches thick, square-edged, dowelled not nailed—to joists

« ARCHITECTURE »

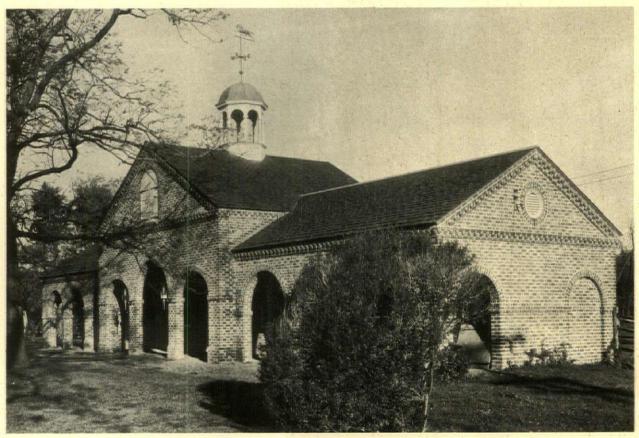
193



Interestation of the



Above, Mr. McCrea's Room, formerly the office. The fireplace is original, but not the woodwork. The large portrait is of Governor Spottswood, an ancestor of Mrs. McCrea's. Below, the riding stable. This is entirely new, but Mr. Lee has used old brick and timbering throughout. The roof is of slate





Photographs by Gabriel Moulin



Chinese Y.W.C.A. Building, San Francisco, Calif.

JULIA MORGAN, ARCHITECT

Above, a general view of the building with its main entrance. It is one wing of a larger residential hotel building of the same organization, the walls of which may be seen above the wing roof. At left, the hallway, looking towards the main entrance on Clay Street. The color scheme is in green and red; the floor, concrete painted while still damp.



Detail of the east tower and roof composition. The nearer roofs are of handmade tile, the walls of brick and cast stone



A corner of the patio, with its little fish pond. The wall tile above this pond are of a fish-scale pattern in green



The entrance lobby in which the color scheme includes a Chinese green, lacquer red, gold and blues. The posts are in red, the ceiling red and green, with stenciling in gold and blues—all lacquered ≪ ARCHITECTURE ≫ 198

The Creation of a Telephone Building

NORTHWESTERN BELL TELEPHONE SYSTEM'S MINNE-APOLIS UNIT AND SOME OF THE UNUSUAL PROBLEMS PRESENTED TO THE ARCHITECTS, HEWITT & BROWN

◎是◆天◎ EARLY every architectural comya mission brings its ©¥&ã© own particularly individual problems, and the Minneapolis Telephone Building had rather more than its share of difficulties. On the site were: one threestory building, one five-story building, and one nine-story building, all used by the Telephone Company to a degree of intensity measured by its need for a much larger structure. It was required of the architects to design and supervise the erection of this new building without disturbance of the existing service-even to the extent of keeping noise from reaching the operators, dust from delicate mechanism, and jar from the myriad electromagnets of the switchboards. To further complicate the



Above, the first rough sketch for the building. Below, the three existing buildings on the site, to be replaced by the building shown in outline

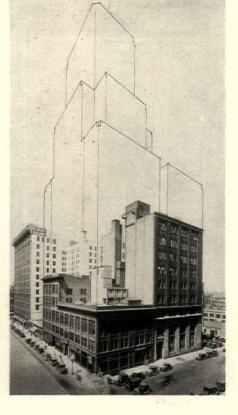
situation, the job was erected during one of the hottest summers on record in that section of the country, and at the height of the building activity the telephone service was further burdened by a large convention, straining the long-distance department to the limit.

The three- and five-story buildings lacked adequate strength and ceiling height, and could not be remodelled. During the War, anticipating the advent of the automatic system, the Northwestern Bell Telephone Company entered upon a building programme which contemplated covering the entire site. Certain building laws and height restrictions at that time prevented them from building more than nine stories; a portion of a building was built on the north side of the lot

*

A photograph showing the progress of the work on June, 2, 1931





A photograph showing the progress of the work on July 27, 1931



to the extreme height then permissible. Wartime restrictions also exercised a decisive influence on the contemplated layout. Finally in 1928–29 the problem of needed expansion was again taken up, and after months of close study the new building was started in the spring of 1930.

As now built, this building is twenty-four stories in height with thirteen stories over the entire property, which is 132 feet by 157 feet, surmounted by an eleven-story tower having two setbacks. There are three basements. The height of the building, however, is equivalent to that of a thirty-story office building. In designing telephone structures, a minimum allowance of 12 feet 6 inches clearance is made for those floors which are to house equipment as compared with a ceiling height in the ordinary office building of from 10 to 101/2 feet. The strength of the building is such as to carry 150 pounds live load to a square foot, as compared with the ordinary building with its capacity of about 75 pounds per square foot.

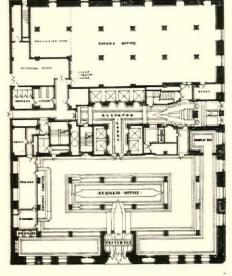
In order to comply with the ordinances and to permit operation within the nine-story building without interruption, it was necessary to build the new structure in five units as follows:

Unit No. 1. That portion of the new structure, up to the height of the nine-story building, on the area occupied by the three-story building.

Unit No. 2. Structure of corresponding height on the area occupied by the five-story building.

Unit No. 3. New structure in the space occupied by rear stairway and chimneys of the nine-story building.





Plan of the first floor

Progress of the work on August 25, 1931

Progress of the work on October 30, 1931

Unit No. 4. New structure within the space occupied by the elevators and lobby of the ninestory building.

Unit No. 5. That part of the new structure from the tenth floor up over the entire area.

In order to provide sufficient exits with stairway and elevator accommodations at all times for the personnel in the nine-story building, it was necessary to erect the fundamental structure of Units No. 1 and No. 2 and install temporary elevators and stairways in them before wrecking that portion of the nine-story building in which Units 3 and 4 were constructed.

Provision for three basements under the entire structure also presented several interesting problems. It necessitated the demolition and removal of all the basement walls and floors and the footings under the two old buildings and further excavation to a depth of 42 feet below the surface of the street with column footings extended to a depth of 22 feet below the third basement. This placed the bottoms of the caissons for the footings 10 feet below the surface of the Mississippi River above the dam.

Outside of the nine-story building 45 caissons were blasted through rock to that depth and a seam carrying a veritable underground river was encountered a short distance below the river level. To complete the sinking of the caissons below this level necessitated pumping from 1,000 to 1,500 gallons per minute continuously. Incidentally, many interesting and some rare fossils were found in strata from 40 to 50 feet below

street level.

Another of the problems encountered in the work of excavation was the terrific street pressure exerted on the



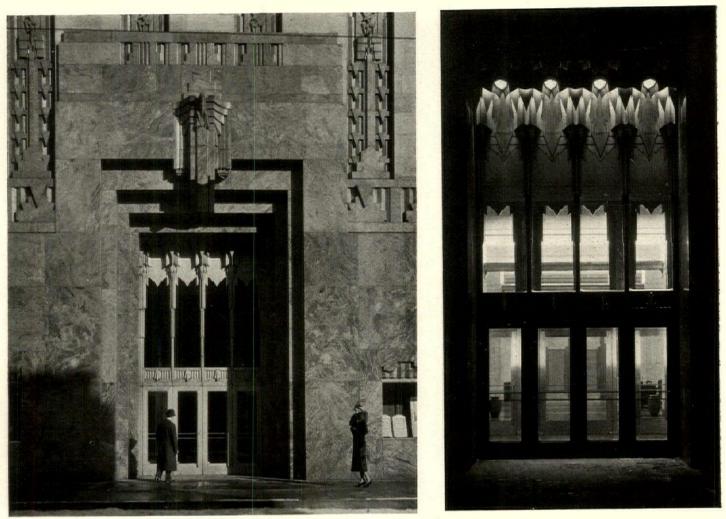


The completed building with its twentyfour stories, thirteen of which cover the entire plot of 132 by 157 feet. There are 237,000 square feet of usable space in the new building as compared with 116,000 in the old buildings. There is a main entrance on Fifth Street and employees' entrance on Third Avenue

Photograph by Howson

« ARCHITECTURE »

201



Photographs by Howson

A detail of the Fifth Street entrance to the public quarters, as it appears by daylight and at night

street side of the pit. This was solved by open cribbing so spaced as to permit the placing through the apertures of the column footings and steel work.

One of the interesting developments on this subject, also, was the use of delayed charges of dynamite in excavating. Because of the danger of interruption and impairment of telephone service by jarring or vibrating the thousands of sensitive relays in the equipment housed by the nine-story building, it had been decided to do all excavating through the rock strata by the "plug and feather" method—a much slower and more expensive method, ordinarily, than blasting.

It was found that by detonating several small charges of dynamite at intervals of fifteen seconds, the same results were obtained without damage to the equipment in the adjacent building. A satisfactory gas exhaust system was devised, enabling the builders to use the delayed charge method in sinking caissons for five additional column footings under the occupied ninestory building.

Another interesting construction feature was presented by the refacing of three sides of the nine-story building, replacing windows with new to conform to the new design, all without interfering with the delicate equipment or the operations within. All the above, including the riveting of four additional stories immediately over the long-distance toll rooms, was accomplished without damage or annoyance to the operators. Temporary partitions were erected inside the wall lines on all floors for their protection, these partitions heavily insulated with hair felt, between the faces and around the sides. A temporary system for providing fresh air throughout the rooms was installed. Despite the high temperatures, the presence of dust outside the partitions, and the noise of riveting machines and other equipment, the operators reported very little disturbance throughout the work.

The stripping and refacing operations proceeded from the top down. Two hanging scaffolds were erected two stories apart. The lower scaffold was used for stripping the old walls and removing the old windows, and the upper one for setting new steel windows and laying new stone ashlar. Before the work was begun all the windows, glass, and stone were on the job. Progress was made at the rate of one story stripped and refaced each week.

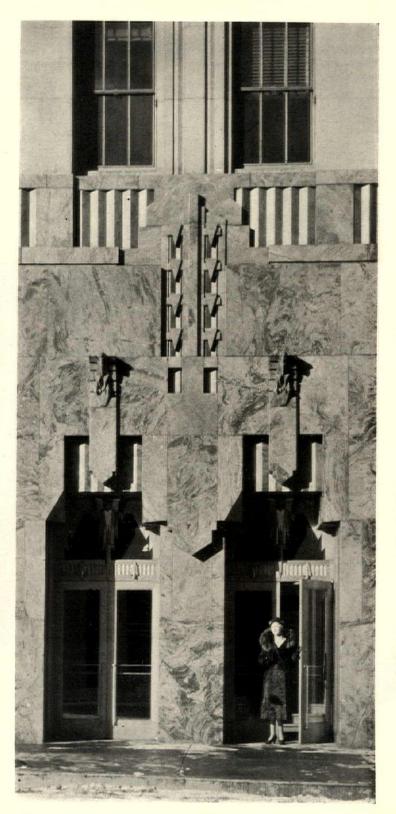
The usual procedure of placing compensation insurance was departed from considerably; the owner insisted upon a single policy for all workman's compensation and public liability insurance covering all the crafts and trades on the entire job, the premiums being billed to each organization in proportion to its pay roll. The insurance company assigned a safety engineer to the job, who worked in close co-operation with the resident organization in maintaining safe working conditions. A safety committee was set up consisting of representatives of the owner, the general contractor, the architect, and the insurance company. This committee met weekly to discuss suggestions and plans for the prevention of accidents and the general maintenance of safe working conditions, and short regular



The employees' entrance on Third Avenue, as shown in the photograph above by night, and at the right, by day

Photograths by Howson

weekly meetings were held with all the foremen, so that the necessity of always keeping on the lookout for carelessness was kept before them. There were no unusual or novel protective devices used but as a result of these efforts, which were an innovation on construction work in this area, the record was very encouraging. According to the figures of the insurance company, the losses sustained were 70.5 per cent of the losses normally experienced for an equivalent volume of pay roll based upon the normal Minnesota level.





Photograph by Howson

Detail of the upper part of the tower

« ARCHITECTURE → ²⁰⁴

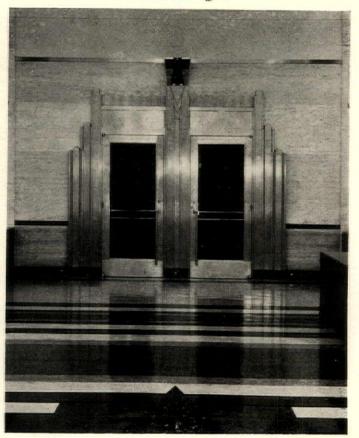


The central part of the elevator bank on the main floor as seen from the lobby leading into the business office

Detail of the mail box in the elevator lobby

Double entrance to the elevator lobby from the business office







Photographs by Lowson

One end of the business office, showing the payment counter backed by the cashier's office and tellers' space, with public telephones at the left

Below, a view lengthwise in the business office, with the main entrance at the left, and the payment counter directly ahead. The lighting, it will be noticed, is indirect, from the aluminum troughs near the ceiling



 ≪ ARCHITECTURE ≫ 206







Making shop drawings of full-size details as derived from the architect's drawings. All full sizes, of course, are measured with a terra-cotta shrinkage scale—13 inches equal 1 foot

The Making of Terra-cotta

A PICTORIAL REVIEW OF THE MAIN OPERATIONS INVOLVED IN ITS PRODUCTION AS PHOTOGRAPHED BY F. S. LINCOLN IN THE AT-LANTIC TERRA COTTA COMPANY'S PLANT AT PERTH AMBOY, N. J.

In the model-making shop. Plain units such as ashlar blocks or simple cornice details can be profiled in plaster of Paris. Small ornaments, as rosettes, modelled in clay, can be attached to the plaster model

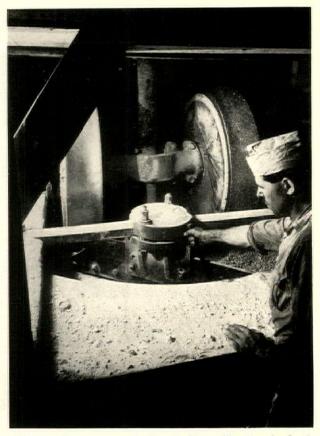


In the moulding shop. From the original models plaster moulds are here made. From these moulds an almost unlimited number of terra-cotta units can be manufactured, if desired

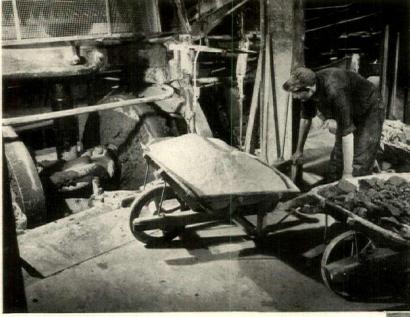




In the modelling studio. Here all ornamental details that depart from plain surfaces are modelled by sculptors or skilled modellers, to be approved by the architect before moulding



Here is the process of grit grinding. Previously fired clay is ground to grit, technically known as "grog," and this is added to the terra-cotta clays in order to control shrinkage



Clay milling. The clays are selected for definite physical properties such as plasticity, for instance, and are accurately combined to exact formula. About one-third of the mixture is grit

« ARCHITECTURE »



208



Clay milling again, where the clay is extruded and carried away on an endless belt. A workman cuts the continuous band of extruded clay into pieces that can be handled more easily



The pressing department. Here the plastic clay is pressed into the plaster moulds. The clay walls are usually about one inch thick with webs to give the necessary strength and stability

Going into the drying tunnels. The pressed pieces remain in the mould until the clay stiffens, due to a slight drying, then the pieces are "finished," and placed in these drying tunnels

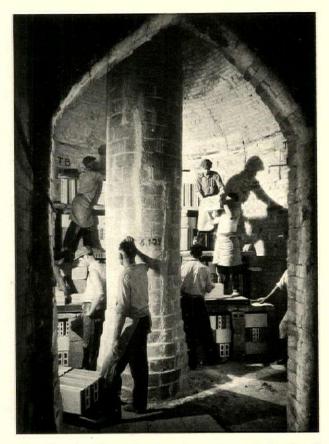


In the spraying department where, by means of compressed air, the exposed surfaces of the terra-cotta are covered with the ceramic mixture or "slip" which, in the firing, develops the desired color or glaze

209

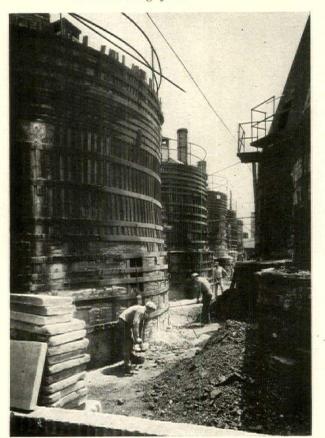


In the polychrome department, where the colors are applied by hand brush or air brush directly to the clay surface. Abbochrome colors are a mottled combination of three or more tones applied simultaneously



Loading the kiln. The clay pieces are carefully placed in large kilns which are of the muffled type. That is, the flames and combustion gasses pass through flues without touching the terra-cotta

Firing the kiln. The heat is gradually increased until the temperature reaches 2300° F. Then the fires are dropped and the kilns are allowed to cool, causing a slow annealing of the terra-cotta



After firing, the terra-cotta is temporarily assembled, the joints being squared and cut to proper alignment or size. Here each piece is numbered to denote its position in the building





Photographs by Samuel H. Gottscho

The Architectural League's 48th Annual Exhibition

GOLD MEDAL IN ARCHITECTURE.-To Henry R. Shepley, of Coolidge, Shepley, Bulfinch & Abbott, for the New York Hospital. This award is made for the orderly arrangement of the many and varied parts of an unusually complex problem, and the excellence of plan and originality of the design.

GOLD MEDAL IN ARCHITECTURE.-To Thomas Harlan Ellett for the design of the Cosmopolitan Club, New York City; a fresh and personal interpretation, beautiful in its simplicity of form and material.

GOLD MEDAL IN DECORATIVE PAINTING .-Thomas H. Benton for his decorations in the Whitney Museum in recognition of the freshness of his viewpoint, the vigor and mastery of his technique, and the authentic originality of his work.

GOLD MEDAL IN SCULPTURE .- To Leo Friedlander for the distinguished and monumental qualities shown in the studies for the Arlington Memorial Bridge Equestrian Groups, and for the originality in his work as displayed in its relation to architecture. GOLD MEDAL IN LANDSCAPE ARCHITECTURE.-

GOLD MEDAL FOR DESIGN AND CRAFTSMANSHIP IN NATIVE INDUSTRIAL ART.—To Joseph Urban for No award. his model of a stage setting for a religious pageant and play. The award is for excellent craftsmanship

and design used in a dramatic manner and in keep-

ing with its grand purpose. MICHAEL FRIEDSAM MEDAL.—To George G. Booth, Founder of Cranbrook Foundation, Michigan, for the establishment of the Cranbrook Foundation at Bloomfield Hills, and for his far-reaching knowledge and help in the field of Art in Industry.

HONORABLE MENTION .- To Harvey Stevenson, of Harvey Stevenson, Thomas & Studds, for the Peter B. Olney House; for the simplicity and balance of mass, the restrained handling of details in sympathy with the materials, and a quality of comfort and quiet dignity which may be enjoyed and be-

queathed to later generations. Avery Prize for SMALL SCULPTURE.-To Benjamin Franklin Hawkins, for Fountain for Day Nursery.

BIRCH BURDETTE LONG MEMORIAL PRIZE .- TO John Wenrich for his rendering of Building No. 1, Radio City, and in recognition of his sympathetic and highly artistic presentation in color of architectural subjects.

THE PRESIDENT'S MEDAL.-To Joseph Urban for his architectural treatment of the Galleries of the American Fine Arts Society Building as a setting for the present League Exhibition, and for his effective installation of the exhibits in the show.



Joseph Urban's setting for and presentation of this year's exhibition gave it a unity which previous exhibitions have rarely attained. The color scheme is of white and red for the walls, the carpet being in yellow, orange, and green. The ceiling of the high galleries was lowered by stretching muslin over a grille of wires diffusing through this the lighting from above



Friday, January 27.-Went to the formal opening of the new Home Office Building for the Metropolitan Life Insurance Company, in which Dan Everett Waid and Harvey Wiley Corbett have produced a well-balanced combination of essential machine and attractive working environment. Just half of the building has been finished for the present, that half costing, I should judge, well over ten millions. The invited guests were taken through the building in groups, and I was fortunate enough to find myself with Chester Aldrich, Dwight James Baum, George Licht, and Robert J. Reiley. We were particularly lucky in being shown the work by Richard A. Tissington who, Mr. Waid tells me, has been very largely responsible for the detail design of the building. All of the working space is air-condi-tioned; some of the floor area, I should judge, is fully eighty feet from a window, so that indirect lighting is used, increasing in intensity with the distance from the window. The ceiling, all of acoustic tile, steps up in six-inch lifts from a low in the interior to just above the windows, thus providing the large amount of space needed for ducts without cutting off the daylight that would have been lost by furring down the whole There are fourteen thousand ceiling. people served with lunch in the basements on each working day-some of them from the adjoining building. The problem of conveying this population from the various departments to the basement and back was a difficult one. Mr. Corbett tells me that the first draft of the elevator engineers left practically no space in the building for anything but elevators. By a staggered schedule over two and a half hours, special elevators convey each department to the cafeterias in the basement. The stream through the latter is constant, and after lunch the employees find their way to the first floor by escalators, using the elevator system from the first floor back to their respective departments.

Three intellectual bouts were put on tonight in Sloane's gallery, opening the exhibition of works by unemployed draftsmen. William Stoane County, pre-dent of the Metropolitan Museum, predraftsmen. William Sloane Coffin, president of the Metropontan being "The sided, the subject discussed being "Two Picture in the American Home. architects, two decorators, and two painters argued respectively their points of view. H. Van B. Magonigle and Ely Jacques Kahn represented the architects; Horace B. Moran and Eugene Schoen, the decorators; with Hobart Nichols and Leon Kroll presenting the side of the painters. It was a good evening's entertainment, touching lightly on such far-reaching questions as: "Did the coming of the easel picture distort the logical age-old progress of wall deco-"Should an interior be an ration? entity in itself to induce a mood, or should it be a background for pictures?" "How much right has a man, unskilled



The Editor's Diary

in design, to create his own environment? If we admit that he may live for himself as he pleases, what about his family and his guests?" "Has any good easel painting a chance to deliver its message effectively excepting under some such custom as that followed by the Japanese in their tokonoma?" All of which, it will be seen, furnish more than enough material for an evening's discussion.

Monday, January 30.-Milton F. Kirchman, a graduate student of New York University's College of Fine Arts, makes an interesting point in an article published in the college paper, The Column. His point is that either our criticism of architecture is defective, or else architecture itself does not explore the realm of emotion. In painting or in music we ascribe qualities in a work of art to the personal equation-we say that a composition is morbid, moody, fanciful, light-hearted. Architecture undoubtedly has been in certain periods marked by the personality of the age or of the location. Rococo was definitely an emotional expression, Baroque another. Has architecture of today become merely a mathematical matter of volume and of lines?

Tuesday, January 31.-Charles F. Abbott, executive director of the American Institute of Steel Construction, is found among the growing ranks of those who see clearly the need for a real programme of public works put into effect to halt the downward spiral. It is a curious thing that in the restrictions governing the R. F. C. loans there is the inexplicable provision that loans on selfliquidating projects are made at five to six per cent; loans for direct relief may be had at three per cent. In other words, we prefer to make it easier and cheaper for the State to borrow for a dole instead of for useful labor. With the need for relief doubling each year in geometrical progression, it is obvious that providing work instead of a dole for the present twelve million unemployed is the only way out.

Wednesday, February 1.-David M. Dunning, Jr., an engineer connected with the New York State Temporary

Emergency Relief Administration, met with the architectural editors at luncheon today, and told us something of the startling growth and difficulties of relief needs. It seems very hard to arouse smaller communities to the realization that they have community needs which might well be undertaken in these times when the Relief Administration fund pays for the labor involved. Instead, many of these communities say in ef-fect: "We need nothing that we know of, but we are slowly starving to death.' Possibly the answer is that any community so moribund as to know of no way in which it can improve itself, deserves to starve.

Thursday, February 2.-Charles C. Zantzinger over from Philadelphia. He tells me that the "renovizing campaign" instituted in that city is apparently producing results. The city was districted, and individual solicitors in team groups called on property owners to have them agree to spend money on necessary or desirable building, remodelling, or renovating. The total pledged in this way, I understand, was about sixteen million dollars. There is no check-up, I believe, as to whether this money is being spent, but the announcement of the fact alone seems to have been of some service in stimulating business.

Tuesday, February 7.-Joined the il-luminating engineers at the International Music Hall this morning to have a look at some of the electric achievements therein contained. Figures as to wattage, size of switchboards, number of lamps, and that sort of thing, are tiresome and mean little, except to the engineer. Three outstanding factors, however, seem today to constitute practically the whole of any lighting prob-lem. The three seem rather commonplace and trite, yet their full recognition is perhaps even now not always found. In the first place, the illuminating engineer considers comfort and necessity in visibility. He must provide enough light for the task of the occupant. The second consideration is the architectural necessities-are there to be many sources, or only one, and what form may these take? In the third place, the illuminating engineer is enabled, partly by his control of color, quantity, and direction, to induce the desired moods in the occupants. One particular characteristic that is emphasized in the achievement of Clyde R. Place, Eugene Braun, and Professor S. R. McCandless is that these men are no longer satisfied to have mere light sources; instead, they utilize directional light in every single one. The great chandeliers in the main foyer, for example, are designed to throw all the light down; to another set of sources, hidden in the ceiling, is given the task of lighting the murals, and incidentally, by a nearly white light,

rather than by the amber light coming from the visible ceiling fixtures and side wall brackets on the mirrors. These latter, incidentally, are designed to throw all their light horizontally; and so with every source, whether it be one of the many lighting the stage, or one lighting a lady's face before a mirror in the powder room.

Saturday, February 11.—In the matter of museums, the American Federation of Arts reports that during 1932 eleven new museum buildings were brought to completion, the average cost of which was a million dollars. Gifts and bequests to museum funds, normally about half a million dollars, amounted to well over five millions. Another interesting, and not surprising, finding of the association is that the interest in and sale of prints have been increasing rapidly at the expense of easel paintings.

Wednesday, February 15 .- Bela W. Norton dropped in to tell me of the progress being made in Mr. Rockefeller's Williamsburg restoration project. The work contemplated at the outset, providing for the rebuilding of the capitol, governor's palace, and the restoration of Duke of Gloucester Street, is nearing completion. The palace and the capitol are enclosed, so that they are coming to an end of the work. Not that the whole town is to be considered finished, for as time goes on there will doubtless be other minor buildings rebuilt or restored, all depending, I suppose, upon the public's reception of Mr. Rockefeller's efforts. It is unlikely that there will be any comprehensive publication of the work for some time to come, since there is much to be done in landscaping.

Friday, February 17.—The Fortyeighth Annual Exhibition of The Architectural League opened last night with the usual ceremonies, excepting that the announcement of awards was put off until the twenty-fifth.

The Show is utterly different from anything that has been done before. Joseph Urban has turned the old galleries in the American Fine Arts Building into such a homogeneous unit that one is first impressed with the setting, and only secondarily and long afterwards with any intrinsic interest of the exhibits. In a word, it is a show, rather than an exhibition—and a very effective show at that.

The usual League affair is so overflowing with new creations, new ideas, beautiful achievements, that one is utterly unable to assimilate the whole without repeated visits. This year, however, the lack of buildings recently completed, and the general demoralization of the profession, has had its effect. Among the chief items that one finally singles out are Coolidge, Shepley, Bul-

finch & Abbott's Cornell-New York Hospital; John Russell Pope's Yale gymnasium; Thomas H. Ellett's Cosmopolitan Club in New York City; a group of Frank Forster's romantic country houses; Delano & Aldrich's Yale Divinity School; Paul P. Cret's now rather familiar Shakespeare Library; Edwin H. Hewitt's Minneapolis Telephone Building; and a number of good country houses, including a particularly charming one in brick by Harvey Stevenson, Thomas & Studds.

The Show is divided into three main parts, with an additional corner off the hall devoted to a particularly impressive exhibition of modern housing here and abroad. Of the three main parts, the first as one enters is given over to theatre design in its many forms, ranging from Robert Edmond Jones's marionettes, to individually lighted models of stage settings.

The second division is given over to architecture and landscape architecture, while the Vanderbilt Gallery itself, the third and largest unit, contains the sculpture and mural painting. I must confess to a feeling of disappointment in the last name | division. With the exception of Thomas Benton's original sketches for the Whitney Museum murals; Leo Friedlander's superb but tiny plaster model of an equestrian group for the Arlington Bridge; D. Putnam Brinley's sketch for one of his Huckleberry Finn subjects; and Benjamin Hawkins's dolphin fountain for a day nursery, I found little to hold my attention.

In speaking of the housing exhibit, Clarence Stein tells me that this material is to be used as a travelling unit under the guidance of the A. I. A. Committee on Housing—a sub-committee of the Committee on the Economics of Site Planning and Housing. Cities in which there is sufficient public interest to have the exhibit may arrange for this through the committee merely by paying the cost of transportation, boxing, and insurance.



Tuesday, February 21.-With Edmond R. Amateis to see what the returning men from The American Academy in Rome have been doing, as exhibited at the Grand Central Art Galleries. Some of Burton Kenneth Johnstone's architectural drawings are particularly good, and the work of Sidney Biehler Waugh in sculpture shows great promise. We were fortunate in meeting Miss Brenda Putnam, an exhibition of whose work was in an adjoining gallerv. It was a treat to see and discuss with Miss Putnam some of the things she has been doing, among which we were particularly interested in the Puck for a fountain

of the Folger Library, a marble portrait head of Amelia Earhart, a particularly lovely portrait in marble of a threedays'-old infant, and, among Miss Put-nam's latest work, "Midsummer." I was struck by the fundamental difference in viewpoint between Amateis and myself: to his sculptor's mind the subject was of secondary importance, the artist's facility of expression and technique the things that held his interest. Lacking his sensitive feeling for these sculptural nuances, I was impressed rather by the subject and the more obvious merits of the interpretation. "Midsummer," for instance, seemed to me little more than a fat woman; to Amateis it was a highly successful effort to express the marvellously intricate and voluptuous folds of flesh.

Thursday, February 23.—The English language is a rather unsatisfactory instrument in some ways. As an example, when we were collecting the material for the Portfolio in this issue on the subject of verandas, the question of the proper title came up. What are the differences between a veranda, a porch, a piazza, a portico, a loggia, an arcade ? Even architects use these terms interchangeably to a large extent—a practice that is fairly well justified by the dictionary. Here are the Standard Dictionary's definitions:

Veranda—An open portico or gallery extending along one or more sides of a building.

Porch—A covered structure forming an entrance to a building; outside and with a separate roof, or as a recess in the interior as a kind of vestibule.

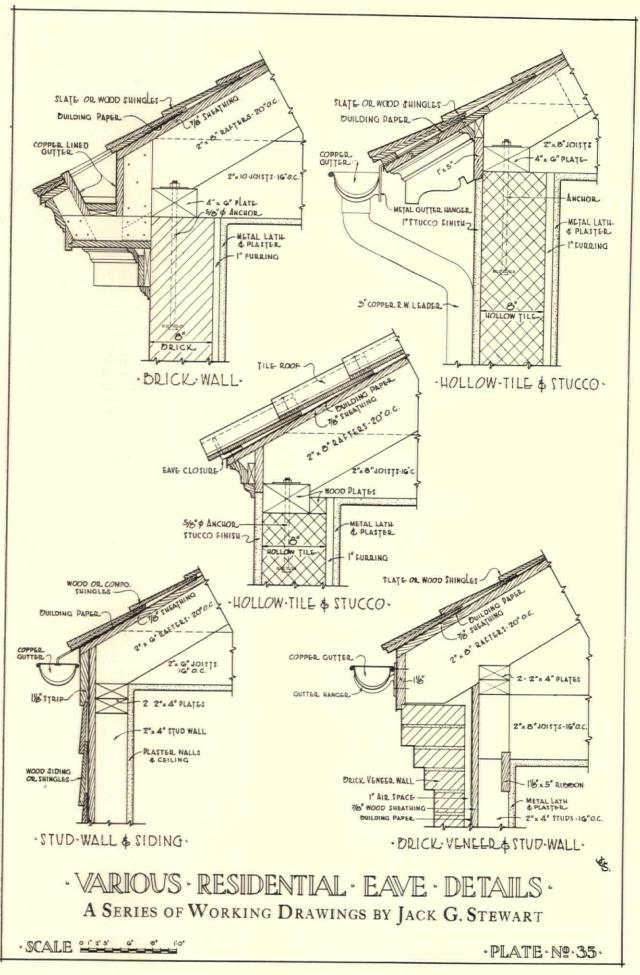
Piazza—A covered and usually colonnaded walk or gallery on the outside of a building; from the erroneous seventeenth-century application of the word to the arcades in the Covent Garden, London. Hence a veranda or porch.

Portico—An open space or ambulatory, with roof supported by columns, sometimes as a detached colonnade, but generally as a porch before the entrance to a building.

Loggia—In Italian architecture (1) a covered gallery or portico, especially when in the upper part of a building, having a colonnade on one or more sides, open to the air. (2) A large ornamental window, often projecting from the wall, and forming a chief feature of the design, as frequently in Venetian architecture.

Arcade—A vaulted passageway or street; a vaulted roof.

If one can sift any definite conclusions from all of the above, I suppose it might be that a porch belongs inseparably with an entrance. The examples in this month's Portfolio, it will be seen, are not entrance porches, and possibly some of them are not, truly, verandas, but there seems to be no other inclusive term for this sort of outdoor livingroom.



THE HOMES OF THE PILGRIM FATHERS IN ENGLAND AND AMERICA (1620–1685). By MARTIN S. BRIGGS. 211 pages, 6 by 9 inches. Illustrations from photographs and drawings. New York: 1932: Oxford University Press. \$4.75.

There has been no lack of literature relating to the Pilgrim Fathers themselves, but of the homes of the settlers, built during the first sixty years after the landing at Plymouth, we know very little. The author starts his researches with the English towns from which the early settlers came, follows their movements in Holland, and notes the Dutch influence on their architecture. With this background and a careful search among contemporary chronicles, he is able to reconstruct, at least more fully than has ever been done, the early homes of the Pilgrims. The author is not satisfied with mere superficial resemblances, but takes up in detail matters of plan, primitive timber construction, the making of doors, finished woodwork, and hardware.

HOMES AND GARDENS OF ENGLAND. By HARRY BATSFORD and CHARLES FRY. Foreword by LORD CONWAY of Allington. 62 pages of text and 175 plates, 6½ by 9 inches. Illustrations from photographs, plans, and drawings. Printed in Great Britain. New York: 1933: Charles Scribner's Sons. \$3.75.

There is surely no lack of literature on the homes and gardens of England. Messrs. Batsford and Fry, however, have felt that there was a distinct need for a comparatively small and handy book that would cover the subject for the general reader without the detailed requirements of the student of architecture. The illustrations are good and, among the wellknown examples illustrating the various periods, there will be found a number of smaller and less familiar ones.

INVESTIGATION OF WARM-AIR FURNACES AND HEATING SYSTEMS. Part V. By ARTHUR C. WILLARD, ALONZO P. KRATZ and SEICHI KONZO. 158 pages, 6 by 9 inches. Illustrations from photographs and diagrams. Bulletin No. 246. Pamphlet binding. Urbana, Ill.: 1932: Engineering Experiment Station, University of Illinois. 80 cents.

This bulletin is the eighth to be published under a co-operative agreement between the National Warm-Air Heating Association and the University of Illinois. A research in warm-air furnaces and furnace heating systems was begun in October, 1918.

HYDROTHERAPY IN HOSPITALS FOR MEN-TAL DISEASES. By REBEKAH WRIGHT. Foreword by JAMES V. MAY. 396 pages, 6 by 9 inches. Illustrations from photographs and plans. Boston: 1932: The Tudor Press, Inc. \$3.

The architect will find herein specific recommendations for the design of hospital construction in the hydrotherapy departments. It is quite evident that the author of the foreword, Doctor James V. May, superintendent of the Boston State Hospital, has little faith in the present status of the architect's knowledge regarding these requirements. He is of the opinion, rather, that hospital construction, as a whole, should be planned by hospital physicians.

MOUNT VERNON. Its Owner and Its Story. By HARRISON HOWELL DODGE. Edited and arranged by EDWIN BATEMAN MORRIS. Introduction by OWEN WISTER. 232 pages of text and 31 illustrations, 5½ by 8 inches. Illustrations from photographs. Philadelphia: 1932: J. B. Lippincott Co. \$2.50.

Colonel Dodge has been resident master of Mount Vernon for nearly forty-five years—longer, of course, than George Washington's term of ownership. He knows every brick, shingle, and boxwood plant of the place, and shows a marked ability to infuse the reader with his own enthusiasm. A large part of his reminiscences, of course, deal with the visitors who have come to see the nation's shrine in these decades—practically every well-known personage who has visited America.

TOWN AND COUNTRYSIDE. Some Aspects of Urban and Rural Development. By THOMAS SHARP. 224 pages, 7 by 93⁄4 inches. Illustrations from plans, maps, and photographs. Printed in Great Britain. New York: 1932: Oxford University Press. \$4.50.

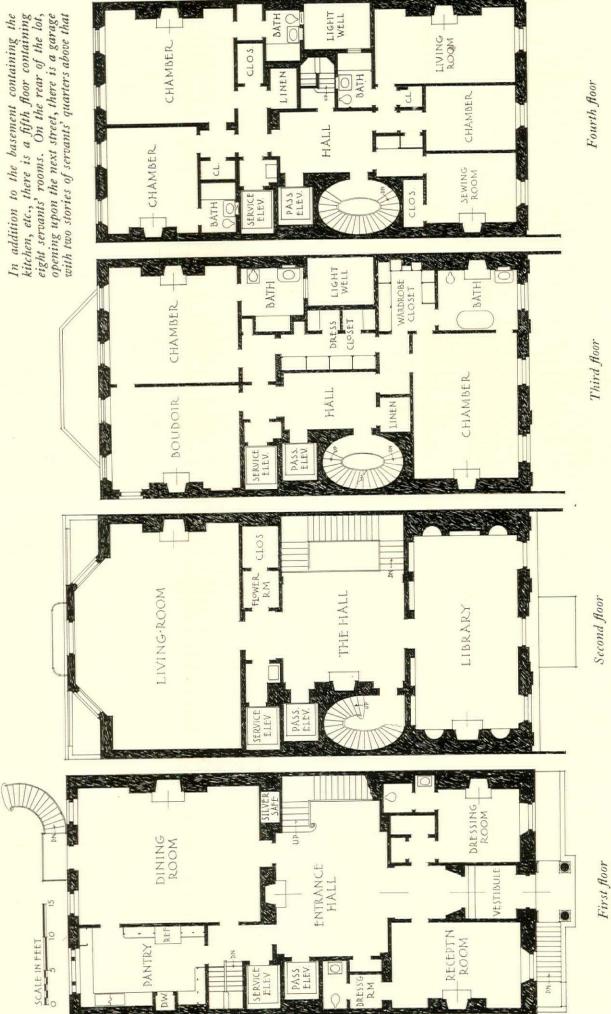
Here is a stimulating book by a man who is more than perturbed over the fact that England is destroying the character of her towns and also of her countryside despite the garden cities and suburbs of which she is so proud. Mr. Sharp agrees with Trystan Edwards in his belief that the art of civic design has been killed by the science of town planning. The diffusion of towns resulting from our trying to make them look like the countryside, and the ruling of straight motor roads and high-tension lines across the countryside, are practices that will, if they have not already done so, kill all the beauty and character of the town and of rural England.

BAROQUE GARDENS OF AUSTRIA. By G. A. JELLICOE. 40 pages, 12 by 17½ inches. Illustrations from photographs, plans, and old prints. Printed in Great Britain. New York: 1932: Charles Scribner's Sons. \$25.

There is an unmistakable individuality in the gardens built under the Habsburg Dynasty, even though there are distinct echoes of Italy, France, Spain, the Netherlands, Turkey, and North Africa. Mr. Jellicoe's scholarly and beautifully presented study of these Baroque gardens was made possible through the Bernard Webb Studentship at the British School at Rome. The drawings, which are plentiful and well executed, were finished by Alison Shepherd. The contrast of the gardens as shown by old prints with photographic records of today, comprise one of the most interesting features of the work.



MOTT B. SCHMIDT, ARCHITECT House of Vincent Astor, New York City In addition to the basement containing the kitchen, etc., there is a fifth floor containing eight servants' rooms. On the rear of the lot, opening upon the next street, there is a garage with two stories of servants' quarters above that





The hall at the top of the stairs leading up from the entrance hall. Allyn Cox painted the walls in his individual realistic style. The niche is, of course, perfectly flat, and the stair railing of wrought iron, polished and lacquered, is painted in facsimile on the far wall. The floor is of yellow Verona and Alabama cream marbles, with a black edge

The entrance hall, with a glimpse of the dining-room beyond. The floor is of black, white, and yellow Verona marble; the stairway of Belgian black marble with a yellow carpet. The dining-room beyond is panelled in pine, painted white

« ARCHITECTURE »



219



A corner of the library. It will be noticed that the book shelving has been changed somewhat from the niche motive shown on the plan. The woodwork is of waxed pine, the hangings of green damask. The wall panels, of which one appears here, are of old French wall paper in sepia, representing the cities of Europe





In the living-room the walls are painted a bluish green taken from an old panelled room in the Phila-delphia Museum. The dado and the cornice are carved wood. For the hangings light beige damask is used over under-curtains of flame-colored taffeta, with gauze sash cur-tains matching the wall color. The floor is an old French parquet; the mantel, an antique of white marble with color marble inlays In the living-room the walls are

A glimpse of the hall through the living-room doors. These doors are of old San Domingo mahogany, veneered, with old English chased brass locks. The door surround is of carved wood



The reception-room on the first floor, into which has been fitted an authentic Louis XV boiserie painted by Huet and Perrott. The general color scheme of this painted panelling is red and gold with overdoors in blue and gold. The rug is an eighteenth-century Samarcand woven with silver thread

Some Pitfalls in Supervision By W. F. Bartels

ENERALLY when stone or brick walls project above the roof, the flashing is in two sections: the cap flashing and the base flashing. The cap flashing should extend into the wall within an inch or so of the other side. Of course the contractor's money—in the form of time and material—can be saved by extending the metal only a short distance through the wall: hence the superintendent must be on his

guard. The cap flashing may be of the plain type which should step up; that is, in a brick wall, extend in over one brick, turn up over another, and thence to the outside. Or, the flashing may take the shape of an inverted "U" in order to avoid any chance of loosening the bond in the wall. An interlocking type prevents loosening the flashing in a wall by binding into the mortar, thereby preserving the solidity of the wall. Another type of flashing has an insert for the

base flashing. All cap flashing should be well lapped, and extend down over the base flashing three inches. Base flashings should preferably be set in the waterproofing-hot pitch, then nailed down. The roofer is apt to argue that the top layers alone will be adequate insurance against leakage, but the superintendent must be adamant in insisting on the forementioned practice. The top edge should fit tightly against the wall and extend well under the cap flashing. The base flashing should extend at least six inches above the high point of the roof. It is disconcerting for a superintendent to find on examination that the base flashing extends up only a half inch or so under the cap flashing. All flashing around pipes, flag poles, etc., must be given careful consideration. Flashings for valleys must be carefully lapped and soldered where necessary. Flashing for chimneys should be well built in while the job is under construction, in order to render masonry operations unnecessary after the building is completed. The metal should go through the chimney and turn up several inches around the flue. This will prevent those disagreeable decorations at the roof line noticeable around so many chimneys. In the case of

XXX. ROOFING AND SHEET METAL (CONTINUED)



beams exposed to the weather in fireproof structures, covered by rules regarding fire towers, etc., they are generally first covered with concrete and then with a metal protection. The metal protection should extend well into a raglet and be properly calked.

Once, while inspecting a building which the owner was forced to take over from the builder in the course of construction, I recommended that copper flashing be put around the stair bulkhead. The flashing was to have its edge

turned and inserted into a raglet of at least 11/2" depth, calked tightly with lead, and finally with an elastic calking compound. All this was agreed to and the work started. I watched the man and noted his progress. The mason had not skimped on the cement, and the mortar between the bricks was hard. Coming back the second day I was amazed to see not only the flashing completed, but the raglet calked. I inquired how many men had worked on it. The foreman naïvely told me, "just the one man." From this I knew that the raglet could not have been made $I \frac{1}{2}''$ deep and that the calking could never have been finished by one man in such short order. So, despite the assurance that the "flashing was all right," I jerked a piece out. It was easy to do. It extended inward only about 1/4", was not turned, and, instead of lead calking, had only an elastic calking compound. Needless to say I required an inspection and approval of each step on the job thereafter. Proper workmanship may easily be done, during construction, at a relatively low figure.

And not to be forgotten are the specification provisions for the flashing on wood window heads, window sills, and other weather stops that the architect has seen fit to require. In all this work it will be well for the superintendent to remember that although water will not run uphill of its own accord, it will go anywhere under pressure—and this is the condition which exists in a driving storm.

A superintendent was once asked to find the cause of a wet floor in a large one-story building having a well furred brick wall. After each hard storm water would appear on the first floor just inside the wall. The brickwork was well laid up and the roof apparently did not leak. Finally it was decided that the only way to find out was to try one section at a time with the aid of the local fire department. First the wall was kept wet continually for several hours but no water appeared. Then the roof was deluged. No spots or evidences of a poor roof appeared, but the water again appeared on the floor. Then the inspector donned rubber coat and boots and went up the ladder. The gutter was too small to carry the water off, but the difficulty did not lie there. The flashing appeared to extend well up under the shingles. However, the gutter was made up of two pieces. One was fastened to the top of the wall and formed the exterior portion of the gutter, while the other served as flashing and gutter. Their junction was not soldered and hence before the gutter filled to overflowing all the water that could go between these two pieces ran down the inside of the wall. Once found, a solution was comparatively simple. But all this could have been prevented had adequate thought been given to the detail and to the tinsmith's private shortcuts.

Gutters are generally made of hard copper. The superintendent should see that they are properly fastened or supported. They should be well pitched and be strong enough to come through the winter without bellies or sags. Of course, if copper is used the superintendent will see to it that no other metal comes into contact with it, and that any nails used to fasten it are of copper, brass, or bronze. The superintendent should see that a suitable copper basket is furnished to be placed over the leaders to prevent leaves from going down the pipes. Leaders must be well supported and be of adequate size to carry off all the water the gutters convey to them. There should be as few bends as possible in leaders. If possible they should not be left unprotected at their base when placed along the edge of driveways or in other locations where they may be dented or injured by automobiles. The bottom piece or shoe-generally put on when the leader does not discharge into a sewer line or cesspool-should never be mitered at right-angles or merely soldered on with the expectation that it will hold fast. If possible the shoe and leader should be of one piece.

MECHANICAL APPURTENANCES

What might be termed the mechanical appliances of a building are too often left to the prejudiced judgment of those interested in furnishing them, to the imagination of a socalled mechanical expert, or in the lap of the gods. Yet usually these appliances are vital factors in the maintenance of the building and if not properly chosen will figure all too prominently later in the "cost of operation" account. As buildings become more and more mechanized it is of paramount importance that the architect thoroughly familiarize himself with the mechanical details of his building.

Tanks, which may be for house, fire, or suction purposes, should most certainly be well investigated. The relatively small wooden tank formerly seen on the top of the five or six story flat has now grown into an enormous container, resting on the top of a sixteen or twenty story apartment dwelling, and is now usually concealed by a design artifice of one sort or another. Generally these wooden tanks are of pine or cypress. The wood should be dry and the abutting edge of each plank properly bevelled. It is well to be sure that the heartwood is on the inside of the tank. The round hoops securing the sides should be of wrought iron, with their connections staggered. Inasmuch as the wood will swell when wet, the hoops are not pulled up tight when the tank is first erected. However, the superintendent should see to it that they have been properly adjusted before he certifies to the final completion of the work.

When steel tanks are placed on the interior of fireproof buildings the slab beneath them will sometimes be poured before the dunnage beams are set (the beams actually carrying the tank). This sometimes leads to error in setting the dunnage beams, which should be placed exactly as called for on the plan, and no risk taken which might cause the load to rest where supports are not sufficient to carry it. The superintendent should insist that the drainage pan called for is provided, because failure to do so will cause a wet or damp floor when the tank sweats. A waterproofed floor may be substituted for the pan.

(To be continued)



ARCH OF CONSTANTINE From the drawing in pencil by Burton Kenneth Johnstone, 1932 Fellow, The American Academy in Rome



MARKET SQUARE, NUREMBURG From the drawing in pencil by Burton Kenneth Johnstone, 1932 Fellow, The American Academy in Rome



The Architectural Observer



I T has frequently been said that an architect does his best work when his cost restrictions prevent his using anything and everything he would like in the way of materials. We do not know that such restrictions are responsible for this frank use of scored hollow-tile blocks in a penthouse on the Mission Inn at River-



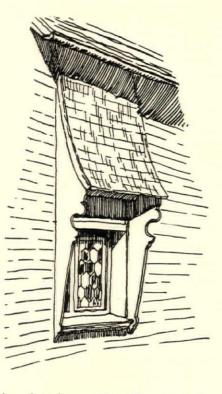
side, Calif. Perhaps the architect, G. Stanley Wilson, used it because he liked the effect of the color with his tile roof. In any event he employed the same pattern, uncovered, inside as well as out.





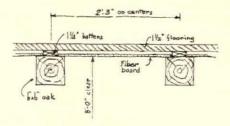
small slot in the plaster. It is fastened on the studding and serves as a ground for the plaster. The usual hooks will fit it.

THE meticulous housekeeper, as an architect's client, sometimes objects to the use of steel casement windows on the grounds that a sudden rain storm is likely to damage



her hangings. Possibly the only way to prevent such damage is by some sort of hood over the outside, unless the windows happen to be close enough to the overhanging eaves to be protected by their projecting soffit. Here, however, is an idea that might serve for adaptation. It is a detail from the Swiss chalet as reproduced by a contributor to *The Architects' Journal* of London.

HERE is a simple solution of the problem occasionally incurred in domestic architectural practice where one wants to show the structural beams in a ceiling. It is, of course, a modification of the familiar mill construction, using an inch and a half floor, splined. This variation was developed by L. A. Culliford, an architect of Beckenham, England.



THE designer of interior details who would find some way out of the difficulty of hanging heavy wraps merely by a tape on a hook, is usually driven to the coat-hanger on a pole. Here, however, in a villa at Canavese, Italy, a coat rack has been built in by Pagano-Pogatschnig & Levi-Montalcini, which avoids the



hanging of a coat by its tape through the use of the metal ring. Incidentally, the umbrella rack, it will be noticed, provides a small receptacle for the drip.

PRIVACY for sun bathing is encountered by the architect as a problem more and more frequently. Hans Zimmerman, an architect of Stuttgart, publishes in *Bauzeitung* his utilization of a flat-roofed extension to a house in a rather crowded suburban community. He gains privacy by vertical awning curtains fastened to rings, so that they may be pulled to any desired place in the perimeter.



Selling Architectural Services Today

By Rion Bercovici

■ I sell his services today ices today ic There are architects today who sit in their offices, like the doctor who has just hung out his first shingle, awaiting with more or less patience the client, who, unless through some miracle, is unlikely to appear. There are others who go out to seek the client, holding it to be no breach of professional ethics if one can show a man that it is in his own interest to undertake some kind of building—and such a demonstration is not particularly difficult even in these times. Here is the picture of such possibilities as drawn by our investigator, in the realm of stores and restaurants.—EDITOR.

will sell—merchandise, services, floor space, and anything that is housed. The architect cannot just be a merchant of even the most expert *architectural and building counsel*: he must be a merchant of *auxiliaries to salesmanship* in one form or another.

To do this successfully he must adjust himself to the rhythm of the times. Through intelligent analysis and utilization, the depression, instead of serving as the ultimate sales refusal of a prospective client, may be the most potent sales argument in favor of the architect.

This adjustment requires a new philosophy of the architect's service, and in some cases a completely new orientation in his own mind concerning his function. This adjustment, however, can be made, and must be made. Otherwise, the architect is in danger of finding himself belonging to a profession that is suffering, perhaps above all others, from attrition due to dearth of nourishment from the formerly regular and normal flow of new business.

With nourishment failing in these erstwhile green, but now arid, pastures, the architect must look for salvation, and even survival itself, to new fields, and must be able to adapt himself to changed conditions. If he attempts to survive purely as a recluse architect, he is doomed. His opportunity lies in filling the rôle of one of the few indispensable counsellors to various phases of an ailing business structure. He must, in many cases, drop the rôle of specialist and be content to carry on as a general practitioner. Colorless as this part may be, in comparison to more creative work, it is one that may be built into a substantial source of business. Recognition of this new development, and his place in the changed business structure, is the architect's life-line today.

A highly paid medical specialist may not be

eager to assume the practice of a general practitioner, but it may often be today his only opportunity to carry on his profession. Through this field, besidessurvivingeconomically, he keeps himself in touch with his

art, and accumulates a fund of invaluable experience, perhaps developing new specialties. This parallel holds true for the architect.

It is made dramatically clear in opportunities often unnoticed by the architect. In the specific cases of restaurants, delicatessen shops, and smaller retail establishments, the architect has an opportunity to synchronize his work with the needs of business. Competition in this field is sharp, and trade depends to a very great extent upon appearances of the establishment and effective presentation of merchandise.

A restaurant, for example, is more than a retailer of cooked foods combined in various ways. It is selling an atmosphere of quiet, rest, or even diversion, in keeping with its policy and the class of customers to which it caters. In this respect there is a good opportunity for the architect. He may discover a real need for his services, and he can point out this need intelligently to restaurant operators, and to realty men and property owners in whose structures there are unrented restaurants or floor space available for such use.

Until quite recently the cafeterias and the cheaper eating places, especially in the East, made very little effort to present an attractive appearance to the customer. Relying on price appeal, they did not think any inducements beyond that, and cleanliness, were necessary. Keener competition, however, and economic changes, have altered this policy. For example, the "new poor" and the white-collar class, who formerly ate in more expensive restaurants, are compelled to eat in cafeterias and the cheaper eating places because of their reduced incomes. An intense effort to obtain the regular patronage of this class is being made today. There are numerous instances. Some of the chain cafeterias in New York City are as different as possiApril, 1933

ble from the noisy, clattering cafeteria of yesterday. With individual tables, attractive lighting, and modern display of food, they attract many customers. Certain new cafeterias utilize the modern note in their restaurants; others have followed the policy of creating national atmospheres to lend romance to the prosaic business of eating.

Often, expert inspection and analysis by an architect can aid the restaurant owner at a very small cost. An interesting example has recently been furnished by the Broadmoor Restaurant in New York. Ely Jacques Kahn, architect, noticed how noisy the place was. Advising the owner, acoustic treatment was given to the ceiling at a cost of about five hundred dollars, a minor alteration that added considerably to the value of the restaurant, giving it added appeal in a highly competitive neighborhood.

This sort of assistance can be rendered by wide-awake architects noticing circumstances deleterious to business that may be overcome by low-priced methods and devices.

Mr. Kahn is keen on the value of business knowledge to the architect, and pointed out that James B. Newman, of his firm, is giving Princeton University architecture students a course in the underlying business principles of the profession. Mr. Kahn also believes that there is a potential and currently neglected field for architects in industrial designing of fabrics, metals, and so forth. He advocates the establishment of educational facilities in these arts.

"The architect should be enabled to analyze the entire status of a project," said Mr. Kahn, "in such a way that he can talk intelligently to builders, real-estate people, financiers, and merchants.

"The architect should know his own exact position in the general business structure. He should be familiar with all the elements that enter into building, from financial set-up and promotion to leasing and utilization of floor space in a profitable manner. He should keep informed and be on the 'inside' of building activities. He should know in advance when his services may be needed. If this is unethical, every businesslike architect is unethical."

Mr. Kahn pointed out another architectural opportunity in the possibility of modernizing the many empty theatres throughout the country, and making them more easily rentable.

Roswell Barratt, New York architect, noticed that the grocery department of Fortnum & Mason, exclusive English specialty shop on Madison Avenue, was so lighted that attention, instead of being concentrated on the groceries for sale, was attracted to the British coat-ofarms and the glaring ceiling.

Through the simple expedient of advising the installation of a modern reflector, the intensity of the illumination on the merchandise was increased to such an extent that attention and sales were spurred considerably. The physical cost of this installation was about one hundred dollars. Its value to the store was many times that amount.

Mr. Barratt is enthusiastic about the possibility of architects creating a new class of work on a consultant basis.





A corner of the Fortnum & Mason store before and after an architect had called their attention to the possibility of selling more goods through better lighting

Photographs by Werner Associates



"Drawings often scare off a prospective client," he said. "Somehow, they are associated in his mind with money and complexity. If you can do work without drawings, you have a distinct advantage today.

"I am a great believer in architects cashing in as much as possible on their experience. There are many consulting jobs waiting for the wise architect who realizes the necessity for this kind of service. Co-operation with engineers, owners, and builders is an important factor in this type of work."

Mr. Barratt believes that there is much work available in the inspection of new and renovated buildings and the giving of miscellaneous advice, even down to the suggestion of appropriate paint.

"I have had the good fortune recently," he said, "to obtain a lucrative commission because I good-naturedly gave one man advice about painting his house, when I had every right to refuse such advice, as he had turned over a job on which I had been working to another architect. He wanted me to give him counsel that would prevent his wife from ruining their house with an inappropriate paint. I gave him this advice. Not long afterward, the country club of whose house committee this man was chairman, burned down. The job for the new building came to me.

"Widespread consulting work does more than bring in money to the architect. It builds a circle of friends and contacts that may prove extremely valuable in a business way as a foundation for future work."

In this respect it is interesting to note the similarity of Mr. Barratt's consultant services with the practice obtaining in England and France, where architects act as continual counsellors to their clients, long after a building has been erected. The lack of new work on a scale comparable to our own makes this an important feature of the architect's activities. Similar conditions in this country are apparently creating similar results.

"I find it convenient to charge for many of these jobs on an hourly basis," said Mr. Barratt, "and have little difficulty in getting my money. Contact with lawyers and doctors has mentally prepared the business man for payment on a fee basis for expert advice. As a matter of fact, I don't see why experienced architects cannot let it be known they are a sort of informal counsel and research bureau, acting for the building owner, or lessor. In this way

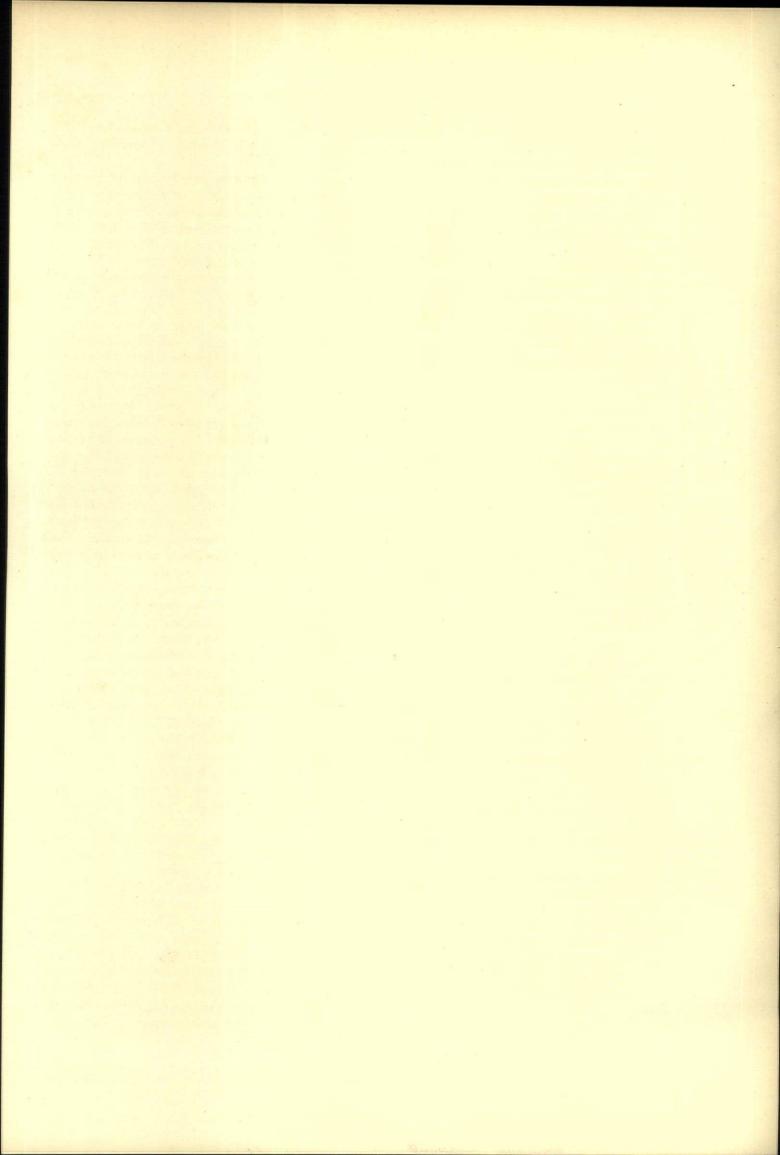
they may perform a service of great value to the community, while building a profitable niche for themselves."

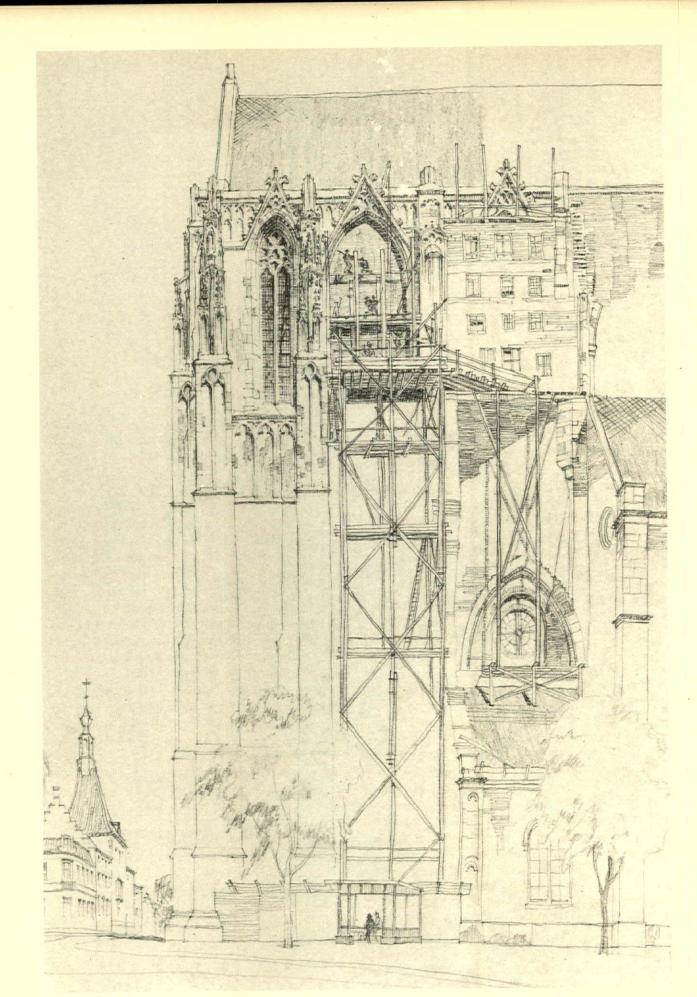
The work done by Mr. Barratt for Fortnum & Mason is an example of the proper way of selling the kind of architectural service that is of direct benefit to a business. Fortnum & Mason were sold on the idea because they realized that it would aid in selling their goods. The architect analyzed the lighting situation from the standpoint of the service rendered by the store, i. e., the selling of groceries. Through his technically superior knowledge of what could be done in a given situation, plus his observation of the store's needs, he knew how it was possible to present the merchandise in a better manner to the customer. That combination of knowledge was bought by the store. If he had approached Fortnum & Mason from the standpoint of architectural design, fitness or beauty, the reply would probably have been, "We can't spend money for anything like that today." This cannot be the reply when the store is shown how it may sell more merchandise. The architect has geared his services into the functional workings of a business organization. That is the main line of thought he must keep in mind in obtaining this kind of work.

The architect should also keep in mind current social and business conditions, and their relation to possible purchasers of his services. There are other factors in the offing that must be considered by the wide-awake architect. The legalized selling of beer and wine will naturally tend to the building of new types of restaurants, as well as the modification of existing establishments. Those institutions remodelling themselves on the pattern of German beer halls, wine halls, Parisian cafés, etc., will have the edge on their more sedate competitors.

In a word, the architect might well constitute himself a seller of business presentation. He should sell architectural service and its results, not only as something convenient and appropriate, but as a permanent and valuable aid to the store and its functions.

Effective presentation is as important to business today as a clean collar to a business man. Even if his business is not as profitable as yesterday, the business man wears a clean collar or he is utterly hopeless. Without it, he loses not only his standing among men but his own morale as well. Business needs the clean collar today more than ever before, and the architect can supply this need.





« ARCHITECTURE »

UTRECHT CATHEDRAL, 1929 From the pencil drawing by Gerald K. Geerlings

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The Way Out By Marshal L. Oliver

The most urgent problem of the present crisis is to provide the means of immediate unemployment relief. Since local and even State authorities are no longer able to cope with the emergency, this has finally become one of the major responsibilities of the Federal Government. All that remains to be A satisfactory solution of the problem of providing employment through a well-conceived plan for work relief must be grounded not only on technical knowledge but also on an understanding of the basic social and economic principles which it implies.

ARCHITECTURE therefore proposes, in a series of forthcoming articles, to present a complete discussion of the question from its logical beginnings. It is sincerely hoped that the readers of these articles will thus be equipped and persuaded to carry on a vigorous and victorious campaign to obtain for this country the relief of which she so desperately stands in need.—EDITOR.

"The idea that a public-works programme represents a desperate risk to cure a moderate evil is the reverse of truth. It is a negligible risk to cure a monstrous anomaly."

-John Meynard Keynes, London, 1921.

decided is whether the authorities will seek to bring about a recovery of business by undertaking a courageously conceived programme of public works or whether, at last, we must resort to the dole.

The fact has been repeatedly brought out that the underlying cause of economic depression is a failure of buying power. Whereas in the past it was generally believed that a surplus of labor could be absorbed only by the gradual, automatic resumption of industrial activity, recent events have forced the conclusion that the shoe is on the other foot. Economists now unite in proclaiming that until buying power has been restored by creating employment for labor there can be no general recovery of trade.

No industry in the country provides a wider or more highly diversified market than does building. At the same time there is no more constant, unsatisfied demand than that for public and semi-public improvements: slum clearance, model housing, better facilities for educacation, recreation, and the public health.

If, as is undeniable, these needs can now be satisfied with the maximum of economy and in such a way as to provide work for a vast number of men who must otherwise be degraded by charity, it is unthinkable that we should hesitate longer before initiating immediate, intelligent action to bring about an extensive programme of Government-financed public works.

Responsibility for the development of such a programme

must rest ultimately with our architects and engineers. Since this is so it seems essential that members of these professions should unite to carry on the educational work which is necessary before it can be brought about.

Here, then, are the essential principles involved, expressed for the most part in the words of experts who have studied the matter in whole and in some of its many ramifications. The quotations which follow have been chosen, from a mass of equally relevant material, with the idea of boiling the subject down to its essentials and answering the chief questions which arise.

The statements immediately following were extracted from hearings before a sub-committee of the United States Senate Committee on Banking and Currency, which met in Washington last February to consider further unemployment relief through the Reconstruction Finance Corporation.

In this country we have a surplus man power now, and consequently any co-operative effort on the part of the Federal Government that will encourage the building of enduring edifices and public works that are of benefit to society as a whole, socially, esthetically, or from the standpoint of education or public health, in my opinion, is a very wise measure.

CARL B. FRITSCHE, M. E., member of the Committee on Aeronautics of the American Society of Mechanical Engineers, Detroit, Mich.

A public-works programme is necessary to start us out of the slump. It is not the only thing. It will not do it alone. But all other reasonable measures would be assisted by it. For instance, if you want to increase commodity prices, public works increases commodity prices by creating a demand for a large number of construction materials. The worker does not buy concrete. He buys shirts and consumer's goods. Therefore, we create a demand for all of those things. And as some one has said, it merely "primes the pump."

OTTO T. MALLERY, economist specializing in unemployment and public works, Philadelphia, Pa.

At the end of the World War our Federal public debt was in the neighborhood of \$25,-000,000,000 and nobody worried about the solvency of this country. Nobody questioned but that it was sound.

Today our public debt is \$20,000,000,000, in round numbers.

Suppose it does take a \$5,000,000,000 programme to get this economic engine off dead centre. What of it? Certainly in actual wealth and in potential wealth this country is a far better risk than it was in 1918.

CARL B. FRITSCHE.

There seems to be quite a general misconception that since there are ten or twelve million people out of work the Federal Government of course cannot provide jobs for all of those people on public works, so why bother with it at all? The idea is entirely overlooked that construction of public works and the stimulation of public works generally is only one of several means, and it occurs to our minds, perhaps, that it is assisting to prime the pump of recovery, to get business here and to get business there, and to give some jobs in that manner so that we may get back to a position where trade and industry can reemploy these people, as it is only from revived trade and industry that the ten or twelve million people are ever going to get genuine and permament employment.

MARTIN DODGE, representing the Banking and Industrial Committee of the Second Federal Reserve District.

Engineering studies have gone into this matter very carefully and have indicated that for all public-works construction directly and indirectly about 80 per cent of the cost of the project goes to the laborer, goes to wages and salaries.

And that is distributed over a large area. It offers one of the sound methods of helping unemployed men as well as stimulating business.

MARTIN DODGE.

A bond of obligation issued for the purpose of raising money to be distributed in a dole represents no value. A bond, however, issued for public works represents a needful and economically sound addition to community facilities and the benefits derived therefrom will, in more prosperous times, permit the retirement of the obligation.

To illustrate the economy of unemployment relief by public works rather than by taxation to pay a dole, assume a public-works construction programme amounting to \$3,000,000,000. This involves a charge for interest and amortization of about \$150,000,000 a year. It is estimated that such a programme would give employment to between 1,500,000 and 2,000,-000 workers per year, distributed between the construction work and the many industries that serve construction. To support these same workers in idleness would cost the community between \$750,000,000 and a billion dollars a year, as compared to interest charges of \$150,-000,000 on a public-works programme.

Money expended in doles or direct relief contributes little to the stimulation of trade, whereas money spent in public works stimulates business not only in the community itself but throughout the material and transportation industries. If the money for a dole is to come out of taxes, as it properly should, since it is ruinous to borrow money to give away, the present burden on the taxpayer would be actually relieved through a public-works programme because the taxpayer will only have to bear the interest charge on the moneys expended. If the Government and its subdivisions must borrow to effect economic relief, it will be far better to invest the funds so raised in community facilities, thereby conserving the public wealth and stimulating a normal resumption of trade.

It is recognized that the word "tax" has come to be a bugaboo to the American public, but it need not be so, if properly administered. As the funds for relief must necessarily come from public sources we have no other alternative than to resort to taxation and we maintain that it is far better to tax for improvement which will raise the standards of living within the community and increase property values because of an added convenience, than to tax and apportion out these same funds without the production of this asset.

JOHN P. HOGAN, Consulting Engineer, New York City; chairman of the Public Works Committee of the American Society of Civil Engineers.

The balancing of budgets so far as current operations are concerned is desirable and necessary; but it is not necessary to include in such balancing the principal sums invested in useful community facilities. Competent economic opinion has almost universally held that it is wise governmental finance to borrow for public works in periods of depression and to repay out of taxes levied upon the future surplus earnings of prosperity. Public works built at present low wages and price levels and financed at reasonable rates of interest will carry a very low cost and require a relatively lower debt-service charge in the tax rate over years to come. It is good business as well as good tactics to use this opportunity to add substantially to the public wealth.

JOHN P. HOGAN.

At this time this is the only way out. Those who still have private means need such encouragement before they will invest their capital in productive enterprise. When the Government borrows money, all it does is to mobilize timid private capital and make it available under public auspices.

SENATOR WAGNER. It is a stimulation to private industry, after all?

MR. FRITSCHE. In the long run, it is, unquestionably, and this is the true way to promote dependable prosperity.

CARL B. FRITSCHE.

In his statement, Mr. Robert D. Kohn, Chairman of the Construction League of the United States and past President of the A. I. A., made the following remarks about slum clearance and housing which he recommends as being especially suitable forms of public work:

Sir Raymond Unwin, speaking to a parliamentary commission in London about housing, said: "Gentlemen, every £100 that you spend on slum clearance is £100 less paid out in the dole." Every \$1 we put into a thing like cleaning up a city is \$1 less spent on direct charities, and we are actually improving the tax income of the city by that because in New York, although they have given tax exemption on the improvement in this housing on the buildings themselves, the land value has been so increased by reason of these improvements, the better housing, that the land now returns to the city in every case a larger tax than both the land and the old buildings on the land returned to the city before the housing was built.

The chairman of the Federal Reserve Board, Mr. Meyer, said to the Real Estate Board in New York, that they should not oppose the housing. "You cannot possibly be injured by the competition of these new cheap apartments, no matter how many are built. As a matter of fact you will not be injured as much as you will be injured if you do not give work to people who are out of work." Property values are going to be more injured from the lack of work for workmen than they can possibly be injured by the competition of the new buildings that might be built up.

Those members of the Federal Government now engaged in formulating a plan for work relief are comparing the respective merits of many projects, highly diverse in character and purpose which have been submitted for their approval.

It is, of course, desirable that the benefits of public work be as widely spread as possible. To this end we must support such undertakings as the scheme for reforestation, the construction of needed bridges and tunnels and the extension of facilities for water supply, electrification, and sewage disposal.

The architect in approaching the subject must naturally consider the possibilities of essential building construction. No vital problem has more persistently escaped solution than has slum elimination combined with some means of providing suitable habitations for families in the low-wage-earning group.

We must profoundly believe that the combination of our present circumstances (*i.e.*, unemployment and industrial stagnation, which can be alleviated only through provision by the Government of funds for the creation of work on public improvements) plus the liberalization of public opinion which has grown out of the unavoidable facing of facts during three long years, have removed the solution of housing problems from the realm of the impossible. Believing further that its solution is a primary duty of the architectural profession, we urge on all its members the necessity for informing themselves on this subject. Under their leadership it can reasonably be hoped that a proportion of the money allotted by the Government to the provision of useful employment may be utilized as well to accomplish a second, equally desirable result: to improve the unhealthful, uneconomic, unsocial surroundings in which such a large majority of our population are now condemned to dwell.

Numerous questions arise whenever the words "public works," "slum clearance," or "housing projects" are introduced into conversation. On the following pages it has been our intention to phrase for the reader some of the questions which most often recur in this connection. They make no pretense of exhausting the subject or of going much below the surface of the matter under consideration. It is our desire, rather, to indicate what form such queries usually take and by answering them authoritatively to show how much ground has already been gained in what we conceive to be the right direction.



Mr. David Cushman Coyle, to whom we submitted one list of questions on the economic implications, is a consulting engineer who has devoted much time to the consideration of modern economic problems. He has made notable contributions to the subject, both in writing and speaking before many organizations. He was among those invited to present their views before the Senate sub-committee above mentioned.

Can the Federal Government, by appropriating funds with which to finance extensive necessary building construction projects, materially improve our present economic condition?

Yes, provided work is undertaken on a sufficiently large scale. Private capital investment is no longer an adequate source of consumer buying power. To the extent that the Government can put men who are now unemployed to work on useful projects it can replace private investment as a source of buying power, thus bringing about a resumption of business activity, without creating dangerous quantities of new commercial debt.

Under existing circumstances can the Government "afford" to embark on such an undertaking?

So long as action on an adequate scale is postponed, the depression continues to deepen

and the Federal revenues to dry up. The Federal deficit can be wiped out only by increasing expenditures enough to end the depression.

In what manner can the Government obtain the funds with which to carry out a public-works programme?

The public must be aroused to the need for immediate action, in order to permit the sale of Government bonds. It will be necessary at the same time to expand currency or bank credit, and the Federal Government must hold absolute authority to force banking cooperation.

What general requirements must be fulfilled by work projects before they may be expected to accomplish the desired result?

They must be obviously useful and carried out in an efficient and workmanlike manner, so as to maintain public support for an adequate volume of expenditure. They should not be of such a nature as to duplicate the undertakings of private enterprise.

Must all Government work projects be financially self-liquidating?

On the contrary, a self-liquidating project is a burden on the consumer buying market, the same as a commercial plant. Only non-selfliquidating works are of permanent value in creating sound business conditions.

Is it desirable for the Government to do its building during depressed periods rather than in times of normal business activity?

Business stability requires high and increasing public expenditure. The rate of increase should be greater during depressed periods, but any tendency to reduce public spending during prosperity will tend to bring on depression. A constantly rising rate of public spending is the necessary adjustment to rising technological productivity.

Do projects involving the clearance of slums and the erection of model housing meet the above specified requirements of economically sound work relief?

The social advantages of better housing are sufficient to justify it. So far as its effects on permanent prosperity are concerned, the essential factors are these: Enough old building must be torn down to prevent an oversupply of space with its consequent bankruptcies; and it must be recognized that so far as the projects are self-liquidating they add nothing to the buying power of the community in the long run. In what manner and to what extent may private enterprise be affected by competition from model housing?

Unless a sufficient quantity of existing property is acquired and destroyed, in the course of the general public-works programme, to prevent an oversupply of housing, there is no escape from serious dislocation of private enterprise.



Mr. Clarence Stein, who has spent many years in the study of housing and community planning, has won for himself a reputation as an authority on these matters which is equalled by few American architects. No one has a broader understanding than he of the difficulties which these problems present, nor has any one clung more persistently to the belief that they would eventually be overcome and so striven more determinedly to bring this about.

Here are the questions put to him, and his answers:

What is the difference between restrictive and constructive housing legislation?

1. Restrictive legislation attempts to improve housing conditions by the exercise of police power. Legislation such as the New York and New Jersey Tenement House Laws has done much to improve living conditions by setting up minimum standards of construction, safety, and sanitation for individual builders. But these minimum requirements, based on small-scale development, have become maximum attainments. Restrictive legislation merely says "thou shalt not" and applies only to the individual speculative methods of development.

2. A constructive housing policy has been found necessary because of the inadequacy of private initiative. The Commission of Housing and Regional Planning of the State of New York in its proposal for permanent housing relief dated February 18, 1926, said:

"When private building for profit satisfies the immediate housing demand of 30 per cent of the population, further construction becomes unprofitable. Construction usually continues as long as the market is 'favorable,' or until evidence of surplus is discovered in a downward trend in the higher rentals. Then the lending agencies become conservative and private building stops. The cycle revolves slowly. Even this limited surplus is infrequent. And this small and occasional surplus derived from housing construction intended to satisfy the demand of only 30 per cent of the population represents all that commercial enterprise ever provides to meet the constantly increasing needs of 70 per cent of the population. At all times and in all places, private enterprise has been unable to supply adequate housing to meet the needs of the underlying population.

"This condition has always prevailed. Building on a speculative basis is confined to a field which offers the margin of profit that speculative enterprise requires. The speculative method is based on a series of negotiations, a combination of independent activities and a heaping up of small profits which accumulate to put the newly constructed dwelling quite beyond the reach of the average family. "The average family must be content with

"The average family must be content with the left-overs—and there are never enough of these to permit adequate housing for more than half the population.

"A system of producing houses which is geared to satisfy less than one-third of the current requirement of society must be accounted a social failure. It may function satisfactorily in its limited field but it must be supplemented by some other producing agency if the social need for housing is ever to be satisfied."

3. Constructive housing legislation is intended to give Government a direct responsibility for producing high-standard and low-cost housing. Only through constructive legislation is it possible to prevent the continued social degeneration of our slums and the economic deterioration of our cities caused by blight.

In what ways can Government take a constructive part in large-scale community housing that will give benefit to the occupant of the house rather than to the speculative builder?

1. By direct action.

By direct Government construction and management, as in many countries in Europe. Or——

By a municipal housing authority as is now proposed in a bill before the legislature of the State of New York.

2. By direct Government subsidy to limiteddividend companies or municipalities, as in England, Holland, etc.

3. By indirect subsidy to limited-dividend companies:

a. By tax exemption, as in New York City (on buildings alone).

b. By federal income-tax exemption on stock dividends.

c. By charging a low rental on land owned by city, as proposed for Chrystie-Forsythe Street property owned by City of New York.

d. By municipal purchase from housing companies of land not covered by building, as in the development of the Prudential Life Insurance Company in Newark.

4. By lending money at:

(1) A low rate of interest.

(2) For large part of cost of project.

(3) For a long period, *i.e.*, at low rate of amortization.

What is the best form of constructive assistance?

Either----

1. Direct action of Government.

2. Lending large amounts of money at low rates of interest and amortization to companies which are restricted so as to prevent speculation and poor housing.

3. Direct subsidy—but only for those who cannot be decently housed on an economic basis.

There should be no indirect subsidies.

All the cost of housing should be apparent. The more clearly the books are kept, the more incentive there will be to find more economical ways of producing decent homes and communities.

What form of constructive Governmental housing machinery now exists in this country?

The only important example that has been tested by experience is the New York State Housing Law. Its essential features are:

1. The Government gives tax exemption on buildings, and the right of eminent domain.

2. The limited-dividend company accepts: *a*. Limitation of 6 per cent return on investment.

b. Limitation of rentals, and

c. Supervision of the State Housing Board.

3. The mortgagee (in the past, insurance companies and savings banks, now the Reconstruction Finance Corporation) accepts limitation of 5 per cent interest.

What development has taken place in State laws during the past year and why?

Reconstruction Finance Corporation money, under the Emergency Relief and Construction Act, July, 1932, has been available to private corporations "formed wholly for the purpose of providing housing for families of low income or for reconstruction of slum areas, which are regulated by state or municipal laws as to rents, charges, capital structure, rate of returns, areas and methods of operation...." So as to take advantage of these loans State housing laws have been passed in Ohio, Texas, and New Jersey (not yet signed by the Governor), and proposed in Arkansas, Delaware, Oregon, Minnesota, Massachusetts, Missouri, Pennsylvania, Indiana, Illinois, Wisconsin, California, and the District of Columbia.

Why, in spite of the fact that the Emergency Relief and Construction Act was passed, has no construction of housing with Governmental money taken place?

1. Difficulty of securing equity money, *i.e.*, the difference between cost of project and two-thirds offered by the Reconstruction Finance Corporation.

2. Even limited private initiative has disappeared.

How can we start a large programme of housing and city rebuilding?

This is possible at the present time only through direct Governmental action. States or municipalities should appoint Housing Authorities similar in structure to the Authority of the Port of New York. Through such an agency money made available by the Federal Government for the purpose of relieving unemployment can be applied directly and effectively to the rebuilding of the rotting areas of our cities.

These bodies should be vested with corporate power and should be able to condemn, acquire, and replan areas for the purpose of rehabilitation and community building.

Such agencies should plan, construct, and manage housing developments. At a future time, it may be possible to set up private companies to take over these developments. At the present time it is unlikely that the large amount of work that is needed, to affect the unemployment situation to any extent, can be carried on effectively and efficiently by other than direct Governmental agencies.

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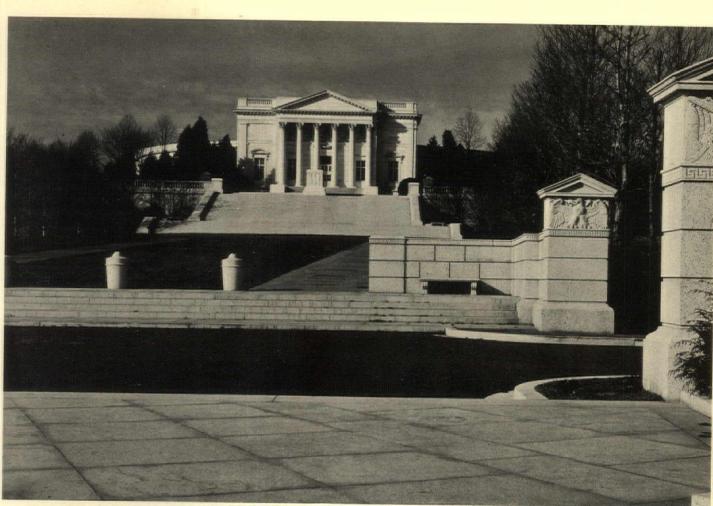
OLD ALSATIAN HOUSE, FREDERICKSBURG, TEXAS From the pencil drawing by E. M. Schiwetz

« ARCHITECTURE »



BASILICA PATRIARCAL, MONTERREY, MEXICO From the pencil drawing by E. M. Schiwetz

« ARCHITECTURE »



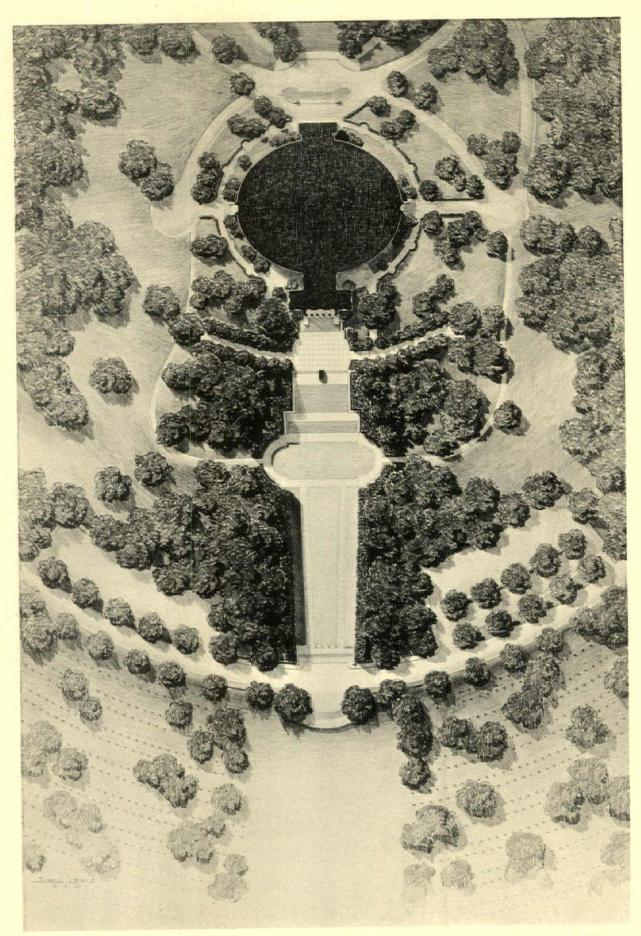
Photographs by Theo. Horydczak

Tomb of the Unknown Soldier and Approaches, Arlington, Va.

THOMAS HUDSON JONES, SCULPTOR LORIMER RICH, ARCHITECT

> The Amphitheatre, completed about 1917 as a memorial to the soldiers and sailors of all wars, was a single item unrelated to any broad scheme of treatment in Arlington. The architect's present task consisted of bringing this large building into relationship with the whole scheme while furnishing a fitting site for the Tomb of the Unknown Soldier. As the result of a competition held in 1928, five of the architects and sculptors entering that competition were selected to restudy their schemes and resubmit them with models of the Tomb itself. After the appointment of Messrs. Jones and Rich as sculptor and architect of the Tomb, Mr. Rich was further commissioned to design the approaches

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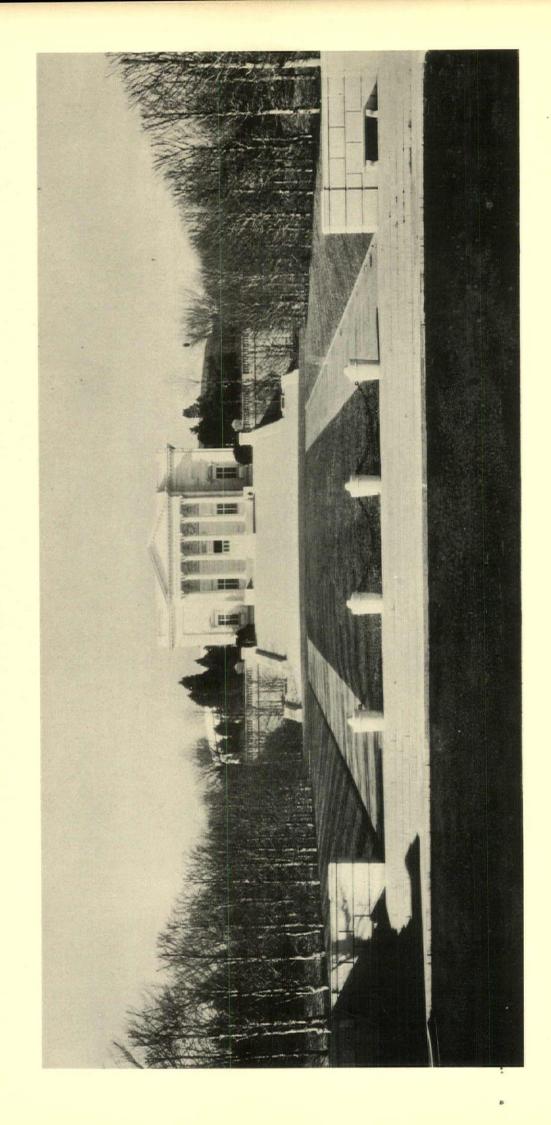


Plan of the approaches to the Tomb. Lorimer Rich, architect

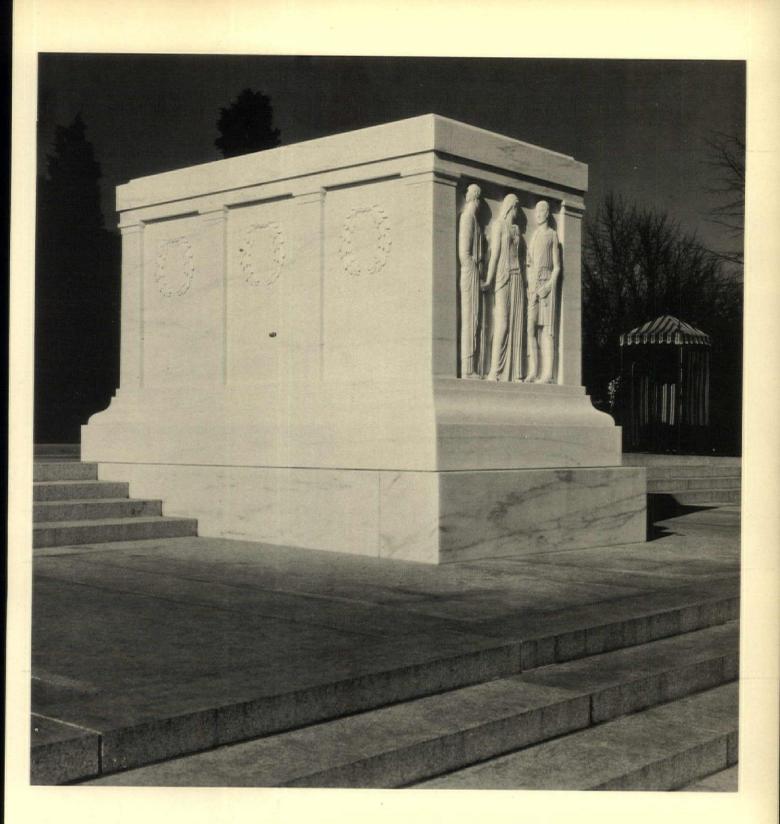
« ARCHITECTURE » 256



« ARCHITECTURE » 257 The Tomb as one approaches from below. Thomas Hudson Jones, sculptor; Lorimer Rich, architect



One arrives at the Tomb on the roadway in the foreground, leaving the conveyance and walking on foot up the gentle slope which is walled in at either side by a magnificent hedge of beech thirty feet in height. (Being but newly planted and without foliage, the hedge in this photograph lacks the impressiveness that it in reality possesses.) Lorimer Rich, architect



The panel on the front of the Tomb, facing Washington and the Potomac, bears three figures commemorative of the spirit of the Allies in the war-Victory in the centre, Valor on the left, Peace on the right with her palm branch to reward the devotion and sacrifice that, with Courage, made the cause of righteousness triumphant. Each side is divided into three panels by Doric pilasters, in each panel of which is carved an inverted wreath. The Tomb above its sub-base is made of only three pieces of marble-base, the block containing the sculpture, and the top slab. The marble is from Yule, Colorado, the same as that used in the Lincoln Memorial. Thomas Hudson Jones, sculptor; Lorimer Rich, architect

« ARCHITECTURE »



The Tomb from the rear. In the distance at the right one catches the glint of the Capitol dome. Thomas Hudson Jones, sculptor; Lorimer Rich, architect. The lettering of the inscription was designed by August Reuling

« ARCHITECTURE ≫ 260

Drawing as a Basis for Etching

By Gerald K. Geerlings

HERE is no architect-made etching in existence that I cannot spot from across the room. Why is it that usually architects can't draw?" So queries the secretary of an etching society.

"When you make an etching, for heaven's sake don't make it look like an 'architect's drawing." The advice which one of the leading print experts of New York gave me.

Any architect is apt to resent that, of course. Not draw? Preposterous. Why, since the age of seven-

Viewing architectural drawings done out-of-doors quite dispassionately, however, rather brings one around to agree. When an architect produces drawings with the aid of Tsquare and triangle he records facts and realities. The final result bears the stamp of authority. But when the architect goes out to sketch, freedom from office restrictions seems to make him less responsible. His sense of selection does not function conscientiously. He is led astray by trying to draw as he thinks he remembers some one else did, instead of recording truth to the best of his ability. Lines (particularly ridge lines on old houses) become doddering. Loosely defined shadows smother detail where it would be most informative. The sun invariably beats down with Andalusian brilliance. All surfaces glisten like the Elgin marbles. The result lacks definition, solidity, and conviction.

It is not that the outdoor drawing should resemble a labored office production. But it should not depend on flashy cleverness, catchy "picturesqueness," or repetitious tricks copied from some one else. It should have the sincerity which makes a Meryon etching vital. Particularly should this be true if the drawing is to be a reference guide for an etching, for in that medium the form must be expressed in individual lines and cannot depend on indefinite pencil smudges. Examine the work of any artist who is truly great (a form of recreation indulged in far too infrequently), and you will find the immortal quality is dependent primarily on straightforward, intelligent drawing. Not just an embroidery of inconsequential lines, but an economic structure of only the essential ones.

The marginal illus-

trations herewith

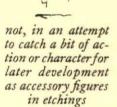
are from fountain-

pen notes made on

the backs of menus,

envelopes, or what

Almost any one can do a drawing of a million lines, but only a master can express the same truth in one hundred lines. Analyze any masterly etching or drawing and you will find the engineering bones underlie the whole structure. The mood of the subject has been studied and the chiaroscuro determined accordingly. Short-cuts are not resorted to. Each square millimetre has informative, vital lines, not meaningless straws. Lines are drawn as true as the artist's ability permitted. When a single surface, such as a roof, is depicted, there is not a false mosaic of the whitest whites and darkest blacks. In a word, there is evidence that the subject has been studied, planned, lived with.



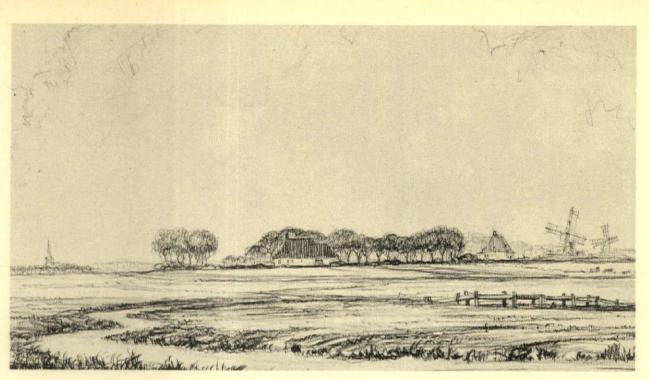




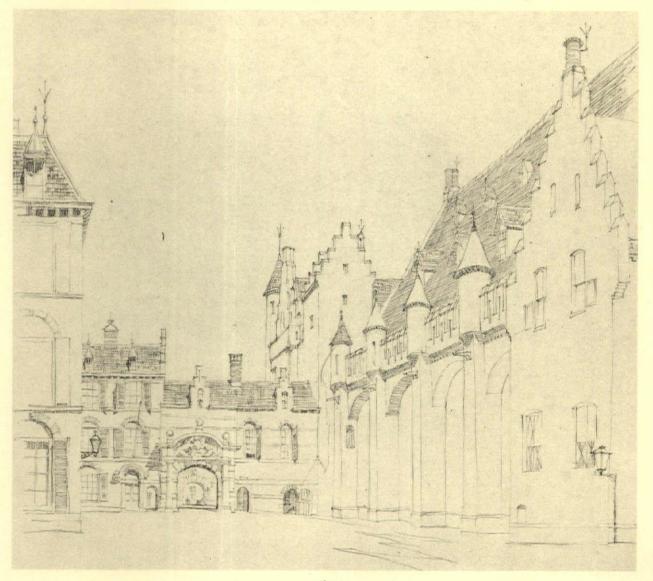
Alkmaar, Holland; the Weighing House at Cheese Market, 1929. Other details, not reproduced, were made showing studies of porters, onlookers, reflections, cheeses, and the like

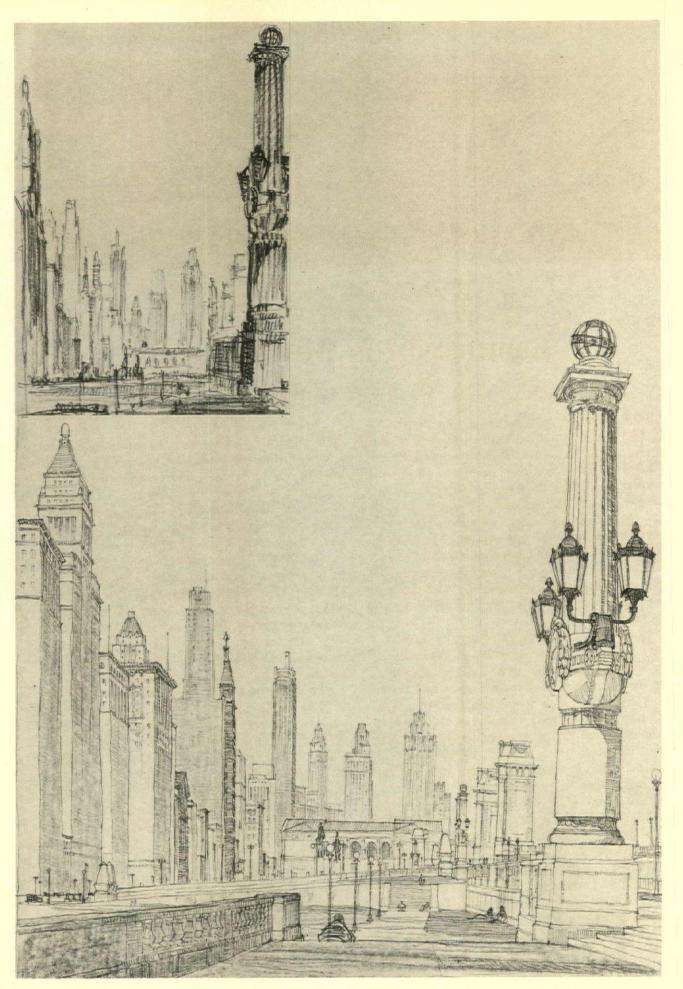
Every artist should of course develop his own method of working. By no means are the drawings here reproduced meant to be held up as models. They are perhaps of interest because of being working drawings drawn on the spot, untouched thereafter, and executed standing up —I never am able to find a place to sit down to get what I want. Obviously they are not finished drawings; rather are they outlines for essays to be built around them later with the various details (not shown). None of them will be used as it is. Each will be composed and combined, providing it serves the purpose of creating a satisfactory interpretation of a theme. Their value to me lies in the architectural anatomy which they record, in their suggestion of masses and compositions, and in the pattern of shadows (these are mostly in outline rather than filled in). In all cases 2B "black chalk" or "carbon" pencil (synonymous terms) was used on a heavy grade of white vellum, except in the Chicago drawing on page 264, where charcoal tones were added. All reproductions are reproduced at the actual size of the originals, except the frontispiece, which has been slightly enlarged.

« ARCHITECTURE »



Above—Friesland, Holland; a composite landscape. Below—Binnen Hoff, The Hague, 1929; both of these from the pencil drawings by Gerald K. Geerlings





Chicago: Michigan Boulevard, looking north, 1930. From the pencil drawing by Gerald K. Geerlings. The upper insert sketch is one of several made in establishing a desirable viewpoint; tones in the lower drawing consist of charcoal "washes"

« ARCHITECTURE » 264



Photographs by Ben V. Matthews

Hinge for one of the side doors of narthex, church at Winston-Salem, built up of three flat pierced plates of steel. Mayers, Murray & Phillip, architects; craftsmanship by Ostrander & Eshleman

Lamination in Metal Work By Eugene Clute

P to produce in the days before men had to produce in the days before men had the heavy machinery needed to roll them from the billets and the power to operate it. Now they can be rolled easily and cheaply. While the old-time workers made little use of metal in this form, we may use plates and sheets freely and with advantage. They can be had in various thicknesses at moderate cost. Bold relief, effective scale, and a lively play of light and shade can be secured by lamination in metal work with comparatively little expenditure of labor.

One of the most natural things to do with a plate of metal is to cut out a design in silhouette. It is only a step further to pile up cut-out plates one upon another to form a design and fasten them together. It is surprising that the possibilities that lie in lamination seem to have been overlooked by designers until within the last three or four years. Now, however, several architects and craftsmen are working along this line, with some admirable results.

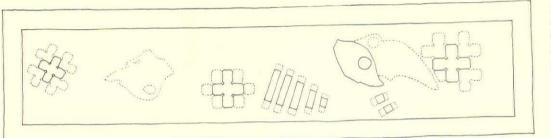
Among the most interesting examples of this technique are the hinges upon the exterior doors of the recently completed Centenary-West End Methodist Episcopal Church, South, at Winston-Salem, N. C., which are shown here by photographs and working drawings. They are the result of evolution from the limited use of lamination in the hinges of the Church of the Heavenly Rest, New York City, which was built about four years ago by the same architects, Mayers, Murray & Phillip. The hinges at the Church of the Heavenly Rest are very rich examples of costly hand craftsmanship, elaborately pierced, engraved and chased in a decoratively treated pictorial design of local historical significance. Lamination is employed in them only as an auxiliary method, a single plate being applied in certain parts to give the required depth.

Desiring to do something equally good in its way, but much less elaborate, for the church at Winston-Salem, the architects set about developing the designs of these hinges on the basis of lamination, with simple piercing, and in this way they became pioneers in creating a new technique in craftsmanship and a new manner of design growing out of its requirements.

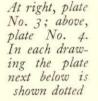
In order that the designs might be fully studied in the third dimension, which is so important in laminated work, they constructed full-size cardboard models of the hinges by gluing cut-out layers of cardboard together. To study the effects of color and texture upon the designs, they applied aluminum paint and black paint to these models to simulate the appearance of half-polished wrought iron.

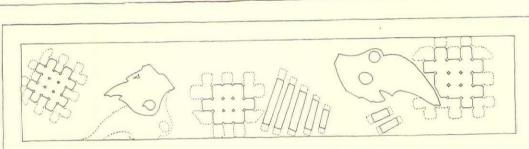
When the craftsmen—Ostrander & Eshleman—received the full-size drawings they made templates of metal for use in marking the designs upon the sheet metal. They engraved the outlines of the pieces by hand, following the templates, then cut out the pieces with a hack saw. The piercing was done also with the saw. Next they filed the pieces exactly to the engraved outlines.

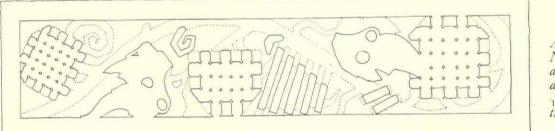




Above, the finished hinge for the chapel door, using four plates as detailed below

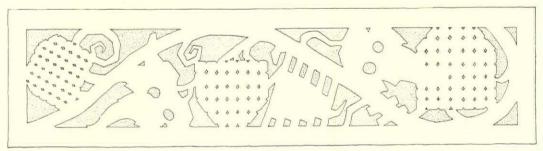






At left, plate No. 2. This and the two above are each ¹/₁ in. thick, the bottom plate being ¹/₈ in.





In order that no screws, rivets, or other means of attachment might show upon the face of the work, it was determined to fasten the laminations together with pins fixed to the back of each piece. Therefore, the templates were spotted for the pins and for the holes to match them, drilled and fitted together. Then, the locations of pins and holes were transferred to the plates with a center-punch. The pins, of a non-ferrous metal, were brazed to the backs of





the pieces and the holes were reamed on the backs of the plates to form conical recesses.

There are knuckles at one end of each back plate of the hinges for the chapel and narthex doors, forged from the same piece, to fit upon a pintle set in the stone jamb. The hinges in the main portal have separate decorative plates. For ease in forging these knuckles, and because it can be had in desirable thicknesses, high-grade American steel was chosen as the material for the hinges. In passing, it may be noted that these hinges work easily and smoothly, for the knuckles, excepting in the hinges of the chapel doors, rest upon Tobin bronze bearings in the pintles, so designed that they may be screwed up or down and secured by a lock nut. By this

267

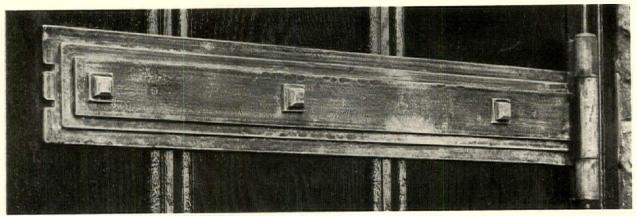
One of the hinges for the main entrance door. There were eight of these, the symbol in the vesica form changing. Two of the variations are pictured at left and right, with the four plates of the eagle superimposed below.





means it is possible to obtain proper adjustment and make each hinge bear its share of the weight.

To prevent rusting, each part was separately cadmium-plated by a process that insures a lasting and impervious coating. Then the parts were assembled, the pins on the back of the topmost plate being inserted in the holes in the next plate below it and spread out with a hammer and punches to form countersunk rivet heads in the backs of the holes. Any projections of the pins were filed down flush with the back of the plate. The same method was carried on progressively, each plate being attached to the one beneath it, down to the back plate. As a result, any water that may find its way between the plates can do no harm, for



A simple three-plate strap hinge of steel for the Bathing Enclosure, Jones Beach State Park, Long Island. Designed by Herbert A. Magoon, architect of the Long Island State Park Commission; craftsmanship by Ostrander & Eshleman

each plate is completely enclosed in a material that does not rust, and the pins, being nonferrous, cannot rust. The back plates are oneeighth inch thick and the laminæ are one-sixteenth inch thick. Four plates are used in the hinges of the doors in the main entrance and the chapel, and three plates in those for the narthex aisle doors. A half-polished finish was produced by the application of a black coating which was removed from the prominences and allowed to remain in the depressions of the surface. The texture is that produced naturally by the process of plating with cadmium, a wrinkled grain effect; there is no hammer marking or other applied texture. The metal was worked cold excepting the forging of the knuckles.

The same method has recently been employed by these craftsmen in executing the laminated hinges for the bathing enclosure at Jones Beach, State Park, Long Island. These hinges also are of high-grade American steel. They have a half-polished finish produced by applying a chemical that turns cadmium black. This is neutralized before its action has progressed far enough to harm the plating as a protective coating, and the neutralizing reagent is removed by thorough washing. Then, the resulting patine is polished off of the prominences.

Practically any metal can be used for laminated work, such as: nickel-chrome steel, Monel metal, bronze, nickel-bronze or aluminum, as well as wrought iron and mild steel. When a non-ferrous metal or alloy-steel is used which does not require protective plating, the parts can be joined by welding. Work in wrought iron and mild steel, when not to be exposed to the weather, may be unprotected and can be welded. Monel metal, various copper-base alloys, aluminum, and wrought iron may well be welded with the oxy-acetylene torch. Spot welding with the electric arc is much used in joining parts of mild steel or nickel-chrome steel. The danger of burning the metal in spot welding can be minimized by placing a thick metal plate as a backer behind the work during the process and focussing the arc in the backer instead of the work.

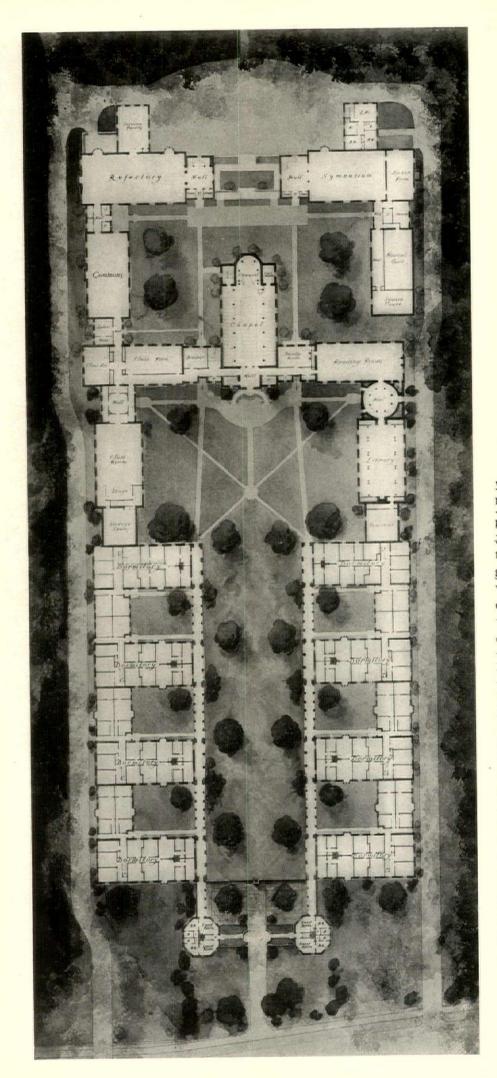
Lamination is just as applicable to the making of grilles, banking screens, doors, or any other architectural metal work as to the making of hinges. That it lends itself readily to designs of a traditional character is well demonstrated by the suitability of these church door hinges to their place. Something very like this, we may assume, is what the mediæval craftsmen would have done if plates of metal had been as available in their times as they are in our day.

There is nothing to prevent the combination of various metals in laminated work, if those metals which tend to set up destructive electrolytic action are not used together, or if they are used with effective electrical insulation between them. A new method of electrical insulation developed by Oscar B. Bach, and employed in the making of the colossal repoussé decorations in combinations of various metals for Radio City, makes it possible to use any desired metals together freely. As a rule it may be said that metals of a more or less similar nature may be used in combination without insulation. For example: bronze, Monel metal, nickelbronze, and copper; or iron, steel, and nickelchrome steel. Iron and copper are frequently combined. Care should be used in combining other metals, the special conditions to which the work is to be subjected being taken into account and met by the precautions of an experienced craftsman.



The Yale Divinity School New Haven, Conn.

DELANO & ALDRICH, ARCHITECTS





SE& THE authorities in charge of the new Yale Divinity School, and the archi-MANT tects, were in accord in their desire to carry out the programme in a kind of architecture which, first of all, should avoid elaboration, richness of ornamentation, and the consequent added expense; and, second, should express in a free and untrammelled way the traditions of old New Haven, of which the key is struck by the ancient buildings of the University and the town and especially by the three churches on the Green, unique in America, or anywhere else for that matter. The scheme was worked out along these lines with the result that while some other recent buildings destined for purely secular use are of a mediæval architecture usually associated in the public mind with the Church, the Divinity School itself, dominated by its Chapel and dedicated to religious education, is in the cool and restrained Georgian of Puritan New England.

« ARCHITECTURE »



A view from the upper end of the campus where the Chapel dominates the dormitory ranges. Although quite different in detail, there is something in these buildings that is akin to Jefferson's University of Virginia

These buildings depend for their interest almost entirely upon their form and grouping, determined largely by the levels of the site. The ground slopes gradually from the entrance up to the dominating Chapel at the highest point, behind which on a broad grassy terrace are the Commons and Refectory on one side, and the Gymnasium, hand-ball courts, etc., on the other. Beyond this the land slopes steeply down. In front of the Chapel, on a wide campus, are the Libraries, entered through a circular rotunda, and the Auditorium, and in front of these again the dormitories with grass courts between,

« ARCHITECTURE »

connected by arcades. Flanking the entrance are the two small octagonal guest houses. All of these buildings are of simple masonry in a warm pinkish brick which comes from kilns near New Haven. In the Chapel itself an effort has been made—and apparently appreciated—to give a churchly atmosphere while holding to the Georgian style. We believe that the buildings speak for themselves and that they hang together as a unit in expressing the rather austere type of feeling and teaching associated with the Yale Divinity School, one of the oldest institutions in New England.





In the Chapel the simple rectangular plan with its apsidal chancel carries forward into a more sophisticated age the dignity and austerity of the colonial meeting-house

On the page facing, a detail of the chancel. The lighting fixtures were executed by Cox, Nostrand & Gunnison from the architects' designs; the central fixtures are of chrome-plated brass, glass rods and a spiral arrangement of the lamps around the central support—the eagle and tassel are gold-plated

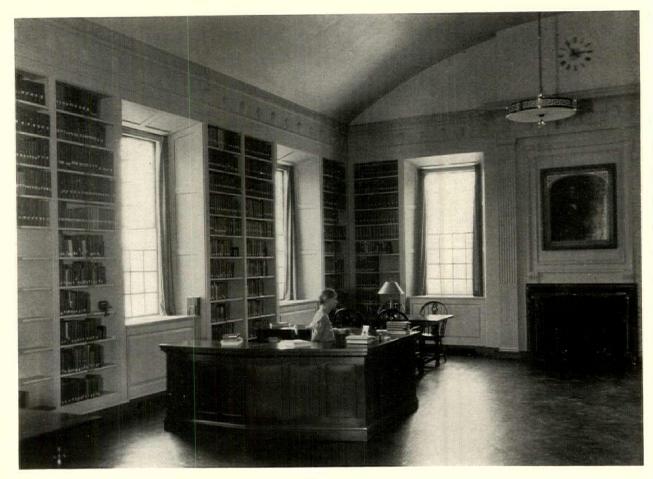
The circular hall connecting the Library with the Reading Room, shown on the plan (page 270) to the right of the Chapel

« ARCHITECTURE »





Above: the Commons Room, in which one unusual feature is found in the lighting fixtures of carved wood, touched with gilding. Below, a corner of the Reading Room





A PHOTOGRAPHIC STUDY BY ROBERT MACLEAN GLASGOW Entered in a contest held by the National Alliance of Art and Industry, this photograph was selected as one of the "hundred best"

« ARCHITECTURE »



The Christian Science Publishing Society's building, now being erected in Boston. It is to have a length of 600 feet, and will be completed later this year. Chester Lindsay Churchill, architect

Architectural News



The Home Office Building, Metropolitan Life Insurance Company, New York City, recently completed. D. Everett Waid and Harvey Wiley Corbett, architects

The foundations are in for this annex to the Post Office Building on Ninth Avenue, New York City. McKim, Mead & White, architects

Below, the Benjamin Franklin Memorial and Franklin Institute Museum, Philadelphia, now nearing completion. John T. Windrim, architect



A model of Old State House Square, Hartford, Conn., with the post-office building demolished and the park restored (with underground parking space) about the Bulfinch State House. Lester Beach Scheide, Inc., architects; model by Elizabeth Judd Scheide



Façade of the American Philosophical Society's new building proposed for Philadelphia, for which a site on the Parkway has been acquired. Paul P. Cret, architect



in Photographs



The Dime Savings Bank Building, Brooklyn, which is to be decorated with a bronze tablet as the recipient of an annual award by the Brooklyn Chamber of Commerce. Halsey, McCormack & Helmer, Inc., architects





Sundial designed by Cass Gilbert and presented by Mr. and Mrs. Gilbert to Shakespeare's Garden, Stratford-on-Avon. The panels, representing the seven ages of man, were modelled by John Donnelly, and the stone cutting done in England

The new school building for Florham Park, a section of Madison, N. J., not all of which building is to be built at once. Rasmussen & Wayland, architects



"There ought to be a law"—but apparently it has not yet been put on the statute books, for the creation on the left exists in Los Angeles, and that on the right in Portland, Ore.



COMPOSITION AND RENDERING. By A. THORNTON BISHOP. 128 pages, 7 by 10½ inches. Illustrations from pencil drawings. New York: 1933: John Wiley & Sons, Inc. \$2.75.

Mr. Bishop, whose pencil drawings are widely and favorably known, lays great stress in this volume on composition, discussing its essentials, and showing parallel drawings illustrating possession of and lack of the fundamental qualifications. He presents also a detailed exposition of pencil indication of building materials and accessories. There is also a chapter on composition in the theatre.

GARDENS AND GARDENING. Edited by F. A. MERCER. 128 pages, 8 by 11½ inches. Illustrations from photographs and plans. Printed in Great Britain. New York: 1933: The Studio Publications, Inc. Cloth, \$3.50; wrapper, \$2.50.

This is the second issue of *The Studio Gardening* Annual—a creditable relative of *The Studio's* year books on various subjects. In addition to almost inspiring photographs of the gardens of many nations, there are constructive articles on the flowering shrubs, small gardens for pleasure and profit, and perennials in the modern garden, and a few illustrations of some new and lesser-known plants.

- SHEAR TESTS OF REINFORCED BRICK MASONRY BEAMS. By D. E. PARSONS, A. H. STANG, and J. W. McBURNEY. 20 pages, 6 by 9¹/₄ inches. Illustrations from photographs and diagrams. Research Paper No. 504. Pamphlet binding. Washington: 1933: U. S. Department of Commerce, Bureau of Standards. 5 cents.
- NEW ORLEANS. Its Old Houses, Shops and Public Buildings. By NATHANIEL CORTLANDT CURTIS. 267 pages, 53/4 by 83/4 inches. Illustrations from two drawings in color, photographs, line drawings, and maps. Philadelphia: 1933: J. B. Lippincott Co. \$3.50.

The old saying that a city has a physiognomy could scarcely be better exemplified than in the case of New Orleans, and the author, who is an architect and a lecturer at Tulane University, has successfully caught the characteristics that give New Orleans its distinct individuality. Mr. Curtis not only has an inspiring subject for his book, but displays unusual charm in unfolding it.

THE NEW ILLUSTRATED GARDENING EN-CYCLOPÆDIA. Edited by RICHARD SUDELL. 1152 pages, 5½ by 8 inches. Illustrations from photographs and drawings, with colored frontispiece. Printed in Great Britain. New York: 1933: Charles Scribner's Sons.

As soon as the amateur gardener has passed the early stages of his fever, the seed catalogues and the specialized reference books will tax more and more frequently his ability to find answers to questions that arise in his work. Here is a book designed to answer many of those questions through easy alphabetical access to subject matter and to data concerning individual plants. Moreover, certain sections dealing with popular specialties are treated much more fully and in accordance with the latest approved practices. There is even a special calendar of garden operations by months, the months being found as headings in the regular alphabetical sequence.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS GUIDE, 1933. 831 pages, 6 by 9 inches. Illustrations from diagrams. New York: 1933: American Society of Heating and Ventilating Engineers. \$5.

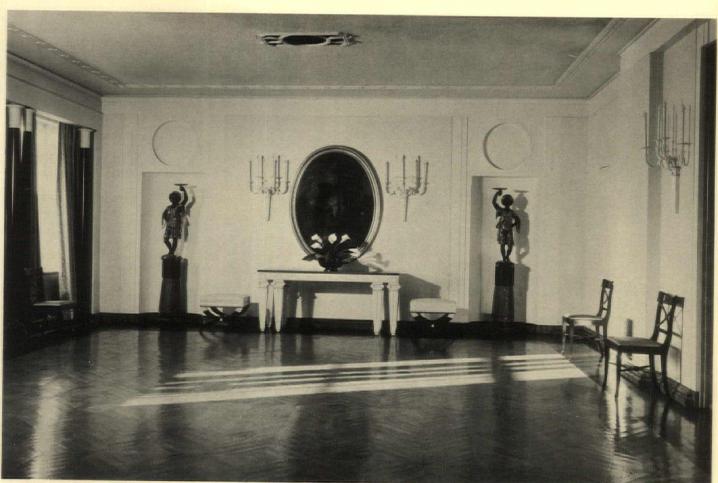
An indispensable collection of reference data on the design and specification of heating and ventilating systems. These annual volumes, of which this is the eleventh, bring a fast-moving science up to date in the practitioner's office.

THE NEW VISION. By MOHOLY-NAGY. Translated by DAPHNE M. HOFFMANN. 191 pages, 7¹/₂ by 10 inches. Illustrations from photographs, paintings, and sculpture. Printed in Germany. New York: 1932: Harcourt, Brace & Co. \$5.

Here is a detailed analysis of a new attitude toward art education, largely as put into practice by the Bauhaus. The author was a lecturer at the Bauhaus in Weimar and Dessau, 1923–1928, and has had the benefit of practical experience with these new theories of teaching.

- PENETRATION OF DAYLIGHT AND SUN-LIGHT INTO BUILDINGS. 2d edition. Illumination Research Technical Paper No. 7. 34 pages, 6 by 93⁄4 inches. Illustrations from diagrams and graphs. Pamphlet binding. Printed in Great Britain. New York: 1932: His Majesty's Stationery Office (The British Library of Information). 20 cents.
- CODE FOR PROTECTION AGAINST LIGHT-NING. 93 pages, 5 by 7½ inches. Illustrations from photographs. Handbook of the Bureau of Standards, No. 17. Pamphlet binding. Washington: 1932: U. S. Department of Commerce, Bureau of Standards. 15 cents.

There has been a tendency in this generation to regard protection against lightning as more or less of an outworn fetish. As a matter of fact, the annual fatalities from lightning in the United States are about 500, with about 1300 injured. Moreover, in Iowa, over a five-year period, there were twentynine unprotected buildings destroyed for every rodded building destroyed by lightning—and this in the face of a large proportion of obviously defective installations.



Photographs by Alexander Piaget

The Music Room. Walls are sand-finished and smooth white plaster; the ceiling gray. There is a parquetry floor with black border in oak; lapis-colored baseboard; ebonized colonnettes with gray marbled capitals. The curtains are silver, gold, and yellow. Furniture and lighting fixtures were designed by the architects The Park Plaza, St. Louis, Mo.

HALL & PROETZ ARCHITECTS FOR THE PUBLIC ROOMS

The Lacquer Room—a private dining-room. Two end walls and a dado are in yellow lacquer; the side walls covered with glazed chintz designed by Albert Herter. The carpet is gray bordered with black; the furniture upholstered in black horsehair





The Marine Dining-room. Walls, chalk white; columns, with carved wood marine motifs, in white lacquer; upper dado, cobalt blue; balustrade in gray lacquer; windows in cherry lacquer. Lower floor is stained pink; the ceiling covered with gold foil





The Coffee Bar. There is a linoleum floor, dado, and ceiling in nine gradations of gray; flat wall surfaces, butter yellow; trim, fixtures, furniture, etc., aluminum. Upholstery is in metallic blue leather; bar in black rubber; the mirror doors, gray

A typical elevator lobby. Walls are white; trim, marbleized Prussian bluegreen; console and chairs in white, black, and gold, the chairs having seats of black patent-leather



The Empire Room. Walls and ceiling are white; pilasters of Pyrenees black-and-white marble with cast pewter capitals; the chimney piece, white with Grand Antique marble; chandeliers are pewter and crystal; the carpet, peach color; the furniture in ebony and curly maple upholstered in clothof-gold

« ARCHITECTURE »

²⁸²

Some Pitfalls in Supervision By W. F. Bartels

• Course, closed • Contained to the should be • Contained to the superintendent for an overpressure of at least 50 per cent more than XXXI. MECHANICAL APPURTENANCES (CONTINUED)

their service maximum. The hot-water tank is usually of this type and is generally fed from the house tank by gravity. The material of which the tank is made should comply with that which has been specified, both as to thickness and quality of the material. Riveting should be so done that there is but little leakage and so that an excessive amount of calking is unnecessary. The superintendent should see that all the reenforcing around the connections called for has been provided. Ascertaining that the outlets are in their proper location is a wise precaution. After connections have been made, tests may be asked for, to determine the tightness of the tank. When this has been done and the tank emptied of water, the superintendent should see that it is thoroughly cleaned, dried and then coated with one of the better tank preservatives. If the tank has arrived on the job without a coat of red lead it should be cleaned and the exterior then painted, followed by another coat as soon as the first is dry. These coats of paint will of course not be put on while the tank contains water, because of the danger of sweating during the painting. Some architects have found that a coat of aluminum paint over the red lead is very satisfactory, but aluminum paint to be at its best should be freshly made from the powder. Before the tank is finally turned over to the owner the superintendent should see that it is emptied of all water and the sludge removed. Otherwise any stirring up of this sludge will not only cause muddy water but it may cause trouble by getting into some of the valves.

Domestic hot-water heaters are of many types. There are those which use an interior steam coil to heat the water in the tank, while others derive their heat from coils attached directly to the side of the boiler. But no matter what system is used, once selected by the architect or engineer, it is the superintendent's duty to see that all specifications in regard to it are faithfully complied with. I was once called back to a job where a side heater had been installed, the owner complaining that not enough heat was forthcoming. Armed with the specification and the rating book of the heating manufacturer, I assured the owner that theoretically enough hot water *should* be coming from the

heater. But the fact remained that it was not. Digging into the covering on the heater, it was found that the number on the heater corresponded correctly to the one specified. But further investigation under the insulation disclosed the fact that the heater was joined to the boiler both top and bottom by a 1-inch pipe, while the outlet of the heater was made for a $2\frac{1}{2}$ -inch connection! The boiler had been delivered to the job tapped for a 1-inch outlet. Finding it thus, rather than laboriously drilling a $2\frac{1}{2}$ -inch hole, the mechanic had bushed the heater outlet down to one inch and covered it before any one saw it.

In the small house as well as in the large one, the superintendent should remember that all heat supplied to an indirect heater for hot water is taken away from the boiler. Unless a boiler is of sufficient size to take care of both the hot water and the steam, considerable dissatisfaction may result. It is evident that the size of both the boiler and the hot-water heater must be checked back against the specifications and the manufacturer's catalogue to see that the proper size has been delivered to the job. Then too, all such other equipment as thermometers, gauges, the rheostats, etc., must be gone over to see that they have been delivered to the job. Proper valves to cut off the storage tank from the heater, and the heater from the water supply, should be furnished. These may also provide for cleaning or removing coils without shutting down the main boiler, or for cutting off the flow through a heater not in use, such as might be required when a small heater is used for hot water in the summer and indirect heating from a large boiler in the winter. There is no use in allowing a flow of hot water to warm the water in the large boiler during the summer, which is what will happen unless there is a valve to shut this circulation off. A valve installed at a point to prevent this will save many B.t.u.'s. It may often seem that too many valves, capped tee outlets, etc., are being demanded, but the convenience they afford and the time and money

that they save when repairs are made, will more than compensate for the cost of their installation.

It is quite obvious that adequate covering of boilers and pipes is essential in conserving heat. When a boiler is properly insulated the room is not only more comfortable for the persons who must be there, but also more comforting on the check book of the man who foots the fuel bill. Many superintendents are prone to pass hurriedly over insulating work, feeling that it is only "fancy work." But if they were apprised of the astonishing amount of heat saved by good insulation, they would never need to be retold to insist on a first-class job. On tanks and boiler work, blocks of magnesia should be wired on, with a wire mesh fastened on top of them to provide the finish coat with a ground to which it can securely adhere. Another material may be obtained which has metal lath already fastened to it.

Many contrivances are used in connection with boilers besides hot-water heaters and the superintendent must be constantly on guard to prevent any palming off of an inferior article upon an owner unless the latter fully understands exactly what he is getting and what refund is to be given.

An illustration might be mentioned which, while covering one particular item, might be considered typical of many similar tests which might be asked for. An appliance which used the condensate of a steam system for heating the hot water of a building, also had a steam connection in case the condensate did not furnish enough heat to raise the water temperature to the proper degree. The appliance had been specified to perform certain functions, namely that a definite amount of condensate returning to this heater would raise a certain amount of water leaving the appliance a stipulated number of degrees. When the superintendent asked to have a test made he was told that it would be foolish, because all the needs for hot water were being supplied by the appliance and it had never once been necessary to cut in the live steam to help the condensate out. This answer, it will be seen at once, was irrelevant, unless other factors were known. The question might be asked, "Suppose there was an abnormal condensate over the period, and an underestimated amount of hot water used. The appliance might only be doing a quarter of the work it was supposed to and yet for a while might "get away with it." And again it will be seen that the superintendent must follow through in tests.

There is no dearth of pumps on the market today. However fortunate that may be, it is no wonder that the architect is often in a quandary as to which one to select. Each one seems to possess one or two specific and individual valuable features. And, according to their sponsors, the lack of this or that gadget on competitive makes automatically settles the choice.

The superintendent is apt to be in a dilemma when inspecting the pump and its installation. He is beset with such an array of conflicting considerations, and such sheafs of pamphlets with miscellaneous data, curves, graphs, peculiar terms, and highly specialized information, that he is to be excused for sometimes being in a mental fog as to how to proceed. But, be they vacuum, suction lift, pressure, force, or other types, these pumps are built to perform certain work according to specific requirements, if they are to operate successfully. The superintendent should make sure that everything within reason is done to co-operate with the concern supplying the pump so that there may be no argument later that the pump is failing to do its job because "such and such an item was not properly provided or attended to" for the pump contractor.

The proper location of pumps is an important item. While it seems perfectly obvious that they must be readily accessible from all sides, and the lighting more than adequate, nevertheless these are often not provided for on the architect's drawings. There must be ample room to get at the pump in case of repairs, when new parts must be substituted or swung into position. The pump should not require specially formed mechanics. In one building I recall that a pump was so located that it required not only a tall, thin man but one with a gorilla's arms to get at the oil cups. The oiler in charge possessed neither of these qualifications; unfortunately he had both short arms and a generous girth. One day the oiler ran to his chief with word that the pump bearings were "frozen." The oil cups were filled to the top and nobody could understand why the bearings could "freeze" with the cups full of oil-except possibly the oiler, who then realized that filling them after the bearings had "frozen" was of little value. Then too, the turns and run of pipe necessary to reach a central point must be considered. These add to the vibration and friction and should be avoided as far as possible.

(To be continued)

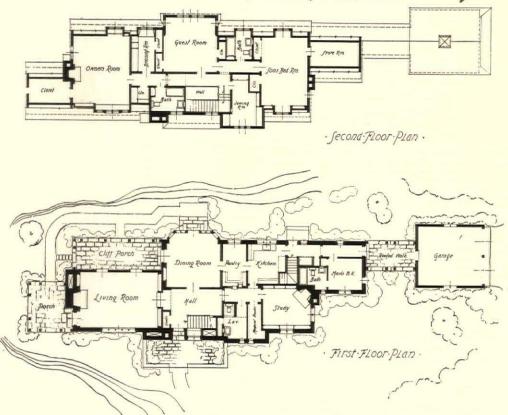


Photograph by Tyner & Murphy

House of Dr. Thomas G. Orr, Kansas City, Mo.

EDWARD BUEHLER DELK, ARCHITECT

This house received the 1930 medal of the Kansas City Chapter, A. I. A., in the residential class. The long plan is explained by the site, the house following the bank of a water course





Photograph by Anderson Detail of the main entrance

ARCHITECTURE
 28



Photographs by Clara H. Sparks The fireplace end of the living-room

House of Dr. Thomas G. Orr, Kansas City, Mo. Edward buehler delk, architect

Looking into the hall from the lower level of the living-room

≪ ARCHITECTURE ≫ 287





Photograph by Clara H. Sparks Dining-room, largely of glass on the side toward the water

House of Dr. Thomas G. Orr, Kansas City, Mo. Edward buehler delk, architect

The stair hall Photograph by Anderson

≪ ARCHITECTURE ≫
 288



Friday, February 24.—Although the facts have been rather widely known for some time, I was rather jarred to realize that out of one hundred forty-five million dollars set aside by Congress for public-building construction this fiscal year, one fifth of it will be spent within the small area constituting the District of Columbia. The Federal projects under way in Washington are as follows:

Extension building, Department

Excension bunding, Department	
of Agriculture	\$12,800,000
Archives Building	8,750,000
Central heating plant	5,749,000
Labor Department and Inter-	211 121
state Commerce.	11,250,000
Department of Justice Building.	12,000,000
Postoffice Department	10,300,000
Public Health Service	908,250
Annex to city postoffice	4,000,000
Addition to Senate Office Build-	
ing	2,146,669
House Office Building addition	582,901
Supreme Court Building	8,381,980
Addition to Congressional Li-	10 17
rary	1,123,000
Development of Botanical Gar-	
dens	739,166
Congressional garage and terrace	1000
development, including the	
subway fountains	806,001
subway fourtaills	000,001
Total	
1 Otal	10,530,90/

Saturday, February 25.-Varying from the usual custom of presenting its medals on the night of the formal opening, the League for this year's Show post-poned the ceremonies until today. There was nothing particularly surprising to most of us in the details of the awards (page 211 of the April ARCHITECTURE). Joseph Urban was the big hero of the occasion in receiving two medals. One of these, the President's Medal, has not been awarded for some years, and it was a particularly popular gesture when it was given this year to the man who put together what, as a unit, is considered one of the most effective exhibitions in its manner of presentation that the League has ever staged

Tuesday, February 28.—The evidence continues to pile up in substantiation of the belief that a really large programme of public works offers the only way out of our economic slough. Even the bankers seem to be joining the ranks, for Martin Dodge, representing the Second Federal Reserve District, recently broadcast his whole-hearted support of such a view. One of the most interesting bits of his talk was:

of his talk was: "Several misconceptions prevail regarding the construction of public works as an aid in the present depression. For instance, it is said that no reasonable programme of public works could possibly supply jobs for the ten or twelve million persons now out of work, so why bother with it at all? No one contends, of course, that the government can supply jobs to ten or twelve million persons. It is equally true, however,



The Editor's Diary

that the government cannot permanently provide food, clothing, and shelter for these ten or twelve million persons and their dependents. The only genuine relief for the unemployed is re-employment by business and industry. Every plan of relief, therefore, should be tested on the basis of whether or not it contributes to economic recovery.

... "A third misconception is the belief that 'public works' means public works by the national government. The truth of the matter is that the bulk of public works construction has almost always been local or State, rather than national. Such projects as municipal water works, sewer systems, street and highway construction, bridges, tunnels, schools, and county and municipal buildings, constitute by far the largest percentage of all public works construction.

... "Can we afford it? Is it not inconsistent with present efforts toward tax reduction, economy, and retrenchment? These questions reflect a fourth misconception regarding public works as a means for stimulating business re-covery. The answer here is that if we do not spend money in such a way as to provide employment we shall have to spend it for unemployment; that if economy means blind retrenchment it becomes extravagance; for instance, a wholesale suspension of public works, ostensibly to cut expenses, simply means transferring men from the employment roll to the relief roll, which costs money just the same but adds nothing to the public wealth and makes no contribution to business recovery.'

Wednesday, March I.—James T. Grady, publicist for the A. I. A., joined the architectural editors at luncheon today, and told us something of the present status of the Institute's efforts toward new Federal legislation. With the change of administration and the strong possibility of a complete reorganization of the government bureaus, it would seem best to sit tight for the moment and await the new course in which the ship of state will be set.

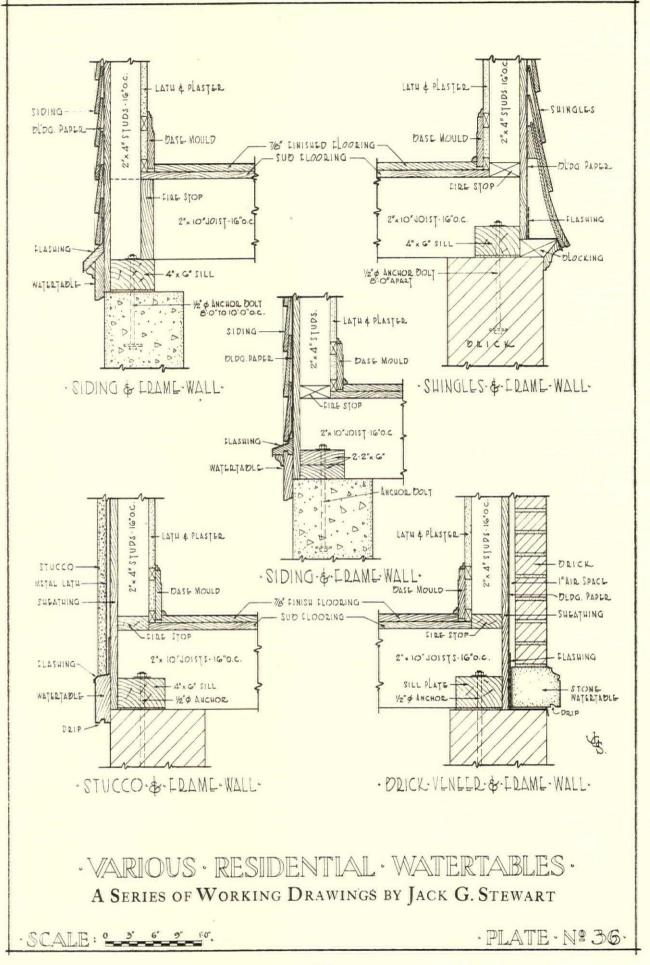
Thursday, March 2.—Lunched with Milton Lowenstein, discussing possibilities in architectural education. It is interesting to speculate on what results

would follow an architectural educa-tional movement based on materials rather than on style. If the student were grounded upon the fundamentals of construction in all the varieties it has achieved throughout the ages, rather than grounded upon what various men did with these materials in the evolution of style, the education of an architect would seem to reach a more logical and rational development. If, instead of studying the history of style, a student were thoroughly grounded (including training in the actual handling of stone, timber, plaster, steel, etc.) in the way, for instance, the French use stone; the Scandinavian countries, timber; Hol-land, brickwork; and the United States, the steel skeleton, would not the chances for creative achievement be brighter? The Bauhaus, of course, has been at-tempting this, but it is still early to weigh the results.

Friday, March 3.—William Lawrence Bottomley heads a committee of the New York Chapter, A. I. A., and the Architectural League of New York, for the purpose of publishing a survey of great Georgian mansions in the United States, all built prior to 1830. The project, like so many other architectural activities these days, is designed to make work for some of the unemployed draftsmen. Among the houses to be included are the Gardner Ladd house, Portsmouth, N. H.; the Van Rensselaer house, Albany; Hyde Hall, Cooperstown, N. Y.; Mount Pleasant, Philadelphia; White Hall, Md.; Mount Vernon and Mount Airy in Virginia; and Drayton Hall on the Ashley River, S. C., some of which mansions are almost unknown to the profession.

Saturday, March 4.—Speaking of educational matters, there has just been formed a Joint Advisory Committee composed of representatives from the four leading architectural organizations, with the purpose of guiding young architects toward uniform professional preparation for the practice. The Joint Committee is headed by Charles C. Zantzinger, F. A. I. A., and includes Charles Butler, F. A. I. A.; Emery Stanford Hall and James M. White of the National Council of Architectural Registration Boards; William Emerson and Roy Childs Jones of the Association of Collegiate Schools of Architecture; Ely Jacques Kahn of the Beaux-Arts Institute of Design. The committee outlined a programme calling for a minimum of eleven years of study.

The chief fault found with the present method deals with the period between graduation from college and entrance upon individual practice. One great difficulty here is the lack of opportunity afforded most draftsmen to see the actual work in progress. Possibly a parttime arrangement might be put into



effect by which the draftsman is paid for his hours in the office and allowed to visit construction work on the job and in the factory with greater freedom.

The eleven years' minimum training consists of four years of school or academy; four years of technical college work; three years of internship or directed practical experiment under an experienced preceptor. Practically all are agreed also that the four years of technical college work should be supplemented by two years of liberal arts or foreign travel, or both.

Monday, March 6.—New York is going about its business almost as usual this morning with the banks closed. Apparently the hoarding of currency is not the only sin of which we may be accused at the moment. The New York Public Library has been subjected to a run. More than thirteen million books were withdrawn in 1932—an increase of nearly 25 per cent since 1929. The run has attained such force that a $33\frac{1}{3}$ per cent limit is placed upon withdrawals. Hereafter the tellers will pass out only two books at a time instead of the six formerly allowed.

Wednesday, March 8 .- This lull in architectural activities gives us a splendid opportunity to put our house in order, particularly in one or two such unsatisfactory matters as bid-peddling. The plan formulated by Professor Eric T. Huddleston, of the University of New Hampshire, is more and more widely and favorably discussed. It provides that a general contractor's bid shall be in two parts-the first quoting a sum total for his own work and profits; the second containing a list of sub-contractors' bids, which the general contractor submits as making up the remainder of his total contract price. These sub-contractors' bids are sent to the architect



shortly in advance of the opening of general bids. The general contractor, therefore, is selected on the basis of his own work and profits, and the sub-contractors are selected at their stated price from the entire list of those submitting bids, provided only that those chosen must have the approval of the general contractor with whom they are to work.

Thursday, March 9.—The Pittsburgh Chapter, A. I. A., has launched a wellmapped-out campaign to make an architectural survey of twenty-seven counties in Western Pennsylvania. The purpose is to locate buildings erected in this section before 1860 in so far as these buildings are important architecturally and historically, and to compile photographs, drawings, and information to be preserved in the collection of the Historical Society of Western Pennsylvania. Rody Patterson is Executive Secretary of the Survey, 1707 Koppers Building, Pittsburgh.

Friday, March 10.-Charles H. Higgins, president of the New York Chapter, A. I. A., was telling me the other day that Stanford White built a house for F. Knight Sturgis on East 51st Street, which, in the façade, very closely resembles a house that Robert Adam built for Sir Watkin Williams-Wynn at 20 St. James's Square, London. Sir Watkin's family happens to be in Higgins's direct line of descent. I went to see the Sturgis house today, and, through the courtesy of E. Harold L. Thompson of the Rosenbach Company, went through it from cellar to roof. The house was designed in all the dignity of the Brothers Adam style, though it seemed to me with a bit less restraint in some of the details than we would venture today. The plan varies considerably from the one in St. James's Square, in accordance with differing modes of living, but in the ceiling of the drawing-room on the third floor Stanford White used a true copy of one of the London house ceilings, excepting for its segmental ends. The elaborate wrought-iron stair railing in the New York house at first glance seems to duplicate the Adam original, but it turns out to be quite different in detail. The London house, too, I understand, is used by a dealer in antique furniture, and it may well be imagined that the stately rooms make an ideal background for eighteenth-century English furniture, silverware, and the like. Incidentally, the London house is rather well illustrated in Bolton's "The Architecture of Robert and James Adam."

Sunday, March 12.--I was interested to see that V. Gilmore Iden, di-

The house at 17 East 51st Street, New York, designed by McKim, Mead & White for F. Knight Sturgis, adapting Robert Adam's house for Sir Watkin Williams-Wynn at 20 St. James's Square, London

rector of public relations for the American Institute of Steel Construction, admits that efforts to build houses entirely of steel are unfortunate. This is setting a good example. In a speech before New Jersey masonry material dealers in January, Mr. Iden quoted Fred T. Llewellyn, consulting engineer of the United States Steel Corporation: "I conclude that the proper design of steel work in residences depends largely on materials other than steel. It depends upon the assistance of the envel-oping materials." There has been entirely too much effort on the part of various industries to prove that one material alone is the best material with which to build our houses. More and more we are coming to see that the logical and economical solution will lie in an intricate combination of a number of materials.

Monday, March 13 .- Alfred Githens, Thomas Ellett, and I discovered a rather interesting book in a club library today -a book that for some reason has apparently failed to achieve notice in any of the professional journals, so far as I know, possibly because it is in German. Its title is "Die Baukunst der Neuesten " an independent unit in an elabo-Zeit. rate series of volumes under the general title of "Propylaen Kunstgeschichte." The series constitutes an encyclopædia of art, profusely illustrated. The volume that interested us most, however, is an attempt by Gustav Adolf Platz to summarize modern architecture in the twentieth century, tracing the growth of the so-called modern architecture from its rather innocent beginnings to the extremes of pseudo-functionalism.

Tuesday, March 14.—William G. Tachau and I listened to Frank Lloyd Wright speak before a large luncheon gathering, laying the bulk of the blame



for the architecture of the twentieth century at the door of our education, which he says is from the top down in eclecticism.

Thursday, March 16.-Reading Mo-holy-Nagy's "The New Vision," I have I have run across the following explanation of distortion in art. I quoted Chester H. Rowell in these pages recently as saving that a fundamental principle of painting these days seems to be that "if one can draw, he mustn't." Moholy-Nagy, who has been lecturing on art at the Bau-haus, explains why. "In our environment there are stereometrically exact objects: flasks, goblets, musical instruments, etc. But since they are all around us, nobody any longer experiences their beauty. So we must make the beauty of the exact clear by an artificial distortion leading to a conscious rectification (in the mind of the observer)."

So now you know.

Moholy-Nagy's explanation of sculpture and its development through the various phases of kinetics, volume secured through motion, and light as spatial projection, leads us still further into the maze of modern thought.

Saturday, March 18 .- The National Archives Building now under construction in Washington is, from all accounts, a most unusual problem. The Office of John Russell Pope is designing it, with Clyde R. Place as consulting engineer on mechanical equipment. The building is to be five stories high, but will contain twenty-one tiers of stacks in which the documents and papers will be stored. The basement is to contain cleaning, repairing, and bindery spaces, photographic rooms, storage and mechanical equipment. The new science of airconditioning here comes into play as a further safeguard against deterioration of the documents. There is to be about four million cubic feet of air-conditioned space. The cooling alone of this large volume of air requires refrigeration equivalent to the melting of one thousand tons of ice every twenty-four hours.

Monday, March 20 .- Lunched with Lorimer Rich, discussing, for the most part, our national tendency to haste. Louisiana, I believe, is boasting of having built its State House in twelve months. Stockholm, on the other hand, built its Town Hall, and Ragnar Ostberg took fifteen vears to do it. Building a State House in twelve months is a risky business at best. When one looks back over the buildings that satisfy us over long periods, one is apt to find that considerable time was expended in their making. The Boston Public Library making. was in the office of McKim, Mead & White for ten or twelve years. Henry Bacon spent almost ten years on the Lincoln Memorial. Nebraska is building a State House, too, but, instead of doing it in twelve months, has been at it for

some twelve years, and the end is not yet. There seems to be considerable evidence, however, to the effect that when it is finished it will be worthy of the time spent upon it.

Tuesday, March 21.-Spent the evening with Kenneth Murchison, William F. Lamb, and two engineers-Leon S. Moisseiff and Edward A. Byrne-as a jury passing on the first stage of the American Institute of Steel Construc-tion's Annual Students' Bridge Design Competition. There were one hundred thirty-four entries from architectural and engineering schools throughout the United States and Canada; from which we selected ten as worthy of further development by their authors in the final stage of the competition. I was interested to find that even in a subject connected so closely with engineering rather than architecture, the matter of scale proved to be a determining factor in the judgment. Too many students would throw across a gorge span of 250 feet a bridge structure that might have spanned Hell Gate or the Susquehanna River at its widest point. Then too, there seemed to be a great tendencyprobably on the part of the architectural competitors chiefly-to display their knowledge of every engineering device ever utilized in bridge design, rather than to make a choice of the most suitable one for this particular problem.

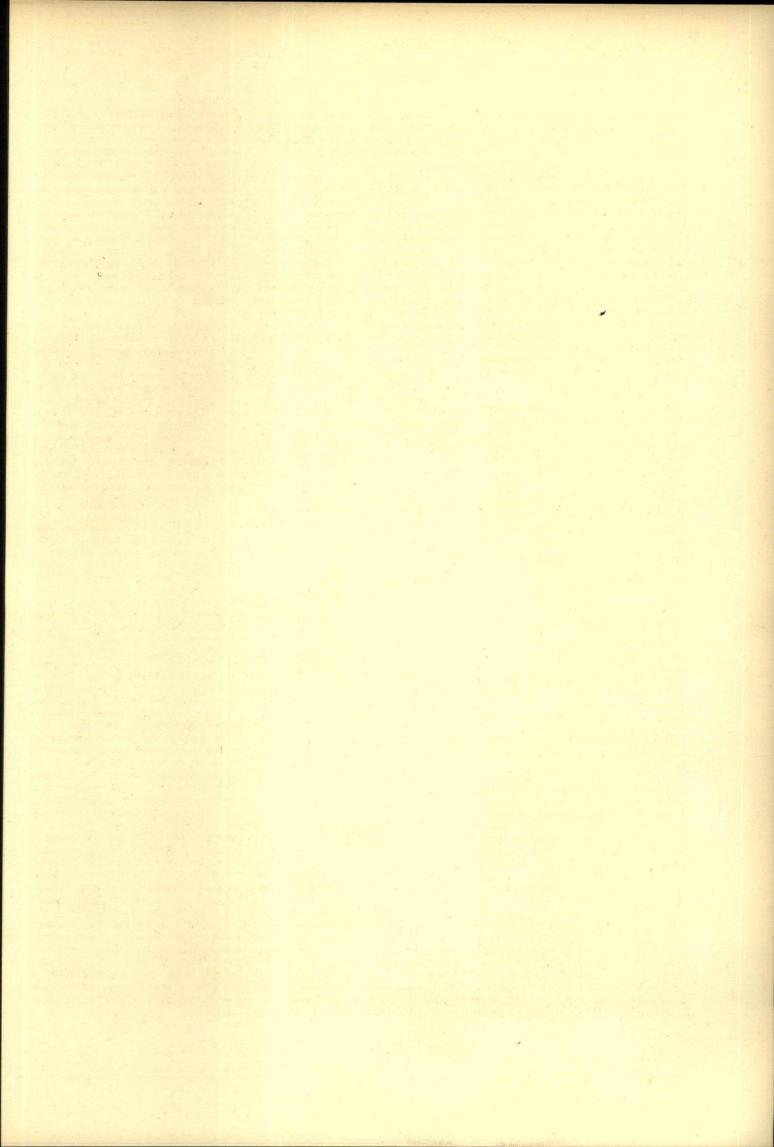
Wednesday, March 22 .- There is an exhibit of the New York Chapter's Apartment House awards covering the years 1910 to the present time, hanging in the main exhibition room at The League. It is an instructive picture of the road we have travelled in nearly a quarter of a century-from the heavy overhanging cornices and applied ornamentation to the sleek, businesslike apartments of recent years, such as Andrew Thomas's Dunbar Apartments, Clarence Stein's Phipps, and others. It is not altogether reassuring, architecturally, to find how illogical and comparatively futile our designs must have been, made twenty years ago, when one considers that these examples exhibited are the prize awards.

XXX

Friday, March 24.—William Sloane Coffin, one of whose jobs is the presidency of the Metropolitan Museum of Art, is somewhat concerned over the fact that nearly sixty thousand fewer persons visited the Museum during 1932 than in the previous year—the attendance falling from 1,334,317 to 1,274,672. It might be expected that in a period like the present, more people would have opportunity and leisure to visit the Museum. Mr. Coffin believes, however, that appreciation and enjoyment of art by the adult, as something to fall back upon in times of stress, seldom comes unless early education has provided a background. However, while the total number of visitors fell off, the number of persons coming to lectures, classes, and other museum work increased nearly twenty per cent. The attendance at public concerts given through the generosity of Mr. Edward Harkness, and a grant by the Juilliard Foundation, increased, which perhaps may be explained by the fact that more people find it easier to enjoy music than to enjoy painting or sculpture.

Sunday, March 25.—Gordon Simpson in from the Pacific Coast with word that building activities are rather more marked out there than in the East, due partly to the earthquake. The Pacific Coast more and more seems to be growing to be a little world of its own, rather more self-contained, I imagine, than the East. Here our dependence upon the activities among other peoples abroad and the intricacies of international relationships are unquestionably growing more acute. The Pacific Coast, on the other hand, seems to worry along fairly well under its own power.

Tuesday, March 28.-Douglas Haskell in with some news of Henry Wright's findings abroad. Wright, in studying modern housing in England and on the Continent, finds a great deal of confirmation for some of the latest conclusions his study has brought out in connection with American housing. Wright is always about two jumps ahead of the prevailing accepted thought regarding housing, and he has just taken another stride. One of the handicaps in our housing has been the tacit assumption that a housing group should be a repetition of one or two sizes of unit. This is not in accordance with our needs, nor Wright's feeling that the family units in any community are very diverse and that their housing should correspond. It is too common practice for young people in a family, for example, when they marry, to have to move to a distant community for accommodations on a smaller scale, thereby straining all ties of family and friends. Through ingenious planning, Wright has arrived at a scheme by which a housing group can provide variety of space on the flat or on two floors, each unit with its individual entrance without the necessity for janitor service, elevators, or other expensive accompaniments of community life. The development of individual heating, hot-water supply, refrigeration, and incineration is likely to bring a new and more workable type of community housing which, for the first time, is adapted to man's needs rather than forcing man with his diverse needs into a Procrustes bed.



INLAND ISLANDS. Soft-ground etching by Gerald K. Geerlings Size of original, 638 by 11% inches. See article on page 333

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Are We Ready for an American Housing Advance? By Henry Wright

American Housing," April Architec-TURE), would seem conclusive evidence against the possibility of achieving decent housing standards through regular real-estate practice. At the end of forty years we find both the planning and the construction more wretched, if possible, than they were before, so that the movement from 1911 to 1931 is not forward but backward. The promise for the future lies in a different concept, that of the large, responsible operating company that undertakes the whole project in one continuous procedure, from acquiring and subdividing the land to planning the details of the individual dwelling and managing either the purchase or the operation for the occupants.

There is one preliminary condition to be fulfilled before the architect will be able to proceed in this direction of group planning and group dwellings at all. This condition is relief from the incubus of pre-ownership of the land. Unless this pre-ownership is removed, no progress can be made, and it is scarcely worth while to discuss any form of improvement in American housing. What is meant by pre-ownership of the land? Not home ownership. Not productive ownership in any form, but simply the subdivision and holding of lots long before there is any conceivable need for them, and then their sale to scattered individuals in a manner that makes it thenceforth impossible for any responsible agency to secure any large-scale control.

Once released from pre-ownership, technical competence would have an opportunity to function. First of all, the responsible agencies, planning with human needs in view, would recognize technical gains and encourage them; and secondly, the technician himself would acquire the facility and understanding that come only with long study and repeated practice.

Whether housing should then become a social function is another question. Whatever the motives that produced it: whether personal enjoyment in the enterprise, social magnanimity, or business gain, the technical competence would nevertheless be in demand. And it is inconceivable that with new processes in action, the movement would not spread, city planning and housing knitting themselves together, so that considerable areas could be organized, with their streets, public improvements, access, and other city-planning factors coordinated to the new building technique.

Now at precisely this point it is necessary to pause. We cannot assume offhand that our present group forms are the correct and settled basis for progress. We scarcely appreciate the extent to which the basic individual dwelling types we have provided within the group, even in advanced experiments such as Sunnyside, fall below the possible standard of quality. The planners have always had to reckon with the general state of non-appreciation on the part of the expected users-a limitation particularly restrictive when the product was for purchase. The chief advance that could be made in a project such as Sunnyside was, first, in the organization of "two-room-deep" space, and second, in group organization.

Out of our practice to date, then, we have acquired a small set of what we think are universally valid principles. These can be presented more extensively in a book, and can only be listed here. First is the principle of the *row*, which saves land, and permits cheaper and more efficient construction both by virtue of continuous processes and the elimination of one wall. Next is the *broad front*, which secures sunlight exposure, interior circulation and ventilation, particularly in conjunction with two-room-deep planning. Now when it comes to fitting these principles to specific dwelling plans, suited to the needs of individual families, the problems are far more complicated. How do people like to live? How can they live most conveniently? What are their real needs? To these questions our answers have mainly been wholesale assumptions. And it is not only in the United States that this has been true, but, as I shall be at pains to point out, also in the far more widely spread operations in England and Germany. Where a satisfactory solution would seem to call for the greatest variety of accommodations, too heavy a reliance has been put on what must be called stock plans.

Before going into greater detail, it may be well to recall whence some of these assumptions about people's living habits derive. We are all of us accustomed to thinking in terms of certain labels: we think of "houses" (whether free or attached), we think of "flats," or of "apartments." Into each of these types our mind's eye places a certain kind of family-thus the family in the "house" has a lot of children, and the couple in the apartment has none-and we plan to continue the assumed living habits of these people with as little disturbance as we can. Meanwhile, even a natural evolution, unguided, would tend to shuffle all these types of domicile, each with its different advantages, and reassort the elements in a quite unprecedented fashion.

What has occurred in the various countries can be noted only in the briefest review, by no means doing justice to unquestioned achievements. In each country the chief basis of postwar advance has been the principle of two-roomdeep planning. Only the United States has been behind, with a mere handful of examples. England centred on the perfection of the row-house, to build, under the guidance of the Ministry of Health, many hundreds of organized communities all very much alike in general concept and varying only in group detail and in the size of the houses. Orientation study in many instances brought about variations in the stock plans for opposite sides of the street, particularly where exposures were north and south. For the most part, however, the main effort in the planning was confined to placing the living-room on the garden side. The development was carried to an extreme of large hollow blocks with cul-desac injections. There was no such universal adjustment in the direction of the row units with respect to the sun as in Germany. In England, as elsewhere, plans were based upon fairly rigid assumptions as to how people would occupy the house. They were left to fit themselves into what the architect had predetermined, and all in a pattern fairly uniform.

In Germany during 1925-1931 there was an even larger movement toward new community building, which supplied almost every industrial community with new housing units. The fact of the "modern" style is important here only insofar as the freedom and experimentation in form were accompanied by new thought and freedom in planning detail. The communityplanning movements of both Germany and Holland are of the utmost importance as a demonstration of the civic and social values arising from orderly communities. The new is of course in the most striking contrast to the old. This organization of community development should receive the most careful study (and is taken up elsewhere), but for our present purposes let us consider not its credits but its limitations.

As in other countries, the plan details in Germany have been divided into two categories. First, there is the single-family row house. This is of either two or, more frequently, three stories, with one bedroom and the laundry usually placed in the attic. Such a type follows the old traditions of living. The other type is a definite concession to new needs and emergent ways of living, for which the appropriate form is assumed to consist of some sort of apartment. Frequently in the same community different architects will be assigned different sectors, each designer putting up two or three rows repeating the identical plan unit throughout. The community plan as a whole, developed by some one of the architects, results from an orderly disposition of these group units in relation to a special street plan. In its larger elements the grouping takes its character from the relative disposition of the row house and the apartment units.

Thus in any particular plan we shall almost always find part of the community made up of row dwelling units two and one-half stories high, and row apartments four stories high (although the apartment height has recently tended toward only three). There may or may not be a storage attic, which may cover either the whole building or only the front half. So, without discussing the design problems that have determined this form of planning, we find in the



Part of the great horseshoe apartment group in the Siedlung Britz, of which the Brothers Taut and Hoffmann were the architects. A plan of the group is shown on page 313

results the following more or less rigid and hampering limitations:

(a) The assumption with respect to people's prejudices that has led to the provision of just two classes of dwelling space of widely separate origin.

(b) The assumption that those wanting large accommodations want them in the form of houses with gardens, while others will want apartments of relatively small capacity and often without gardens. (An excellent exception in respect to gardens is found at Britz, Berlin, where a convenient and fair-sized garden is provided for every apartment in a set of three-story structures.)

(c) The segregation of these basic types in different areas, the taller often surrounding the lower buildings.

(d) Large units, or numbers of units, or sometimes whole projects, held to one standard apartment plan.

To this there might be added that behind the impressive novelty of these flat-roofed exteriors is concealed an anomalous admixture of elements old and new in the interior equipment.

Possibly the limitations were inherent in a

period of advance when technical skill was concentrated upon problems of universal application, such as good orientation for every occupant. Using what they had learned, the designers faced a sufficiently complicated problem in securing community balance and a pleasing artistic use of the constant repetitive external elements. There was a fine spirit of democracy, or socialism if you will, in securing an equal share for every one in the sunlight and the green of the garden. Yet, this much once accomplished, the claims of diversity in the human family, even upon the most democratic basis, urge themselves anew.

Before leaving German housing, we might call attention to the more recent theoretic studies of the German architects, including those of the Bauhaus. They seemingly result in a community organization even more rigid and monotonous than heretofore (and my own observation leads me to believe that this mania for universal exposure loses more in other living qualities than it gains in its one acknowledged aim), but there are other very promising aspects. There are plan studies, for example, that start from a fixed stair and bathroom position, and permit a variety of adjustment in rooms, both in number and use, in both vertical and horizontal grouping. There are also extensive studies of fenestration bearing upon internal effectiveness of light and ventilation. All these studies will permit more freedom to the designer when once more he begins thinking of human needs and better ways of life rather than organized façades or balanced grouping. It is reasonable to assume that nothing need be lost for design if the human needs are met by those technically competent.

5

In the few experiments that have been made in the United States there has been the same tendency to constrict variety while concentrating on the more elementary general problems. The war housing communities, of special merit, were based upon a development of the Philadelphia row house. The long Philadelphia rows were broken into short groups, with studied and sometimes successful group interest. Yet the plan was still based upon the repetition of one or two typical plans little different from the few "broad-front" plans then in use. Community groupings of note may be seen in Yorkship Village, where more than half the houses are of an identical five-room plan, or at Buckman Village, Chester, and Sun Hill, Chester, where row houses were effectively handled on a hillside site. Exceptions to this rule of limited-scale repetition were made at Seaside Village, Bridgeport, where buildings of one and a half and of two stories were varied internally to serve for one or for two families and were intermingled in a successful mass design; and more especially at Newburg, N. Y. Here the architectural composition grew out of a more related juxtaposition, in which there figured single-family houses, semi-detached and row houses, and apartments of two sizes and plan variations. All these were designed in response to a predetermined spread in demand. Quantities of accommodations were built in sizes and kinds elsewhere not provided at all.

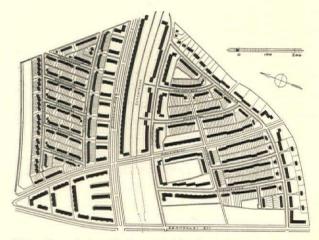
Mariemont, Ohio, straddled the problem. One corner of the community plan was to be taken up by row and two-family houses, variety being secured in these by employing a large number of architects; the town centre was laid out in apartments; all the rest of the town, in short the most of it, was devoted to lots with extravagant costs of street frontage and of heating from a central plant. These were to be built upon by individual owners under compulsory architectural guidance.

Sunnyside was the outgrowth of the war experience and of the study its planners had devoted to English practice. It was limited by the directing concept of holding to housing types that were known and were more or less current in the neighborhood. The structures were held to a uniform two-room depth. The street blocks were of the New York narrow width but unusually long. Because of the length, the house rows were broken down into groups of from four to seven units. Removal of the garages from the centre of the block created a garden and at the same time permitted erection of enough additional structures to pay for the space occupied by the garages elsewhere. In the first units the community composition was effected by juxtaposing symmetrical units, made up respectively of two-story two-family houses, threestory apartments, and one group of two-story single-family row houses. In later years the planning became standardized upon the basis of individual groupings, consisting of a row of single-family houses flanked at one end by a double two-family unit and at the other concluded by a three-family unit of two stories that projected inward into the garden. This last sort of structure was provided for the double purpose of permitting some variation in apartment size and semi-dividing the garden into two or three more intimate small courts.

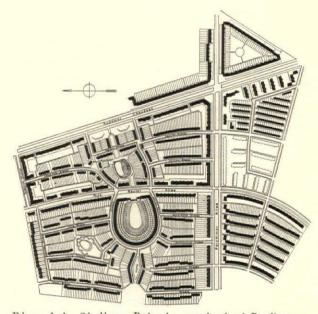
This early Sunnyside experience had in it at least the germ of plan variation for divergent human needs rather than for stereotyped technical assumptions. Certain factors limited its effectiveness. The inadequacy of the kind of cost accounting in use by everyone at the time misled the designers into accepting too restricted a plan area and particularly too narrow a frontage width. Hence over a four-year period there were repeated some 300 identical houses —identically deficient in dining-rooms and with an almost useless third bedroom. In all plans used, the well-known tendency of architects toward an overstudied plan compactness was also a limiting factor.

At Radburn the same architects were engaged in the very stimulating innovation of reversing the house front. This was done to meet very human requirements, but again the results were limited by the assumption that people would insist on an old concept of a house in a JUNE, 1933

new dress. And the new block form, perhaps too well known to require exposition here, was also unfortunately limited by overemphasis on symmetry or balanced planning on an axis. The result is an orientation not always ideal. What tendency toward diversification had begun at Sunnyside was arrested by the assumption, correct on its own premises, that it would be unwise to mix single-family houses with twofamily ones owned by one of the occupants. The two-family houses remained in company ownership and were segregated, and this segregation weakened the advance that was made in their design and their arrangement as repetitive but architecturally varied groups.



Plot plan of the Siedlung Zehlendorf, located in one of the better residential suburbs of Berlin. The Brothers Taut and Hoffmann, architects



Plan of the Siedlung Britz in a suburb of Berlin near Neukoln and the southeast industrial area. The horseshoe represents the three-story apartment group, around which are the low houses with their individual gardens. The Brothers Taut and Hoffmann, architects



A detail in the horseshoe at Britz which makes clear the appearance of terraced gardens, one for each apartment. The Brothers Taut and Hoffmann, architects

Here, then, are three different countries, and in all three of them the existing housing of even the most advanced type is limited and obstructed in its free evolution. In none of the countries is there the diversification that modern occupants would have a right to expect on the basis of their needs. And the limitation was in part the result of the very progress that was made through the application of technical thought. To have achieved release from the lot crowding and the idiotic house organization that were described in the last article was in itself no mean achievement. And yet technical advance has been arrested because the technician ascribed to the public an exaggerated love for existing dwelling types as he himself classified them: the single-family houses, the flats, and the apartments of the past; and he believed that the public would insist upon their perpetuation. Advance was arrested, again, because of certain cost assumptions. It was believed, for example, that savings must be achieved by means of small rooms and narrow fronts. There was also as yet only a partial development of automatic service facilities—new heaters, refrigerators, and the like—which make it possible both to arrange dwellings in groups and leave individual control without the usual onus.

Now it would be most unfortunate to distract the attention of American students from the great importance and excellence of the English, Dutch, and German advance, or from what limited progress we have made at home. The value of the two-room-deep standard cannot be overstressed. And vet, to digest the European work of the last ten years so thoroughly as to make our own projects completely in its image would be a most unfortunate thing. We should be fully aware of the Europeans and build upon their experience; however, there are certain advantages we ourselves possess, once we get rid of pre-ownership of the land, that are unique and not to be spurned. For one thing, the American public has been permeated with the consciousness of apartment-type living to an extent that has broken down old, long-established prejudices. Add as another factor our great capacity in construction, hitherto concentrated on the skyscraper, and our new structural techniques, already rapidly developing; add also our unique advances in the direction of automatic services, and, with half a chance, American technical ability should carry us far beyond the excellence of any existing results. We could place America as the "leader" instead of the "lagger" in the whole housing world.

It is upon this foundation that I have envisioned a new and far-reaching organization of American housing. It occupies the second section of my forthcoming book, the section devoted to "Group Housing." Here, then, is a summary, or credo: I believe

(a) That the apartment-house development in America has been actually of much less consequence and permanency than its spectacular nature might lead us to assume.

(b) That its original impetus is greatly weakened by the fact that the convenience once inherent in the apartment can now be attained in other and better ways.

(c) That the apartment house is a less natural and logical outgrowth of our widespread cities and our ample space than some intermediate form of housing, less ponderous and less burdened by centralized service facilities that are privately maintained for profit.

(d) That our new structural techniques and

our automatic facilities make possible the provision of forms other than apartments that meet city conditions both in areas to be reconstructed and in new areas where individual detached houses cannot actually and permanently be maintained.

(e) That the past advances in improved row dwellings and small multi-family units give us the basis upon which, aided by the emerging facilities, we can best continue to grow.

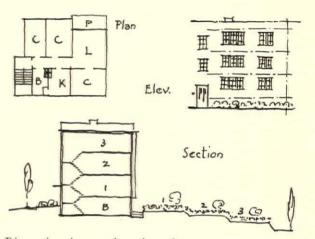
f) That a new concept of mixed group dwellings is necessary. Technical design, popular thinking, and city regulations should all be adjusted to the new concept. The accepted "single-family row house," "multi-family dwelling," and "apartment," in two-room-deep planning, must all be included, but further developed. They must not be segregated, but must be freely intermingled. They must lose their categorical significance as "single-family houses," or any other compartmentalized type, and become more variable elements in community groupings. They must offer a wide range of space accommodations, up and down, or flatted, with maximum or minimum cooking, laundry, and other conveniences. All varieties should share in utilizing automatic services, comforts, common or collective nurseries, kindergartens, and the like, provided according to the nature of the individual community.

(g) That we cannot be content to design for a catch-as-catch-can group of occupants, but, whether in public or private enterprise, must seek for groups corresponding to the membership of the public utility societies of England or Holland. This does not eliminate the objectives of such well-constituted and experienced owning and management companies as the *Einfa Gehag* at Berlin, or the *Gartenstadt* und Kleinhaus Aktiengesellschaft at Frankfort on the Main.

(h) That students from many angles of approach should restudy the new techniques for such a free and experimental adaptation to diverse needs.



To visualize how a further diversification of dwelling-space might be achieved, while holding to the essential features of our present advance, I have sketched such variations upon a fine existing project in Germany, the *Britz*



Plan, elevation, and section of a very common type of four and a half room apartment in Berlin. The apartments are identical on each floor and throughout long building groups, the unit being about 30 by 32 feet. The section shows the basement access to gardens for each family

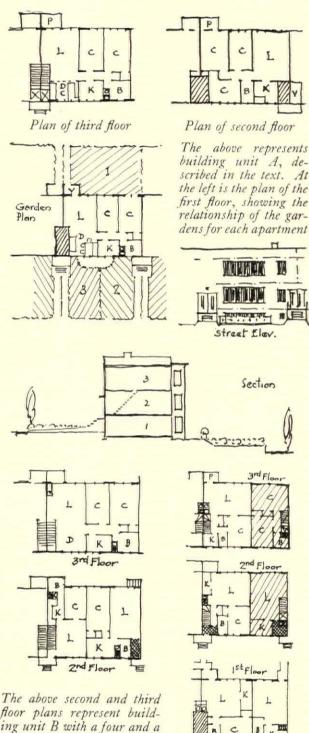
Siedlung at Berlin. The ideas here presented are to be taken as a rough and imperfect outline for further theoretic study.

The great horseshoe at Britz is a much finer scheme than photographs would indicate. The single-family houses radiate from the central curve, this latter being composed of a large number of practically identical four and onehalf room apartments on three floors. Each apartment is provided with a garden on the court side, in a series of terraces sloping down from a level half-way up the basement wall. The gardens are reached by going to the basement, climbing up half a flight of stairs in an areaway, and then walking down again along the slope to the various garden levels.

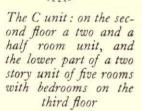
In the alternative scheme it is proposed to move the structure slightly further back from the street, retaining the same shape and stair spacing. Our object is to replace the identical four and one-half room units with a diversity of types. The first floor is dropped a few feet, to the top garden level; on the outside of the curve this puts it a few feet below the front yard. This will permit masking the minor rooms, which are placed on the side of the front vard and are shielded by a hedge. All entrances are directly at the exterior of the building. They are approached along paths that slope a little more steeply than the garden, reducing exterior steps to a minimum. The first-floor entrances are on the opposite side, and are reached by an occasional archway through the building, such as already exist.

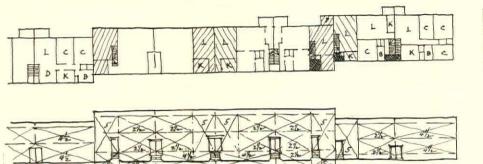
With this preliminary modification, which

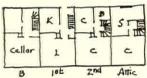
gives all floors their direct outside entrance, and necessitates only one flight of internal stairway (from the second to the third floor), we



floor plans represent building unit B with a four and a half room apartment on the third floor; a two and a half and a two room apartment on the second floor, the latter sharing the vestibule with the third floor; the first floor is another four and a half room unit similar to the third floor except for entrances







JUNE, 1933

Above, the four floor plans of the typical onefamily house in such a group

Plan and diagrammatic elevation showing one of many possible combinations of units A, B, and C in two and three story dwellings. Any number of other variations would be possible without destroying the unity of the exterior as a whole

are ready to vary our types. Three different building units have been evolved, called A, B, and C, all of the same width and interchangeable. Building A might have identical four and one-half room apartments on all floors if the vestibule entrance were shared by the second and third. To give these two floors separate entrances and direct access to their respective gardens, a variation can be introduced in the second floor, giving it a second vestibule and one more bedroom instead of the dining alcove shown on the standard plan.

When we come to Building B we have on each—or either—side of the stair a four and one-half room apartment on the third floor; on the second floor one two and one-half room suite, and one two room suite that shares the vestibule with the third floor; on the first floor is another four and one-half room unit similar to the one on the third floor except for entrances.

In the C unit there is on the second floor one two and one-half room unit and also the first floor of a two-story unit of five rooms, with its bedrooms on the third floor. The rest of the third floor is occupied by a three-room apartment. The ground floor can contain the usual four and one-half room unit, provided that the floor above is made to support the upper partitions; otherwise the ground-floor can be divided into one two and one-half room and one one and one-half room apartment as shown.

A larger composition based upon A, B, and C units might then work out as shown in the plan and diagram. Any number of other variations would be possible without showing differently on the exterior, since the ground-floor divergencies would be hidden by the hedge. No basement is required, though a pipe and conduit trench might be needed along the out-

side of the front wall. Heating would be by small gas-fired boilers for hot-water radiation in each apartment separately, the apparatus for which is now perfected, eliminating all piping except gas and cold water to each apartment. The stacks for these boilers are provided in the plan. Waste would have to be carried to common points here and there in the development, unless incinerator stacks were introduced.

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The various relationships involved—the amount of diversification, the desirability of various types of dwelling space, the need or needlessness of gardens for every dwelling—all these and many more questions can be ironed out by a process of cross-criticism. The aim of diversification has however been established and illustrated. Why turn out houses alike by the dozen, each with an inexcusable amount of waste storage space, and then confine apartment dwellers to two and a half or four and a half rooms, with no storage space at all, and only occasionally with cellar access to the garden?

Further architectural interest will be found in a combination of two and three story buildings, and occasionally four stories, with common stairs to the top floors, need not be avoided. Study and criticism by architect readers is invited.

In the great blighted areas of many large cities land costs have so receded as readily to permit an average height of two and a half stories in replacement schemes. In smaller cities land has seldom, in the past, warranted buildings higher than this standard. There is, then, almost no limit to the application of these proposals.



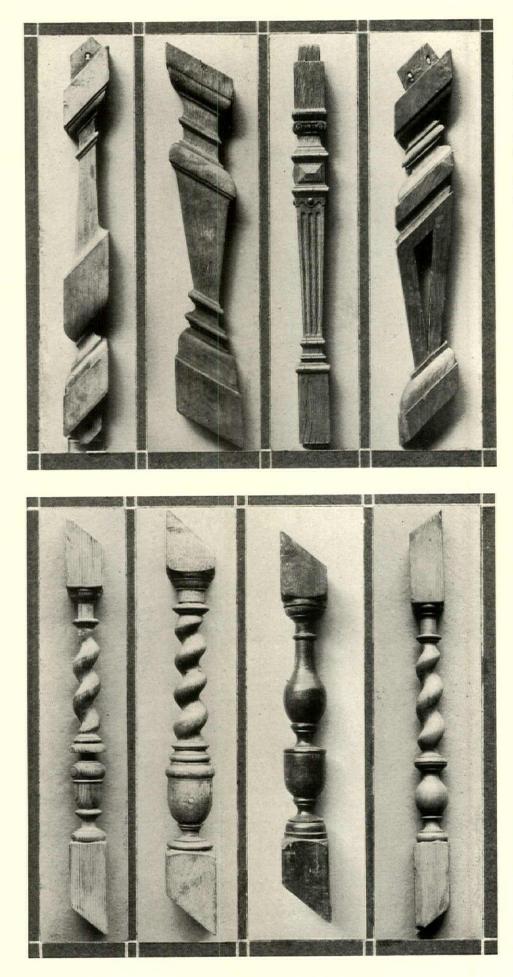
From left to right: oak, later 16th or early 17th century; oak, 16th century; oak, 16th century, from the old monastery, Southall, Middlesex; oak, 16th century; oak, late 16th or early 17th century, from Ealing, London

A collection of seventy-six wooden balusters from English staircases has recently been acquired by the Metropolitan Museum of Art, New York City. Sixty-nine of these were obtained by purchase, the remaining seven being a gift from Acton Surgey, Ltd., of London. The collection illustrates rather clearly the development in England of the stair baluster from the late sixteenth century to the third quarter of the eighteenth century

The balusters fall into three general periods : the later sixteenth and the first half of the seventeenth century; the second half of the seventeenth century; the eighteenth century to about 1770. The overlapping of styles has made the dating of certain examples more or less hypothetical

English Balusters

FROM A COLLECTION IN THE METROPOLITAN MUSEUM OF ART, NEW YORK CITY



At left, reading from left to right:

Walnut, first half 17th century, from Great Windmill Street, London

Oak, first half 17th century, from Market Place, Yarmouth

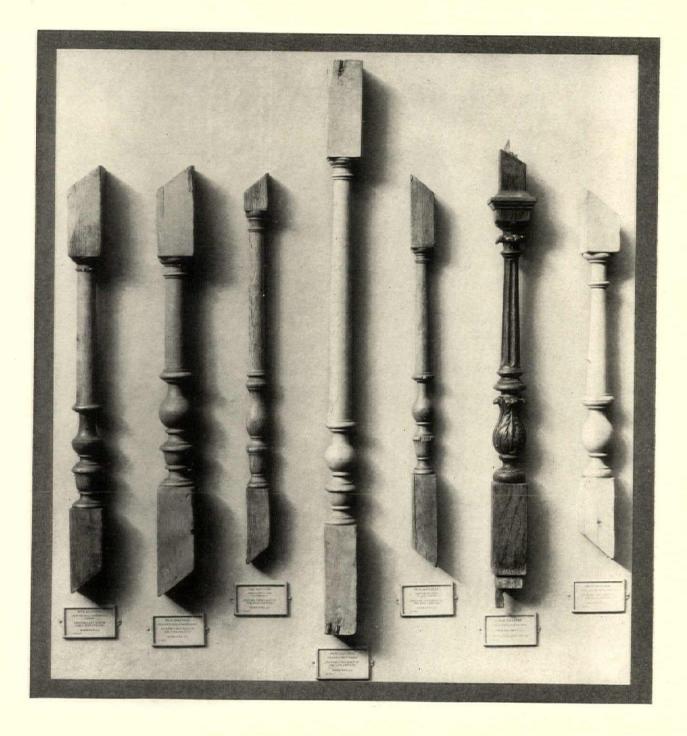
Oak, first half 17th century, from Eastwell Towers, Kent

Oak, first half 17th cen-

At left, reading from left to right:

Pine, second half 17th century, from Spitalfields, London Oak, second half 17th century, from Guildford Oak, second half 17th century, from Kiddal Hall, Leeds

Deal, late 17th or early 18th century, from Hanover Square, London



In the panel above :

Pine, late 17th century or early 18th century, from The Mall, Hammersmith

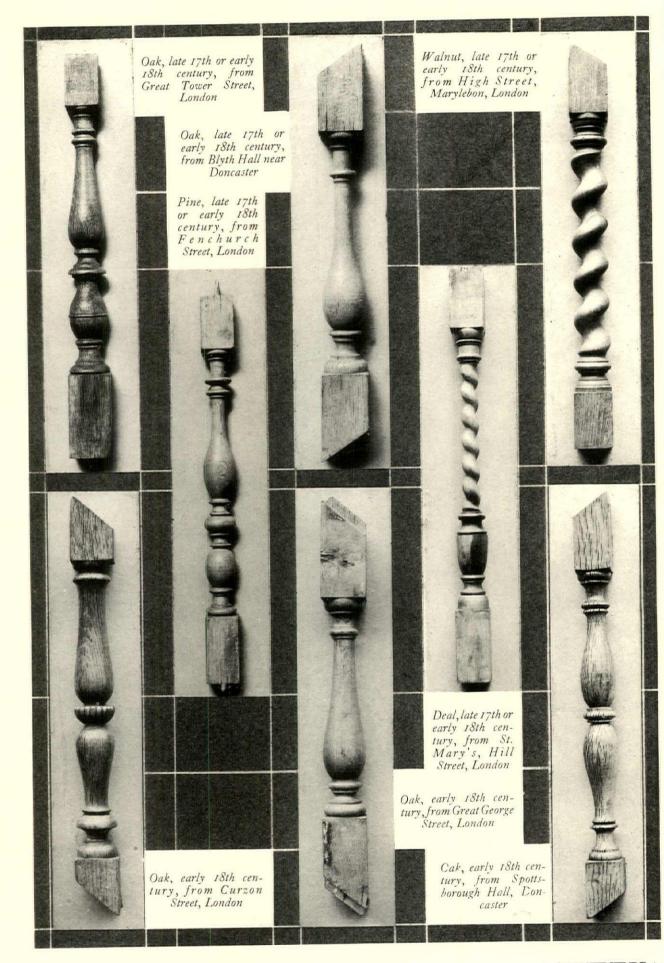
Deal, first half 18th century, from Blyth Hall near Doncaster

Oak, first half 18th century, from Sandwell Hall, West Bromich

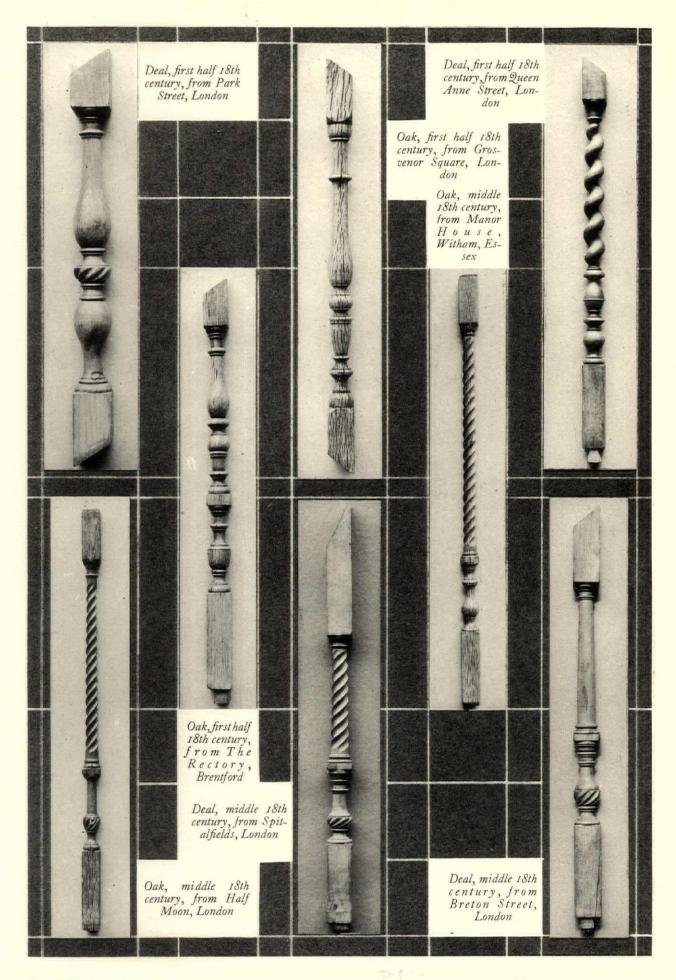
Deal, first half 18th century, from Hill Street, London Deal, first half 18th century, from Parson's Green, Fulham, London

Oak, about 1693, from Chipstead Place, Kent Deal, first half 18th century, from Charles Street, London

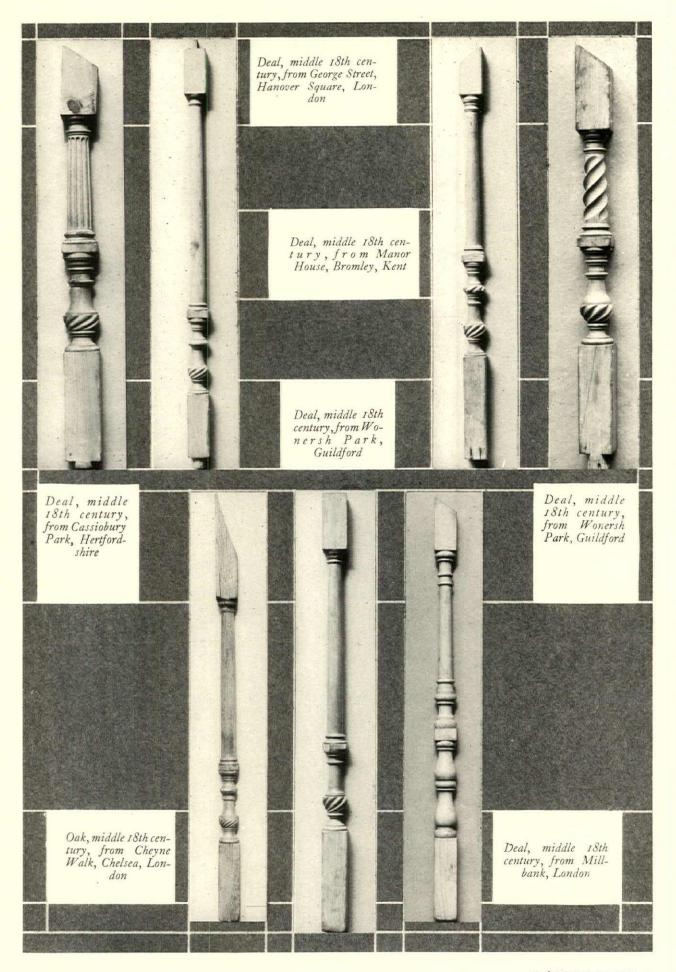
« ARCHITECTURE »

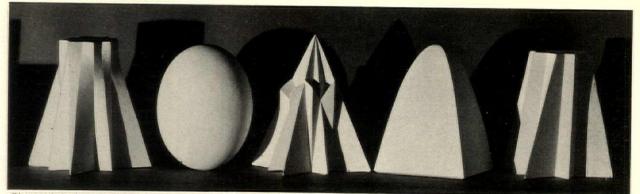


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« ARCHITECTURE »





Photographs by Lenz & Janssen Co.

Can We Invent New Forms? By Rutherford Boyd

Copyright, 1933, by Rutherford Boyd

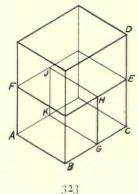
HERE is a familiar and yet a curious duality in the very nature of manhe demands variety or change and yet he admires order, system, or an equilibrium. These extremes of his experience through all the ages are imposed upon him in the paradox of his existence, so he has learned to like them; nor can he live without them. Long ago, out of sheer necessity he had to cope with change in *quantity* and, as he dealt with it in many circumstances and places, he invented in a haphazard way that great device, the system of Number.

Centuries of the use of Number in barter and communication and in his "earth measuring" led him to invent another great instrument, "geometry." Meanwhile he was groping slowly, vaguely toward his first ideas of proportion, like the relation between five feet and eight feet, or of two units to three. So he invented another device for the relation of whole numbers to each other in architecture, and centuries afterward it is handed down, for good or for ill, by Vitruvius as the celebrated "modulus."

The Pythagoreans sought to trace the origin

of all things to Number, investing certain integers, whole numbers, with extraordinary attributes. But the Greeks found that life was not so

> All these models are evolved within the "bisection-volume" of the rectangular "ratioenvelopes of form." In this shape if the longest dimension D C is bisected at E, the halfvolume E C B A is similar



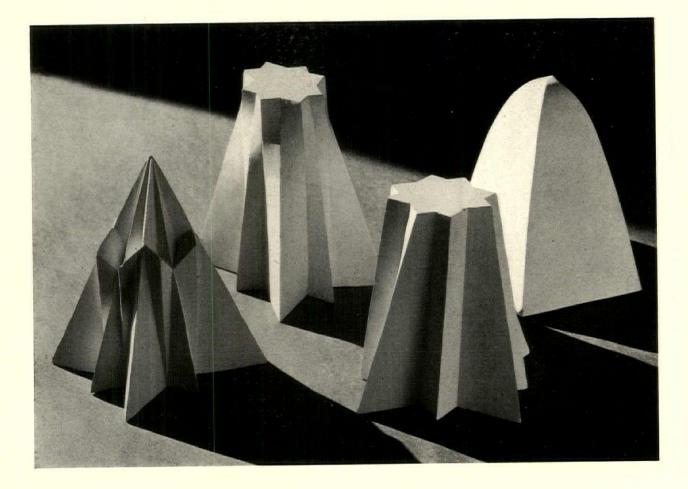
simple as all that. Eventually these ideas of integers in Proportion were perforce developed and expanded to include the more difficult group of numbers appropriately called the "irrationals," or incommensurables. In the tenth book of Euclid's Elements we have at last the complete system of a geometrical progression. Thus we have developed an instrument of change or, if you like, of ordered increase or growth, that has a curious duality in its own nature. It changes continuously (in size or magnitude) and yet is always the same (in ratio or proportion).

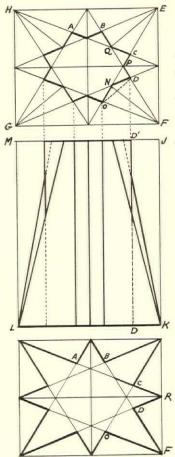
Quite recently developed and applied in tridimensional form, this device—increase in magnitude by a constant ratio—becomes the basis of a system of proportional rectangular volumes, called "Ratio-Envelope of Form."

Having read faithfully all that has so far been said about this device, the friendly architect interrupts with a difficult question: "Admitting the logical development of such a series as the 'Ratio-Envelope of Form,' can we actually evolve from it new form-ideas?" And without waiting for the answer, he asks another, "If these new forms can be created consciously, how can this be done?"

> Fortunately for the author's peace of mind, just those questions had been anticipated ! Experimenting and modelling in the clay and then carving in

in shape to the whole rectangular envelope. Similarly when C B is bisected at G then the quarter-volume H G B A F is similar to the half and the whole volume. See the January issue of Architecture





Three of the models shown on these facing pages, developed from an identical base pattern (lower diagram), have as an envelope the bisection-volume, the diagonals of the bisected rectangles forming the inscribed star. The first diagram shows the top plan of two models. Note that the re-entrant angles of the base are identical in plan position with the corresponding points ABCDO of the top. The model be-hind the "pyramid" has sixteen warped surfaces rising from base star to top star. In another model projecting edges are straight lines joining base star to top star, the inner edges being straight lines joining the corresponding re-entrant angles.

The pyramidal model involves a secondary dethe plaster, he sought an answer to those questions in this group of seven models. It is only a tentative answer, certainly incomplete, yet suggestive of the potential wealth of this new source of form-themes. The group of plaster models presented here is strictly structural in every detail. They are all developed from and contained within the same "ratio-envelope of form," the "bisection" volume, as defined in this diagram (bottom of page 323).

These plastic compositions are carved all to the same scale and each form-theme emanates directly from the spatial anatomy of this particular "envelope." The models demonstrate only a few selections from the great variety in form-themes which can be generated structurally by this approach to Design in tri-dimensional form. The captions and diagrams fully describe the principal themes of these proportional shapes.

Remember that these models exhibit variations on some only of the main planes and divisions within this particular envelope. Also that each different proportional shape in this series of "ratio-envelopes" can be likewise manipulated and controlled by a discriminating seeker after its secrets, many of them as yet un-

« ARCHITECTURE »



explored. For in this series we have an instrument for the synthesis of form-organization the possibilities of which have not yet been reached or defined.

Which leads us again to consider the question: Can we hope ultimately to create or invent new Form?

It seems to have been our custom, when the tradition of a great style wanes, to seek in many places. Sometimes we return directly to nature's infinite variety of form. Borrowing here and adapting there we arrive somewhere, somehow, and a new style is proclaimed! Inevitably the adaptations from natural and other form-sources become conventionalized anew into a group of abstract forms, often without much ancestral resemblance.

Every phase in the art of the past exhibits this phenomenon—a few basic forms repeated, refined and redesigned. Around and in these basic design-ideas we create a style, in which, being very human, we incorporate the human figure with greater or less variety. One is tempted, when considering the evolution of style, to use the phrase "an accident of chance !"

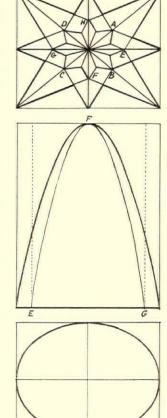
Certainly our retrospective view of Design can never be from the viewpoint of its creators

« ARCHITECTURE »

velopment intersecting the edges one third down from the apex (see diagram at right). The points A B C D are the focal points of the ratio-envelope. These interrupting planes intersect the other alternate star edges at the mid points E F G H. The form is completed by verticals rising from the eight re-entrant angles of the base.

The fourth model involves the parabola, and may be called a rectangular paraboloid. In the middle diagram at right, the parabola E F G is the vertical section through the shorter dimension, the other parabola through the longer dimension of the base.

The diagram at right shows the ellipsoidal model pictured on the next page



or even of its contemporaries. Those pressures and influences that overwhelmed a style and overturned its traditions, seem to have varied from an emperor's edict to the fancy of a courtesan. More likely, in sober truth, a complex of political, religious, social, and economic causes profoundly affected each transition in style. What faint vestiges of the glitter and glory of a court or of the pomp of chivalry that now remain to us, are only the faded glory in the tapestried background of art in its long history.

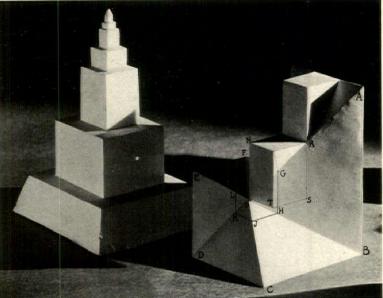
What does not change, what is the same vision to our eyes as for those who worked in the arts of old, is the great Form itself, be it cathedral, or pyramid. The chemistry of change may produce new beauty in a patina or a tonal and chromatic harmony that is far from the designer's original intention in color. The foliated spire, great Theseus in his pediment, a fragile kylix or rock-hewn colossi—all impress us with their innate proportions, the inevitable majesty of their great Form—as much the property of ourselves as it was theirs in the past.

Our contemporary scene exhibits, however, an amazing variety of sources, creeds, trends, and what-not in the criteria of our taste. To generalize, there seems to be a definite drift away from over-elaboration of ornament, wherever derived, toward a greater, more "intelligent" designing of simpler surfaces, plane and curved, with a studied contrast of materials and of their textures. In other words, today we appear to

Materials and of their other words, today At left of the photograph, a model showing a series of bisection volumes within a "pyramid" of similar

mid of similar proportions as shown in the diagram above. The other model

is a remarkable demonstration of many surprising relationships, among which we mention only a few: A B is the greatest dimension, B C the next, and C D the shortest dimension of the



have taken another step or two in departure from the *appearance* of nature toward abstract formal organization. Perhaps too often dominated by the conventional engineering viewpoint or some "ism" of the moment, yet our contemporary style is evidently more abstract, more geometrical, than ever before.

In the arts men of courage now urge with foresight less adaptation, less of the eclectic procedure, an approach to each problem with full consideration of all that function, materials —that every integral factor of the design problem—can yield to artist or architect and to serve broadly as the basis of his inspiration.

But much of our "inspiration" is a discrimination constantly active in form-selectivity as we accept and discard, as we analyze and synthesize in design. With more than inspiration, more than conviction, we must penetrate to that acute perception of *Form* which lies in a conscious appreciation of what may be done by us, not only what has been done, by nature or by man. So much toward the ideal, so much that is

well known, but beyond all this, even beyond the individual concept that dominates the design, is an immutable geometry of the proportions or dimensions of the "envelope," the great Form inclosing the project. Not the outward shape alone, but the study and understanding of the generation of interrelated forms and in the spatial design of the inclosing Envelope of Form. This will be in itself the creation and invention of new Form.

> rectangular envelope; DC is half of AD, EF is half of BC, and FG is half of C D. These lengths are six terms in this proportional series. and the point G is the precise centre of the form. GH is on the same plane and parallel to A B and is one quarter of it, also half of DE. Again, HJ is one quarter of BC, JK one quarter of CD, and so on



These murals are now completed and placed in the central rotunda of the Los Angeles Public Library, of which building Bertram G. Goodhue was the architect, with Carleton Monroe Winslow associated architect. Mr. Cornwell started the work on this series nearly five years ago, his purpose being to express the history of California from the days of the Spaniards. In a problem so dependent upon color unity, obviously these black-and-white approximations must fall far short of conveying the effect on the walls

Dean Cornwell's Murals for the Los Angeles Library



THE MISSION ERA

© Floyd H. Faxon

EDUCATION—the monk

COMMERCE—the Indian trader



« ARCHITECTURE » 328



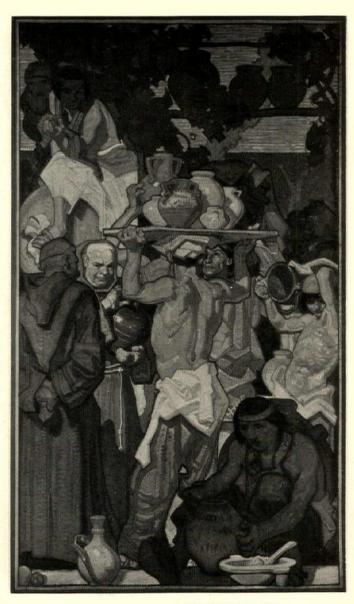
© Floyd H. Faxon

THE AMERICANIZATION OF CALIFORNIA

AIR—the fruits of the earth

FIRE—the potters





≪ ARCHITECTURE ≫ 3²⁹



© Floyd H. Faxon

THE FOUNDING OF LOS ANGELES



Origin of irrigation— Moorish water wheel

WATER

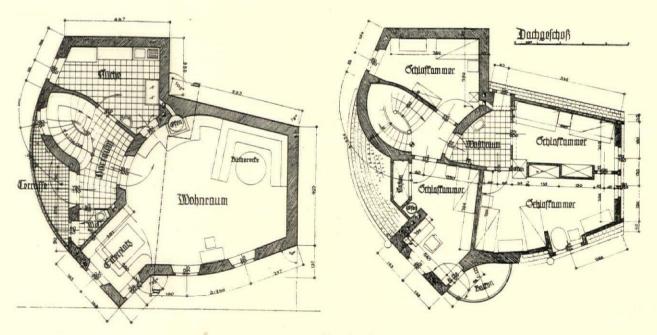
≪ ARCHITECTURE ≫
 33°



Ein Landhaus

Devotees of modern architecture have produced many wondrous things in their creative heat of recent years, but here is a country home in Dürnstein which seems to represent nearly the ultimate in effects without apparent cause. The architect is Hofrat Professor Dr. Karl Holey of Vienna. We have not been able to interview him as to this creation, but it would be particularly interesting and instructive to learn just why he has produced this combination of two-dimensional and three-dimensional forms. The shapes of the various rooms interest us particularly with a degree of wonder not only as to why they are shaped thus, but also as to how the workman with his try-square ever managed to construct them.

Our illustrations are reproduced from Der Baumeister



PLANNING PROBLEMS OF TOWN, CITY AND REGION. 158 pages, 6 by 9 inches. Philadelphia: 1932: William F. Fell Co. \$3.

Here are the papers and addresses presented at the twenty-fourth National Conference on City Planning held at Pittsburgh, November 14 to 16, 1932. One of the most significant points discussed was the fact that every large city in this country lost population in its central areas between 1920 and 1930.

- STRENGTH AND STABILITY OF CONCRETE MASONRY WALLS. Report of an Investigation conducted by The Engineering Experiment Station, University of Illinois, in co-operation with The Concrete Masonry Association, The Portland Cement Association, The Western Brick Company. By FRANK E. RICHART, ROBERT B. B. MOORMAN, and PAUL M. WOODWORTH. 38 pages, 6 by 9 inches. Illustrations from photographs and graphs. Bulletin No. 251. Pamphlet binding. Urbana, Ill.: 1932: University of Illinois. 20 cents.
- ÆSTHETIC MEASURE. By GEORGE D. BIRK-HOFF. 226 pages, 8¼ by 11¼ inches. Illustrations from diagrams, vase forms in color, line drawings, and photographs. Cambridge, Mass.: 1933: Harvard University Press. \$7.50.

The author, a mathematician, attacks the formidable task of measuring by means of mathematical formulæ our appreciation of two-dimensional forms and melodies, starting with the basic formulæ Mequals O/C in which M, the measure, is equal to Order divided by Complexity. He carries us through a discussion in which one is amazed to find how well within reach is actual measurement of æsthetic impulses.

DECORATIVE ART. The Studio Year Book. Edited by C. G. HOLME. 140 pages, 814 by 1114 inches. Illustrations from photographs and drawings, some in color. Printed in Great Britain. New York: 1933: The Studio Publications, Inc. Cloth, \$3.50; wrapper, \$2.50.

The latest in a long and dependable series of pictorial reviews marking the progress of English architecture, decoration, and the crafts, this time with more than the usual emphasis, perhaps, on the work of the modernists.

THE COLONIAL AND FEDERAL HOUSE. How to Build an Authentic Colonial House. By REXFORD NEWCOMB. 174 pages, 7 by 10 inches. Illustrations from photographs, plans, and drawings. Philadelphia: 1933: J. B. Lippincott Co. \$3.50.

Dean Newcomb's experience in teaching architecture, and his ability to express himself clearly and concisely, has here been utilized in a good cause. The author explains the essentials of what we know as the Colonial and Federal styles in planning, materials, and details, inside and out. We might wish for a better presentation of the illustrations than the grouping together of small photographs on a mount and illustrating it as a whole.

THE CARPENTER'S TOOL CHEST. By THOMAS HIBBEN. 209 pages, 6¹/₄ by 8 inches. Illustratrations from line drawings. Philadelphia: 1933: J. B. Lippincott Co. \$2.

Thomas Hibben, well-known architect, has performed a magnificent job in tracing, for his and other people's children, the history of tools, how they are used, and what has been done with them from the Stone Age to the present time.

HOW TO JUDGE A HOUSE. Report of the Subcommittee of the National Committee on Wood Utilization. 85 pages, 6 by 9 inches. Illustrations from photographs and diagrams. Pamphlet binding. Washington: 1931: U. S. Department of Commerce, Superintendent of Documents. 10 cents.

N. Max Dunning is chairman of the committee which has prepared this guide for the prospective home-builder, pointing out details of construction and design.

ALUMINUM IN ARCHITECTURE. 234 pages, 5¹/₄ by 8¹/₄ inches. Illustrations from photographs and drawings. Pittsburgh: 1932: Aluminum Company of America. \$1.

A handbook made necessary by the wide and more varied use of the metal, telling of its properties, its available forms, and the technical details of its employment in building.

LIFE INSURANCE HOME OFFICE BUILD-INGS. A Study of the Problems of Building Construction. 156 pages, 8½ by 11 inches. Illustrations from photographs and diagrams. Fort Wayne, Ind.: 1933: Life Office Management Association. \$5.

A compilation of a committee representing the insurance world, and consisting of an elaborate and comprehensive check list of requirements—an indispensable aid to any architect who happens to be designing an insurance company's home office building.

THE EVOLVING HOUSE. A History of the Home. By Albert FARWELL BEMIS and JOHN BURCHARD, 2D. 502 pages, 6¼ by 9¼ inches. Illustrations from line drawings and plans. Cambridge, Mass.: 1933: The Technology Press. \$4.

A serious effort to trace the whole development of domestic architecture from earliest days to the present. The work will be in three parts, of which Vol. I only is now published, bringing the review of the evolution of the home, together with the social and economical forces which have governed it, up to the present time. The second and third volumes will deal with current housing conditions and methods, looking somewhat into the future.

Soft-ground Etching the Architect's Medium

By Gerald K. Geerlings

This is the first small experimental plate the author did, reproduced at exact size of original. It illustrates his point about using small pieces of copper to get accustomed to the medium. The pencil went through the tracing paper in the lower left-hand corner. The vertical pencil lines near the sides show where the plate was cut later

HE "itch to etch" is a common complaint. The pressure of lots-of-busya ness is the usual preventive. But the infection is likeliest to become malignant when there is a dearth of clients. After a summer of outdoor sketching the mere sight of etchings is apt to bring on a rash and drive the patient to copper. If the results are encouraging the after effects may be entirely beneficial, both as revitalizing personal enjoyment, and as a means of lowering the resistance of clients. However, when the effects are discouraging, the patient may be reduced to an irascible disposition. In order to prevent the latter, the following prescription is respectfully submitted, based on notes made while attending the Royal College of Art, London, and some subsequent clinical experiences.

Usually the treatment, but not the cure, consists in taking an etching needle in hand, and drawing on a plate prepared with a wax ground. The difficulty is that one does not ordinarily draw with as fine-pointed an implement as a darning needle, nor is one accustomed to bright red lines showing against a field of black. To locate black lines on white paper is difficult enough usually. Even with every possible detail going according to Hoyle from start to finish, the resultant print looks like a combination of so many thin wires, instead of so many sympathetic lines. Although a pen-with-ink may be a frequent means of architectural expression, an etching needle is by no means a twin spirit. The best of pencil sketches translated literally into a line-etching is doomed to failure because there is no conceivable similarity between a



pencil line and an etched line. Actually, to produce a good etching involves conceiving of the pencil drawing as merely a preliminary guide, and not the model which the etching is to simulate. The realization of this fact is singularly disregarded, even by some seasoned etchers.

The treatment which will yield better results is *not* to attempt a line etching (at least at first). A more sympathetic medium is the socalled "soft-ground" etching. The tool is not the sharp darning-needle point, but an ordinary pencil used over ordinary tracing paper. Any one accustomed to manipulating the pencil, and desiring to etch, can succeed. This article attempts to describe how the tyro can sally forth on adventure bent. In effect a soft-ground etching combines the pencil quality of a lithograph print, with the distinctive printing quality and plate-mark of an orthodox etching.

With all the other forms of etching, if there is anything which goes wrong, it can always be mended in one way or another. Not so with the soft-ground medium. While it is possible after much experimenting to work over a plate with a second ground, it requires personal instruction. The descriptions given here have been gone into fully so that if carefully followed the plate would be complete when taken from the acid and the ground removed. If you wish to burnish down certain parts to reduce them in value, or to make other parts darker, all that is a long story, and not as readily related as demonstrated. Even when done the result would not likely be as satisfactory as doing the plate over and getting it "to come right" without any patching.

SUCCESSIVE STEPS IN SOFT-GROUND ETCHING

Note: The numerals in parentheses after each "Step" refer to corresponding numbers under "Materials," pages 336, 337 and 338. Perhaps it would be advisable to glance over these requisites first before reading further. Then when you are ready to begin a plate, spread out these two pages before you, and carefully follow directions.

FIRST STEP: THE DRAWING (1 and 2)

Select a subject which you want to draw, and can draw, better than any other. Reduce the composition to its simplest terms. Speak only one sentence but say it clearly; reserve long paragraphs and sentimental speeches for a future date. Try to constrict the drawing to a small area, perhaps 5 by 8 inches for your first essay. Make a complete drawing of the effect you would like to see in a print. Then do a simplified tracing of the main elements only, using a red chalk pencil lightly. Don't use more red guide lines than are actually needed to act as a skeleton for the drawing, because too many will cramp your style and result in a cautious, stiff production. Trim the drawing so that it is about one inch larger around all margins, than the size of the copper. Put this drawing away in a safe place.

SECOND STEP: PREPARING THE COPPER PLATE (3, 4, and 5)

Get a piece of copper the size of your drawing. Take the plate to a work table alongside the sink and bevel the edges with a file. All copper filings must be thoroughly brushed off. This is essential because rubbing one speck of copper about on the surface can cut devilish scratches. Wet the plate under the running water. Dip a piece of felt into the whiting paste, and rub the surface of the plate. Replace the felt in dish. Wash plate with running water. Dip the other piece of felt into the vinegar-salt solution and rub plate. Repeat each operation twice more. Rinse plate under water thoroughly. Be certain hands are not greasy, but do not touch the top surface. Place plate between clean blotters and dry. Use a clean handkerchief to rid surface of any slight fuzz which lingers.

THIRD STEP: LAYING THE GROUND (6, 7, and 8)

It is absolutely essential that this step be done quite perfectly, or all the work which follows may be useless. The purpose is to coat the copper with as thin a breath of wax ground as possible, so that when submerged in the acid, the copper will be protected from corrosion. From this point on never touch the top surface of the plate; get in the habit of holding or carrying it poised on the tips of the fingers and thumb of your left hand, like a waiter carrying a tray. Shut all windows and doors so as to prevent the movement of air from depositing dust. Each speck which settles on the plate results in puncturing the wax film, and allows the acid to bite through later.

Place the copper on the heating plate, and regulate the gas to a low flame. When the copper plate has become warm, take the cloth-encased ground, place it on the plate, and wait until it

FOURTH STEP: AFFIXING DRAWING TO PLATE (9)

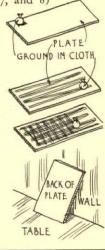
There are two methods for securing the tracing-paper drawing over the plate.

(1) Put the copper plate on a drawing-board in a position where it will be most comfortable for drawing, then place the tracing over it so that it fits exactly. Use large thumbtacks all along the edges so that both are held firmly. That is all. This is the simplest method and is fairly satisfactory, except that the paper cannot be stretched absolutely tight. (See sketches to right.)

(2) Another method—first cut out the corners of the tracing as shown in the sketch below. Crease the drawing so that these folds enclose an area equal to the size of the plate. Tilt the plate up on the bottom edge, until it stands in a



« ARCHITECTURE »



PERSPECTIVE

SECTION

ministration another

THUMBJACK

COPPER-

begins to melt. Then rub it gently to and fro over the entire surface of the copper until the latter appears to be covered. Don't worry about its not being evenly distributed. Don't let the copper get so hot that the ground sizzles; if the plate is getting too hot, remove it for a few moments. Use the dabber in gently dabbing the plate all over until the ground is evenly spread, or use the roller to accomplish this same end. This will require a little practice until you can do it quickly and well. When employing the dabber or roller, start at one end and methodically finish an area parallel to that end before proceeding to the adjacent strip. Continue until the entire plate has been completed. Take the plate from the heater and let it cool, face inclined downward so that dust cannot settle on it. Prop it so that it can't slip and thereby ruin the ground. After it is cool place it on the table where you intend doing the drawing.

nearly vertical position. Put some paste or rubber cement on the back of the plate along the top edge. Place the drawing over the plate so that its top edge will correspond to that of the plate, and press the overhanging margin so that the paste will adhere. Then tilt the plate up on its bottom edge until it is vertical, put paste on the back of the plate along this edge, stretch the drawing taut and hold until the adhesive dries. Repeat on the two remaining edges. The object is to paste the margins of the drawing to the back of the plate without letting your fingers touch the front. Put the plate, with the drawing-side up, somewhere so that it is horizontal, and blow a fine spray of water on it. The drawing will dry out quite taut, perfect for drawing. If the corners dry out with serious wrinkles, restretch the paper.

BOTTOM

TABLE-TOP

FIFTH STEP: DRAWING ON THE TRACING PAPER (10)

The preceding steps may sound tedious, but they should not take over a half-hour (excluding the first step), once you have the materials in readiness and have gained a little experience. Up to this point all has been preparatory; this fifth stage represents the actual problem. All that precedes and follows is chemistry; this step is purely artistic. It is here that the real quality of the print will be principally determined. If you are not feeling up to par, put the plate away until you are. Only if you are snorting with impatience to draw, should you tackle it. With vigor and spirit the job will be complete in a few hours with a vital freshness which persevering doggedness can never equal.

Place your final study before you, and the handrest so that its cleats clear the sides of the plate. Sharpen the 2B pencil. Then draw boldly, without a thought or worry over copper. *Remember*, you can make no erasures, and the pencil point only must touch the surface of the paper. *Forget* everything except that you are bending all your artistic talents to produce your best pencil-drawing to date.

SIXTH STEP: REMOVING THE DRAWING (11)

When you are certain you have drawn all that you should, cut the drawing off around the edges. Work from the back of the plate so that a slip of the knife will not damage your work. Put the plate down again, face upward. Beginning with one corner, carefully peel the drawing off. What has happened is this: wherever you have used pencil, the ground has adhered to the paper. Where you have borne down hard nearly all the wax will come away from the copper, so that when the plate is in the acid, the line will be bitten deeply. Where you have made a light line, only a fraction of the wax has come off,

SEVENTH STEP: BITING THE PLATE (12 through 18)

The plate is now ready to be submerged in the acid bath. Put the thermometer in the acid bottle to determine the temperature. If it is below 65 degrees you can raise the temperature readily and with safety, by standing the bottle in hot water *after removing the bottle's stopper*. Then pour enough acid in the tray so that it will generously cover the plate. Lift the copper plate by its edges, being careful never to touch the top surface, and put it in the acid. Make note of the time on a slip of paper. Bubbles will collect wherever the acid is biting the copper. Use the feather to swish them off gently as soon as they form. Be certain the feather is a soft one, or it may disturb the ground. If you see bubbles collecting where there should be no lines, record how many minutes the plate

EIGHTH STEP: REMOVING THE GROUND (19)

For better or for worse, the battle is just about over. Place the plate on an old newspaper and pour on some turpentine. Rub it around with your finger tips. If you feel any grit, stop rubbing and rinse off with running water. If the stopping-out varnish is reluctant about dissolving, heat the plate on the hotplate, then take it off and add more turpentine. Turn the plate over and with the aid of turpentine remove all the varnish here too. Clean the plate thoroughly, using a cloth at the end. Don't be careless with the turpentine near the gas flame.



The print will look approximately like whatever you put on paper. Try for directness, rather than building up tones by successive strokes. You should have studied your subject so well that you know exactly how to draw it without any hesitation. The resulting print will show precisely how well you know your subject, and how sure you are of your drawing. There is no luck in this connection. If in the midst of the drawing you feel uncertain how to delineate a certain passage, take time off and determine how best to do it by trying several methods on a separate piece of paper.

A few precautions: (1) Don't press so hard as to tear through the tracing paper; if you do the resultant mark will have to be "stopped out" before the plate goes into the acid bath, as described in the next step. (2) Try to work where the temperature will remain the same from start of drawing to finish, and during the middle part of the day when natural changes of temperature are less than those from early morning to midday; otherwise the wax, being softer during the warmer periods, will adhere more to the under side of the paper than you suspect. (3) Don't work in the sun.

thus allowing the acid to attack the copper less vigorously. Keep the drawing for reference.

Wherever you see the pencil has pierced the paper, or where finger prints are in evidence, or flecks of dust seem dangerously large, dab on the stopping-out varnish with a small, wornout water-color brush. Paint it on as though it were water color. It will render the surface acidresistant. Use it wherever the ground looks as though it might not be acid-proof. In general, it is advisable to paint out sky areas, and such other locations which you wish to make certain will print white. Also, cover the entire back and edges of the plate with stopping-out varnish don't forget this.

has been in the acid, take the plate out of the acid, and wash off under running water. Hold it on one edge until all the excess water has run off. Let the remaining moisture evaporate. When the plate is thoroughly dry, touch up the offending spots with the stopping-out varnish. When the latter is dry, put the plate back in the acid. Generally you will find that 15 minutes is a pretty good average length of time for the plate to remain in the acid. All the while it is in the bath, use the feather to dislodge bubbles. Take the plate out when the time is up, rinse under the faucet, or in a pail of water. Place it on one of the blotters. Blot the surface too touching the surface will not do any damage now. Only the print will show whether the plate has been bitten just enough, too long, or not long enough. Keep a record so that you can profit by any mistakes.

Wrap up the plate in any paper which does not contain chemicals. Take it to some friend or a plate-printer who will pull a proof for you. Take along your original drawing from which you worked, as a guide for the printer.

NINTH STEP: RESULTS (21 and 22)

When you see the first print, don't feel elated or depressed. Take it calmly—and try again. Keep on trying, for the real sport comes in finally succeeding after a run of failures. Clients and boards-of-directors may be lured into commitments by your etching presentation. Now, before the next boom, is the time to learn etching and enjoy life.

MATERIALS FOR SOFT-GROUND ETCHING

If you have access to a friend's etching workroom, the problem is much simplified. Better than any amount of reading, far-and-away the best method of proceeding will be to have some one show you how to manipulate the materials. If you care to do some reading on the subject, one of the best works for completeness, clarity, and brevity is that

1 -TRACING PAPER



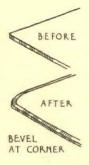
To start with, the best quality of tracing paper will give the most satisfactory results. While it should be fairly smooth, it should not be devoid of slight "tooth." Various Japanese papers will yield interesting results, depending upon the suitability of grain running in one direction more than in the other. The quality and texture of the paper will be a matter to be decided by the subject matter to some extent, because the more texture, the more the print will resemble a drawing on a rough piece of illustrating board.

2

2 -PENCILS

A colored pencil, such as sanguine chalk (*not* crayon), and an ordinary lead pencil about 2B grade, are all that are necessary.

3 -COPPER



This is sold by the square inch, and, while not prohibitive in cost, is not to be lightly consumed like sketching paper. Try out some experiments on small pieces of copper first, before doing a large job. John Sell Cotman (1784– 1842) did some notable soft-ground etchings no larger than 3 by 4½ inches. The copper should be delivered to you free from any scratches, and you have a right to insist on its being practically flawless. There will be minute, multitudinous marks completely covering the surface from the mechanical polishing it has received, but these are innocuous and to be expected. Copper plates are usually cheapest when bought in stock sizes; find out what they are and have a small plate cut up, if necessary, rather than ask for an arbitrary size. Sometimes very small pieces are yours for the asking if you visit the works. 18 gauge is recommended.



4 -FILE

Any file which is not too coarse can be used to bevel the edges of the plate. It is well to do the filing first, so that if there are any slips of the file across the plate, your work will not be there to ruin. File the edges to a bevel so that a generous 32d, or a scant 16th, of an inch exists on the 45-degree face. Unless the edges are bevelled they will cut through the printing blankets, as well as the paper, when printed.

336

by E. S. Lumsden, entitled "The Art of Etching." If you are starting out entirely on your own, the materials described in the ensuing paragraphs are necessary. Except for numbers 7 and 9 all these materials are used for all forms of etching. Their total cost would be about five dollars, excluding hotplate (6) and copper.

5 -- CLEANING AGENTS

Unless the copper surface is abso-lutely free from all impurities such as grease, the ground will not adhere and the whole process is doomed to failure. There are various means of rendering the copper quite clean, but the follow-ing materials are easily obtainable, inexpensive, and will do a thorough job. Get ordinary gilder's whiting, put some in a medium-sized dish or bowl, and moisten it with a solution of water which contains enough ammonia so that you can smell it (5 per cent solution in water is ample). Keep this solution in a glass-stopper bottle. In another container make a solution of vinegar and salt; a teaspoonful of salt in about a half-pint of vinegar is ample. Have two old pieces (about 3 to 4 inches on each side) of thick flannel, felt, or like durable material, with which to apply them.

6 -HEATING PLATE

In laying the ground the usual etching equipment includes a "hotplate," which is merely a sheet of metal on a frame having legs, and supplied with a gas-ring underneath. Lacking this, use your ingenuity in rigging up a cake-tin, or something in the nature of a piece of sheet metal, over the gas range. Turn on the gas flame only a small amount, or the heat will be too concentrated in the centre, and too hot for your purposes. The heating plate should be large enough to allow you to work comfortably, perhaps 12 by 18 inches, and firm enough to afford a sound foundation for the dabbing you will do. A table in close proximity will be necessary.

-WAX GROUND

If you can purchase a "ground" especially made for soft-ground etching, it will save time and trouble. Otherwise get Rhind's standard ground, also a piece of mutton fat about the same size (cut it off before the chop is fried for dinner), and melt the two together in a small, clean, cooking utensil. Before it hardens from cooling, mould it into any shape, wrap a piece of silk, muslin, or other cloth material, around it, and tie the gathered ends together. When used on the copper this cloth casing will make it easier to hold and to manipulate. In warm weather perhaps one-third mutton fat with the ordinary ground, may be better than one-half.



MMOI

AMMONIA (5%

& WATER



GAS-RING





8

-DABBER OR ROLLER

In order to lay the ground you will need either one of these two. The dabber will cost less, and can be homemade if you care to do so; it is perhaps the more easily manipulated, once you get the hang of it. Don't use this particular dabber for laying an ordinary ground later, but reserve it for soft-ground etching only.

The tracing paper can be thumb-tacked around the edges of the plate, but there is always the likelihood of one or the other moving. In a landscape this

While working on the plate after the

ground has been laid, it is of the utmost importance that nothing should touch the surface. If it does so that the

ground is disturbed, remove the latter with turpentine, clean the plate anew, and relay the ground. When the tracing

paper is fastened in place, nothing except the pencil must be allowed to

touch the paper. If your finger imbeds

the paper into the ground, it will have the same effect as though you had done so with a pencil point, and the evidence will show on the print. Therefore, in order to draw with absolute freedom,

it will be advisable to have a handrest,

unless the plate be so small that you can

reach all parts of it easily without mak-ing your hand stir from a single position. Take any piece of thin board, like

three-ply wood, and nail cleats at the ends. If the cleats hold the board a

half-inch above the table top, it will be sufficient. Don't have them so far

apart that the board will sag in the centre and "let you down." A slight

downward, forward slope of the cleats

of making a handrest, use any stiff, thin

board and let it rest on two cleats or

Get a small bottle of this quick-drying

varnish; it will cost about fifty cents. It

can be applied to the plate with worn-

out water-color brushes, very small ones

for delicate touches, and a large one for

painting on large areas, such as the back of the plate. Some products are not rapid in drying-get a type which is. Rhind's is one of the best. Don't ever

plunge the plate into acid or water un-

til the varnish is thoroughly dry.

books at the sides of the plate.

-STOPPING-OUT VARNISH

If you don't want to go to the trouble

may be of advantage.

9 - PASTE

10. -HANDREST



ROLLER

may not be detrimental, but in an architectural subject it may do con-siderable damage. Therefore use paste, or better still, rubber cement, to hold the tracing securely in place (see Fourth Step).



11

12 -ACID

For this type of etching the nitric bath is best, because when the copper is submerged in it, bubbles will form wherever the acid is biting. Consequently, if there have been any finger prints, or other accidental marks, they will disclose their existence. Then the plate can be taken from the acid, and these spots blotted out with varnish as described in the Sixth Step. In making up the acid solution, a good working proportion will be to use 3 parts of nitric acid to 5 parts of water; a 32-ounce bottle will give you a good working quantity. It is of the utmost importance, in mixing acid and water, to add the acid to the water, not the re-verse. Otherwise there would be so much heat generated that the glass container will likely crack, among other disasters. Keep the acid in a glass bot-tle having a glass stopper. Often the latter has a way of refusing to come out; put a cloth in hot water, then wrap it around the bottle top, and after a little heat treatment of this sort it will yield readily. Don't try to force the glass stopper.

-THERMOMETER 13

After several years of etching you may be able to judge how well the acid is biting, by taking the plate from the acid and squinting against the light to determine the depth of the bitten areas. But for the first few years a thermom-eter is a valuable aid. Acid will work for you best between about 65 and 70 degrees Fahrenheit. Experiments will be of great aid to future plates if you record what the temperature was when you bit the plate. Later on you may meet a similar problem where this in-formation will supply the correct an-swer at once, instead of guessing badly and being compelled to do it all over. It takes only a moment to jot down the conditions under which a plate is bitten, while it may take days to make over an entire plate.

-TRAY 14

The container must be acid-proof, so don't use enamel ware over metal, unless you give it several coats of acid-proof enamel or lacquer first. Any rec-tangular porcelain or china tray that has a flat bottom will do admirably.



-FUNNEL 15

In order to pour the acid from the tray back into the bottle you will need a funnel; get a glass one preferably.

16 - FEATHER

Take one or two soft ones from a duster, or other source.



PARTS NITNO

WATER

17^{-BLOTTERS}

At various intervals along the way these will be necessary. Get them white and of the most absorbent quality possible. Sometimes desk blotters do everything except absorb moisture.

18^{-RUNNING WATER}

The business of placing the copper plate in, and removing it from, the acid, is best done in the vicinity of running water. If you drop acid on the plumbing-fixture enamel, fittings, etc., wash it off promptly before it stains them. It delights in attacking clothes and shoes, taking out the color and making holes. Be most careful not to splash any on your face, particularly in your eyes. Half-strength nitric will not hurt your hands as you merely manœuver the plate in and out the acid bath, providing you wash it off immediately. Use rubber gloves if you have any open cuts, or the acid will burn smartly.

The latter should be free from grit, buttons, hooks-and-eyes, etc.

20-змоск

When it comes to the acid operations it is advisable to wear something to protect your clothes. Have your sleeves rolled up and out of harm's way.

21^{-PATIENCE}

This is an important ingredient, and quite essential if your first experiment is not to be your last. Approach softground etching as a game that requires a certain amount of technique before you can conscientiously expect to put over blazing aces. If your first small experimental test plate is not what you expected, it will augur better for future success than though it had turned out so well that you felt there was not much more to learn. Every plate is a new adventure, and while past experience is of inestimable value, there will always be sufficient new problems to keep your interest intense.



Reproducing at the original size a portion of the soft-ground etching in color, "Rue St. Jacques," by T. F. Simon



Don't try to lay in a supply. There is occasionally some to be had in etching, but not much. The laws of chemistry are immutable, not temperamental. For example: the copper is clean and not temperamental. the ground stays on, or the surface is greasy and the ground comes off. There is no luck one way or the other. The tracing paper is put on carefully so that nothing but the pencil point touches the paper, or it is put on carelessly and finger prints show up on the print. Just a matter of technique-not luck. From a small test plate you find out how long the plate should remain in the acid, or you make a poor guess based on no in-formation at all. That is a matter of taking an hour's time to find out, not a lack of luck. Where luck sometimes does figure, however, is in this manner: In a small test plate you decide that a certain degree of pencil blackness on the tracing paper will give exactly the tone you want, after the plate is bitten fif-teen minutes. Then, without realizing it, you bear down on the pencil a bit heavier than you realize, the rising temperature of the room makes the ground adhere to the paper more than it did on the test plate, and presto! the print shows that while all is blacker than you intended, the thunderous effect is an improvement over your paler study. Or, perhaps a thumbmark gives a foreground smudge which is a better imitation of a dried-up mud-puddle than you could have drawn.

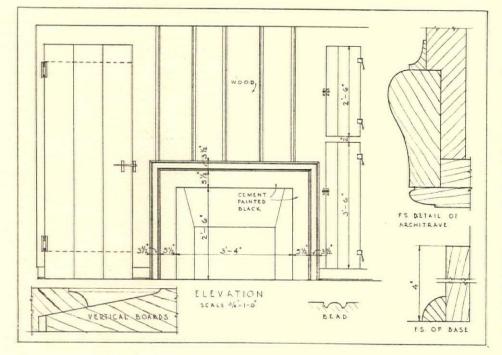


By courtesy of Kennedy & Company

FAVORITE FEATURES



CHARLES S. KEEFE





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 has hoped, and he would not change it if that were possible.

Here is another in this series of "Favorite Features," a bedroom chimney corner in the guest house of Constantine Hutchins, Needham, Mass., which satisfies Mr. Keefe



Friday, March 31.-Lunched with H. T. Lindeberg, discussing the myriads of efforts toward standardization in building. Two things stand out as rather obvious facts: first, that standardization in building must concern itself with units of construction rather than with buildings as a whole-at least, above the size of a gasoline-filling station or portable garage. Second, a real progress in the achievement of proper standardization of parts is very definitely handicapped through the fact that each industry, if not each individual manufacturer, is trying to make a material or a device out of the raw materials with which he alone works. There is no correlating agency to select and further the most likely combination of materials and methods; just as there is no one to persuade the lumber industry, for instance, that it is wasting its time and efforts in attempting to prove that one should build a house out of nothing but wood.

Saturday, April 1.-Chicago's North Shore Real Estate Board recently conducted a competition for the design of 'average American home with a an first prize of one thousand dollars which was awarded to Robert S. Arnold, of Winnetka. The jury, in its report, bewails the fact that it expected one thousand entries and got about one There seems to have been hundred. something wrong with the publicity. The sponsors say that they notified every chapter of the A. I. A., and The Chicago Tribune gave the matter considerable mention. Nevertheless, so far as I can find out none of the architectural magazines was invited to help spread the news, so that the competition naturally remained a local matter.

Monday, April 3.-Robert D. Kohn has almost acquired the status of a commuter between New York and Washington where he has been in close touch with Senator Wagner; Lester Douglas, Director of the Budget; and Miss Frances Perkins, Secretary of Labor, working toward the inauguration of a really comprehensive construction programme to put the unemployed back to work. Mr. Kohn figures that we have lost practically a year in our failure to take advantage of the provisions of last year's Wagner Bill, and that even more forceful measures are now necessary. Incidentally, he brought before the leaders in Washington a detailed list prepared by the National Committee for Trade Recovery of more than two and a half billion dollars' worth of planned public improvements delayed or abandoned because of the depression, and probably in large part ready for inclusion at once in a public works drive on a war basis.

Wednesday, April 5.-Tonight the New York Chapter, A. I. A., awards



The Editor's Diary ©

to Louis Ayres, member of the firm of York & Sawyer, its Medal of Honor in recognition of "his prominent part in the many distinguished designs produced by his firm that have contributed to the moulding of public taste and to the honor of the profession, and for his faithful service to the public as a member of the National Fine Arts Commission"—a particularly popular and welldeserved award.

Julian Clarence Levi, retiring president of The Architectural League of New York, and chairman of the Architects' Emergency Relief Committee of New York, has, as many of us know, worked night and day in the past two years in a sustained and effective labor for others. The Chapter expresses its recognition of his tremendous and productive efforts in its citation read in tonight's annual meeting:

"The crisis through which the world is now passing has brought to many of our profession great privation and distress, the alleviation of which has become our chief concern.

"The work of relief has been organized and administered with so much sympathy, energy, and untiring devotion by one of our members as to merit our warmest approbation.

"As an expression of our grateful appreciation of this eminent service to his profession and his fellow men, the New York Chapter of the American Institute of Architects desires upon this occasion to bestow its highest commendation on Julian Clarence Levi."

Thursday, April 6.- The A. I. A. Board of Directors straddled the fence very neatly in their statement that the Board "recognizes and commends proposals for mass or factory production of small houses. Nevertheless, attention is called to the danger of obliterating the individuality and character of the house '-which double statement might . . ' have been combined possibly in the more tenable theory that progress in housing will result from standardization of construction units rather than from standardization of houses, whether they are large or small.

Saturday, April 8.-Robert Wiseman is prompted by the reading of Carleton Ryder's articles to express his amusement over the position in which the philosophers and the scientists find themselves. Wiseman has been listening to some lectures by John Dewey in which the latter holds that experience is the only truth we know. At the same time he has been reading Max Plank, the German physicist, who arrives pretty nearly at the conclusion that human experience can go only so far, and then we must assume a truth until it is disproved. Wiseman finds very amusing the fact that the philosophers are, at the moment, putting their faith in the proving of facts, while the factfinding scientists are apparently coming around to doubting the practicability or even the possibility of arriving at facts.

Monday, April 10.—J. C. Knapp, vice-president of the Otis Elevator Company, in a speech before The Architectural League today, voiced a hope which has for long been a pet one of ours. The architect who designs a building should, as a matter of course, continue his interest in the structure during its lifetime. As a specialist in buildings, and particularly in that building, the architect is best qualified to suggest changes and improvements to maintain its useful life. Of course, something like this is the case in England and in France. Perhaps we are at last coming to it.

Wednesday, April 12.—Frederick Heath, Jr., writes me that a photograph on page 227 of the April issue takes him back to about 1919. The illustration showed some scored hollow tile used in the wall of the penthouse on The Mission Inn at Riverside, Calif. Mr. Heath tells me that these brick were "Heath Units" as invented by his father, Frederick Heath, a Tacoma architect, some time prior to 1913. They were manufactured by the Los Angeles Pressed Brick Company, now Gladding McBean & Sons.

Friday, April 14 .- W. E. Emmett, District Engineer at San Francisco for the American Institute of Steel Construction, reports that his investigations following the earthquake indicate that steel apparently held the record for stability. The only fallen piece of steel evident in the vast area of store buildings was an I-beam that dropped when the entire brick front and sides of the structure fell. On the other hand, many steel lintels are visible, due to the fact that the brick fire-wall was not properly anchored. There were some examples of brick construction badly wrecked, the fault apparently not of brick, but of poor construction. The highest structure in Long Beach, the Villa Riviera Hotel and Apartments, is of steel-frame construction, designed for dead and live loads JUNE, 1933

and fifteen pounds of wind. It came through with only a few plaster cracks.

Monday, April 17.- There is food for thought in the fact that while a sophisticated jury awarded the prize to a very modernistic flat in the Marshall Field Apartments, Chicago, the five thousand lay visitors voted overwhelmingly for a period room. The modern flat was designed by Mrs. John Root, with unfinished mahogany furniture and a yellow color scheme with white Venetian blinds at the windows. On the other hand, the popular vote was for an eighteenthcentury English suite designed by Mrs. A. C. Cramer. The choice of the most livable apartment as voted upon by the public lay between an early American style, one combining Beidermeier and Directoire motifs, the English eighteenth-century, and the modern one.

Tuesday, April 18.—Dropped in to see Henry Wright, only just back from studying housing abroad. Foreign methods of living differ materially from ours, and their housing must necessarily differ from ours. Nevertheless, there are lessons in the fundamentals that we may learn from their longer experience in government-subsidized work of this kind. These lessons, as Wright sees them, will soon be made available to the profession.



Wednesday, April 19 .- O. H. Cheney, who directed the national survey of the publishing industry two years ago, has of late been devoting his analytical efforts to the building industry. Mr. Cheney's concrete suggestions are not particularly new, since many of us have been urging this sort of thing for months. Nevertheless, he does bring the problem out into the light of specific inquiry with the following twelve questions, suggested as the necessary preliminary

to an immediate advance. "What is the present supply of available accommodations in each class of building and use?

'What is being actually added and what planned?

"Exactly where are these old and new

supplies? "What economic and other influences are now at work which might affect particular neighborhoods and buildings?

"Is there a danger of oversupply of a certain type of accommodations in a given neighborhood?

"Of what kind of accommodations is there an inadequate supply and where?

"Why are tenants moving in or out of certain buildings or areas? "What competitive accommodations

are being offered in other parts of the city or metropolitan area?

"What are current returns on various types of property in various areas, and what are the causes of differences?

"What buildings are ready for demolition and what areas are ready for rehabilitation?

"What facts are necessary to determine the best use of any given piece of property ?

What are the extent and causes of current vacancies? (Not the sketchy, inaccurate and misleading so-called vacancy surveys which so many real

estate organizations have made.) "'With such facts at their disposal," Mr. Cheney observed, 'owners of projected property need not be blind as to prospective returns and builders need not be blind as to the market for con-struction work."

Friday, April 21.-Pierre Blouke in from Chicago by way of Washington, with the news that Chicago is, if possible, even quieter than New York, architecturally. He says the Fair is going to be worth seeing. Blouke, by the way, has just designed a sizable country house to be built with an exterior of copper, using for color contrast the silver gray of lead-coated copper, and the bronze that copper rapidly acquires. For pattern he is making use of the standing seam.

Saturday, April 22.—Diego Rivera seems to be leaving a trail of argument behind his mural painting as he pro-ceeds from New York to Detroit and back again to Rockefeller Center. In Detroit his work in the garden court of the Institute of Arts is being attacked as being "communistic," "irreligious," and "satirical." In New York the news-papers are making gay over their contentions that Rivera is putting over, at Mr. Rockefeller's expense, propaganda for communistic ideas. All of which is probably the usual product of news gathering when real art news is scarce. Nevertheless, my own feeling is that Diego Rivera is a good painter-in Mexico.

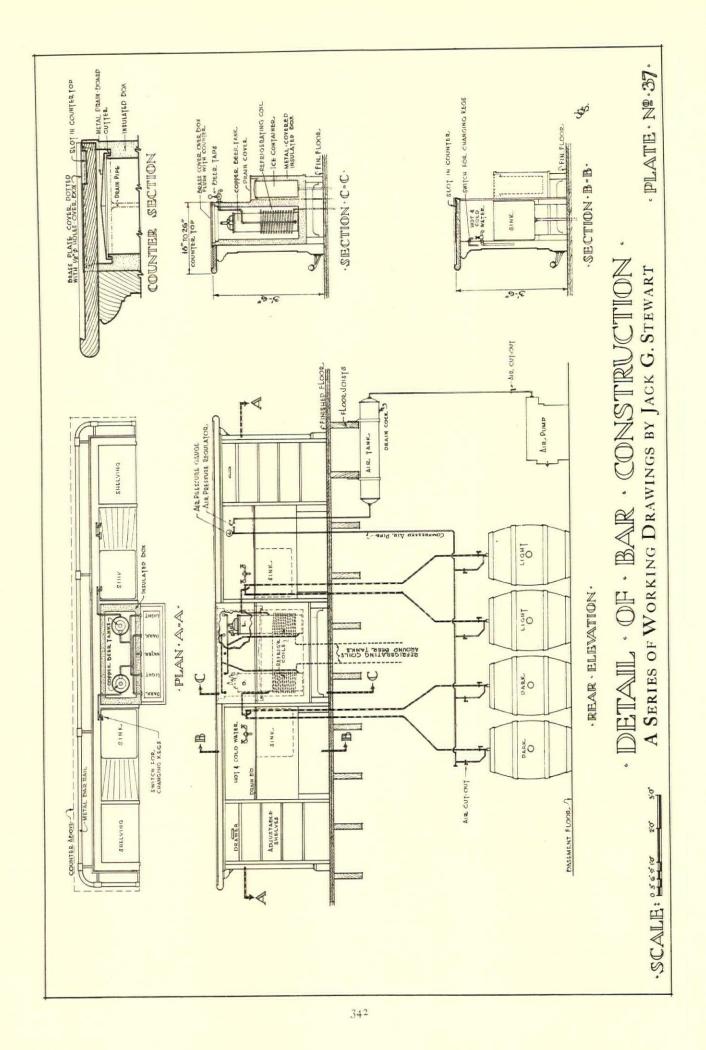
Monday, April 24.-George Sakier showed me today his carefully studied scheme for standardizing bathroom equipment. Sakier has taken a long step beyond the present state of affairs, in which plumbing fixtures are the commodity. In this new conception the bathroom is the commodity-not a fixed unit, but a series of wall panels in metal with which are incorporated the plumbing fixtures themselves. The scheme is so elastic that one may install a bathroom in an old building without breaking into the walls. In a word, it is a bathroom in sectional wall units which are easily joined, arranged in a multitude of combinations, and beautifully finished with the color baked directly on the steel. In these sections are combined

not only the essential plumbing units, but medicine cabinet, lighting fixtures for over the lavatory, all the usual bathroom accessories, heat duct openings, and ventilating grilles. In other words, a plumber and a carpenter can assemble a bathroom complete almost as easily as one can now install the kitchen dressers.

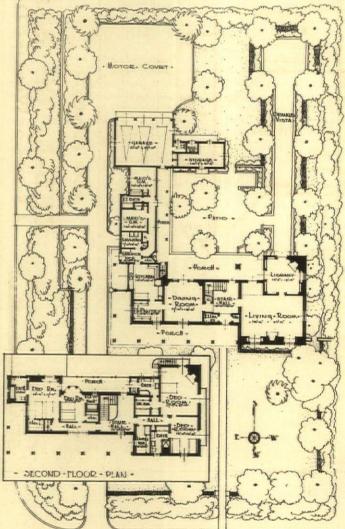


Wednesday, April 26 .- Hobart Upjohn was host to a distinguished company at dinner tonight at The Architectural League. The occasion was unique, and long to be remembered by all who were privileged to attend. Here was the celebration of one hundred years of architectural practice in a single family. Richard Upjohn, whose best-known work is Trinity Church at the head of Wall Street, New York City, was born in Shaftesbury, England, in 1802. He came to this country in his twenties, and soon attained recognition among the leaders of his profession. He found The American Institute of Architects in 1857, and served as its president for sixteen years thereafter. Richard M. Upjohn, his son, who was a contem-porary of Richard Hunt and Stanford White, designed among other works the Connecticut State Capitol and the old St. Thomas' Church at 53d Street and Fifth Avenue, New York City. He had five sons. Four of them tried to follow in their father's professional footsteps, but found it hard going under a master who believed in a rigorous enforcement of traditional apprenticeships. Hobart Upjohn, the youngest of the sons, approached architecture from the engineering school. His latest church, All Souls, New York City—a distinguished work is one in a long line of more than one hundred Upjohn churches in the United States, largely in the east and south.

Among the distinguished guests at the dinner were Dean Milo H. Gates of the Cathedral of St. John the Divine; former Governor William T. Gardiner of Maine, for whose grandfather Richard Upjohn built one of his first country houses; Royal Cortissoz; Dr. Ralph Adams Cram; Charles H. Higgins, president of the New York Chapter, A. I. A., who presided as toastmaster; Julian Clarence Levi; J. Ernest Russell, president of the A. I. A.; Dean William T. Boring of Columbia; D. Everett Waid, past president of the A. I. A.; and others to the number of fifty. Unfortunately I was compelled to leave the dinner before some of the speeches which, as a whole, constituted a love feast in praise of architectural tradition. Cram and Cortissoz, among sympathetic friends, voiced with all their vehemence the further development of traditional forms as the only tenable road of progress for architecture.







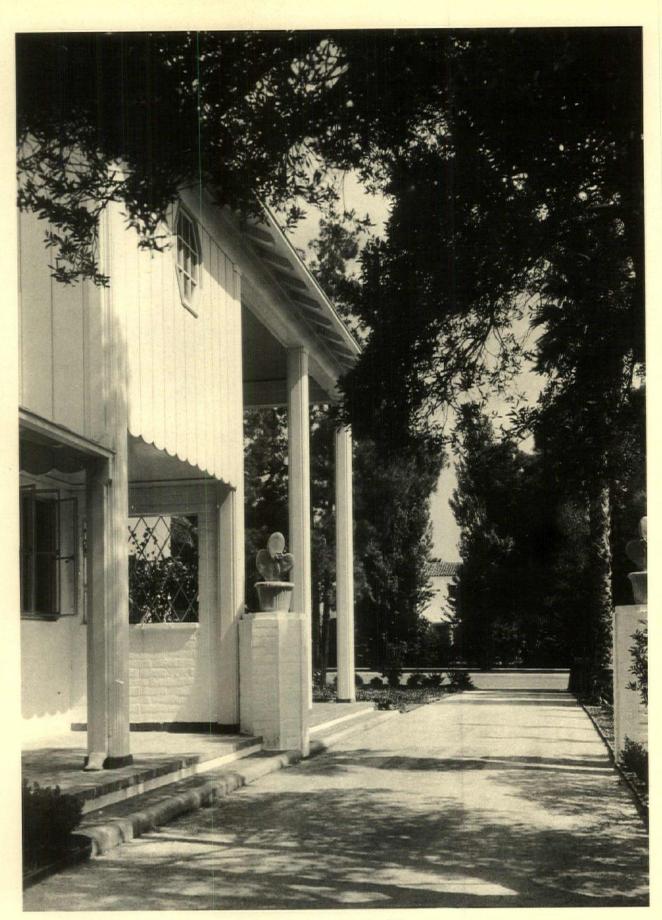
One of the most interesting features of this house is the color treatment of the exterior. The dado, which shows very indistinctly in the above photograph, is green with a dull yellow band at the top. Elsewhere the exterior walls are white, but the ceiling of the porch is also green with a darker green band outline, and the small cement bases of the columns are the same green. The roof is pure blue

Photographs by George D. Haight

House of Edward H. Heath, San Marino, Calif.

> ROLAND E. COATE, ARCHITECT

« ARCHITECTURE »

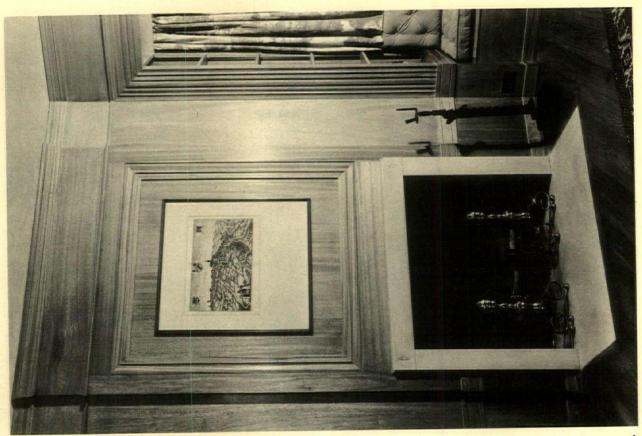


A detail along the side of the house at the driveway entrance. The glazed terra-cotta ornamental pots are greenish blue, holding cactus of terra-cotta color



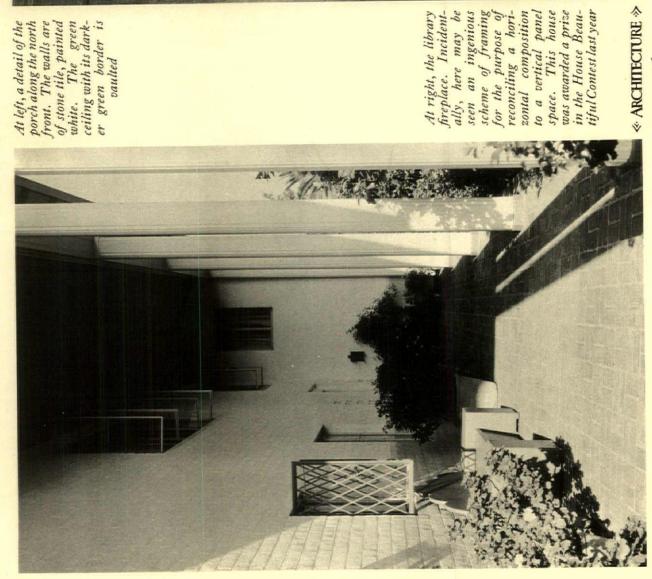
A corner of the patio, showing under the roof the flower sink lined with green and yellow tile. The steel casements are painted a straw color

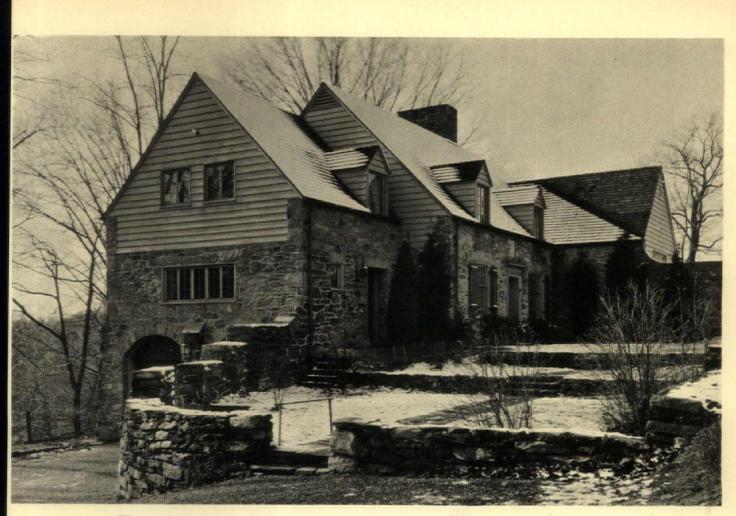
« ARCHITECTURE »



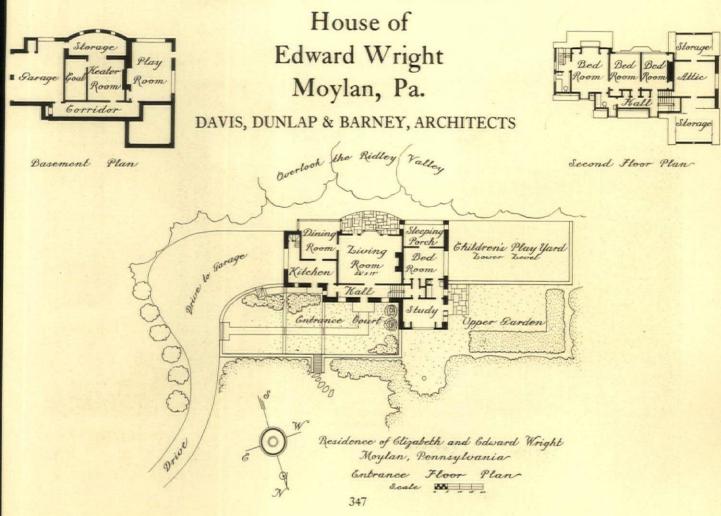
At left, a detail of the porch along the north front. The walls are of stone tile, painted white. The green ceiling with its dark-er green border is vaulted

At right, the library fireplace. Incident-ally, here may be seen an ingenious scheme of framing for the purpose of reconciling a hori-zontal composition to a vertical panel space. This house was awarded a prize in the House Beau-tiful Contest last year



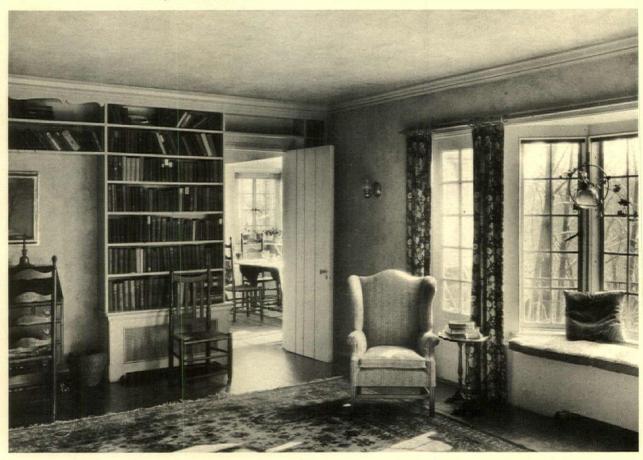


The north front and entrance garden. On the other side, the south, the land drops abruptly to the valley of Crum Creek, about 150 feet below





Two views of the living-room. Virtually the whole south side of this room is taken up by a range of casement windows. The fireplace is faced with native stone. Walls are of sand-finish plaster, tinted buff. All the woodwork is cream

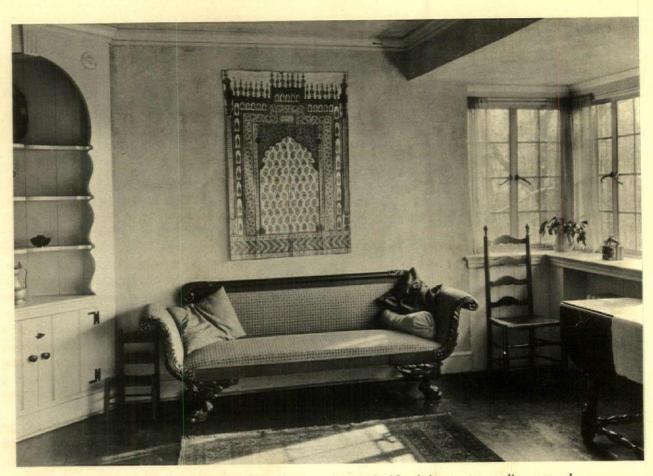




Main entrance on the north side, the carved date stone above the door being of limestone bearing a cipher devised from the names of the owners

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Above, the dining-room. Here again the entire south side of the room extending around the corners is opened up by casement windows. Below, the children's playroom on the basement level at the west end of the house. The steep slope permits here, also, long ranges of casements on the south and west



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Some Pitfalls in Supervision

HE control board for the pumps must be clear of all water lines, and not under locations where serious leaks may occur without due preBy W. F. Bartels XXXII. MECHANICAL APPURTENANCES

(CONTINUED)

caution being taken for the protection of the board. It is advisable to provide that both starters may control either pump, if two pumps are provided. Particularly is this true of sump pumps. To illustrate: let us number the pumps I and 2, as well as their starters numbered I and 2. If starter I breaks down and pump 2 breaks down, number 2 starter can operate number I pump. This is a very simple matter to arrange and the cost is negligible as compared to the margin of safety it affords. In short, by means of a throw-over switch number I starter will operate either pump, as will also starter number 2.

The superintendent should secure the approval of the design and location of the pump foundations before he permits the contractor to proceed with the subsequent installation. The contractor is apt to argue that if the pump is a good one it will be balanced, have little vibration, etc.; but the instructions of the manufacturer should be meticulously adhered to. Any special features, such as cork foundations, should be carefully carried out according to details.

The capacity of the pump is important in relation to the work it is expected to perform. It should first be checked against the manufacturer's rating book, to make sure it is the one ordered. Then the head against which it must work, if it is pumping fluids, should be checked. Many times the plumber figures the head from the bottom of the tank or the floor. This obviously is incorrect, because the water enters the top of the tank, and in some special instances might have to go higher in order to get into the tank. A test should of course be made to check the capacity, at which time other items, such as bearing temperature, speed, etc., may also be investigated. If run by electricity the motor and pump should be connected by a flexible coupling so that the errors of the human element may be kept to a minimum in aligning the drive shaft. A slight amount of disalignment here will cause all sorts of trouble later. It is a good plan, when two pumps are

installed for the same purpose, and where one is regarded as a spare, to have them so arranged that they alternate automatically. This keeps both pumps tuned up and the

man in charge can always be sure that the other one will work if it is called upon to do so.

The superintendent should see that all spare parts called for are furnished, and that the engineer who will be in charge is thoroughly acquainted with all aspects of service that will be necessary for the continuous and efficient operation of the pump. It is important—extremely so—to know how far away the nearest service station is, and how soon help will come when needed in an emergency. Many a dealer with a good pump has lost a sale because the answer to this question was not satisfactory.

The smooth functioning of a pump is to be desired, but because it does work well is no reason for overloading it. On the other hand, some types should not be underloaded. For example, a centrifugal pump working against a lesser head than it was designed for is inclined to race, with the resultant consumption of unnecessary power and possibly burned-out windings. While pumps must be run to do the work required, good practice demands that the pump be not run more than 35 or 40 per cent of the time without being given a rest. The connections from a pump delivering water should not be at sharp angles, nor should there be more angles in the line than are absolutely necessary. The reasons for this are obvious.



The testing of pumps has been mentioned, where there was a receptacle to catch the water. Where there is none, and a test must be made, such as a test of a fire line on a roof, an instrument known as a Pitot tube is used. This tube gives the pressure with which the water is leaving the hose nozzle; knowing this and the size of the nozzle, the amount of water may easily be computed. The tube is a hook-shaped affair, the end of which is put over the discharging nozzle.

In the testing of fire lines on a roof I once

encountered an interesting fact. The pressure was well up on the pump gage; the valve at the hose was turned on, but no water appeared. Telephoning the engineer, the latter reported a steadily mounting pressure. Still nothing resembling water appeared at the hose end except a sorry dribble. Cutting the pump off and taking the last connection off, it was found that a workman's leather glove had gotten in the fitting and was effectually cutting off the water and causing the plumbing contractor no little worry.

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If the superintendent is not familiar with motors he should not hesitate in asking assistance when inspecting them. They are complicated if inspected minutely, and none but an expert can detect all of the hidden or likely defects. The manufacturers as a whole do not wish to misrepresent or deliver a product that is unlikely to give satisfactory service. But this does not prevent an unscrupulous dealer from switching name plates or anything else that may suit his convenience or profit. Most motors have a plate put on them by the maker, giving the pedigree of the article. Motors are generally 40° or 50° Centigrade. This means that in four hours continuous running they will not heat up more than 40° or 50° C., respectively, above the room temperature. Of course they must not be expected to perform this in a very small room without ventilation. A superintendent was once on a job where a majority of motors were 40° C. Coming across one that was well covered, but at its visible points had a shabby appearance, he looked more closely at its tag. It was a 55° C. motor. Checking back against the specification, he found it loosely written at this point and of no definite requirements except to provide for "a motor twice as strong as necessary to do the work." The question arose as to what the amount necessary was to do the work. Feeling that a technical advantage had been unjustly taken, the superintendent third-degreed the contractor. The latter

finally admitted that not only was the 55° C. wrong, but that the entire plate was incorrect, and that the motor had been rewound. Finally after much guaranteeing and verbosity as to the soundness of the motor, it was installed, but it is doubtful if the owner really got what was intended by the specification writer. Then, too, the horsepower of a motor may be changed (as far as a superficial inspection goes) by changing the plate. Thus a motor with a certain rated horsepower at 40° C. may be stepped up in horsepower by changing the plate to read 50° C. These methods and tricks are not resorted to by the well-known manufacturers, but by the unscrupulous firms interested only in quick profits and a quicker getaway.

When the motor is tested it should previously have been running at least two hours. Then its revolutions should be measured by means of an instrument called a tachometer. The voltage should be read, as well as the wattage and amperes.

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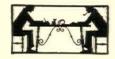
The following story will illustrate what care a superintendent must exercise. I was to witness the testing of a motor by the contractor's "electrical expert." Various features of the machine were tested, but no watt meter was in evidence. Thereupon I asked that one be produced in order to ascertain the wattage. Imagine my surprise when I was told that it was not necessary to know the wattage, because they could work back from the assumed factor of the motor and arrive at it. But it was this assumed factor of the motor that was to be determined, and hence the wattage was necessary in obtaining this. What the "electrical expert" either did not know or "lost sight of" was the fact that I desired to have it proven to me that the stated efficiency was correct in order that the owner's. maintenance bills should not run higher than necessary. Such seemingly insignificant factors, while not stupendous in themselves, mount up if not checked, until the owner is eventually swamped with costs, and wonders why he is making no profit on a supposedly first-class job.





CONTACTS

DEVOTED TO A BETTER UNDERSTANDING OF THE BUSINESS SIDE OF ARCHITECTURE AND ITS RELATION TO THE INDUSTRIES



A Constructive Policy for the Construction Industry

By Lewis H. Brown President, Johns-Manville Corporation

THE construction industry, taken in its broadest sense, is one of the largest industries in this country. To adequately outline a constructive policy for this great industry in such a short time allotted, calls for brevity and condensation.

In order that we may get a perspective of the building industry, may I take a cross-section of it-a typical city-the city of Chicago, Ill., and, using building permits as a measure of activity and extent of the construction industry, give you a thumbnail sketch of what happened.

In 1882, building permits in the city of Chicago amounted to \$16,-286,700. The average per year in the 1880's was \$21,000,000.

In the decade after 1890, the average per year was \$35,000,000, the increase being stimulated by prep-aration for the World's Fair. In the last year of the decade, building permits were \$20,000,000.

In the next decade, beginning with 1900, the average building permits per year were \$53,000,000, increasing every year and reaching a top figure of \$90,000,000 in 1909.

The next ten years covered the war period. The average was \$87,-000,000 per year. In 1911, 1916, and 1919 building permits exceeded \$100,000,000 per year. 1917 and 1918 were relatively poor years for this decade.

But in the next decade, from 1920 to 1929, something happened. The average normal building permits were \$265,000,000. Even for the two years of the terrible depression of 1920 and 1921, the average was over \$100,000,000 a year. From then on during the remainder of the decade, nothing less than \$200,000,-000 or \$300,000,000 figures were tolerated. 1926 was the peak year with

Mr. Brown rearranges and revivifies our perspective of volume in construction—what it is, what it has been, and what it may be. The article is adapted from his talk on March 16 last before a joint meeting of the Producers Council Club and the Architectural League of New York.-EDITOR.

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\$366,000,000 of building permits in the city of Chicago only.

What happened to the construction industry? Something certainly did happen. Most of us are inclined to answer that question with a statement about housing shortages created as a result of no building during the war. But this is one of those fallacies of history.

In Sinclair Lewis's latest book, "Ann Vickers," one of his characters, an instructor to a group of young ladies in a girls' school, tells them that they have all heard about the 'Fall of Rome." Then he tells them the various reasons advocated by various people as to why Rome fell. And then he tells them that that's another fallacy; that, in fact, Rome never fell. Rome simply changed. At the height of its glory, it was a little city. Today it is the tenth largest city in the world.

And so what happened to the city of Chicago, in reference to the construction industry, was what happened to the construction industry all over the country.

In the first twenty years of this century a new means of transportation was made available to the people. And just as a new means of communication had revolutionized the world in the decade preceding, this new means of transportationthe automobile-revolutionized our entire conception of life in these United States of America.

Where before people had to live within three miles of their place of business, they could now, with this cheap, fast means of transportation, live within thirty miles and get back and forth in approximately the same time. A great and rapid migration took place from the congested centres of population to the outlying suburbs. This required new homes, new roads, new sewers, extension of public utilities, such as light, telephone, power, gas; new stores, new banks, new theatres, new parks.

At the same time there was a great migration of people from the farms to the cities, intensifying this movement. Four million men had been taken out of their normal channels of existence and shown new sights and new scenes during the war. When they returned, the farm and the little village from whence they came looked small and unimportant. These men were restless, used to action and noise. They gravitated to the cities.

Upon the construction industry of this country fell the burden of meeting in this short space of time the needs of this tremendous migration.

We are inclined to believe that the depression began in the fall of 1929. Actually it began in 1927, for it was at that time that we had really caught up with the actual needs of the changing times.

In 1930, building permits in the city of Chicago dropped to \$79,000,-000; in 1931 to \$46,000,000; and in 1932 to approximately \$5,000,000.

Now I have taken your time to

give you this perspective of a crosssection of the construction industry because I do not believe that any of us can adequately prescribe a constructive policy for the future without a real understanding of the facts concerning the past. If you are looking to reconstruct exactly the good old days of 1920 to 1929, then I think you are seeking the impossible. Those conditions were absolutely abnormal. In my judgment they will not be produced again, because the cause that brought them forth will not again be operative in the same way.

Today general business activity is measured by the Annalist Index as, roughly, 58 per cent of the 1928 volume of business. Total construction of all classes in 1932 was valued at 18 per cent of the 1928 volume. And the decline continues into 1933.

However, during the past two or three years, home construction has barely been sufficient to take care of the losses by fire and obsolescence. The 350,000 new families created in every year have not been provided with new homes. This has been offset in part by the temporarily reduced standard of living that has forced thousands of families into unsatisfactory living quarters. The conditions of the last three years are not normal.

What, then, can we expect? I am not given to making predictions. But it seems logical that after what has taken place during the past three years, we must expect that it will require two or three more years gradually to work out of this depression. And then it would seem to me reasonable to expect a volume of construction necessary to take care of the normal growth of our population and its normal needs in terms of replacements of obsolescent structures and the requirements of rehabilitation and repair which are going to be of considerably more importance in the years that lie ahead than they have been in the past.

This seems the more logical when we consider that statistics clearly show that the ratio of population growth is slowing down.

But is this a pessimistic outlook for the construction industry? I do not think so. Rome has not fallen. It is simply changing. The task that lies ahead is a more difficult one, but for those with vision and courage I believe that it offers an opportunity to build a more solid foundation upon which the construction industry of the future can profitably stand.

And now let me outline, in the briefest possible way, a suggested constructive policy for the construction industry.

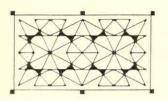
I. First, let every one extract from his mind the picture of the construction as it existed from 1920 to 1929. Let's replace that with a clear-cut and logical picture of what may be required and expected of the construction industry from 1935 to 1945.

1945. 2. Second, let's all determine to keep out of the figures and out of our minds the temporary and abnormal construction work of the Federal Government that may be done to alleviate unemployment and stimulate business. While this is a welcome addition in these times to the activities of the construction industry, it will only confuse us in laying our basic plans for the longrange future unless we keep this work in a separate category.

3. Let us recognize that for several generations in this country, the owning of a home or real estate was not only a mark of distinction and stability, but almost inevitably resulted in a profit. Today, thousands of people have lost their faith in real estate.

The construction industry must co-operate in clearing away the débris that has resulted from the unsound period that has gone before. We must lay a foundation that will again make the owning of real estate and the building of buildings a sound investment. We must then again prove to people that the owning of a home or an investment in real estate is a sound investment.

4. It is unfortunate that the construction industry is not better organized and better prepared today to take an active part in the reconstruction of our financial system in



such a way that it would provide a sound uniform mortgage financing system. This is the keystone and the arch that, after the present depression is over, will help to bring the construction industry back on a sound basis. I suggest that the methods of handling mortgages in France might be helpful to us in this country.

In this connection, the Federal Home Loan Bank System, which was authorized by Congress a year ago and is only now beginning to get into operation, is a real start in the right direction. The plan itself is not yet perfected. But what it needs more than anything else is real leadership and vision. The plan itself can be moulded to meet the needs of the country. The foundation, however, has been laid.

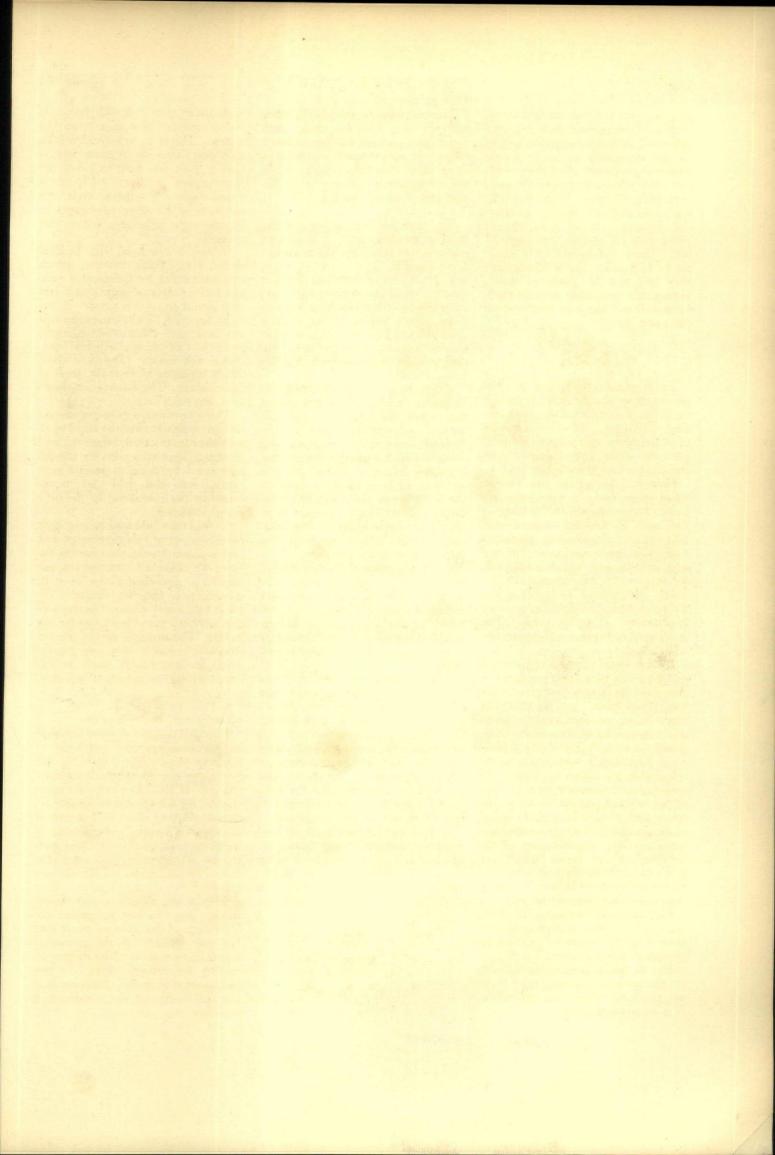
The construction industry should recognize clearly that the building of a sound construction, financing, and mortgage loan structure for the future must be done to attract new capital into this field and to reestablish the confidence of the ultimate purchaser.

5. And then, when we have gotten ourselves out of this depression and laid a sound foundation for the future, we must all concentrate our efforts on evolving a new type of construction for the future. We must find a way to build better and cheaper homes and buildings for the future. The example set by the automobile industry in giving greater value for less money must be followed by the construction industry.



I do not suggest that we attempt to revolutionize the methods of building over night. But the old traditions and the old methods must change. If the labor rates for erection on the job cannot be greatly reduced, then we must find means of altering the methods of erection. If we cannot reduce the total cost with the use of present types of materials, then we must find ways to create new materials.

It is in this direction that opportunity lies. In my judgment the architects of this country must lead the way. Many of the manufacturers have been working in this direction for several years. In my judgment it is in this direction that the real future of the construction industry lies.





Photograph by Ben Judah Lubschez

A bit of Sunnyside Gardens, Long Island. Those who have concentrated their attention upon the objectives of home ownership may have failed to appreciate those examples of thoroughly organized communities in which group initiative, aided by nature's handiwork, has been creating neighborhood qualities which others may well emulate

ARCHITECTURE

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Housing_Where, When, and How? By Henry Wright

EDITOR'S NOTE:- A discussion of Housing at the San Antonio Convention of the American Institute of Architects first crystallized in Henry Wright's mind the need, for the use of the profession, of a manual of good housing practice. At that same convention, in the president's address, Robert D. Kohn said: ... we know now that we need to understand the relations of architects as a group with the larger world of things. We must ask ourselves, what is the place of the architect as a citizen in this changing world by reason of his being an architect? ... Our effort must be to make every architect conscious of the importance of the functions he performs, of the opportunities it offers and the obligations it imposes in every civic relationship, and conscious of the reforms that must be brought about in his own function in order that he may meet his obligations to those other many interrelated and interdependent functions.'

Those were, in the light of events since transpired, prophetic words. And Mr. Kohn went on to say: "We must recognize ourselves as being part of a guild devoted to an art which can only be advanced as the whole group of its workers advances."

The publication herewith of Mr. Wright's conclusions from his years of studying housing is in line with this guild idea. With a tremendous task of building ahead of us, it is only by sharing the fruits of our knowledge and experience without reserve, that we shall avoid a maze of error and really justify our profession.

Half of the present issue of ARCHITECTURE and half of the August number are given over to what is in effect a Manual of Housing. With the addition of further material—most of it specific "case histories"—the whole will shortly be brought out in book form under the title "How Shall We House?" by Henry Wright.

A FOREWORD BY LEWIS MUMFORD

HETHER new housing shall be undertaken on a large scale is no longer a question. The present housing shortage, concealed only by the doubling up of families and the tightening up of living space, leaves only one answer. Whether this new housing shall be aided by the Federal Government and whether it shall embody new standards of design is also no longer a question. For housing for the lower-income groups has a major place on the government's program for economic reconstruction.

The problems that face us today are: Where shall we begin? In what order shall we rehouse our present population? How shall we

proceed ? What methods and standards shall we put into effect? To approach these problems intelligently we must first examine the actual housing conditions that prevail today in America, particularly as a result of the methods and purposes that have prevailed during the last forty years. Most of our discussions of housing have ignored the dominant housing types in present-day America, just as our statistics have tended to conceal their existence. But in providing for a new set-up in housing, we can learn perhaps more from our widespread bad housing than we can from our occasional good examples. We must first define "Where?" and "For Whom ?" and upon this fresh basis we may then intelligently describe "How?" and "What?"

Part One

OF WHAT DOES OUR PRESENT HOUSING CONSIST?

I. THE BLIGHT OF OUR CITIES

HAT we show the visitor to our cities is the tall apartment hotel mirrored in the lake in the park; what the social worker struggles with is the dark, foul hallway down in the slums; but the main problem of those who are interested in the nation's housing lies in neither of these. Slum clearance is most urgently needed. Our slums are among the world's worst, and the indictment against them cannot be softened by mere familiarity or by the passing of time. Yet cool observation coming to the aid of sentiment discovers the nub of the problem elsewhere.

Our present efforts at slum clearance resemble the attempt to bail out a river that is constantly swelling through neglect and erosion along a hundred tributaries. It is the whole network of our housing production that we must examine. We shall find that large quantities—almost the largest—of our regular "middle-class" output are flowing inevitably toward the muddy marshes. Our undertaking must be to survey and then try to redirect certain major streams in the flow of real-estate and building enterprises. Otherwise the social agencies dealing with the ultimate slum will continue to find themselves swamped.

In the terms more usually employed, the slum represents an advanced case of "blight." The committee which dealt with the related subjects for President Hoover's Conference on Home Building and Home Ownership made the distinction that the slum is mainly a social problem, while blight is still mainly a problem in economics. In the field of public health we have developed the idea of preventive medicine, which is not content to deal with a disease in its early stages but is concerned that not even these first stages shall arise. We now require a science of slum-preventive housing. In such a science, the slum is recognized as a derelict. Its incipient stage is blight, and blight may on occasion be detected by the keen eye of the housing doctor in those very regions where, to the average citizen and even to the incautious real-estate operator or investment company, everything still looks prosperous and

rosy. The future slum may on occasion be located on the precise spot where we today are probably showing visitors tall apartment houses mirrored in lakes in the park. Any book which takes up the question of "how we shall house" must find out the reason why. Not even the wealthiest of our people are absolutely protected against discovering themselves in a blighted neighborhood. We must discover how the blight we already have can be cured before it goes into the slum stage; we must be even more concerned to find out how blight may be prevented at the outset.

BLIGHT CAUSED BY MISTAKES

The first cause of blight lies in population shifts and the changing needs of industry. Considering the unplanned manner in which American cities have grown, the greatest cause for surprise is that any district in them can manage to retain its identity for any length of time. The most chronic forms of blight, however, are the result of misconceptions, all the deeper in that they are unconscious. The most prevalent of these is concerned with the inherent deficiencies of residential areas in the interiors of our cities which have been "left behind" as these cities have expanded at the periphery and developed new suburbs. It has heretofore been argued that such interior areas, although temporarily sick, would soon be rescued by the expansion of industry, which would absorb them into a new industrial or commercial use. But of late industry has expanded vertically instead of horizontally; it has been sucked up from its many lofts into few skyscrapers, so that instead of covering more ground it has come actually to cover less; meanwhile it has been producing more goods, faster, with better and fewer machines, occupying less space per unit produced, even within the taller, narrower building. So we must speak today of "technological unemployment" not only of workers but of the land: more and more land has been "thrown out of work." Hence those large ailing residential areas surrounding the central core, which have been "waiting for the

city to catch up to them," not only have been left to their stagnancy but have commenced to expand inwards toward the centre, like mud flats surrounding a receding lake. We can no longer be content, therefore, to try temporarily zoning them, any more than a doctor could be content to zone his patients into especially segregated groups so they might be a little less conspicuous while their condition steadily grew worse.

The second prolific cause of blight lies in the wholesale erection of buildings of a grossly inefficient type.

It is only as one travels the length and breadth of our cities and their suburbs that he begins to realize the havoc that has been wrought. Horrified at the results of their survey, the editors of a leading magazine of business put the whole process under the heading of a "racket." But this in turn must have shocked those honest business men involved in marketing and financing dwellings, who are conscious of being no worse than the next fellow and who are sincerely convinced that they are "giving the public what it wants." As indeed they are! For how could the public ever know that there was anything better which it could "want"-and might get if this want were sufficiently insistent? Were the prospective buyer to tell the salesman that he wanted, for a price within the middle range of incomes, an ample lot, a clear view, a playground for his children, cross ventilation and sunlight in every room, and no narrow alleys or courts-all implying no more than a reasonable standard for decent living-the salesman would reply, as politely as he could, that unfortunately all this could be had only for three times the money. This reply should not dismiss the question, only leaving the buyer feeling foolish. Most buyers are too modest in advance. The public can "want"that is, it can buy-only the best that is offered at the price within reach. It can want and buy nothing better. So the circle is complete. If all the builders in a district are offering a stupid kind of house, then that is the kind of a house the public will buy; and since actual purchases are considered the best guide for determining what the public wants, the builders will prove to themselves once more that the public "wants" this stupid kind of house.

Unfortunately for the builder or owner involved, the worst stupidities draw their Nemeses after them in the form of blight; but fortunately for those interested in improvement, a standard vastly higher than that of the average commercial builder proves itself not only practical but often more profitable in the long run, when all costs are finally covered.

Summarizing, we find that in considering blight we are concerned with two major types of problems, one involving city planning and concerned with population trends and wants; the other concerned with general types of buildings produced and their basic fitness for modern life.

THE SPREAD OF BLIGHT

Blighted areas have continued to spread in our cities because:

I. Many of these districts were built in a wholesale and slipshod fashion that rendered them inherently blighted at the outset.

2. No new public interest, leading to new building investment, has been recently devoted to these older districts. They represent fully exploited opportunities; they have been milked dry and abandoned by the real-estate procession.

From the business point of view it has been easier to neglect the older sections in favor of new developments on "unspoiled" land. This would be more defensible from the standpoint of public policy if our new communities were definitely cheaper, more modern, or more desirable than the old; provided, also, that the city were in a financial position to extend the new streets, sewers, and other services which it would have to maintain, not in place of the old ones, but in addition to them. But most of our new communities partake of all the defects that have caused the older ones to deteriorate, and, by postponing many of their public-service costs, have kept concealed, until recently, the fact that cities by overexpanding their services indefinitely are headed for bankruptcy. Meanwhile great areas within the older city remain stagnant and their assessable values no longer carry their costs in city services.

3. No one has been concerned with the idea of evolving new methods for completing or rebuilding these districts in terms of a more modern technology. No technical resources have arisen—or, more correctly, none have been commercially recognized—to provide new *forms* of dwellings of a more economical type suited to filling in the vacancies and to rebuilding the better located parts of these arrested areas for the use of those who might yet be conveniently served in these districts.

Therefore we find that our blighted areas

are now spreading, not so much because new competing communities are really better or more attractive, as because the older areas are completely neglected. Yet it will frequently be discovered that many of these older areas of small multi-family or row dwellings constituted in their time an economically effective form of new substantial construction, which in terms of then current incomes came much closer to meeting the needs of their time than most of the product of the post-war "prosperity" era. While these dwellings fell short of certain desirable qualities, yet at the time they were built they could at least be rented or sold within the means of a large proportion of those clerically or industrially employed. Their construction was fairly sound and their municipal equipment was generally more nearly complete than in most of our recent speculative areas. We do not suggest a return to the era of the speculative 'flat" (see note and illustrations below) because of its wastefulness both in land use and in building plan, but rather to find a new form of housing that will apply more recent technical advancement and yet similarly conform to rentpaying ability of city families. This is one of the chief objectives of the present study.

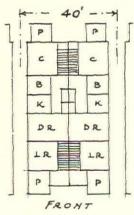
BLIGHT VS. SLUMS—THE CONDITIONS COMPARED

Before proceeding further with the consideration of blight, it may be well to suggest its relation to the problem of slum clearance. The latter is far more popular in recent and current housing discussion. It would indeed be a fine thing if slum clearance on a large scale might be accomplished. Yet after the most courageous and insistent efforts it has not been brought about, and is not likely to be brought about for a long time to come. The difficulties are entirely practical. In a great many instances of blight, most of the devices that would save it are ready to hand, awaiting only correct analysis and good planning. In the case of slums the present obstacles are seemingly insuperable.

The great and inhibiting problem of slum clearance is the assembly of land, and this problem has two distinct aspects of practical difficulty: one is the high speculative appeal of slum areas, land being held for a future advance in value due to change of use. The other is that the first piece of slum clearance and new building so stimulates the surrounding land values as to defeat its own repetition. In point of fact, there should be ample evidence now to satisfy any thinking business man that it is unprofitable any longer to speculate in areas bordering on a central business section that is now receding. Yet there has as vet not been sufficient appreciation of this situation by owners to cause a real break in holding prices to levels necessary for housing use. Until this appreciation is widespread, all efforts for slum clearance on a large scale are futile, if not actually self-blocking in their tendency.

There is no doubt that the cause of housing has been held back by some of those who have

WHAT IS A FLAT?—The term "flat" will frequently be used in this study. To make its meaning entirely clear to those living in sections where either the flat does not exist, or is known by other names, it should be explained at once that a flat is a form of dwelling, allon one floor, in a building with at least two such dwellings, one above the other. The rooms of each such dwelling are in tandem, running through from front to back. In its simplest form, with just one dwelling above another one, the building containing such accommodations is itself called a flat, with no distinguish-

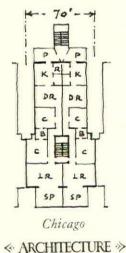


St. Louis

ing adjectives. Sometimes, however, two such building units are doubled along a party wall, resulting in a "double flat," or more specifically a "double two-family" or "four-family flat." A three-story form, accommodating three families, also exists in the single and double type. (This form is generally listed in the statistics not as a flat, but as a "multi-family" dwelling. A flat it nevertheless remains.)

This breed of dwelling is a most prolific one, and constitutes 75 per cent of all dwellings in Chicago, and nearly as great a proportion in St. Louis. In Bridgeport, Conn., in the form of a wooden building, it provides the cheap form of low-cost housing, and it abounds in many other cities of the United States.

The ungainly four-family and six-family types of St. Louis and Chicago are shown at left and right. In the Chicago example the plan of the first or half-basement floor provides a central hallway reaching the inside stairs.



been placed in positions of responsibility for the purpose of speeding a large-scale and presumably public-spirited procedure. These persons have undoubtedly been sincere. Nevertheless, their daily interests being directed to problems of banking and investment, they have had an "investment" attitude toward the problem. They have been more concerned with "saving" the slums as a form of property investment than with eradicating them by the only practical means-the means of deflating the almost universally false "investment" values at which land is held. Thus the evacuation from 1925 to 1930 of 57 per cent of the former population of the famous New York East Side has aroused great concern for rebuilding, not because it caused a sufficient depression of land values to make rebuilding thinkable, but for fear that these values would decline still further. Now they may be arrested before reaching the point at which housing might conceivably take place.

There is widespread lack of understanding among housing advocates of the specialized problem of the slum in other cities and other slum areas that are more typical than the New York East Side.* Elsewhere slums are found not exclusively in districts built as cheap tenements, but quite as often the slum forms in an area once used for fine residences from which the former population has entirely migrated. The buildings suffer not so much from age as from inappropriate use, and the rents paid may be anything from very low to relatively high.

The present low-grade occupancy is thought of by the owner as a temporary one. He expects to be approached some day by an agent assembling land for a business block-maybe a skyscraper. Yet there is no real necessity for a congested use of such areas. Comprehensive plans for city rehabilitation may be based upon the fact that in most cities we have more than enough room for everybody without crowding. The greatest loss in trying to push slum clearance when land values are not fully liquidated is that we continue to crowd people into these areas when there is no necessity for it. We thus oblige ourselves to concentrate our planning efforts within a deadly restricting atmosphere in which "tight" planning, intended to meet high land costs and yet to house people of small means, stultifies our thoughts and constricts our methods, which might otherwise be released to do a real job.

Slum clearance is drastically needed; it has been thoroughly discussed; but in this country it has practically never been carried out. It is held back chiefly because our foolish timidity in placing private property rights above the public welfare makes it possible for a few owners to hold up the agency attempting the assembly of adequate sites, and housing as an enterprise has been powerless to overcome this handicap. Fortunately housing has at last been recognized in certain States as a "public utility" entitled to the right of eminent domain. No successful application of these new powers has as yet been effected, but the opportunity remains.

To a certain extent our tax system has helped to obstruct the downward trend of slum land prices. People holding for long-term increment have been willing to pay taxes without relation to present earning values, and the resultant assessed valuations on speculative prices have tended to fix these values as established and to encourage their unreality. The high assessment helps appearances. And, finally, in paying these high assessments and other "carrying costs" the owner has put in so much money that by now anything less than the skyscraper apartment or business-block price looks to him like a positive loss !

Such is the situation that slum-clearance students have felt themselves bound to accept. In every instance they have had to base their calculations on this speculative "value" of the land. And so they have chivalrously fought on unchosen ground. They are finding that they cannot win. Despite many efforts in New York and elsewhere, practically no genuine slumclearance project has yet been carried out that replaced old dwellings with new.

There is, in fact, no magic formula by which low-cost housing can be produced in a way to absorb high land costs. In 1928 I helped to make studies for the New York Housing Board, and these confirmed previous reports that practically no land on Manhattan could be found at a land cost low enough to permit the construction of new dwellings to rent for \$12.50 or less per room per month in five-story walk-ups.*

^{*} The famous East Side slums of New York, instead of being typical, are entirely unique. They are the only slums virtually built as such, to accommodate the transient population of the great immigration era. Elsewhere slums are purely accidental. It is most unfortunate that our popular notion of slums and their correction should be so largely centred on the highly specialized problems of the least typical American city.

^{*} It should perhaps be explained that the New York Housing Law at the time of these studies permitted tax exemption to be given to limited-dividend projects on Manhattan renting for not to exceed \$12.50 per room per month, bathrooms not counted. Some concessions have since then been incorporated in the law to permit the rent actually to be higher. But the rent-paying ability of the average family has in the meantime receded to a

Since five stories had become the maximum number acceptable for walk-up apartments, it was decided, in the studies mentioned, to draw up the East Side slum-clearance projects on the basis of higher elevator buildings. Further investigations, however, revealed the disconcerting fact that the greater height and the elevators brought no gain. The simple reason was that, so long as the rent was held to \$12.50 (in tax-exempt apartments), the increased cost of the higher construction, the cost of the space given to elevators, and the cost of maintaining them, all keep pace with the savings on the land that result from more stories of height. If standards of light and air are kept even remotely commensurate, we are warranted in the statement that no desirable low-cost housing can be built on land above \$5 per square foot in Manhattan, or at a much lower maximum figure in other cities where rentals are far from equal to rentals in New York.

It is really time for housing students to stop playing the magician. Instead of trying by some trick of planning to maintain impossible land prices, let them see that the problem is set up in terms that can be solved. The highest rentals that can reasonably be expected from any largescale development stand within limits that can be ascertained. Bearing in mind the top limit of rent to be received, let us design buildings which, within that limit, are the most economical to build and to maintain. If the rent must be held within a limit, and the building cost is known, it is easy to discover what is the top price that can be paid for land. Beyond this price no land can be used for the purpose. If prices asked are higher, there is nothing the technician can do about it. He is not responsible for the mistakes of speculation. If suitably priced land cannot be found in one region, then

There is one project in New York, the Grand Street apartments of the Amalgamated Clothing Workers, that would appear to contradict the above. It should therefore perhaps be explained that it forms an exception, for the reason that the land it occupies did not have to be cleared of old houses but was formerly taken up by one large printing plant. It therefore required no assembling. Despite these advantages, the rentals or net monthly costs to the co-operative owners—have been held down to \$12.50 only by virtue of the fact that these co-operators accept practically no return on their part-purchase money required in the co-operative plan. The chief reason that it has *appeared* possible to cover high

The chief reason that it has *appeared* possible to cover high land costs by means of high elevator buildings has lain in certain calculations relating to maintenance. There are a few housing search must be made in another, and if it cannot be found there, then nothing can be done until land prices come down. In fact, those wishing to promote building activity are beginning to discover that their interest lies not in bolstering up land prices but in seeing them come down to a point at which profitable buildings can be erected and maintained. Even city assessors are beginning to realize that a safe tax budget is based upon taxes from earnings, not from anticipations.

If the designer takes this position, he will soon find that the whole trend plays into his hands. It is daily more evident that the skyscraper or business block for which the slum landholder is waiting is not going to come.

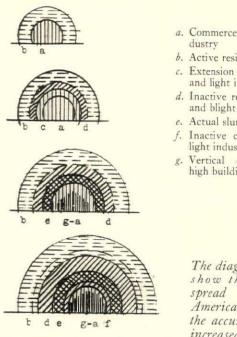
THE RINGS OF CITY GROWTH

The accompanying diagrams show the process by which slum areas have become fixed by the outward spread of cities, finally augmented by the inward shrinkage of commercial districts.* It seems to follow that these slums are either to remain or are to be replaced only by housing. If they are to be replaced, their land values must eventually be deflated to a figure at which housing on a large scale can be built to take their place; and housing on a large scale can be successfully built only for rents that a large number of families can pay. While certain limited sections can be utilized for better-class apartments, most of these areas must be rebuilt for the moderate-rental groups and must await the time when the recognition of these facts is reflected in prices. Unfortunately the downward trend is likely to be arrested by a situation in which wholesale unloading on the government at the present, partially deflated, prices may arrest this liquidating process. The situation is one of those

projects built under the auspices of the New York Housing Board, and occupied by groups of co-operative workers' organizations, that have been able over a short period of years to maintain their new apartments, including elevator service, at costs fully 33 per cent lower than the average good commercial practice elsewhere. On this basis a total maintenance cost has become currently admissible of only about \$40 per room. This figure is used in theoretical set-ups, not only for the six-story heights that obtain in the instances cited, but even for ten or twelve stories, where costs in actual experience are still greater, reaching usually to nearly twice the amount assumed for certain proposed projects. Unfortunately no one has yet been able to make it clear why an apartment with a plan almost the equivalent of high-class apartments in Upper Manhattan could, simply by virtue of being transferred to the East Side, be both built and maintained at costs far below the normal elsewhere.

* These and other diagrams appear in an article by the author in the *Survey Graphic* for August, 1933, which more fully expounds the reasons for anticipating a further shrinkage of slum values.

point where even \$12.50 is an impossible figure. The change thus has a double-headed aspect. The raising of the legal minimum has made certain recent slum-clearance projects seemingly possible. The decline in actual incomes on the contrary has meant that we have departed still further from the avowed goal of slum-clearance activities, which is to provide housing for those of moderate incomes.



- a. Commerce and light in-
- b. Active residential area
- c. Extension of commerce and light industry
- d. Inactive residential area
- e. Actual slum areas
- f. Inactive commerce and light industry
- g. Vertical expansion in high buildings

The diagrams at left show the typical spread of modern American cities and the accumulation of increased areas of

blight and slums. At top, the primitive city; next, concentric expansion; third, arrested growth of centre by vertical expansion; and, last, the central area shrinking, due to further vertical growth and lessened space needs

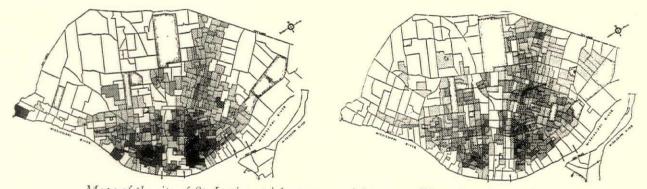
anomalous ones in which the socially minded effort is defeated, as it so often is, by impatience to achieve results. A neat turn on the part of adroit business interests enables them to capitalize once more on the very propaganda of our progressive groups.

While these diagrams cannot convey the whole complicated situation at the present time, they are indicative of the broad underlying factors involved in city rehabilitation. These factors are considered later in discussing a choice between slum clearance and an attack on blighted areas, as the opening wedge in the whole process.

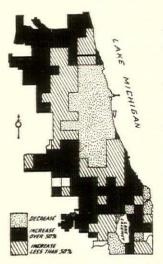
There are, of course, no sharp lines of demarcation corresponding with the districts indicated in these generalized diagrams. In cities such as Philadelphia and Baltimore the distinction is not between districts composed of tenement houses and a surrounding belt of smaller types of dwellings, but between districts of dilapidated row houses and a contiguous group of somewhat less crowded and dilapidated row houses. In Chicago these concentric circles alternate between frame houses and larger brick flats marking successive original layers of outward expansion and different degrees of present blight. In Cleveland the vast blighted areas that have almost isolated the city centre from its newer suburbs are made up of a widely varied motley of old wooden houses and more recent brick and wooden flats.

More frequently than otherwise these areas have for some time past been subject to losses in population, so that the problem of congestion is less severe than that of bad and unsanitary physical conditions.

Most usually, then, our worst slum conditions arise from altered or transitional neighborhood uses. Dilapidation arising from neglect is as frequent as any bad character in the buildings themselves. There are, nevertheless, other instances in which stagnant areas have developed out of the underlying street pattern or the city plan. In such instances as the one at Evansville here illustrated, and in the more widely spread Dallas slums, the infection has arisen at bad spots in the city pattern. In New Orleans, on the other hand, vast areas have a neglected slummy character arising from a faulty subdivision of the land that is also common to other cities of the South. Salt Lake City suffers from an even larger square block of somewhat different character.



Maps of the city of St. Louis : at left, 1910 ; at right, 1930. These show the population density for the two periods. White areas represent less than 20 persons to the acre; full black areas, more than 120 to the acre. In the 1930 map, the latter areas have almost altogether disappeared



Map of Chicago, showing the increase in population per square mile between 1920 and 1930-a flight of population from the in-terior areas. Here, as in St. Louis (maps on preceding page), the expectation that residences would be replaced with commercial or industrial buildings has not been fulfilled, the spread of commercial districts having been arrested by vertical increases and by the technological reduction of space needs for industry

There are therefore slum areas of one kind or another to be found in almost every city. Such attention as has been given to the subject of housing has been aroused by the conditions within these areas. It has usually been centred on questions of human misery, crime, and disease, that have very often coincided in location with the slums. Slum clearance has been considered primarily a humanitarian problem, and has been chiefly the concern of social workers in an appeal to philanthropic agencies. But declining faith in these slow philanthropic processes has led to the thought of slum clearance as a municipal responsibility, entitled to at least such aid as the city might give through its borrowing power at low interest rates. Failing this, tax exemption has been resorted to. It is natural that under such agencies and conditions the thought has been concerned with minimal standards; it has been taken for granted that those now living in the area should be the beneficiaries of the new housing, in the same place. This assumption has led to the futile attempts at cheap housing on expensive land; land crowding and room crowding have been the natural result, and low standards have also been taken almost for granted.

While the problems of the slums and the fate of the lowest-income group cannot be altogether segregated, need it follow that the poor people in the slums should always be rehoused in the same area after rehabilitation? When the slum buildings are torn down, these people are obliged to move out: need we make certain that when the new buildings are up they shall move back? Two parties are involved in the operation, the city and the slum dwellers. The city may find that the particular district in question is so well related to a business centre or to other special conveniences (such as a view across a river) as to make it a logical place for a higherincome tenancy really able to pay for the new buildings as well as the actual values reflected in the higher land price. To choose this location for occupation by an illogical type might represent altogether too large a loss for the city. If the previous occupants move out, where then will they go? There is some validity in the claim that they will take up better dwellings elsewhere made vacant by a general shift up as the higher-income groups move into the restored area. Moreover it is truly held that in any longterm program there must always be a fairly large group occupying second-hand accommodations. Yet to say this does not dispose of the problem. For it takes care of only half the slum problem. Slums occur, it is true, in bad dwellings in which there is overcrowding, lack of sunshine, air, and green space; and from the worst

SLUM INCUBATORS—Slums frequently are mere aggregations of poor dwellings which have accumulated in some back-wash of the city, or which are the result of conditions caused by bad land subdivision. Thus at Evansville, Ind., where the original town took a natural relation to the river landing, with streets on the diagonal, the later enterprising engineers insisted upon reverting to the customary compass direction, and produced a mix-up at the junction of the two periods which

was so confusing that streets remained unpaved and unfrequented. Here naturally grew the Negro slum of the city.

Again in New Orleans the type of square-block subdivision inherited from slave-owning days resulted in very narrow deep lots which tempted the building of rear houses—sometimes three deep. The cross streets, with only two frontage lots on each side per block, remained dirty and unpaved because there were not enough interested properties to pay for the improvement. The result is a widespread slum in the lower-cost areas.



EVANSVILLE

of these quarters the slum dwellers will have moved away. Yet the second factor in the slum situation is the group of people who cannot afford suitable space to live in; and even if these people are moved out of the slums they will still have to move into quarters not properly adapted to them. And there are plenty such that they will still be able to find, even among the many fairly recent flats of our usual types. If families unable to pay the rents for a complete dwelling double up in such deficient buildings they will quickly make new slums out of them ! And even though decent conditions at the start, with a modicum of light and openness, will draw a response from such families, yet their crowding will eventually result in slums, whether the dwellings were originally good or bad.

We are therefore not out of the woods until the situation has been attacked from both sides. On the one hand all inferior dwellings, even outside the present slums, represent a potential slum menace until replaced by new ones at least reasonably well planned. On the other hand, no matter what we do about the location for the low-income families—whether we decide to rehouse them where they are, or whether we force them out where in the end a smaller subsidy will enable them to have sufficient space in less valuable quarters—this low-income group must in any event be subsidized. If they are not subsidized, their income must be increased, if we are to avoid slums in the long run.

It may also be found that it is more effective to care for the lowest-income groups by planning new dwellings for them in the proper places, with suitable standards of room size and space arrangement, rather than to leave them to live awkwardly and wastefully in old houses with large rooms and high ceilings or other unadaptable features. This entails new building, with moderate subsidy, even though it does *not* contemplate placing the new buildings where the slums now are.

It is probably true that we have the largest and some of the worst slums in the world, but these arise chiefly, except in New York, from rapid changes and shifts in population, and a too rapid outward expansion of our cities, rather than from long-standing class distinctions or ancient habit. Physically our slum clearance should be relatively easier than in other countries. In most instances it should be possible to rebuild for a population at least equal to the present number of occupants, while at the same time making the most ample provision for open space requirements.

A more thorough understanding of these varied characteristics should make it possible at the opportune time to make our slum-clearance job a really comprehensive one; then we may not only provide better housing for the sake of the families to be housed, but also see the slums cleared for the purpose of restoring the assessment values of cities, and the re-creation of desirable conditions in the heart of our cities to provide the greatest convenience and satisfaction to all.

The position of the author in cautioning against a too ready acceptance of slum clearance on its face value, should not be misconstrued. He is not opposed to slum clearance, he is for it in every possible and practicable way. There is, however, need for the greatest caution in judging the progress of all projects which really attempt to clear the slums. As far as they furnish drastically needed employment they may, at this time, be excused some of their other shortcomings. Some of them have been started under favorable conditions and fairly reasonable land costs. Others are not so favorable, and it will be necessary as the work expands to keep the closest scrutiny to see that slum clearance is not merely made the means to "unload" on the government unfortunate speculative or investment holdings on which the owners may otherwise have to take drastic though well-deserved losses.

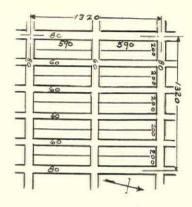
In order to place the elements of a broadminded, long-time program before the reader, Chapter II attempts to develop the broad aspects of a far-sighted program of housing, if present-day cities are to continue and resist the possibilities of complete abandonment in favor of new, modernized communities.

II. WHERE SHALL WE HOUSE?

FHILE slum clearance and the problem of ever-increasing blighted or stagnant areas must be linked closely together, the latter should no longer be overshadowed by its more popular rival. These blighted areas form the next outward belt of city expansion and entail many similar losses to city tax budgets. They also carry the cost of increased transportation and utility mains that do them no good but lead through them to the newer areas beyond. The problem of the blighted areas is one covering a much vaster physical area than the slum. Yet it is one that may be readily and comprehensively undertaken at this time because of the comparatively low land prices which are inherent in the greater and rapidly increasing areas involved. The existence of these blighted areas and the rapid obsolescence within them arise from a series of factors different from those prevailing in the acclimated slums. The types of dwellings that occupy our intermediate blighted districts are usually two. The first is the narrow row house. The second is the makeshift kind of smaller multi-family dwellings that was invented to take up the increasing costs of physical services of city land subdivision in that period of rapid urban expansion which started with the turn of the new century. They represent, for the most part, fairly solid construction in communities in which the city service plant is fairly modern and complete (streets, utilities, schools, etc.), and they are, usually, less wasteful in point of scattered lot occupancy than the housing of the post-war period. Their defects lie, first, in the universally deficient and inefficient planning of their dwelling types, and second, in the extent of their continuous repetitive design over long stretches of monotonous streets. Behind the speculative activities of the post-war land subdivision there lies a very real urge to get to the open country so as to get away from the drabness and sameness of the old parts of the city. Unfortunately, home seekers have not sufficiently reasoned out their desires to appreciate the fact that the open country which they have been buying in parcels 35 or 50 feet wide has all the seeds of the old monotonous regions that they hoped to escape. The new districts, if and when built up, merely repeat the old conditions and cause a new abandonment for newer, unspoiled fields beyond.

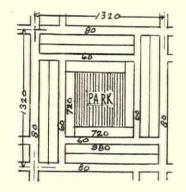
The existing situation in these vast areas is least understood and appreciated, first because their conditions are not really so bad as to excite public interest—they are not usually the centres of crime or disease as our worst slums are. Second, because their very vastness makes them less conspicuous, on the basis that "familiarity breeds contempt." They are those practically continuous districts of ugliness that we pass through while reading our morning papers on the trip from the suburbs to the city. We have less cause really to visit and appreciate them than the close-by slum district, which may lie more immediately in the path of our daily business transactions. Thus we know little of their real character and extent, and appreciate only vaguely the degree to which they represent the border line of respectability for countless numbers of our substantial working families. We fail to realize the extent to which their gradual deterioration threatens the financial security of the city and its ability to maintain the extended lines of communication upon which the maintenance of desirable conditions in the more fortunate outer rim must eventually depend. Finally, we have continued to overlook these areas because our lack of understanding has left us unprepared with appropriate forms of new dwellings, suitable for the intermediate requirements which lie between land so high in cost as to be almost impossible and land that has been considered low enough in cost to be almost thrown away in our extravagant suburbs. Like one enthusiast for "East Side" slum clearance, we have felt that "the difficulties of high land cost make the problem interesting and bring out our crusader spirit." What we need to see is the much finer opportunity for organized community development in these vaster areas of increasing blight.

Slum clearance and the rehabilitation of blighted areas are, therefore, to some degree alternative or competitive problems; and the choice of beginning with one or the other is a matter of strategy as well as practicability. If fair progress on blighted areas should be made first, this will have the advantage of providing additional housing facilities not too far from those now living in the slums, nor necessarily inappropriate for them. This will not only relieve later slum clearance of the difficulty of providing

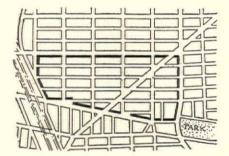


Too little attention has been given to the inexcusable wastefulness of our customary street pattern. At the Boston Convention of National Real Estate Boards in 1926 the author presented a large amount of evidence to this effect, resulting in a resolution recommending the use of longer blocks.

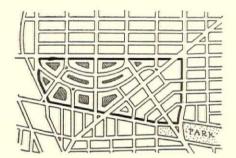
One of these studies showed that in a fortyacre tract, a quarter mile square (New York City basis of streets), a reorganization of streets would produce about 87 per cent as much property with less than 76 per cent as



much street area, the land salable at less per foot for the same depth. There would remain in the suggested new plan six acres of park at no cost to the community



Here also is a proposed change in a particularly extravagant New York street pattern. At left, there are 20,660 lineal feet of streets with 25,000 feet of frontage. On the right, the plan provides 14,750 lineal feet of streets with 24,000 feet of frontage of the same depth. There are eight acres of land originally in streets transferred



to the interior block parks. It is likely that many cases of city bankruptcy might have been avoided if these facts had been observed

for those evacuated, but also by evacuating them before clearance will hasten the fall in holding prices in slum land.

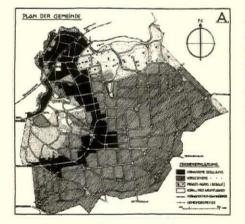
These two interlocking problems of slum clearance and blight rehabilitation are, therefore, inseparable in any really comprehensive treatment of our housing policies. In their solution the human factor of the unfortunate poor remains a weighty consideration, but the major problem becomes one in which the fate of the entire city is at stake. A new and important element has also entered into the picture. Our past ideas of city planning and city expansion have been based on a rapid growth of city population. This expectation has now not only been greatly reduced but has, in some cases, almost disappeared. To the fact of the rapid slowing down of the population growth of the country, evidenced in the 1930 census, has been added the breakdown of industry as the mainstay of labor absorption through new employment. Large numbers of families have been thrown out of our cities and back to the primitive life of selfsupport through direct contact with the soil. The only thing which keeps this from developing into a real and permanent evacuation of our cities is our general incompetence to make a living from the soil. Unfortunately, a good part of the population is too far removed from its agrarian antecedents—not so much in time as by the extent to which it has become altogether dependent upon the artificialities of urbanized existence. In this the European nations are far more fortunately situated and with them "back to the land" is no mere shibboleth.

At best, the growth of population in our cities as a whole is destined to be so reduced in its effect that certain choices as to city policies will shortly become essential. The problem will not be "how can we improve both our slums and blighted areas as well as the quality of our suburban expansion?" but a choice between outward growth and central rehabilitation. Any housing policy and any housing technique, to be of any lasting importance, must be based upon some practical anticipation of this essential choice. My own guess is that we are not going to be content to cut off all outward expansion; but on the other hand, if we dash about in uncertainty, first doing a little slum clearance, then rehabilitating a section of blight, and then improving our methods of land subdivision and expansion, with no co-ordinated purpose, we are going to end in chaos and a more general breakdown of our cities than anything suggested by our present difficulties.

If, on the contrary, we are to make choices and so direct our city policies along some more promising lines, it will be necessary to consider the various regions and their advantages and possibilities in terms of present practicability and ultimate success. The problems involved are those of quantity, distribution and time, in which the time element is one of the most important to those interested in the subject of housing.

To recapitulate the typical development of many of our more recently established cities, particularly in the Central States, we have found that their growth can be represented by a series of widening concentric circles. We have added layer on layer, usually jumping one type of use over another. At first our suburban layer for homes, made possible by electric transit, left only the commercial and industrial areas to extend in its wake. The lag of such extension behind the outward expansion resulted in temporary slums or transitional occupancy between changes in use. But while our outward expansion increased in rapidity the central extension slowed down, due to new requirements of industry, which sought cheap land at the outskirts. Slums tended towards permanence and added a new layer of blight. Finally our central areas mounted skyward and actually fell off in required land area, shrinking away from the inner rim of the rotting slum area, thus not only increasing its extent but also adding abandoned warehouses to its derelict houses and tenements. To add to the waste and confusion, zoning ordinances set aside for commercial and industrial purposes from four to five times the area that could actually be used.

But regardless of either human needs or the abilities of cities to provide services within economic taxable revenues, we bonded the future, and outward extension went merrily on. It is indeed a backward city that cannot show, either within or on its borders, at least one vacant lot for each one occupied, while those that recently boasted of really being progressive provided paved streets, sewers, and even street lighting, for a large majority of these lots. Now, even if we can call a halt on further expansion, we cannot altogether abandon these existing areas and their ingenuous homesteaders. We must have a policy of consolidating and utilizing these vast expanses of suburban lots. There must also be a policy for rehabilitating those sections that, left behind in our blighted areas, are nevertheless important, since unfortunately they form a necessary physical link between the business area and the suburbs. A frank survey of the field will show that the one lacking element is likely to be a sufficient number of human beings to require all the potential space and facilities of the combined slums, blighted districts, and spotted suburbs. If we put all these various areas to their best use we shall have no reason for overcrowding in any one of them. To overcrowd in one part would mean depriving other areas of their logical and reasonable utilization. Our suburbs not only are overspacious but have far too extravagant provisions for public services. They have frequently been so platted that they might also be adequate to the possible requirements of rebuilding for future intensive use. Now that such future use is altogether improbable, such



Where we have overstepped the limits of reasonable future needs in connection with the land, platted areas must be vacated and returned to farm and garden usefulness, as has been done in certain German regions. Around Hamburg, on the recommendation of the Regional Planning Authority, nearly every smaller city has abandoned its over-platted areas, restoring them to agricultural use.



≪ ARCHITECTURE ≫ 12 areas must be reassembled and replatted with a greatly reduced demand on the city for extravagant and inefficiently used streets, utilities, and transportation. For such a reduction we have ample precedents abroad and in a few communities, such as Radburn, at home.

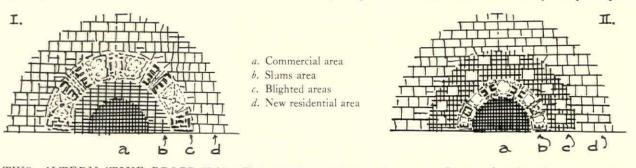
Underlying the entire program of city reorganization and the proper treatment of these various use areas, there must be a very conscious effort toward redistribution of people with relation to their habitual work places and daily movements; we must undertake to reverse the former unguided program, which has first dispersed industry beyond the residential area and surrounded it with a fairly large proportion of its workers; and then in turn tried to jump all the executives and clerical workers over this industrial area out into the yet more distant and temporarily unspoiled suburbs. The great areas that have been left behind in the slum and inner blighted districts must be rehabilitated for a reasonably large portion of these central workers. In most cases they can be made equally attractive, if not more so, than most of the present suburban districts.

In such a program these inner areas may also be provided with very ample open spaces, essential to their permanently restored popularity. While we should not be so foolish as to try to transfer to this inner area the single-family, detached house-and-lot ideal that has formed the basis of outward expansion, the city must encourage a moderately efficient building type in these inner areas. At the same time it must invest sizable sums in providing very considerable open space and other amenities in order to assure a permanently agreeable character. This will encourage a stabilized use and assure taxable income. With such a broad policy, accompanied by superior technical development, the new housing of these areas should really compete for the choice of clerical workers and other central workers who now make great sacrifices to reach the suburbs. They will be far better served, and the city will further profit in the relief of the costly traffic and transit now required and still mounting, for the purpose of taking people from places where they have to be to other places to which they really need not go.

When we come to the final considerations that should control our broader program of general rehabilitation, we shall find that there are two possible and distinct choices. These are indicated on the accompanying diagrams and may be explained as follows:

I. We may rush our slum clearance b in in the face of land costs that have not declined to their true value limitation for housing purposes only. At the same time we begin the process of reassembling and replatting our suburbs don new modern garden-city lines, with large blocks and fewer and smaller streets. If we do these two things thoroughly, we can hardly at the same time undertake an active campaign of rehabilitation in the blighted areas c.

The objection to this course is that the slum program carried out on the present land-price level will require a fairly intensive use of these areas. This will not only mean that a larger percentage of our population must be housed in tenement buildings—or in model apartments, if you prefer—but, even with fairly ample open



TWO ALTERNATIVE PROGRAMS OF LARGE CITY REORGANIZATION AND GENERAL REHABILITATION—Above, the scheme calls for slum areas (b) to be first rebuilt, almost inevitably with an apartment type of housing for more than the existing population. Suburban areas (d) would be revamped with a less extravagant street system. Blighted areas (c) would be attacked last, and, with the reduced population, be devoted mainly to industries and large park areas.

Under the second plan, blighted areas (c) would be re-

habilitated as an early step, keeping the present street system, reorganized for safety movement, and providing new efficient dwellings in an average height of not over two and a half stories. Large and frequent open spaces would be provided. The outer area (d) would be revamped with a less extravagant street system. The slum areas (b) would be left to take up final population needs, or if not so required, purchased at drastically reduced land prices and developed as a park belt around the business centre, with cultural facilities, corresponding to the Ringstrasse in cities such as Vienna. spaces—areas a and d fully occupied—the scheme would so exhaust and meet the needs of the full population that we would eventually have to evacuate a large part of the blighted area c; this would create an unnecessarily large expanse of open land here, thus making permanent the present too great separation between the central business and active outer residential areas.

The advantage of this plan, on the other hand, would be that industry on a large scale might expand and recentre in the c area—an industry in which coal smoke is no longer essential would not be objectionable here. It would then be conveniently in reach of both the outer and inner living areas d and b, and would thus provide for individual choice as between suburbs, with longer transportation, and apartments, with central convenience. We may assume that with the relocation of industry the city could provide amply for the necessary transit facilities at reasonable cost.

II. The second or alternate plan is to begin first with the rehabilitation of the blighted areas, postponing slum clearance until later. The land prices in this larger but less congested intermediate district c are at present very much lower and are likely to continue low, because of the vast extent of the areas involved. The present awkward and wasteful buildings not only provide ample open space to restore permanently desirable residential conditions, but also to increase the number of people housed. This, moreover, could be accomplished without resorting to any form of dwelling as intensive as the walk-up apartment. The space is ample and land prices are low enough to permit the use in these districts of small multi-family or rowhouse types-greatly improved, it is true, over the existing wastefully planned dwellings of similar general intent that constitute our present largest though most backward housing equipment. The second section of this work, entitled "Group Housing," is taken up with suggestions for the appropriate housing forms.

By drawing out the population from the slum area b, we could cause a further shrinkage of holding values, making possible later housing in these districts of a more generous and less tenement-house-like character, suitable in fact for both the executives and the workers employed in the central commercial district. In cities where population has become almost stationary, the improvement in areas c and d might almost entirely fulfill the requirements of both population and industry already spread out through these districts. In this event the needs for additional housing in the b district might be relatively reduced and limited to near-in transient apartments, with a few areas deliberately subsidized to provide for the low-income service employees of the central district. The remainder of this space, acquired at relatively low land values, could remain as a generous belt of open space surrounding the central business area-in which the usual public buildings for amusement and cultural purposes would naturally centre. We would thus acquire some of the dignity of those European cities which came into the legacy of such near-in open space through the abandonment of their ancient fortifications.

We cannot here anticipate or follow through all the difficulties to be met in either of the foregoing programs, or suggest further plans for making something out of the present hashed-up mess of our large cities. Nor is this essential to our purpose. But that some such comprehensive and positive procedure is most immediately urgent need hardly be argued. Either our old cities must find the way to make over their present areas into something commensurate with the needs and technical advances of the present-day world, or they will find themselves abandoned for new cities, which will inevitably arise and provide such modern conditions. In either event, we shall have good reason to evolve new and better methods by which to provide housing for the average wage-earner in our cities. This we have failed to do in the past, particularly during the large building program of the post-war period. We now see that the job of doing so is one of the few reasonable ways of putting our large manufacturing and construction facilities to work. It therefore becomes important to develop a concept of the appropriate structures for use in our great blighted areas and our slums.

THE problem of blight rehabilitation differs in many ways from slum clearance. As a result, we still lack the necessary concepts. We possess a fairly well-fixed concept of how to rebuild a congested area, with structures ranging from "model tenements" to "garden apartments." Yet in the blighted district there is no need for such crowding as inheres in even the most open types of garden apartment. There is room to care for a larger population than the present one, and still to provide ample open spaces.

It is important at this point to speak of the smaller city. Such cities seldom have slum areas in the form of large deteriorated tenement districts. Even such a city's stagnant district immediately bordering the business area is no more congested than the larger outlying blighted areas of our large cities. The same conditions as to relative land costs may prevail in regard to inner and outer areas, but the housing types which are appropriate only to the outer areas in large cities will probably fall within the range of land costs and may be quite appropriate for these slum areas in small cities.

In the blighted area the public-service plant is in relatively better shape than in the slum. The streets are in many cases quite capable of utilization with only minor changes. There is not the problem of wholesale replacement and rearrangement that arises in the congested slum.

What of the existing structures ? In the slum there is no doubt whatever that the shacks must be torn down. In the blighted area, on the contrary, at first glance the existing buildings might appear solid enough and well enough preserved to suggest renovation rather than reconstruction. This conclusion does not hold, however, in the face of a thorough analysis of their planning. This planning results in so huge a waste in maintenance and operation that, entirely apart from the desire for greater amenities, their replacement would be the only "good business proposition."

With what then should they be replaced? No one has told us. We must find our own cue. And in looking for it labor might be saved if we began at the blighted area itself, to examine the kinds of dwellings that now occupy its vast dreary wastes. To the investigating mind what we here encounter is extremely curious. For it is

in these areas that we find the dwelling types that have actually become the backbone of American housing that is really within the reach of the average American family. Neither the single-family, free-standing house that is the pride of the suburbs, nor the large apartmenthouse, the pride of the centre, has ever had a chance, economically, to replace these two-family "St. Louis flats," these row houses of Philadelphia and Baltimore, or these single or double "three-deckers" of Chicago or Kansas City. How could such popular types remain so defective in plan? Why should they be so dismally backward in quality as to place the United States at the bottom of planning progress among modern countries? And, greater mystery perhaps than that of how they became so bad, we find ourselves asking what is there in them that enables them, with all their deficiencies and almost suicidal wastes, to survive, and in their weedlike fashion actually to thrive? There must be hidden virtues in this wild breed which wait only for domestication to serve the very purposes they now defeat.

THE DWELLING MOST COMMON IN OUR CITIES

Our attention during the last decade has been centred on the luxury types of dwelling. So completely were we concerned with the individual house and the huge apartment that we came actually to consider these as the bulk of our housing equipment. These types were pleasant, on the whole, to think about. The small house gave an opportunity to architects to have some share in its production: even where the price did not permit the employment of an individual practitioner, there were small-house bureaus and ladies' magazines absorbing and distributing a few plans. The apartment design was the architect's paradise. It could seldom proceed without him, and it often gave him an opportunity to make something of a splurge.

Our concentration on these two kinds of habitation, and our belief that they were central to the problem, were reinforced by a great unnoticed fault in our statistics. These statistics are almost universally drawn up in terms that were relevant thirty years ago but that have since then lost their import. At the turn of the century it

was a novelty for a family to move into anything but its own private house. There arose the two-family flat. And then, after quantities of such flats had been constructed, once more it seemed epochal that the structure should be enlarged, and not two families but several should live under a single roof. Later expansions seemed more natural and took place rapidly, so that psychologically there was less of a break between the three-family flat and an apartment-house with accommodations for a hundred households than there had been at first between a house for one family and a house for two. These attitudes are reflected in our statistics. It is still customary to group all our dwellings into three general categories as does the Committee on Dwelling Types for President Hoover's 1931 housing conference, and to speak of "single-family" houses, "two-family" dwellings, and "multi-family" ones.

Yet if we start today, without preconceptions, on a tour of any large city, we shall find that the above classifications are far from revealing. To speak of both the three-family flat and the hundred-family apartment in a single classification is to take a worm's-eye view, from which a cat and a man are both "large." If we observe by a motor or street-car trip how our cities are actually growing today, we find the types grouped in a different way. For convenience we might provisionally put this difference on a basis of density. We have already described the concentric rings of which the city is composed. In the outer, suburban ring, the population is spread out, and the structures are predominantly free-standing houses. Toward the centre of the circle is the congested district: it is highly concentrated, and composed predominantly of elevator apartments. Working outward again, we find the elevator apartments vielding to walk-ups; while scattered among them, and occupying the huge intermediate areas, are the various kinds of flats, or small multi-family dwellings.

It is time for the housing agencies to begin an accounting that shall differentiate among all the greatly varying types on something like a generic and morphological basis. From no mere desire to vary from the committee, but rather in the dire need of having something specific to discuss, there is here offered another list. Its importance will quickly become evident:

1. Single-family houses: *a*. Detached.

- b. Semi-detached.
- c. Row.
- Small multi-family dwellings:
 a. Two-story flats:
 - Single; double; row.
 - b. Three-story flats: Single; double.
- 3. Non-elevator apartments:
 - All serviced apartments in walk-ups not arranged in the characteristic old "flat" plan with rooms in tandem, usually in three- or four-story buildings.
 - (Two-story apartments are too infrequent to be detached from 2 *a* above.)
- 4. Elevator apartments and hotels:
 - a. Apartments.
 - b. Apartment hotels.

A little further on we can examine the evolution of these plans, showing how there arose the relationships that divide them into the several groups or families. But the first and most important result to extract from a reclassification such as we have made is an entirely different statistical view of the types of which our housing is composed.

Our most important discovery is that the vast majority of the population occupies the middle range of structures, under the second heading of Small Multi-family Dwellings, the product of city expansion of the 1895–1915 period. Let us examine how immense this middle range really is.

In "Neighborhoods of Small Homes," by Mr. Robert Whitten, published in 1931, we have a tabulation of the total existing housing in seventy-two typical cities of moderate size. This shows that:

- 47.1 per cent of families live in single-family dwellings;
- 47.7 per cent live in two-family or small multi-family dwellings (flats), predominantly two-family;
- 5.2 per cent only live in heated apartments, many of which fail to live up to the standard their name implies.

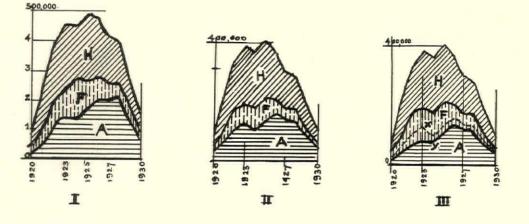
Now if we add to the 47 per cent who live in small flats the occupants of the three-family and six-family flats of Chicago and Kansas City, and those of the Philadelphia and Baltimore row houses (closely akin to the flat), we have by far the largest body of city dwellers occupying this vast intermediate group between the single free-standing house at the one end and the real apartment at the other.

16

During the last decade, attention was distracted from the persistence of these small multifamily types by a sudden spectacular growth in large serviced apartments. Housing experts thought that they observed a new era; and appearances certainly favored their view. Was it true that dwelling heights, like prosperity, had reached a "new permanently high plateau"? In retrospect we can see that appearances were deceptive. So large is the physical apartmenthouse, as a mass upon the horizon, as naturally to obscure large numbers of humble neighbors; and the statistical picture was so drawn up as to reinforce the optical illusion. It must be pointed out that during the post-war period 25 per cent of this apartment growth of the country as a

whole took place in the one city of New York; and during the years from 1925 to 1929 the share of that city was almost one-half of the national total. Therefore, the inclusion of the New York figures causes a violent distortion in the picture as a whole. Moreover, in most of the statistical calculations, due to the backward-looking kind of classification we have already described, large numbers of structures are counted as apartments that are not really apartments at all, lacking the apartment's essential services and being laid out, in contradistinction to it, on a pattern that is akin to the flat, with one suite to the floor on a narrow, deep plan with rooms tandem.

The general trends in new building were shown in a valuable study by Coleman Wood-



STATISTICAL DIAGRAMS OF HOUSING BUILT IN U. S. CITIES, 1920–1930.—These diagrams are particularly important to an understanding of what was built during the ten years after the war. Diagram I is an accurate graph of the total new dwellings for each year, drawn up according to the Bureau of Labor statistics, for 257 cities listed in the bureau's records. The total is divided into three classes: H, single-family houses; F, two-family (two-story) flats; and A, all other multi-family dwellings, including apartments. This graph makes it appear that, first, flats were a small proportion of the total, as compared to previous years; and, second, that other multi-family dwellings were built with increasing momentum up to 1928 and were holding their own at half the total annual production for 1929 and 1930.

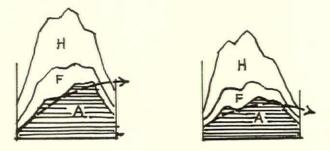
However, this chart includes the five boroughs of New York City, and these not only lagged behind the rest of the country, so that their peak came later, but they also built a disproportionate number of apartments as against other types of dwelling. Up to 1926 they were building one-fourth of all the apartments in the whole country, and by 1929 over one-half. The combined effect of this lag and this bulk is to distort the picture, giving an appearance of momentum to apartment building toward the end of the decade. If, therefore, as in

« ARCHITECTURE »

Chart II, New York is left out of the picture, the altered curves represent the corrected totals and distribution for the other cities. It reveals that larger multi-family dwellings (A), instead of increasing steadily from less than 25 per cent of all in 1920 to over 50 per cent in 1928 (the last year of active building outside New York), increased to about 35 per cent in 1923 and to about 40 per cent in 1926, and barely maintained the latter proportion during the succeeding years.

Actually there is another distortion to be corrected. In group A in Diagram II, purporting to be apartments, the statistics were so drawn as to include all three-story flats, running to a large number, and all related not to the apartment but to the flat in the character of their plan and services. In the cities in which flats had previously predominated, there were built (at least from 1921 to 1926) nearly as many three-story flats as two-story ones. Therefore, to have a real picture we must introduce a new division between flats and apart-ments, at y instead of the old line (shown at x). This is shown in Diagram III. Though there are no complete statistics on the subject, this line y is not far from correct. This last diagram shows that even in the last decade the "flat" type of dwelling has remained an important factor, even though in less proportion than in the previous decade when new production was less fancy and more in line with practical usefulness.

bury in *The Journal of Land and Public Utility Economics* for August and November, 1930, and in subsequent issues. The accompanying diagram is based on a graph in his article and shows the production of new dwellings from 1921 to 1928. He divides them, as do the available statistics, into single-family houses (above), two-family flats (in the centre), and all other flats and apartments (below). This classification must be altered to conform more nearly to the criteria we have just set up, and I have accordingly taken the liberty of adding to the section called "flats" the area below the dotted line "X." This area represents dwellings which,



Diagrams similar to those on preceding page made to express more clearly the trend of apartments and larger multi-family dwellings during the period 1920 to 1930. The graph at the left represents the statistics for 257 cities; the graph at right, the same group with the exception of New York City

even though they hold more than two families, should be classed as flats rather than apartments, by virtue of their layout and the kind of service they provide.

It will thus be seen that, even at the height of the movement toward congestion and apartments, the smaller multi-family dwellings made up a fair share of the total constructed, though proportionately not so great as prior to 1920; and if the new ones be added to the great number already standing, both together accounted for the preponderance of our city habitations.

If the apartment seemed to bulk larger than it actually did during the height of the boom, in the depression that hit building after 1927 and 1928 there has been a similar but reversed temporary trend in favor of the small house. This is not to be considered very significant. It parallels the shift in the period of underbuilding immediately following the war. In each of these periods the total amount of building was relatively so small that the net result did not materially affect the long-term upward trend of multifamily types, particularly in cities of 50,000 or more, distributed throughout the eastern and central industrial regions. The small dwelling offers an individual outlet or small-scale investment at a time when disturbed conditions make the larger sources of capital hesitant.

Summarizing, we are now in possession of a corrected statistical picture: the large apartment dwindles as it is removed from its favored position directly in front of the eye; the single-family free-standing house also recedes in importance; the great main area of the city is found to be built up in an intermediate type: small multifamily dwellings, ranging from the two-family "flat" to the double "three-decker"—also a flat, as its pattern clearly shows.

What are these small multi-family dwellings like, and how did they come to be?

THE EVOLUTION OF THE FLAT

To answer the second part of the question first, the reader is referred to ARCHITECTURE for March, 1933, "The Sad Story of American Housing." There we traced the evolution of housing types in St. Louis from 1890 to 1930. This process is typical of other cities. The types gradually evolved from the old-fashioned town house of Philadelphia through the various stages of narrowly separated, free-standing singlefamily houses down to two-family, double twofamily, then three-family and double three-family flats. Throughout the whole evolution, meeting the changing economic demands so far as the amateurish abilities of the builders could meet them, the plan never really advanced. The process was hog-tied to the concept of the narrow lot. Throughout, the buildings remained long and attenuated; and the narrow side yard persisted as a haven for alley cats while the front of the building blossomed out with porches and decorative "motives" to make up in window dressing what the structure lacked in natural adequacy.

Meanwhile, although the realty effort nowhere abandoned its basic method of subdivision, in many smaller cities the effort was carried through successfully to make the standard lot wider. Forthwith an unguided public demand for the still more wasteful "bungalow" of one story filled and overcrowded the lot even in its new generous proportions. By 1930 the builder himself began to realize that these bungalows, jammed against each other, looked somewhat awkward. A movement then got under way to camouflage the bungalow as a modest

18



At left, a dwelling of 1880 in St. Louis. Our "rugged individualism" separated the houses by two feet—wide enough for the alley cat, but not sufficient for light and ventilation

At right, St. Louis, 1915 to 1925, the double three-story flat still retained these narrow side yards, by adding porches

Below are three typical efforts at self-expression on the part of the untrained builder: left, from Kansas City; centre.from Minneapolis; and on the right, "the house of a thousand gadgets," Kansas City









At right, the Minneapolis bungalow of 1930. The narrow lot has been somewhat widened, but the unguided popular demand of the



time for the onestory dwelling filled up this additional width. Here it is camouflaged to simulate a row of detached cottages



At the left, house built in a St. Louis subdivision to set a standard of good taste in design; and right, failure of builder to live up to the standard



cottage. A high-pitch "cross-gable" was turned across the front of the house, giving it the appearance of running parallel to the street. The main roof being kept at a lower pitch, the fact was hidden from sight that the bulk of the house was arranged precisely as before. This ingenuity was cleverly manipulated in many Minneapolis examples but botched in other cities. The ubiquitous front chimney, badly placed for living with but easy to advertise, was also characteristic of this period.

A more recent and even cruder example of this process took place over a much shorter period of time in Detroit and Buffalo, within the last few years. This is described under "The Blighting Effect of the Narrow Lot," on page 23.

Need we introduce further evidence of the innate stagnation of the entire procedure? Seeing the realtor-builder at work over a long period, we find that his operations have never transcended the most simple-minded of basic concepts. He is first, last, and always a merchant of commercially negotiable building lots of a familiar and never-changing type. Selling these lots, financing them by means of mortgages, and filling them with construction "on the side"these are his functions as he sees them and faithfully pursues them. It follows quite naturally that any considerations of orienting the house to sunlight or arranging internal plan economies cannot even be dreamt of. The houses do not so much as meet the ordinary requirements of decently economical construction; and the heat they lose amounts to throwing half the coal right out of the window.

Yet apart from what it shows us about the origin of the miserable arrangement of our city dwellings of the vast middle range, there is special interest in this evolution of housing forms. We find that the single-family house is never more than a passing phase. The tendency is always toward multiple dwellings. When a period of depression temporarily resuscitates the smaller form, this condition does not last, but quickly yields to the recurrence of the twofamily flat and then something larger. If, with all its unbelievable defects and brutalities, the flat cannot only survive but flourish, it must be a hardy breed! The reason is that the small multifamily dwelling, despite its defects, still retains an incontrovertible advantage. Among all the forms produced in the regular processes of building, this one offers the public the most in the way of convenience-at a not impossible cost.

GETTING DOWN TO THE AVERAGE PURSE

The one thing that was never thought of during the riotous decade from 1920 to 1930 was getting down to the average purse. Observing the spectacular success of the first apartments, builders behaved as if the field for them were unlimited. If the first apartment paid, so must the next one just a block down the street. Land values obligingly rose; as did assessments. It became necessary to collect high rents in order to make a profit on the investment. No one attempted to find out where the people were to come from with incomes that should justify such expenditures on rent. It was fashionable to deduce building heights and coverage from the "value" of the land.

It is not surprising that under methods of this sort the new accommodations were all massed within a restricted price range. Whether they were apartments or suburban homes, it was the luxury market that they met. For people below the top third in range of income no desirable new housing was produced. But we are not at the moment concerned with the new production as a whole. We must make the attempt to discriminate among the various kinds.

The greatest handicaps in cost lay at the two extremes of expansion and congestion. Roughly speaking, the old-fashioned free-standing house suffered excessive costs because of over-expansion; the apartment suffered them because of over-concentration. From another standpoint, the small house suffered because the processes involved were intermittent and scattered. Small numbers of dwellings were erected by shoestring builders on incompletely prepared land; inexperienced consumers who bought the houses only gradually came to realize what a white elephant they had undertaken to support. The apartment suffered from the opposite kind of ailment: it involved too heavy a central administration and maintenance, too intricate an organization with correspondingly heavy risks and rapid obsolescence.

COSTS OF THE SMALL HOUSE

Let us go more into detail about the small American "dream cottage." By nature it can exist only so long as the city itself expands. The heavy requirements of the small house in terms of land put it entirely out of the question for central city areas, for even if these were to be

« ARCHITECTURE »

20

fully built up with such houses, the distances to and from the business districts would be prohibitive. Indeed, the distance is making small houses highly inconvenient even at the rim. Since business districts have not been decentralized concordantly with residential ones, the white-collar suburbanite finds that, along with his free-standing house, he has acquired a disagreeable ride on the 8:17 and the 5:12 that daily rob him of two daylight hours. Yet although the small house calls for new outlying areas, its wastefulness of land and public services put it out of reach of the average family even there. On any large scale it can subsist only on low quality, or on so incomplete an initial set of public services that the buyer is only deceived, and later required to meet a more costly installation.

The fantasy of the snug and cozy little home that the typical American will own, building it for himself, to his own plans, on his own lot, is indeed one of the most highly paid fairy tales the advertising man ever managed to float. To find a very different reality we need not even go back to the bulk of the single-family houses the people actually inhabit, our country's "largest mass of obsolete and discredited equipment." There are observations startling enough to be made from the current crop, built within the last four or five years. These "modern" houses were the object of special attention when, in 1931, I had the opportunity of visiting twentytwo representative cities for the President's housing conference, to see what kinds of dwellings were being built, by whom, of what merit and at what cost. The notes that follow are therefore based on first-hand observation.

1. It is of the highest importance that in the huge preponderance of cases the individual owner did not in any manner build his own house. The picture-books show him purchasing a lot, selecting an architect or at least a stock plan from a magazine, and employing a builder. Direct observation on the street showed beyond contradiction that from 75 to 90 per cent of the houses currently produced in the twenty-two cities were in the hands not of owners but of speculative builders, putting up anywhere from half a dozen to 150 houses at a time for sale in the open market. Not only "small houses" but pretentious affairs in the price range from \$20,000 to \$40,000 were being constructed by the commercial builder for unknown purchasers. Clearly the buyer is at the mercy of the general builder's intelligence and honesty. Some inference may be drawn as to the waste motion involved on the part of those home-seekers' magazines and other agencies of guidance, which direct their whole energy into educating the prospective home-builder to materialize the home of his dreams from his own plans on his own lot.

2. The utilization of land was characteristically defective. Narrow, deep lots prevailed, with a resultant trend toward long, narrow plantypes running back from the street. Not even such broad-front plans as were shown in the plan-books could be used, because their standard, such as it was, remained beyond the subdivider of the land, whose method had precluded them. Open spaces were dissipated into dark side yards, generally lined with concrete, which served both as driveway and sounding-board to the car on its way to a garage (if there was one) placed at the back of the lot, taxing the little sheltered space remaining there. The neighbors' windows were located like choice seats in a theatre, as if the purpose had been to make a neighborhood drama out of private family life. Concentrated open space for pleasant outlook or recreation there was none; the possibility of it had not been thought of.

3. A single type of dwelling would be standardized in a given locality, or sometimes throughout a whole city, shutting out the diversity needed to meet the normal range of family needs. Copying of house types from one city to another was also noted, largely without reference to local climate, topography, or traditions.

4. Guided by emulation and fear of competitors, rather than by even the feeble tastes or basic needs of families to be housed, builders were engaged in a mad scramble to provide the greatest possible number of gadgets. Colored tile bathrooms—sometimes with sunken tubs pseudo air conditioners, imitation fireplaces, all were being freely offered in place of convenient and livable planning or desirable environment.

5. It follows that the houses were in dubious taste. The literature alone would reveal it. The builders, however, are innocent. They have been listening to architects. They feel that they are spreading an era of style appreciation heretofore unprecedented. Their houses are English, Spanish, Colonial, or otherwise "artistic."

Moreover, single-family houses, generally speaking, are bound up with a wasteful procedure, involving premature land speculation and high financing costs, promotion and advertising expenses. These, added to the delayed and increased public-service costs, constitute a burden that must be thrown overboard for any permanently satisfactory solution. The small house is meanwhile not amenable to more advanced technological and construction methods, which involve such elements as machine excavation, continuous outside walls, efficient spans, and a hundred economies arising from straight-line production.

Nor will it be saved by prefabrication of standard types indiscriminately broadcast throughout the country. This move will only augment the present chaos, in which incidental and overhead expenses are much greater than the total cost of actual labor and materials that go into the final selling price of such houses.

From the standpoint of consumers, the small house depends on the family as a stable and responsible entity, deriving from the time when the home was really a homestead; whereas families are now constantly being broken down into smaller units. And these divide and shift still more as jobs become more standardized and mobile. The groceryman now works for a chain store, and may be transferred; the former small manufacturer has charge of an office today in Denver, tomorrow in Detroit; it is not only the factory worker who has become nomadic. This condition of course affects home ownership rather than the house itself; but the small house is the one that particularly invites ownership.

Such, briefly summarized, has been the career of the free-standing single-family house in the hands of those who love it best. The subdivider and speculative builder, by resisting every attempt at improvement in concept and execution, are helping kick their darling out of the door. Even were the type intrinsically the soundest, it would still have difficulty surviving its devotees. Unfortunately the type *as such* is subject to the most formidable handicaps, so that, like a battleship too slow to keep up with the fleet, it can depend for survival at best only on the most skilful handling.

HIGH COST OF THE APARTMENT

The apartment is a solution for more expensive dwelling space based on problems of high land cost. These land costs, even in widely decentralized cities, are an inevitable accompaniment of our haphazard city expansion. So few are the really livable parts of our cities, that all who can afford the luxury of ordinary comfort and convenience crowd into a few small districts, forcing land costs high, even though the area represented constitutes a very small part of the entire city. And, land costs aside, the construction and service costs of the apartment would still place it beyond reach of the average family income.

In all discussion of comparative costs, there are three fundamentals to be balanced. Wrapped up in the sales price or rent are the cost of land, the cost of construction, and the cost of maintenance and depreciation. The apartment house makes its savings by multiplying the floor area on a restricted piece of land. Yet, on land valued up to \$2.50 per square foot, the added complexities of construction and service more than offset the savings from intensive land utilization. These costs include the distinctly heavier walls and firmer foundations required by a building that rises above two or three stories; the hoisting and double handling of materials for the upper stories; the provision of fire-escapes, fireproof stairs and stair wells; and the complexity in providing access to the roof (additional stairs, penthouse or stair bulkhead at the roof, parapet for safety, laundry-drying equipment, and finish of roof to permit walking). In respect to service, the apartment house requires the capital cost of elevators in buildings above four or five stories, together with the capital cost of the space the elevators occupy; a central heating plant, general laundries if provided, and other institutional provisions. It requires the maintenance of these features, including the lighting, cleaning, and repairing of public halls, the upkeep of courts and gardens, and other miscellaneous expenses. In general, the technical facts and actual working experience are still too meagre as a basis of definite conclusions. Yet the implications of all the most careful and well-supported analyses are that those forms of apartments which exceed the limit of a normal, walk-up, non-elevator standard, suffer distinctly if any desirable standards are to be observed as to sunlight exposure, cross ventilation, and general amenity. To say this is not simply to voice a vague suspicion. Later in this work are presented the carefully digested, comparative costs of apartment and non-apartment buildings based on the known figures of actual cases.

Parenthetically, the popularity of elevator apartments has grown partly from an unfortunate circumstance. In New York City, a code leniency remains as a hangover from the times of the six-story walk-up tenement of the nineties. This concession permits non-fireproofing

of six-story buildings in general, and is absolutely indefensible. Moreover, the tenants have been encouraged to feel that the elevator raises them not only to the upper floors but to the upper social strata. The resident of the second floor, though he seldom uses the elevator and is often annoyed by its noisy operation, contributes at least an extra dollar per room per month for this privilege. Such attitudes are irrational but need not, just for that reason, be permanent. Snob psychology can be made to work both ways, and even on the principle of "conspicuous waste," a community of amply spaced twoor three-story buildings in the middle of a city of congested apartments might be made the "ritziest" thing.

But let us suppose that the elevator apartment could be forced within the range of the average family. Would even such a change measurably retard the spread of blighted districts? Would it replace the miles of worn-out or obsolescent dwellings of our large cities? LeCorbusier once proposed the ideal of replacing vast areas of low housing units by isolated towers accommodating an equal population, yet such an ideal is very far removed from possibility in this country. It would require revolutionary adjustments in our entire concept of landholding, land utilization, and community planning. These tall towers would moreover embody to the highest degree the complexities of maintenance and service we have mentioned, if not of construction; and this alone would place them beyond the reach of the mass of our population. Meanwhile, if such apartments were not widely spaced in large parks, they would rehouse the present population of our cities in a mere fraction of the present area occupied, leaving the intermediate spaces blighted, unsightly, and unprofitable, just as they are today.

THE TECHNICIANS NOD

Returning to the flat, we might as well disclaim at the outset the intention of perpetuating it in its present form. Not the flat as we see it all around us, but the flat as the technician might long ago have reincarnated it, is what concerns us. The technician has been asleep at the switch. His whole attention has been concentrated on the luxury dwelling. Whether it was a huge apartment building, or whether it was a residence on Long Island Sound, the structure that received his attention had no meaning for the majority of the population. The halting and

« ARCHITECTURE »

ineffective job that has meanwhile been done by the speculative builder through a purely commercial instinct has actually been our best. At last the unguided interests have run their course, and inherent wastes and lack of imagination have brought an unbridgeable discrepancy between the cost of the product and the means at the command of the possible occupant.

THE BLIGHTING EFFECT OF THE NARROW LOT

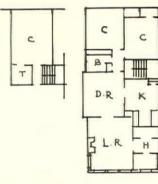
No house can be wider than its lot. If the technician is to make a start toward improving the dwelling, he must begin by widening it; for most of the inefficiencies and stupidities of the present forms derive from their narrow, tandem arrangement. Yet the lot must be widened before the house can be.

The narrow lot arises from marketing habits that have nothing to do with the final purpose of the purchaser in terms of building. A narrow front *is* important to the land subdivider, because he sells his lots as if they were a finished marketable product, by the front foot; and this places the broad lot at a disadvantage. This obtains despite the fact that the cost of street frontage even at its worst exaggeration is relatively unimportant in the final cost of the completed building, in which the lot is only one subordinate element. Better community planning of streets, providing in advance for heavy and also for light traffic, would cut frontage costs still more.

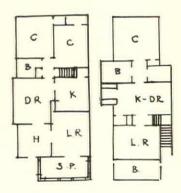
A second factor in the narrow lot is that practically all new subdivision is in terms of singlefamily houses, although a large part of this land is ultimately used for multi-family dwellings. There is only one instance known to me where a new subdivision of any size was laid out deliberately for sale to builders or investors as lots suitable for multi-family buildings. This was one in St. Louis that I myself designed soon after the War. It was highly successful as a marketing project; but unfortunately the owners attempted to straddle and did not enforce the restrictions on use that were recommended to accompany the plan. As a result, broad-front shallow lots were bought by unimaginative builders who forthwith made a mess trying to fit their old, wasteful, narrow-front plans on lots quite superior to their purpose (see page 19).

Multi-family dwellings have remained awkward and wasteful because they were the product of unimaginative builders with no concept of

good and bad planning principles. They calmly adopted ill-shaped lots as a necessary evil. They argue that since people have always accepted the miserably arranged flats provided for them, and have appeared to live happily there, the flats must be quite all right. Then, as we have shown, these flats are developed unthinkingly from smaller types such as single-family houses, or lately even from bungalows. This process we have already sketched as it took place over a period of thirty years in St. Louis. Stretched over so long a period, an account of the process would have to take into consideration numerous obscure causes. Yet if we come closer to the present day, we can find a similar evolution running the same course before our eyes in one of our medium-sized cities, the city of Buffalo. In this city, the building of better-class homes fell off in 1926-1927, long before there was any thought of the great depression. Builders who had previously been active in outlying land subdivision found this market closed and returned to a previously exploited but still unbuilt area nearer in. Tracts that had fallen in price, due to their own previous suburban competition, these builders now developed with small houses built for sale. Naturally they followed the popular mind, educated by magazine pictures of the Sunny South, and adopted the one-story bungalow type. To fit the narrow lots these bungalows were necessarily stretched out into a narrow and wasteful plan. Only by the poorest con-



Here, at the right are the first and third stages in the "rebirth of the flat." The building at the right is a bungalow for one family only, and has a sun porch adapted from more expensive houses. The house at the left is the third stage of the full two-family "bungalow flat." Plans at the upper left show the first stage; one rent-



al room on the second floor. In the lower left corner is the plan of the one-family bungalow shown in the photograph. Beside this is shown the second stage of bungalow expansion, requiring a change in the stairs, and permitting a fairly large suite above. At the right are the plans of the bungalow flat which has blossomed out into almost a full two-story flat, with nearly equal space above and below. Sometimes there are rear stairs also. Here in the final stage are still the rudiments of the original bungalow, with the appliqued sun porch of brick, long ago absorbed into the front part of the living-room

also held up the plaster—could the handicaps of the plan be overcome. Yet by adopting a brick "sun porch" as an alluring front approach, the builders were able for a time to market their product. But the bungalow, particularly in its crude narrow-lot form, happens to entail waste and expense which sooner or later register themselves as "sales resistance," something which, we regret, has never been countermanded by any Eighteenth Amendment. So the resourceful mind of the speculative builder invents the "investment bungalow," with an annex on the rear

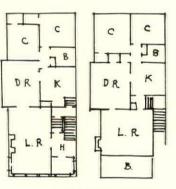
struction I have ever seen in the North-the

plaster held up the paper, but perhaps the paper

attic for a subtenant who pays part of the rent. Some sacrifice is appropriately required of the owning family on the first floor. The extra stairway needed for the new upper tenant crowds the living-room of the main unit forward into the erstwhile sun porch.

The next step for the practical mind is naturally to provide more space above for more rent, and the upper dwelling is consequently expanded into almost a full replica of that below. Almost, because the new two-family structure must still masquerade as a modest bungalow—for who wishes to admit his dependence on his neighbor (above) for the lion's share of his monthly costs ? Very ingeniously the public is coddled into receiving this almost final step in the undoing of its bungalow ideal—very in-





« ARCHITECTURE ≫
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Here is the row of "bungalow flats" that have blossomed out into what is almost a full two-story flat. It will be noticed that with the absorption of the former sun porch into the living-room, part of the living-room wall is of frame and part of brick, with one little window flanking a fake fireplace in frame wall, the other in the brick

geniously deceptive in front, but brutally frank behind. (See page 27.)

Finally the top story pushes itself out into a full replica of the story below-but still not quite. The effect must still be guarded by the "draping" of a false gambrel roof, which doesn't really fool any one, but makes a highly valued variation for each alternate unit in an endless row of equally dreary façades. But, prize of all! throughout this whole process the hardy resistance of the speculative builder's mind has preserved its integrity. Look down the line of these full-fledged two-flat dwellings of 1931. The "sun porch" appendage is still maintained in its distinguishing brick appliqué as the front half of the living-room, tied into the frame half of this room by the fake brick fireplace, at each side of which is the proverbial small window over the proverbial bookshelves; the get-up distinctly advertising the interior dishonesty by the fact that one window is in frame and the other in brick.

Here we see demonstrated the emasculation of the whole range of dwelling construction by amateurs, unblessed by the capacity of even a second-rate draftsman to develop something that might meet the exigencies of a falling market. And still they were able to borrow a good share of the cost of these wretched buildings from those great institutions to whom we have been induced to entrust our savings and insurance money !

Now, as already said, even a second-rate

draftsman could in short order produce a better plan within less actual space. The blighting effect of the narrow lot has not only damaged our cities but has dulled the minds of those astute builders of ready-built houses and flats until they are impotent to make the least use of technical competence even for their own selfish ends. They merely back and fill in the welter of backnumbered ideas which can no longer meet the economic necessities. Otherwise some of them, operating on a row of houses or flats where an entire street frontage was at their command, would have been able to apply a little crude mathematics. By this means they could easily have discovered that a plan with rooms of identical size and shape could be put into a building of a slightly different shape with a saving of from 12 to 15 per cent in the case of a brick flat with twelve-inch walls, and an equal saving in perimeter. Not only would the building appear considerably more valuable and be better arranged, but at a saving of only 20 cents per cubic foot for the area saved, it would permit the use of the necessary additional frontage at \$75 per front foot. This ignores the possibility (beyond the mental capacity of our "astute" builder) of rearranging his land so as to reduce the depth of his lot by one-third, which would amount to at least 1600 sq. ft. of land at, say, a base price of 20 cents a square foot; this would just neatly balance the \$825 added for the eleven feet of frontage, leaving the building saving pure "velvet."



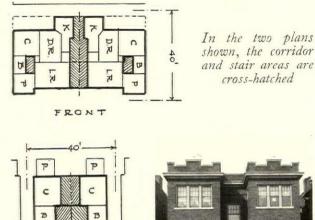
A four-family flat with complete apartment service, built by the author in St. Louis primarily to demonstrate to local builders the economics and improvements possible in broad-front planning. Contrasting with this is the narrow-front plan of a four-family flat as developed by a nearby speculative builder. The upper plan has a fully equivalent and much superior arrangement of living space, included within 85 per cent of the area of the other. A single steam-heating unit in the broad-front scheme used 63 per cent as much fuel of the same grade per season as the four separate hot-air heaters in the narrow-front building

A demonstration of this principle was made in two broad-front two-story apartments which I built in 1920 to show to St. Louis flat builders the wastefulness of their usual type of plan. This had invaded a subdivision for which I had made the plans just prior to the War period. While it had no immediate effect on the local builders, it was copied by apartment builders in a higher-grade district and in fact became the customary plan for the three-story double-flat type of apartment built over a large area in succeeding years.

The awkward arrangement of the flat for housekeeping purposes has previously been mentioned. Its rectangular form is entirely inelastic in its capacity for bedroom space.

Even though the most usual plan shown herewith is some 65 feet from "stem to stern," it provides only two reasonably usable sleeping spaces, one at the extreme rear, the other in the front sun-porch appendage farthest removed from the bathroom. It is this type of plan that predominates in great areas of St. Louis and Chicago and which has resulted in the necessary "popularity" of the disappearing "closet bed." This *ingenious* device had to be invented in order to preserve the total *lack of ingenuity* on the part of builders who persisted in such stupid plans.

Furthermore, the form of these flats precludes the entrance of any sunshine to any first-



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story rooms and to most of the rooms on the second story. Even where the street system is almost ideally carried north and south, these plans succeed in defeating the good orientation that would be possible in broad-front, two-roomdeep row dwellings or flats on the very same streets.

SUMMARIZING THE FAULTS OF THE FLAT

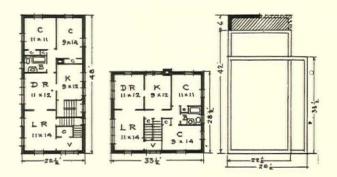
We have emphasized that none of our multifamily dwellings have quite outgrown their origin on the single-family lot. They filtered into cities already platted in single, narrow, and deep city lots, and their design has never ceased to be hampered by this Chinese shoe. The fact is that such buildings, at least in the case of the flats, are now usually produced by the dozen at one time and place by a common builder; but this would never be inferred from their accidental positions on the city map. Good judgment in the most rudimentary form would suggest the desirability of planning the whole enterprise as a single, related project. Unfortunately, inertia is reinforced by piecemeal methods of financing. The operator is obliged by the lending company to keep his property in the form of loose change -small units that can be sold to small investors to take advantage of mortgage money made available by small and none too secure lenders in small units. Even this restriction would not, however, prevent radical improvements in the form of larger individual buildings, if the habit of narrow-lot plotting could be overcome.

What, then, are the specific defects of these buildings, planned to fit into a typical city lot?

A. They arrange living space in a deep, narrow, oblong form, one suite to the floor, running from front to back, either singly or on each side of a double building with party wall.

B. Rooms, however many in number, must be arranged tandem. Either the relationship is a simple 1-2-3, with all circulation passing through one room on the way to the next, as in many Southern flats, or there is a long hallway, usually against the interior wall, and consequently dark.

C. Such an arrangement is particularly inconvenient and wasteful from the standpoint of





housekeeping. Moreover, it provides a maximum of space that is dark, noisy, and lacking in privacy, since the outside openings are only on narrow courts, frequently six feet wide by sixty feet long, as in St. Louis examples, or entirely closed at one end, as in Chicago.

D. Deep, rectangular dwelling space, particularly in double party-wall flats, is most wasteful of building materials, masonry walls being a dominant factor.

E. Such buildings are excessively wasteful in maintenance, particularly with regard to fuel consumption, since they expose a maximum periphery to the weather. Studies on this subject are borne out by my personal experience in owning small multi-family buildings of improved design. Both the studies and the experience indicate conclusively that squaring up the design of these buildings to conserve floor space and cubage, by means of efficient and compact hallways and reduction of other non-living space, makes possible savings of about one-third in heating costs.

F. Such buildings are universally produced with no thought for community atmosphere or community amenities. There is neither the

Above, at left, approximate plan of the speculative builder's efforts pictured in the row at left. Centre plan a broad-front rearrangement with rooms of identical size and shape. Right-hand diagram shows savings: cross-hatched, area saved; black, outside wall saved. The narrow-front variety is shown front and rear in photograph at left. While in 1927–31 Buffalo built 5,000 such wasteful dwellings, Frankfort, Germany built 10,000 solid, broad-front houses such as shown below





pleasant view that derives from planned grouping, nor provision for normal group activities of the tenants, such as sports. The physical buildings comprise the entire interest of the producers, and so there is no trace of a reason why such communities, or rather non-communities, should resist the ravages of deterioration, becoming within a few years as truly slum areas as their predecessors.

That a form of planning so unimaginative and uneconomical might occasionally occur as the product of meagrely trained builders who construct without benefit of professional planning services, would not be a matter of great surprise. That so unimaginative and uneconomical a form of planning should not only spread in our cities but now frequently be copied in small towns, where no scarcity of land can be claimed as an extenuating circumstance, is hard to credit. Zoning has made valiant efforts to segregate this undesirable type of dwelling, but has done little to improve its form.

RENOVATION OR RECONSTRUCTION?

It is just such flats as those above described that occupy vast parts of our cities and make up no small part of their blighted and stagnant areas. In many cases the neighborhoods are still fairly well kept and the buildings are by no means dilapidated. It is usual to consider that their faults concern their obsolete bathroom and kitchen equipment; and there has recently been no little agitation for their renovation on a large scale. But to admit that renovation is more feasible than reconstruction would be to accept, for the most part, the permanency of the vastly deficient and undesirable qualities of most of the housing space representative of these sections. Particularly where they consist of "flats" of the pre-War era, even though they are substantial and often in fair repair, they enclose dwelling space which is ridiculously wasteful, badly arranged, and providing no opportunity for recreation, enjoyment, or leisure in any form. It so happens that in this extreme wastefulness of practically all the 1905-1915 product of the speculative builder, there lie the seeds of its undoing and replacement. These buildings are becoming so wasteful in maintenance that we cannot long afford the constant losses which they entail; we can better afford the drastic one-time job of replacement rather than the wasteful piecemeal job of renovation. If this is true, and the case is strongly in its favor, then the stage

might be set for rehabilitation on a large scale. Let us see whether such a case can be made and maintained.

There are numberless owners whose buildings once enjoyed a fair degree of occupancy just because there was little or nothing else available at anything like the same rent. The general overbuilding of the last few years, together with a shift in populations, has exposed the real condition of these buildings: they are inescapably obsolescent. Their owners are faced with the need of doing something. Quite frequently, the ownership has already passed to the mortgage holder or banker. An architect in whom this banker happens to have confidence may at this point be entrusted with questions of alteration or modernization. Generally speaking, all that is sought is the shortest way out of a bad bargain, and the assumption is that expenditure should be held down. The result comes to a set of minor alterations which in no way really modernize anything at all.

The architect should have a clearer insight and guard against such makeshift. His ability to cope with the problem requires, first of all, that he be familiar with all the factors that go to make up rent. With such knowledge firmly in mind, he may, in fact, often decide, and amply demonstrate, that remodelling will be ineffective and that complete replacement is the real need. He can usually take for granted that the old building was not particularly well planned to begin with, and when altered will at best be removed one step further from, rather than nearer to, efficiency or adaptability in relation to its new up-to-date use. Maintenance and depreciation are likely to be so great in the altered dwelling as to more than offset the increased capital costs that would be required to wreck the present buildings altogether and replace them with something really up to date.

Were the architect dealing with the former individual owner, such complete replacement might be out of the question. But large mortgage-holding institutions should be amenable to the argument that it is wiser to supply the additional capital for reconstruction, if such a course will secure a definite improvement both in current returns and in the soundness of the investment. Although the banker may not want to let one new building expose the faults of the many older ones in the neighborhood, so shortsighted an attitude is not likely to prevail if the claims for replacement are on a solid basis.

It may be of value to suggest the elements to

be considered to arrive at a solution rather than a temporary makeshift alteration. As frequently happens, the determining factors are not easily discovered and may be tucked away in certain obscure items which do not bear out the customary assumptions to which commercial agencies frequently limit their outlook. Obviously, maintenance costs are in these cases as important as the original costs of building, and since they are seldom fully known or taken into account, the validity of rehabilitation schemes is frequently placed in doubt. Even the unchecked judgment of very "experienced" operators is not always dependable in such cases. Some slight insight into a few of the contingent factors of rehabilitation may be gathered from the following case of practical analyses for a problem of some magnitude:

The owners of a new, efficiently planned, five-story walk-up apartment that covered a large part of their property were also in possession of another group of older apartments of a three-story flat type. The latter were well tenanted, and were of rather better than average quality and preservation. Fortunately, the old and new apartments were separately incorporated, with separate bookkeeping, although they were held by the same interests, managed by the same staff, and, incidentally, connected to the same heating plant. Hence, all the materials were available for a comparative study of costs.

After eighteen months' operation, the return on the old buildings was so low compared to that on the newer ones, that the question came up whether they had better not be removed and replaced by an extension of the new project.

Calculations based on construction, land cost, and depreciation, gave a negative or inconclusive answer. The construction costs of the proposed new building, it was estimated, would parallel those of one of the modern units already built. But the land would cost much more, since the book value of the old buildings had to be added to the underlying land cost at vacant land values, subjecting the proposed new structure to a 125 per cent increase in land cost as compared with the similar unit in the existing modern structure.

The problem may be stated in simple terms as one of balancing increased capital costs against decreased depreciation and maintenance. Maintenance was at the outset limited to cautious assumptions based upon "average" experience. Current maintenance charges were figured against both the old buildings and the existing new ones at approximately the same amount per rentable room. The only excess cost assumed for the older buildings was for more frequent renovations required by their more depleted conditions. The advantage of rebuilding on the basis of these assumptions was found to be too slight and uncertain to warrant the added investment.

It was at this point that the suggestion was made that the assumptions be checked by a more careful effort to determine the actual cost of heating, janitoring, and other maintenance operations, in the old buildings as compared to the new. Due to the separate bookkeeping the comparison could readily be made. For instance, the heat used by the old buildings during the previous year had been metered and was found to run about 60 per cent higher per rental room than in the existing new buildings. This was due, no doubt, to the fact that the old buildings were wastefully laid out as flats with a great deal of outside wall exposure. Also, their height being only three stories as against five stories for the new buildings, they exposed proportionately more roof and basement to the weather. Similar disadvantages were found in janitoring the old houses, with their proportionately larger number of stairs, and in decorating their wasteful halls. Corrections for these discrepancies resulted in a new set-up showing a decidedly increased income from rebuilding instead of remodelling.

Thus we find that the processes of maintenance and building planning, which previously have been divorced from one another, have resulted in a widespread misconception of, or at least failure to fully weigh, wasted maintenance costs of remodelled dwellings against the increased capital costs for rebuilding. The complete facts may frequently demonstrate that remodelling which accomplishes very little toward the larger problem of really salvaging blighted districts is in actual effect, on resulting combined capital and maintenance charges, so nearly equal to the costs of wrecking and rebuilding new efficient dwellings as to throw the weight of good business judgment on the side of rebuilding. There can be no question of choice from the point of view of social rehabilitation and the interests of the city in re-establishing sound assessment values. These considerations underlie the study which follows and which proposes the possibility of rehabilitation of areas of wasteful flats on a basis which, if once successfully begun, might be self-accelerating and result in replacement on a large scale.

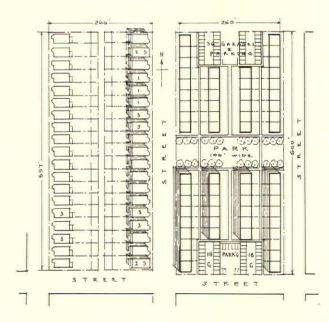
IV. VISUALIZING THE POSSIBILITIES OF REHABILITATION OF BLIGHTED AREAS

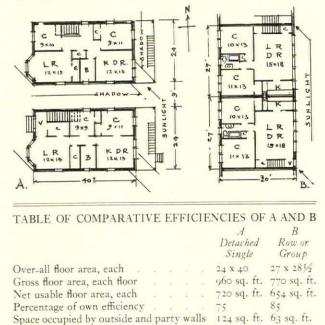
previously pointed out, the greatest drawback to carrying on a large program of rehabilitation is our general lack of appreciation of the problem in both its requirements and possibilities. The accompanying studies, originally appearing in part in Building Investment (New York), undertake to show (a) that very desirable results can be obtained within the limits of the existing street pattern, especially in mid-Western cities where block sizes are very generous, and (b) that there is so much loss through the inefficient maintenance of the old buildings that, even though they may not be dilapidated or a public menace today, they might be torn down and rebuilt upon modern lines with at most a very small loss in terms of money and an inestimable gain in living values and permanent returns in city taxes.

The situation assumed is typical of Chicago, where 376,000 families, nearly 40 per cent of the whole population, now live in wasteful detached two-family flats. These deep, narrow buildings, facing streets running north and south, are so related as to fill up the generous size lot and block most of the sunlight. Fifty per cent more two-family units may be arranged within the same space, so that all rooms receive either morning or afternoon sunshine, by merely substituting modern broad-front attached flats of approximately the same living capacity, in four rows per block, running north and south with the streets. Even the interior rows are readily accessible from driveway approach between the convenient garage groups at each end of the block. In addition a cross-block park space is provided across the centre of the block. A fairly liberal financial set-up, ignoring the difficulties of purchase or land assembly, shows that at present costs and rentals the job of rehabilitation should be accomplished in such a manner as to take up all the present market value and yet provide rentals at about the same rates, while at the same time giving a modest return on the investment.

To accomplish this seemingly magical result, three factors must be counted upon: 1. The saving in space and outside wall exposure due to good planning of the dwellings, which in turn re-

Below, a typical Chicago block of two-family flats, 38 to the block; and beside it a proposed reconstructed block of 60 broad-front two-family flats, 72 garages with parking space and a 100-ft. park. Below at right are the typical floor plans for each scheme, showing how they lack, or profit by, the sunlight. All rooms in the broad-front plan are sunny either morning or afternoon





Exterior wall exposure

« ARCHITECTURE »

124 lin. ft. 54 lin. ft.

sults in maintenance savings for heat and upkeep; 2. The reduction of rental vacancies due to present obsolescent equipment and undesirable neighborhood conditions; and 3. The reduction of depreciation due to the gradual effects of the general blight of the locality. In order to effect the last two results in a permanent degree, which would justify the new investment at the small margins of return which must be assumed, such rehabilitation can be undertaken only on a largescale basis and through the introduction of certain positive factors for assuring the immediate and permanent better character of the neighborhood.* Here the city must be called upon for action. It has an interest at stake in that the present rapidly depreciating buildings now scarcely return enough taxes for the bare maintenance of the public facilities, and will soon fall far below present returns. The city streets and schools are fairly modern and entirely adequate for even a small increase in population, although some new assessable values must be discovered to provide for new arteries through these areas to the new districts beyond. There is in addition a scarcity of play areas in the district, while street accidents are a growing concern to city officials, and above all to the parents of young children.

THE CITY'S PART

The scheme must be large scale to be effective. The city then is asked to step in with powers (existing or possible under pending legislation in most States) to help assemble land. The

* FINANCIAL SETUP OF THEORETICAL FIVE-BLOCK REHABILITATION:

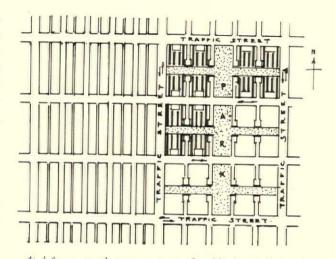
The present 40 two-family units are paying an average of 6 per cent net on \$6000 each, which is taken as their market value: 40 x \$6000 or \$240,000 becomes the land cost for the restored project. On the basis of an ownership pool a higher purchase cost is to be avoided. The present properties cost, of course, more than their present depreciated value, due to both building and neighborhood obsolescence. The new buildings, with their greater efficiency, will require less for maintenance, depreciation, and vacancies, which will permit a larger part of the rent to be applied to their increased capital costs. To this is added the reduced cost of fuel, an item of considerable importance, assumed now to amount to \$100 per family, making their present rent total \$520 per year with heat. Rentals in present block are:

Rental for each two-family building \$70 x 12	\$840
Vacancies 10 per cent	84
Y	\$756
Interest on \$6,000 value at 6 per cent\$360 Taxes at 2 per cent	
I dates at 2 per cent.	

Depreciation 2 per cent of original cost of building	120
Repairs and redecoration.	120
Collection and operating expenses 5 per cent.	36
1	\$756

« ARCHITECTURE »

31



At left, normal street system five blocks wide by three blocks long, with alleys; main traffic and frontage on N. and S. streets. At right, reconstructed system of same area; boundary N. and S. streets widened to carry through traffic; cross streets made one-way traffic streets; other streets dead-ended to reach local frontage and form safety parkways for pedestrians

project is to take place on the basis of five blocks in width at a time. Bordering streets are to be relieved of both sidewalks and local parking, which are provided internally and at block ends. The remaining four internal frontage streets are to be "dead-ended" so as to permit the hook-up of the cross park spaces to the central one of the five blocks. Thus a safety street system is to be provided (similar to Radburn) by merely removing one hundred feet of pavement and repaving with grass, the underground water and gas pipes are to remain undisturbed, and the city need not necessarily vacate the grassed

The capital values or costs for reconstructed block are: Value of present block, 40 buildings with land (80 fam-

**************************************	ilies) at \$6,000 each
ar at 6 per cent	Carrying charges for on
imilies) at \$5,000 300,000	Cost of 60 new buildings (12
ths at 6 per cent 9,000	Carrying charges for 6 r
al utility pipes, etc 27,000	Cost of landscape work, add
\$590,000	
entals for same are:	The maintenance costs a 6 per cent guaranteed to prese
where and mortgagees on	6 per cent guaranteed to prese

patojoco market value	₹14,400
5 per cent on 52 per cent first mortgage of \$300,000. Repairs and redecoration on 120 flats at \$42; \$18 less than	
much more wasteful present building	5,040
rieat furnished for 480 rooms at \$15	7.200
Depreciation 1½ per cent on \$309,000	3.245
Taxes 2 per cent on \$590,000-\$144,000 destroyed value	8 020
5 per cent collections and management.	2,740
Rental returns on 120 flats with heat at \$520	
Balance on construction equity of \$50,000. Less vacancies and bad debts, say 3 per cent of rentals.	\$ 5,875 1,875
	\$4,000

portion of the streets. The city is also to introduce an additional large amount of open park space throughout the project by the purchase, for park purposes, of the central one of the five blocks, or such other ones as may be more practicable, retaining schools and other public buildings within these blocks as far as practicable. Purchase of these parks is to be financed as a direct lien on the project in such a way as to permit the additional taxes on the remaining blocks, over and above the present taxes on the five blocks, to be applied to the interest and amortization of the park bonds. The city will be temporarily at least in a better tax position if it can maintain its present taxes instead of facing inevitable shrinkage if no action is taken. Eventually, if the presence of these open spaces is successful in maintaining the local values, the city will have retired its park bonds and will receive a surplus of taxes over those at present.

While there is a natural tendency of planners to envision the great possibilities of finer neighborhood design by scrapping the old street system and providing more ideal community patterns, there would seem to be some merit, especially where fairly modern public facilities exist, in seeing how far we may go in utilizing the present street pattern as a foundation for rehabilitation in blighted areas such as that suggested by the present studies. Certainly in this case the block sizes, as well as street orientation, are not altogether devoid of possibilities for a fairly satisfactory solution.

At this point I can anticipate the reaction of many of my readers. This is a beautiful theory, but "how is anything of this kind to be really brought about?" or "why not concentrate on a practical problem and try to first remove some of our really dangerous slums?" or "why try to start by destroying buildings which are admittedly still sound and in which people, after all, are not suffering from disease or neglect?" These questions can be satisfactorily answered if we see this great problem of city rehabilitation in the large. The solution is a practical one if we can convert present wastes in maintenance and repairs into payments on the capital costs of new modernized buildings; if it improves the conditions of vast numbers of families who suffer from the depressing character of drab surroundings and dismal quarters in a manner no less real than the hardships of those in the far less extensive slum dwellings; if it provides a really large and continuing program which will, if given a fair start, be self-stimulating rather than

self-stultifying as is the case where slum clearance attempts to pay returns on artificial land prices. It is believed that such a program will do these very things. The improved communities will be so definitely better than the old, without increasing rents in even a reasonable proportion to the increased comforts and conveniences, that people will quickly occupy the new facilities, releasing more areas in which old properties may again be purchased at low costs, without constituting an actual serious loss to owners. This will, in turn, make possible a repetition of the process until entire districts can be renovated into desirable neighborhoods.

SUMMARY

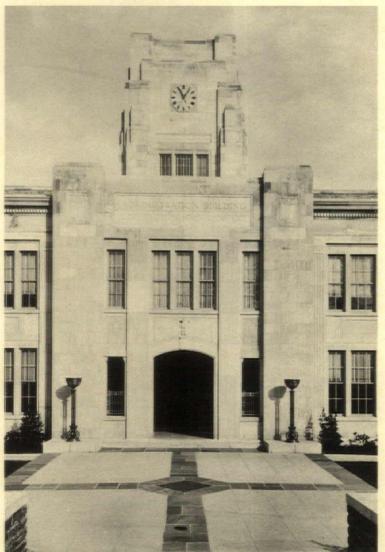
If, then, we review the situation with respect to house or dwelling types available for large areas in our cities, we find that these areas are already occupied mainly by the family of structures known as "flats"—small or medium-size multi-family dwellings providing for households ranging in number from two to six. Bad as they have all been in plan, they have survived like hardy perennials in competition with their popular rivals, the single-family house and the apartment.

There must be virtue in it somewhere to account for the survival. Might it be that this halting and ineffective job, done under a purely commercial instinct, contains the germs within it of a higher, more humane type that could be consciously evolved? Might the solution be almost under our feet—might the way to the future lie through the humble flat?

Clearly something on the order of the oldtime flat, or at least equal to it in meeting average needs under city conditions, must be found. Part Two of this work* is devoted to the problem of finding such a form, through the application of modernized technique. The result is the evolution of a somewhat new type of dwelling, which is a close relation of the flat, though partaking also of some of the qualities of the row house (and indeed of the apartment); by crossing these old worn-out strains it evolves a new dwelling that retains their good qualities but eliminates their defects. We might call it a hybrid, except that, unlike the plant breeder, we are able to cross our genera three at a timeflat, row house, apartment-and produce what he might call a tribrid !

* To appear in the August ARCHITECTURE.

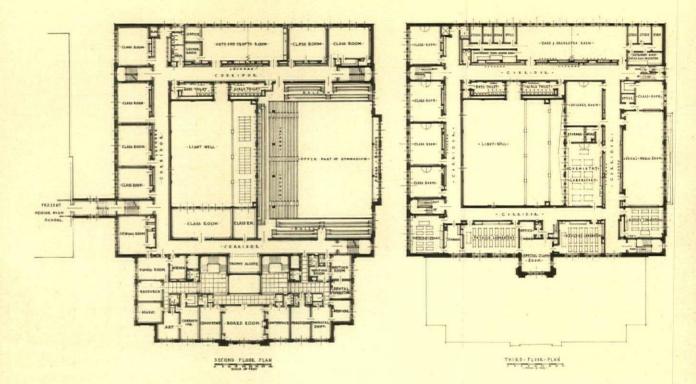




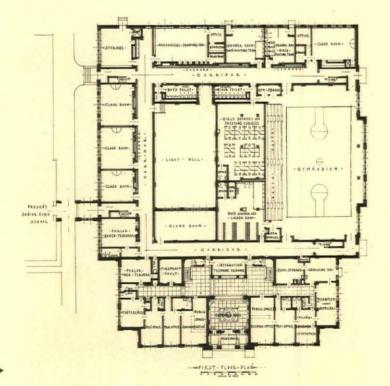
Administration Building, Lower Merion School District

ARDMORE, PA.

SAVERY & SCHEETZ, ARCHITECTS



The new building consists in reality of a three-story addition to the present Senior High School of the Lower Merion School District. The Administration Building is connected with the high school by a covered way. There are thirty-five classrooms in the addition, a gymnasium in which can be seated fifteen hundred spectators, and the administration section. The latter occupies the two-story front portion, and here the business management and other direction of the entire district, containing five thousand pupils and two hundred fifty teachers, are conducted







The outside walls of the building are faced with a split-face granite in a warm color, and variegated Indiana limestone having a plucked planer finish

Photograph by Albert S. Burns



Photographs by H. Parker Rolfe

Above, the lobby in the Administration Section, showing the bureau of information and telephone exchange. Below, a class in the chemical laboratory on the third floor. The diversity of modern school needs is well indicated by the floor plans of this classroom section



Some Pitfalls in Supervision

I heat by proper insubent upon the architect's superintendent to give this matter

his close attention. Whether intended for steam or hot-water pipes, the material must first be checked to see that it complies with the provisions of the specifications. The substitution of a thinner, inferior article is not uncommon in pipe covering. The thickness of the material is important, as well as whether one or two layers are to be applied. If two-layer work is called for, the superintendent must see that the joints are staggered, and that they are filled and finished smooth. This will require sharp watching, as it is easier not to stagger or break joints, and takes less time to do. If the superintendent will use contrasting colors on his plans to designate which lines are to get single and which double covering, he and his assistants may more readily inform themselves of the requirements at a glance. Besides the covering for hot-water or steam pipes, there may be covering specified for lines (such as leader lines) which might sweat. While this covering may differ from that on heating pipes, it is necessary to see that it is well applied.

The wires, or bands, which hold the insulation in position must be as called for, and as frequent as specified. Lines going through walls or floors should be covered as well as those in the open. The pipe coverers too often butt their work against the wall and call it a day. Then, too, lines in exposed portions of the building are "forgotten" until it is too late to cover them. All elbows and other fittings will probably be covered with a plastic material, which in turn should be covered with canvas to hold the material in place. If molded pieces are used to insulate the fittings they should be well wired to hold them on.

The wrapping of the single layers of pipe insulation may be that which originally comes on the material, or the architect may have specified a canvas cover to be sewed on. Other special coverings may be specified. In any case it is the superintendent's duty to see that these are where called for.

The covering of hot-water tanks, boilers, etc., is a job that needs to be well done if any

By W. F. Bartels

XXXIII. INSULATION AND ACOUSTICS degree of comfort is to be had by those working nearby. For the owner it means a considerable fuel saving. Thickness, re-enforcement, and finish will be the salient points to check in

this work, and no one of these can be overlooked with safety.

Insulating a house to prevent loss of heat is getting to be almost as commonly accepted as good economy as it is to insulate boiler or steam pipes. The brand, weight, and thickness of the materials used for this purpose will naturally be overseen. It is important to inspect the installation of this work. Particularly is this true when it is being installed around doors and at window openings. No skimping should be allowed, and all ends should be tightly fitted and well fastened. It should be borne in mind that the better the job of insulating that is done the less the coal bill will amount to.

SOUNDPROOFING

The importance of soundproofing and acoustical work cannot be overestimated. Formerly it was thought of as a subject only to be taken into consideration by architects designing auditoriums and churches. At present it should be given consideration by the designer of the most modest dwelling.

Plasters of various kinds have been set forth as the very acme of acoustic perfection. Their application, as per specifications and manufacturers' directions, is the superintendent's chief concern. Some of these plasters are not as easily put on as those the mechanic has been used to working with. And while this difficulty of application may seem a trivial item to the specification writer, it necessitates much work for the superintendent. It is not as easy as it may seem for the superintendent to check the number of coats applied. The plasterer, wishing to make an extra profit, often "forgets" one coat, and, as both coats are of the same material, the lack of one coat is not readily detected. The superintendent's only assurance, in the event of his not actually having witnessed the skimping, is to cut into the work to find out whether the proper thickness has been put on.

A certain acoustic plaster was being used on a building. One-half inch was to be its thickness. The mechanics had trouble putting this much on at once. The material was "short." The manufacturer's agent, unknown to the superintendent, told the plasterers to make the coat less than one-half inch. Caught at this, the plasterers agreed to put on two coats of one-fourth inch each. The coats would not stick because of the "shortness" of the material. Hard plaster was added. It would be difficult to say which was the worse acoustically—a thin coat of the real material or a thick coat with hard plaster in it.

Many other materials besides plaster have appeared on the market, offering acceptable acoustic properties. These may vary from a structural block acting as a party wall, to a frankly ornamental hanging. The superintendent who has lived in a noisy apartment house will be in sympathy with the architect's desire to soundproof each apartment, and will do his part to see that the work is well carried out. Probably the first thing in an apartment that the architect should think of as needing soundproofing is the wall surrounding the elevator shaft. In the private house provisions may be made to soundproof certain rooms, such as playrooms and baths.

The application of sound-deadening material (other than plaster) will, like the many other trades, need to be carefully supervised. Any special precautions must be carefully observed. It must always be kept in mind that material of this sort is a factory product and hence probably more true to dimensions than the average wall to which it may be applied. Consequently the means of attaching it must be carefully supervised. If it is attached by means of an adhesive, it may well pay the superintendent to investigate the longevity of this binding agent. Perhaps a special preparation of the surface, such as shellacking or varnishing, is necessary, before the material is applied. This is particularly true where a masticlike adhesive is to be used on a dry or spongy surface; the latter might easily absorb any of the adhesive qualities which the substance might possess.

Some acoustic treatments are of the hung or suspended ceiling type. In this work it is the superintendent's duty to see that the proper supports are provided, and that the framework or fastening to carry the ceiling is substantially erected. No waves or bumps should be allowed to occur in the finished work. Particular attention must be paid to all openings for lights or other fixtures, to see that they will be covered by their escutcheons. Too often in this work there is a tendency to cut holes in the soundproofing and hope that it is at the exact position where the ceiling or wall outlet is to come through. Any piece of material with a hole in it that is not covered by escutcheons should be ordered removed.

The painting of any acoustical work must be carefully supervised, and done only in accordance with the manufacturer's directions. Any filling of the small holes in the material would noticeably lessen, if not entirely eliminate, the sound-absorbing qualities. Therefore no paint work must be allowed until both the painting material and the manner of its application are approved.

ELEVATORS

HILE the building is under construction the superintendent will have to be particularly careful to see that the elevator shaft is as nearly plumb as possible. The steel contractor is usually given a certain leeway beyond which he must not deviate in the plumbing of his steel. For the steel contractor to erect his work deflecting from the vertical makes it difficult for the elevator contractor to keep his rails plumb. The feeling of going around a curve sometimes experienced in an elevator is very often due to the improper plumbing of the rails.

Proper securing of the guides is an important part of elevator construction. The plates holding the rails are fastened to the steel skeleton by means of bolts which go through holes drilled in the iron beams. Often the workmen, under orders from their own superintendent to speed up, will use a torch to burn a hole in the beams to which the plates are to be fastened. This produces a jagged hole and one which in most cases is too large. The workmen will maintain that they will "drift-pin the hole" (*i.e.*, drive a drift pin into the hole to make it round). More often than not this is omitted, creating a possibility that the rail will work loose. A more acceptable way is to burn a hole and then drill it out—but the drilling must not be forgotten.

(To be continued)

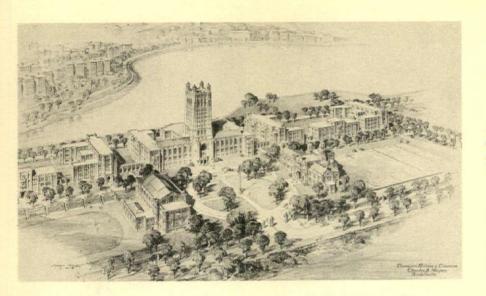


An Achievement in Model Making

The John H. Hutaff studios recently exhibited a one-inch scale model of several rooms with an adjacent garden, representing an American country home. The paintings, panels, and garden background are by A. Vimnera. The furniture and accessories were modelled with meticulous care upon original pieces in the Hutaff studios



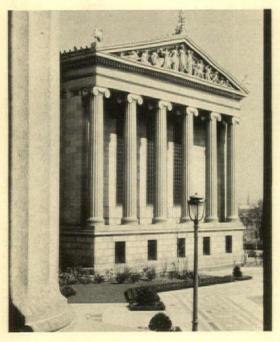
Photographs by Robert E. Coate

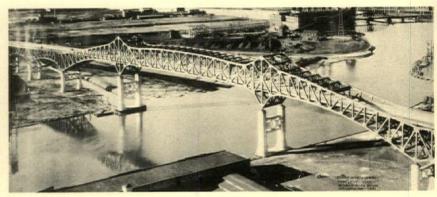


Architectural News

A bird's-eye view of Hunter College of the City of New York, the central unit with the tower still to be built. Thompson, Holmes & Converse; Charles B. Meyers, architects

First-prize winner in the A. I. S. C. 1932 award for the most beautiful bridge of steel costing over one million dollars—High Level Viaduct over the Jersey meadows. Jacob L. Bauer, State Highway Engineer





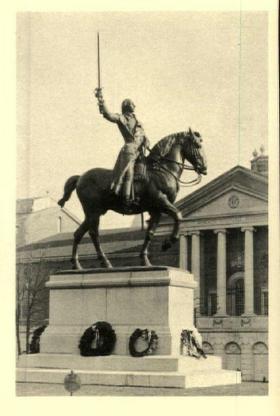
North wing, Pennsylvania Museum of Art, with the new polychrome terra-cotta tympanum. Horace Trumbauer, C. C. Zantzinger, and C. L. Borie, Jr., architects; C. P. Jennewein, sculptor; Leon V. Solon, colorist

Below, statue to Lafayette unveiled last Armistice Day in Hartford, Conn. It is the gift of Mrs. W. M. Storrs, and is a replica of Paul Wayland Bartlett's bronze in the Louvre



≪ ARCHITECTURE ≫
4°

The Cincinnati Union Terminal as seen from the main approach. Alfred Fellheimer, Steward Wagner, architects and engineers. See waiting-room on facing page



in Photographs

Vocational Institute for New York State at Coxsackie, N. Y., a contract covering most of which has just been awarded. Thomas & Baker; Thompson, Holmes & Converse, Inc., associated architects

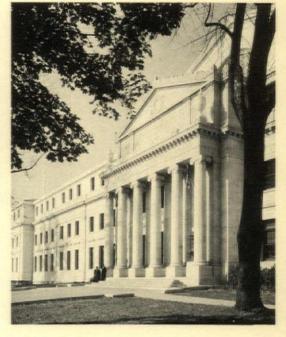
French King Bridge over the Connecticut River received the A. I. S. C. award for bridges of medium cost. A. W. Dean and G. E. Harkness, engineers





Below, "The Spirit of Nursing," by R. Tait McKenzie, R. C. A. central figure for the memorial to Jane A. Delano and 296 nurses who died in the World War, in the Garden Court of American Red Cross Building, Washington, D. C. Delaware County's new \$4,000,000 court house at Media, Pa. The photograph shows the central portion of the south front. Clarence Wilson Brazer, architect

© 1931, Clarence W. Brazer





The interior of the Cincinnati Union Terminal with its waiting accommodations near the train gates. Alfred Fellheimer, Steward Wagner, architects and engineers

41

Thursday, April 27.-Lunched with Harold Rambusch, and when Leon Solon joined us there naturally developed a vigorous argument on color. As a result of many years of experience in the use of color, Rambusch, with apologies for such an arbitrary dictum, said that he was convinced that the smaller the pallette, the better chance of success in a color scheme. When the artist uses two colors-and possibly gold -the chances for a successful result are good. If he adds one more color, the chances are less; if he adds two more colors, the chances are that the scheme will be a failure. Rambusch said that this general statement, like all others, is subject to exceptions, but in the main, it is a fairly reliable guide.

Friday, April 28.—Myron Bement Smith tells me that he has given up his work as General Secretary of the American Institute for Persian Art and Archæology to accept a research fellowship under the American Council of Learned Societies. He will spend the next year in an investigation of the pre-Islamic and early Islamic architecture of Persia, with special reference to brickwork.

Saturday, April 29.—I see that John Ihlder, executive director of the Pittsburgh Housing Association, is one of a group of officials from American cities who will visit Germany and Austria this summer in a brief study of German municipal government—which worthy purpose would seem possibly to be a bit of a task at the moment. Government in Germany seems unable to stay put for long enough to permit of study. Incidentally, I hear that Bruno Taut, Walter Gropius, Peter Behrens, Josef Hoffmann, Erich Mendelsohn and others among Germany's leaders in art, have felt obliged to flee the country.

Monday, May 1.—James M. Fitch, Jr., joins the ranks of those who are concerning themselves with what the architects will design, if given the opportunity, next month or next year. He says: "Isn't there some way in which archi-

"Isn't there some way in which architecture can be made a more exact science, so that it will not repeat the monstrous blunders of the past few years? In Birmingham I am always depressed by one downtown corner, on all four points of which stand buildings over twenty stories in height, yet down any one of those four streets you can see the open country near at hand. If architecture is to have any future at all, I think it must closely approximate the course of all other branches of science, and plan to learn by experience. It must look at the crippled city of today, and try to diagnose its many ills, and then show some initiative in trying to cure them. It must try to reconcile the permanent



The Editor's Diary

structure to the shifting land, for it seems to me that this is the crux of the matter. This is much more evident in a city the size of Nashville, my own city, than, say, in Cleveland, for here we have the genial Southern habit of ignoring facts out of existence-the main fact being that around the city's heart there is a ring of dead wood that must cover fully 30 per cent of the city's incorporated area. Is anything done about this? Not on your life! A viaduct is built over it, and the rich people move out to the country, blandly ignoring the enormous waste of money, materials, and labor that these areas represent. I don't say that the architects are responsible for this condition, but they do not pay it enough attention. As far as I can tell, we have reached in America our second stage-assimilation of our conquest. Rather than pushing our city limits out



Julian Clarence Levi, who for his work as president of The Architectural League in trying times, and for his unselfish efforts in the work of emergency relief, has been presented with the President's Medal of The League

farther each year, we should resolve to do something about what is already incorporated. Here is the opportunity for the architect to take the long view, and, incidentally, benefit himself eventually."

Tuesday, May 2 .- Ely Jacques Kahn tells me that the Carnegie Corporation has given him a roving commission to investigate the matter of art education. Do we buy our designs for the crafts abroad, or do we use our own? Where do these people learn how to design wall papers, or fabrics, or furniture, and how ? Are they being taught in the best way? Kahn is looking around this country first, and then is going abroad. Incidentally, he tells me also that all of the advanced teachers of art have left Germany, all schools conducted under modern methods being closed by edict. Ger-many is apparently trying to turn back the history of art to old Nuremburg, and fix it at that point for present use.

Wednesday, May 3.-Professor R. Norris Shreve, of Purdue University, has reported to the American Chemical Society the details of his development of a synthetic building stone made out of limestone quarry wastes. In the Purdue laboratories the stone was perfected by causing a chemical reaction between pulverized shale and an alkaline earth base, the action taking place under pressure in polished steel forms. The new synthetic stone may have its original color or be varied through integral materials. The chemical reaction between the aluminosilicic acid and the alkaline earth base is completed by two hours of cooking under steam in an indurator. The whole process of grinding, mixing, pressing, steaming, and finishing takes barely a day.

Thursday, May 4.—Kenneth Murchison, William F. Lamb, and I, as the architectural members of a jury which included also Messrs. Moisseiff and Byrne, engineers, dined together at The American Institute of Steel Construction offices with Mr. Frankland, and judged the final stage of the students' competition for a bridge design.

Afterwards we went to The League to witness the installation of Arthur Loomis Harmon and a row of distinguished vice-presidents, delegates, secretary, and treasurer, to launch The League on a new year of activity. Julian Levi, retiring president, turned over the gavel to the new president in the presence of a company of ladies and gentlemen, many of the latter being past officers in the organization. Ralph Walker was unwilling to allow the transfer of authority without expressing the tremendous gratitude to and admiration for Julian Levi, who has carried a staggering burden in the management of the club's affairs, and, on the other shoulder, the work of the Architects' Emergency

JULY, 1933

Relief. President Harmon introduced Hobart Upjohn, who, in the gallery containing an exhibit of the work of the three Upjohns covering a hundred years of practice, told us particularly interesting and many amusing incidents of early architectural practice in America.

Friday, May 5.—I see that sculpture is looking up. A. A. Weinman has just been given a government commission for Delano & Aldrich's Post Office Department Building in Washington, amounting to \$260,000 worth of sculpture. James E. Fraser is to do the work on York & Sawyer's Department of Commerce Building, the contract amounting to \$136,000.

Saturday, May 6.—I was rather surprised to learn that more than one half of the new homes built in 1932 were financed by Building and Loan Association mortgages. The United States Building and Loan League reports that only 10 per cent of its funds for lending went into mortgages on newly built homes. The remainder was for refinancing of home mortgages held by other institutions, some for remodelling loans, and others for purchase of existing homes. The average mortgage loan for a newly built home in 1932 was \$2,685. This compares with \$3,500 to \$3,600 for the period 1928–1930.

Monday, May 8 .- In all this talk about slum clearance and housing, there is one point which, it seems to me, has not been sufficiently stressed. It is easily argued that the State's responsibility for a decent housing of its citizens is no less marked than the responsibility which it already accepts for medical care in the schools, hospitalization, alms houses, old-age pensions, etc. Nevertheless, in any proposed subsidy for lowcost housing, there is no justice in granting such subsidies merely for the sake of paying fictitious land values. Such ac-tion means subsidy of the land owners, rather than subsidy of the housing. Until we reach some sort of an agreement as to the proper way in which to value land used for public purposes, there is always this stumbling-block in the way.

Wednesday, May 10.—Diego Rivera has been dismissed from the job of completing the Rockefeller Center frescoes, which, in view of the artist's predilection for painting propaganda, is not surprising. The specific objection of the Rockefeller managers was directed at the inclusion of a picture of Lenin in the composition. Probably we shall hear a lot more of this in the press or in the courts before it is finally determined just how much right a painter possesses in the matter of expressing his own views and convictions rather than those permitted to him by the building owner. Thursday, May 11.—Lunching with Norman T. Newton and David Coyle, a discussion of art as induced by the Rivera-Rockefeller Center episode brought out a new system of classification. Some of the modern painters and their following seem to feel the necessity of powerful punch and startling color. This school we might call the "Boo!" school. On the other hand, the quiet, peaceful representation of classic figures, or dreamlike subjects, might easily be dubbed by the modernists the "Blah!" school. So there we have the two distinct schools: the "Boo!" school and the "Blah!" school.

Friday, May 12.—Drove over into Pennsylvania, stopping off at Trappe, Pa., to see the Augustus Lutheran Church which was built in 1743. This, the cradle of Lutheranism in America, is a curious expression of German rural architecture—a simple rectangular plan



with a gambrel roof and a porch at the middle of a side and at the middle of one end. The shell is of brick, the interior woodwork all very primitive, of handhewn oak, with a steeply inclined gallery at one end and along one side, and a raised octagonal imported pulpit of walnut. There is no provision for heating the building; the stone-paved floor was covered in winter with straw, and unless the worshiper brought his own hot brick he kept himself warm by faith. Unfortunately, along about 1814 the hewn oak posts were painted to imitate marble, and this desecration has never been removed.

Saturday, May 13.—The Diary had quite a lot to say on Friday, March 10 (May issue), about the house of F. Knight Sturgis, in New York City, which closely resembles one which Robert Adam built in St. James's Square, London. Apparently the way to be set straight in this world is to make a public statement, and then await corrections. In this case it transpires that Stanford White had nothing whatsoever to do with the Sturgis house, which, it appears, was designed by Ogden Codman.

Monday, May 15.—Professor H. Vandevoort Walsh, professor of architecture at Columbia, says that America is not likely to have mass production of houses because the market is too restricted to make such procedure profitable. He points out that the long record of what he calls a wild-goose chase in quest of the standardized house produced on a large scale has continued for many years, enlisting the efforts of many inventors, even Thomas Edison, and that to date the results are not encouraging.

Wednesday, May 17.-Spent a few hours with Robert L. Davison who, under the Pierce Foundation, is trying to simplify, improve, and standardize the various parts of a house so as to bring a product that is twice as good for half the cost. In direct contradiction to Professor Walsh's theories, Davison is convinced that we are well along on the road to a successful product. In his researches he has been particularly fortunate in being tied to no industry and no product, so that he is free to choose from the world's supply that which is best for any particular purpose. The bedroom and kitchen-the two most complex unitsare in a finished stage of development. almost ready for marketing. The matters of exterior walls, partitions, floors, and roofs are still proving difficult problems. Incidentally, Davison tells me that the hardest part of his job has been to persuade men in the industries that a particular unit can be made, even though departing radically from the established forms. The icy grip of habit and tradition rests heavily upon most of our manufacturing processes.

Friday, May 10 .- Talked with Henry Wright regarding the publication of his findings concerning the housing problem -the work of many years. Now that we are apparently ready to embark upon a really adequate programme of public works-a measure which would have been effective on a much smaller scale if we had not waited so long-the question is whether the architects of this country know what they should build. It would be a tragedy if the old forces of speculative building were again unleashed to spawn unneeded and unstudied buildings on this country. It would be a tragedy if, with the means and energy of a nation behind us, the architectural profession should prove incapable of supplying the leadership and technical skill needed to achieve results worth while.

Saturday, May 20.—John K. Wright, a Providence architect, finding himself unsought at the moment by clients, nominated himself as a client, designing a year-round cottage to fit his own needs. Unlike most architects, however, he was not content with designing the house, but went ahead and built most of it with his own hands—which is one way of meeting the depression.

Monday, May 22.—Lunched with M. D. C. Crawford, who knows more about

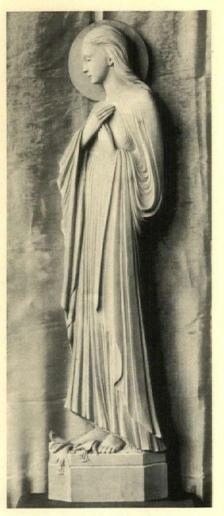
textiles, ancient and modern, than most men-a subject, however, upon which we scarcely touched. The matter worrying us at the moment was the probability that, with the tremendous acceleration of machine design in this age, there is a grave danger that we, as a people, may lose the fundamental basis that has enabled us to create these tools-and inevitably fall back. The point is this: each bit of machinery that we have devised sprang originally from hand processes. It was only by developing an ex-tremely high degree of manual skill that we were able to invent machinery to do the thing better than the hand could do it. Having once left that basis, and with generations coming along that will have no such dependence upon these fundamental bases, is it possible that we can continue to go forward as rapidly, or even at all? Professor Whitehead, of Harvard, recently astonished the stu-dent body, and the faculty as well probably, by saying that the next advance in the development of mankind must be a further education of his hands rather than of his mind.

Tuesday, May 23.-The Grand Cen-tral Art Galleries this afternoon turned out to be a regular "old home week" for scores who wanted to see Dean Cornwell's cartoons, color studies, and detail sketches for his Los Angeles Library murals. Orson Lowell, Jack Sheridan, Herb Roth, W. T. Benda, Lowell Thomas, and Frederic Hirons were enthusiastically congratulating Cornwell upon his draftsmanship, composition, and meticulous study of detail. When one sees these hundreds of detail studies -studies down to the matter of a few knuckles on a clenched hand, or the drapery of a cope, one no longer marvels at the fact that Cornwell took five years to do the job, painting every inch of the murals himself. Part of the time, with a broken leg he was hoisted before the walls in a boatswain's chair. The masterly quality of the line in these murals can but faintly be sensed in the photographic reproductions in the last issue.

Wednesday, May 24.—Lunched with H. T. Lindeberg and Royal Cortissoz, discussing many things, and among them the relief and pleasure with which one meets the two little low buildings fronting Rockefeller Center—a pleasure that is made up of many things unquestionably, but largely of their low height, the clean simplicity of their lines, and the open space about them. Incidentally Paul Jennewein's doors for the British Building, gold figures on dark blue, make a stunning focal point.

Thursday, May 25.—There has been an unusual exhibition in the main gallery of The Architectural League, a collection of material for use in small churches. There are altars, crosses,

ARCHITECTURE



A wood carving by Adam Dabrowski one of many interesting examples of art and craftsmanship in the Liturgical Arts Society's exhibition

tabernacles, pews, altar rails, fonts, riddle posts, dossals, carvings, and paintings. The exhibition, which was held under the direction of the Liturgical Arts Society, is intended to show that cost is not necessarily an accompaniment of art. Practically all of the items shown are simple and relatively inexpensive. The exhibition should be productive of much good in raising the standards of liturgical art.



One of some three hundred studies made by Dean Cornwell in the creation of his murals for the Los Angeles Library

JULY, 1933

Saturday, May 27.—Residential building is well on the mend, according to the reports for the first half of May, as compiled by the F. W. Dodge Corporation. In the thirty-seven States east of the Rocky Mountains, the total for residential building increased 36 per cent over the first half of April. This is a reversal of the normal April-May decline of 10 per cent. If the rate continues through the rest of the month of May, it seems likely the total will exceed May, 1932, and it would be the first time since the spring of 1931 that residential building has risen above the corresponding period of the previous year.

According to the Bureau of Labor Statistics, United States Department of Labor reports from 778 cities having a population of ten thousand or over, the increase of building construction in April this year over March was 21.2 per cent. This increase was greater than that shown in comparing these two months in any of the previous three years.

Monday, May 29.—Hewitt & Brown, architects of Minneapolis, have compiled a very interesting summary of business conditions, further accented with a chart. The conclusions to which their inquiries point are that in previous recoveries from building depressions, the owner invariably loses considerable money by not being foresighted enough to take advantage of the upturn. Buildings erected on the heels of a depression fail to secure the advantage of depression prices for two reasons: first, decisions to build do not crystallize until the rising market is under way; second, the most important money-saving period, after the upward trend is recognized, is consumed with investigations, studies, and preparation of plans and specifications. In a word, the lesson is, the time of depression is the time for making building plans.

Wednesday, May 31.- I see that further details of the well-concealed efforts of Robert L. Davison in the Pierce Foundation investigations looking to-ward bettering our less expensive methods of building, are coming to light. According to the *Journal of the American* Chemical Society, vinyl resin is being studied very hopefully as a wall material, incorporated with a stiff backing of insulation. This vinyl resin, which is not unlike bakelite and similar sub-stances, is used as a fairly thin coating on its supporting slab for standard wall panels, doors, ceilings, and floors. It is possible to finish the material in glossy or a sort of dull honed surface, and in any color. It has a high abrasive index, is inflammable, and is unaffected by most of the chemical or mechanical agencies which tend to damage building interiors. We shall probably hear more of this material in the building industry.

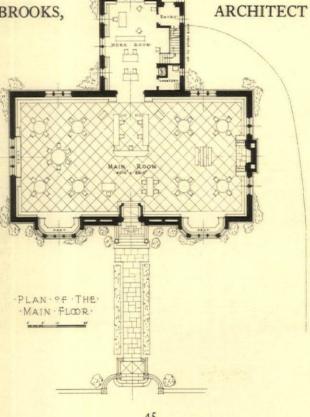


A Children's Library

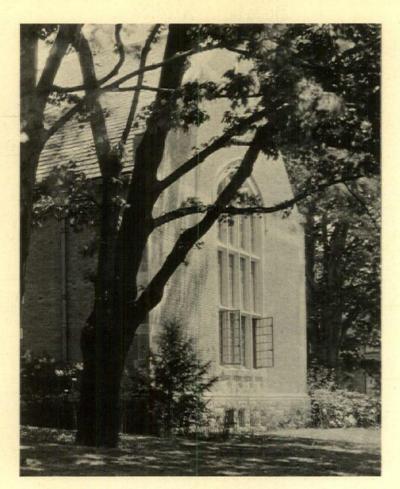
THE MARY RICHARDSON HAWLEY MEMORIAL LIBRARY, NEW BRITAIN, CONN.

W. F. BROOKS,

This building was pre-sented to the Public Li-brary of the City of New Britain for the exclusive use of children. It is adjacent to the main li-brary, and faces the same street, differing in style of architecture from the main building in order to give it in-



dividuality as a me-morial, although a certain unity is preserved by a color scheme simby a color scheme sim-ilar to that of the larger building. The Hawley Memorial Library was completed in November, 1931, at a cost of \$87,-000, exclusive of furnishings



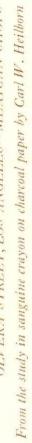
The exterior is of rough-texture, buff brick with limestone trim and slate roof, the cupola and rain conductors being of lead. The windows are of steel with leaded glass, the latter clear in the lower windows, and obscured above by using rough tinted glass in ambers, greens, and purples graded from light to the deeper tones at the top

One-half the main room is devoted to the younger children, the other half to the older ones, and furniture has been provided suitable to each group

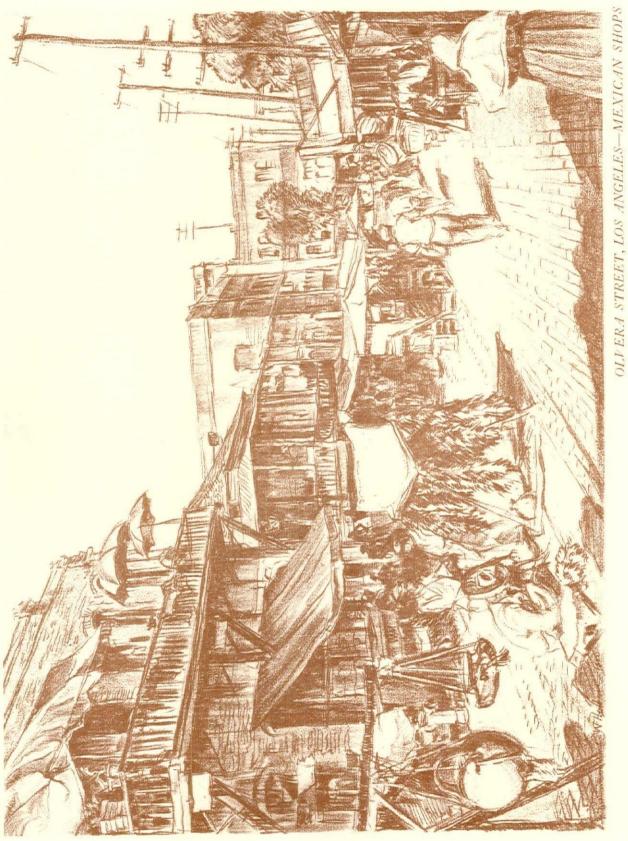








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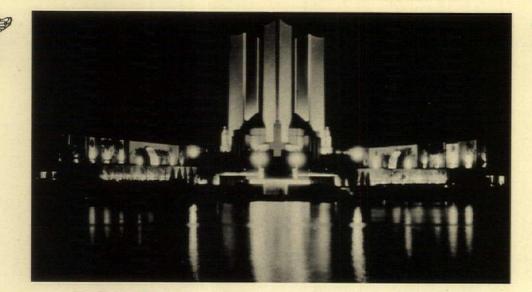


ARCHITECTURE

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The Federal Building and Hall of States from across the lagoon at night. Edward H. Bennett and Arthur Brown, Jr., architects

The Century of Progress Exposition By Henry H. Saylor

C a definite theme—a century of prog-TER ress. One hundred years ago Chicago consisted of a huddle of log huts crouching in the shadow of Fort Dearborn for protection from the Indians. Chicago's birth and growth as a community, coupled with the dawn and unprecedented development of an era of discovery, invention, and increasing comfort and convenience for mankind, form a theme of dramatic and absorbing interest. That theme is well sustained throughout the vast aggregation of exhibits. Surely never before has there been such a magnificent demonstration of our march up the steps of civilization. One could easily spend a month-two months-roving among the visualizations of this progress, and find something interesting and instructive at every turn. In this respect the Century of Progress International Exposition is an unqualified success.

It was back in 1923 that the idea of an anniversary exposition was first seriously considered. It slumbered and was almost forgotten, but reasserted itself late in 1927, and was formally adopted. A corporation, not for profit, was organized. If any surplus funds remain after the Fair is over and paid for, the money goes to the Art Institute, the Rosenwald Fund, and similar institutions serving the public welfare.

Furthermore, unlike other world's fairs, this one sought no subsidy from city, county, State, or Federal Government, and received none. The Chicago World's Fair of 1893 received about \$7,500,000 in public subsidies; Saint Louis' Louisiana Purchase Exposition, \$10,000,000 and a government loan of \$4,600,000; the San Francisco Fair of 1915 received about \$10,000,000 from city, counties, and State.

In the present instance a group of citizens underwrote a bond issue of \$10,000,000, secured by the deposit of forty per cent of the gate receipts. In the years of depression that followed the issue these notes have been through much changing of hands, and have been used for payment of services and materials, but have not sold for less than par. It is to Chicago's everlasting credit that through all the gloom and precarious uncertainty of recent years her determination to build this Fair and to build it in accordance with, or better than, the original specifications, never wavered. And today, with the attendance running ahead of the estimates, with every hotel full, with the tourist business exceeding all expectations, Chicago is finding that the Fair, instead of being a local burden, is putting the city right out in the forefront of the nation's march back to prosperity.

It is now several years since the Exposition authorities delegated the architectural problem to a commission: Harvey W. Corbett, Edward H. Bennett, Hubert Burnham, John A. Holabird, Arthur Brown, Paul P. Cret, Raymond Hood, and Ralph T. Walker. To this original group were later added: Ely Jacques Kahn, the late Ferruccio Vitale, Lee Lawrie, and Joseph Urban.

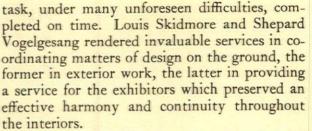
Throughout the long succession of special problem after special problem, Clarence W. Farrier, assistant director of operations, has held a strategic position on the firing line and has acted as a sort of liaison officer between the architects and the builders. To his initiative and ingenuity is due great credit for the achievement of a huge



The "breathing dome" of the Travel and Transport Group; the dome is hung from steel posts guyed with steel cables. Edward H. Bennett, Hubert Burnham, John A. Holabird, architects

> At right, the tower and court of the Hall of Science. It is here that the Fair is lighted nightly by an impulse from the star Arcturus. Paul P. Cret, architect

Below at left, a bit of one of the popular concessions, The Streets of Paris. Below at right, the north front of Paul P. Cret's Hall of Science



It is a matter of interest, in passing, that the buildings were erected at a cost of from ten to sixteen cents a cubic foot.

The Century of Progress enjoyed an unusual advantage in its site. An enabling Act of the Illinois legislature permitted the exposition to be built on two hundred twenty-four acres of made park land lying along Lake Michigan. This land, pumped up in recent years out of the lake bottom, is under the jurisdiction of the South Park Commission and not under the city of Chicago. Thus the buildings were unhampered by existing codes, necessarily unfitted to the needs of temporary structures. The problem of building for a safe and active summer life of one hundred fifty days was quite different from that of building for a life of, say, thirty years under both winter and summer conditions.



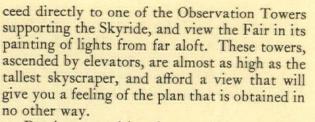
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The site, however, also brought its peculiar obligations. The land was to be returned to the Park Commission six months after the Fair closed, unencumbered by buildings. Thus new problems were substituted for old. Ease of dismantling, salvage values and such factors came into the picture. Salvage was at first considered a matter of prime importance, but it has faded into a minor rôle. It soon became evident that the dumping on the market of steel shapes, electric conduit, wall board, in huge quantities would not be a desirable thing, particularly at a time when industry sees some promise of coming once again into normal production. So, most of the materials used have been made for a short lifenot the stock materials of the various building industries, but specially designed types that will serve this particular purpose only. The floor of Lake Michigan, therefore, will in all probability welcome next winter a great deal of what is now the Century of Progress International Exposition.

Every one who has visited the Fair will probably tell you, upon request, the best way of seeing it—and the ways will be widely various indeed. My own recipe is to go first at night, pro-



Previous expositions have made much of the "grand plan"—particularly Chicago in 1893. In forsaking the classic building, the architects have here largely forsaken the grand plan as well. One might tramp over the Fair grounds for a week and fail to gain that subconscious sense of where one is and where he is going—that feeling that the grand plan, if well done, instills very quickly.

I freely confess to a total lack of mental plan picture after two days of wandering about in a conscious effort to gain just that thing—but I had not followed the recipe given above. It is somewhat disconcerting, one must admit, in attempting a main-axis tour of the three and a half miles length, to find oneself, without conscious deviation from the straight path, on the second floor of a tire company's exhibit, and facing the necessity of encircling that whole floor



The General Motors Building, in the centre of which is a full working assembly line for the Chevrolet car. Albert Kahn, architect

At left, looking along the interior façade of the Hall of States which frames the Federal Building. Edward H. Bennett and Arthur Brown, Jr., architects

> Below, the Avenue of Flags, from in front of the Administration Building, looking toward the Hall of Science. Below at right, a corner inside the Belgian Village—a colorful reproduction in plaster







« ARCHITECTURE » 65 before getting back to the main axis a storyheight below. The fact is that major and minor axes are not strongly in evidence here excepting in respect to individual buildings, upon occasion. It is evident that this avoidance of axial treatment in the design of the whole was no mere oversight on the part of the architects. Probably they came to the conclusion that a definite break with the past in the forms utilized for buildings called for a break as well with axial planning. It seems to me, parenthetically, that such a conclusion is still worth debating: the case is not proven.

There was considerable fanfare, in the early stages of designing the Century of Progress Exposition, as to the desirability of permitting form to follow function. It was pointed out and the argument carries conviction—that it would be rather absurd to build an enclosure for a historical picture of the development of radio, television, air-conditioning, gas-tube lighting, and the like, and to model that enclosure upon a Greek temple or a Roman bath. The exhibition buildings were to enclose space for the particular purpose of exhibiting the recent progress of science. This progress must necessarily be described in words that would mean little or noth-



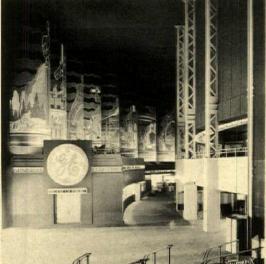
ing to the Greek priest or to the Roman dilettante; it would surely be logical to utilize our most recently acquired knowledge and skill in construction methods to shelter these records of modern progress. We can control artificial light more easily than daylight, therefore there would be no windows. The buildings must offer no fire risk, must be prefabricated as far as possible to save labor costs, must be weatherproof, particularly against heat. Skeleton steel construction, covered outside with a wall board of asbestos and cement, or sheet steel; covered inside with a similar wall board; and insulated by the wet gun process—all these conclusions justify themselves.

Judging from the final results the function theory was not, in the raw, satisfactory to the designers. Having enclosed the requisite amount of space with walls and roofs, the result lacked something; it lacked a lot-the power to please the eye. Strictly functional form, therefore, seems to have been sunk at this point, without trace. The designers apparently set out to evolve form for form's sake. A dome is hung from "sky-hooks"-where, through a change of exhibits, no dome was required; enormous pylons are raised up to mark a little-used boat landing; great ribs project far above a trussed roof, yet the supporting trusses are inside; enormous verticals mark a concave semi-circular front and buttress radial ribs that need no buttressing; three enormous towers support a dome at knee-height and then enclose vast quantities of unused and unneeded space above.

In "The Garden of Comfort," designed for the American Radiator-Standard Sanitary exhibit by Hood & Fouilhoux, Vitale & Geiffert

Below at left, a view on the main thoroughfare, looking toward the north entrance, with the Shedd Aquarium beyond, outside the grounds Below, inside the semicircular portion of the Electrical Building, with an effective mural decoration by C. B. Falls. Hood & Fouilhoux, architects





« ARCHITECTURE »

All of these devices catch and hold the eye; each carries a punch. It is as if a building were saying: "Behold, miserable wretch, what magnificent form I have! Tremble and be properly humble before me as I puff out my cheeks!"

Well, what is the alternative? A return to the World's Columbian Exposition of 1893? A double row of huge packing-boxes in which exhibits are housed? Surely, neither of these. But there are other possibilities. This exposition, like all of its predecessors, accepted the basic idea of individualism in exhibits, in buildingsthe heterogeneous grouping, in vast spaces, of loosely classified divisions. It would be interesting to see what could be made of an exposition which unified the whole business, concentrating it in one huge structure-or in a closely related group form. If a building devoted to agriculture, or to social science, or to homemaking, cannot in itself be impressive without taking on extraneous and functionless forms, perhaps a closer combination of these subjects would result in the need for a single structure of such size and variety of articulation as to be impressive and interesting without the exaggeration and distortion of architectural forms. The possibilities opened up by some such scheme in the line of comfortable, compact, air-conditioned space, and relief from some of the leg-weariness connected with the traditional use of "magnificent distances," are inviting.

Though the design of the buildings was parcelled out among various architects, the control of the color was entrusted to one man, Joseph

> The group of four buildings designed to house General Exhibits. Harvey Wiley Corbett, architect

Below, a detail on the upper level of the Electrical Building, the cascades of light made of neon tubes. Hood & Fouilhoux, architects Below at right, the Chrysler Building, the design for which was the result of a competition won by the firm of Holabird & Root, architects Urban. This task could scarcely have been put into more capable hands, for Urban's fearless use of color is a gift possessed by few men. For the sake of unity and harmony the color could not well have been left to the judgment of the individual architects. Particularly with the vast areas of flat planes resulting from the character of construction employed, color became of primary importance to the Fair as a whole, and a single control seems to have been unavoidable. Nevertheless, it can scarcely have been other than surprise and some disappointment with which the architects first viewed the manner in which their designs were radically altered by the color. Planes obviously designed to count in contrast have been painted into a background; subordinate elements have occasionally been vigorously accented by contrast. It would seem to have been wiser to have Mr. Urban impose a general palette upon each designer, allowing him a free hand in the working out of details.

Mr. Urban's illness prevented his being in Chicago to supervise the application of the color. This task had to be carried out by assistants who conferred with Urban in New York and brought him frequent reports of the progress. It is said that he has a detailed mental







picture of the finished result—a picture so complete that a sight of the Exposition itself would bring him no surprises. I wonder.

One's first impression of the color is that it is largely of strong red, blue, and yellow. It is rather surprising to find that Urban used twenty-four colors:—one green, two blue-greens, six blues, two yellows, three reds, four oranges, two grays, with white, black, silver and gold. It is still more surprising to find that twenty per cent of all painted surfaces is white, twenty per cent blue, twenty per cent orange, fifteen per cent black, and the remaining twenty-five per cent divided among the yellows, reds, grays, and green.

With such an extensive use of color outdoors in the summer sunlight, special efforts were made to maintain the color without fading. Lead-and-oil was abandoned for the reason that chalking would start to gray the colors at once. After considerable research and experiment the paint chemists decided upon mineral pigments in a casein base, and it is unlikely that any change of color will be noticeable during the life of the Exposition.

The night lighting is unusually elaborate and effective. With the coming of successive expositions, both here and abroad, the progress of illuminating engineering has gone forward by leaps

and bounds. Each new exposition presents an opportunity for daring advances in lighting such as rarely, if ever, occurs in the normal routine of commercial work, and the Century of Progress is surely no exception to this rule. Here, the color in the buildings introduces a comparatively new complica-

At right, looking down upon the entrance court of the Hall of Science from under the Skyride. Across the lagoon at the right is the Electrical Building

(Rand McNally & Co.

tion. The lighting of a vast area of dark blue silhouetted against a night sky offers a problem that staggers even the ingenuity and resources of present-day lighting engineers.

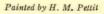
There are several ways in which the Century of Progress Exposition differs radically from previous expositions, but one of the most obvious is in the prevalence of amplified sound. All through the grounds there are concealed or inconspicuous amplifiers broadcasting music from the national radio programs or from some source within the Fair. These amplifiers are rather well distributed and spaced, so that the visitor is rarely out of hearing range of one of them. Although the stations are far enough apart to avoid interference, one occasionally hears a combination of music with its lagging echo, the latter so strong as to suggest another origin. Announcements of special events in the Fair are also broadcast through this system.

It is down the Midway, however, that sound amplification is pushed to the limit. Rival barkers for the sideshows are no longer limited in range by their own powerful vocal cords but rather by the size and power of their amplifiers —with the result that the visitor is being harangued to visit a show so far away that he may not reach it the same day.

To the question, "Is the Fair worth seeing?"

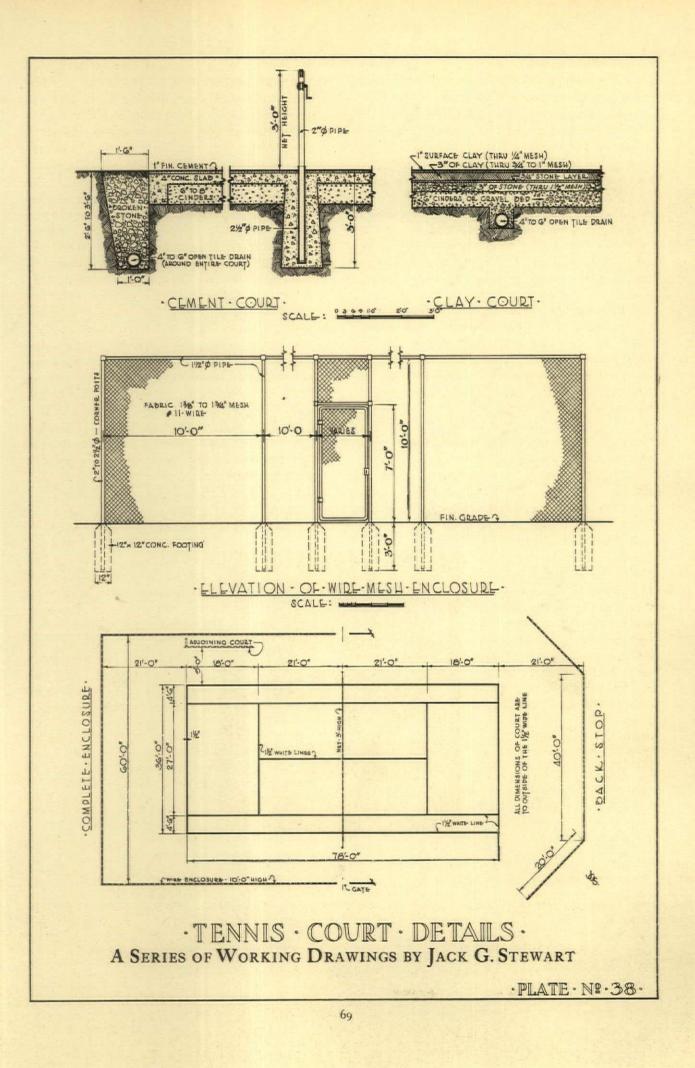
I would answer without hesitation, "Unquestionably!" If one asks, "Is this Exposition likely to have, as did the 1893 Fair, a powerful influence on the future architecture of America?" I would say "Emphatically no!—excepting that it shows so many things we shall want to avoid repeating."

Below, a bird's-eye view of the Exposition, from which one gains an idea of its plan and its relation to Lake Michigan, the Adler Planetarium at the right lower corner, and Grant Park just above it









ARCHITECTURAL PLANNING OF THE AMERICAN COLLEGE. By JENS FREDERICK LARSON and ARCHIE MACINNES PALMER. Foreword by ROBERT L. KELLY. 179 pages, 7½ by 10 inches. Illustrations from photographs, drawings, and plans. New York: 1933: McGraw-Hill Book Company, Inc. \$2.

For four years the Association of American Colleges has maintained an architectural advisory bureau. This book is partly a record of the experiences thus gained, and partly an appraisal, for the guidance of building committees, of the principles involved in campus planning. The book is an outgrowth of that pioneer work, "College Architecture in America," by Charles Z. Klauder and Herbert C. Wise, published in 1929, but is in no sense a substitute for it.

INDUSTRIAL PIPING. A Case Book of Proven Practices and Methods. 286 pages, 5¹/₄ by 8 inches. Illustrations from diagrams. Chicago: 1933: Engineering Publications, Inc. \$3.50.

A compilation of handbook material combined with specific installation records—in other words, not only the technical data, but the results of their specific applications in all phases of piping use.

ANCIENT STAINED AND PAINTED GLASS. By F. Sydney Eden. 214 pages, 5¼ by 7½ inches. Illustrations, six in color, from photographs and drawings. Printed in Great Britain. New York: 1933: The Macmillan Company. \$2.50.

Here is a work which, first published in 1913, has made a definite place for itself. It is not an exhaustive work, but rather one supplying the basis of an intelligent appreciation of stained and painted glass in England, older than 1714.

- GENERAL INDEX TO THE FINAL REPORTS OF THE PRESIDENT'S CONFERENCE ON HOME BUILDING AND HOME OWNER-SHIP. Prepared under the direction of DAN H. WHEELER. Edited by JOHN M. GRIES and JAMES FORD. 114 pages, 6 by 9 inches. Washington, D. C.: 1933: The President's Conference on Home Building and Home Ownership. \$1.15. Set of eleven volumes complete without Index, \$10.50; with Index, \$11.50.
- HARVARD CITY PLANNING STUDIES. TRANSITION ZONING. By ARTHUR C. COMEY. 150 pages, 7 by 934 inches. Illustrations from photographs and drawings. Cambridge, Mass.: 1933: Harvard University Press. \$2.50.

The more we practice the comparatively new science of zoning the more we realize that it is an instrument of vast potentialities, not only for good, but for harm. Out of a mass of research concerning existing practices, the author brings clearly into focus the desirability of certain definite regulations that should govern our zoning. REMODELLING AND ADAPTING THE SMALL HOUSE. By HAROLD DONALDSON EBERLEIN and DONALD GREENE TARPLEY. 163 pages, 7 by 10¼ inches. Illustrations from photographs, plans, and diagrams. Philadelphia: 1933: J. B. Lippincott Co. \$3.50.

A book for the owner, the prospective owner, or the layman who has remodelling aspirations. There is good advice here, yet not so much that it will convince him of his ability to do without an architect.

ROOFTREES, or The Architectural History of an American Family. By PHILIP LIPPINCOTT GOOD-WIN. 135 pages of text and illustrations and 17 plates, 9 by 12 inches. Illustrations from drawings and photographs. Philadelphia: 1933: J. B. Lippincott Co. \$10.

Here is something entirely new in book making —the architectural history of a family starting back with one Ozias Goodwin, of Braintree, Essex, who migrated to the United States in 1637. The author tells, in words and in drawings and photographs, the kinds of home the pioneers and their descendants lived in from the centre of England's cloth manufacturing country to Connecticut, and its slowly widening circle in which the family dwelt. There is something here that reminds us of Noel Coward's "Cavalcade," in the steady onward march of forms—architectural in this case—surrounding a single family of which the author, an architect, is one of the present members.

ARCHITECTURAL DESIGN. By ERNEST PICK-ERING. Foreword by REXFORD NEWCOMB. 311 pages, 8½ by 11¼ inches. Illustrations from photographs and drawings. New York: 1933: John Wiley & Sons, Inc. \$6.50.

The author, who is professor of architectural design in the University of Cincinnati, has written a text-book on architectural design which has rare balance in the light of present needs. The Classic Orders are here, but they take their place with forms dictated by steel, concrete, glass, and other materials. The author's concept of teaching architectural design provides for a thorough understanding of the past, an alertness toward the future, and a regard for truth and sincerity.

- COMPRESSIVE STRENGTH OF STEEL COL-UMNS INCASED IN BRICK WALLS. By ALBERT L. HARRIS, A. H. STANG, and J. W. McBURNEY. 16 pages, 6 by 9¼ inches. Illustrations from photographs and diagrams. Research Paper No. 520. Pamphlet binding. Washington: 1933: U. S. Department of Commerce, Bureau of Standards. 5 cents.
- SUNDIALS. Prepared by R. E. GOULD. 6 pages, 53⁄4 by 9 inches. Illustrations from diagrams. Circular of the Bureau of Standards, No. 402. Pamphlet binding. Washington: 1933: U. S. Department of Commerce. 5 cents.

Some Pitfalls in Supervision

HE prime requisite of an elevator is safety; therefore anything affecting this should be carefully observed by the superintendent.

One of the reasons for securing properly supported rails is that the safety devices grip the rails when the car falls or exceeds the speed limit. In the newer installations a valuable safety device is the so-called "electric eye." This throws a beam of light across the car entrance. If a passenger interrupts this beam it is impossible for the door to close. All improvements and safety devices of this type are indeed commendable and show this branch of the building industry eager to give the public better and safer service.

Often during the construction of a building an elevator shaft is pressed into service so that a hod hoist may be used in it temporarily. These hoists seldom fit the rails properly. Instead of operating smoothly, as a passenger car would, they bump from side to side considerably. The result is that soon the rails may be slightly out of alignment and the ends will not meet as well as they did before. Hence the rails should be replumbed and properly filed down again to give smoothness to the travel of the passenger car. In exceptionally tall buildings there is an interesting fact in regard to the elevator rails and their attachment to the steel work. The weight of the building compresses the steel frame-work ever so little in each story, but the total accumulation amounts to several inches. Because of this compression the elevator rails on some of the taller buildings will buckle. Although there is no weight on them, the rails will be bent out of line because they are fastened to the structural steel. When once understood this is easily remedied by cutting out a part of the rail.

The finish of the shaft in which the elevator travels is preferably a smooth material with as little tendency as possible to gather dust. It is advisable that paint be used to bind all minute parts of the shaft masonry, so that dust or sand will not be forthcoming from them. Actually, painting is economy in the long run, although at first this may seem to be extravagant, but every particle of grit that gets on the machine and cables contributes substantially to the wearing out of these parts. Painting the shafts, however,

By W. F. Bartels

XXXIV. ELEVATORS

(CONTINUED)

does not mean that the painter should throw the paint around so that the doors and facias become spattered. When black asphaltum paint is used on the shaft, it is very distressing to

see this splashed on a baked enamel door of some other color.

The bottom of the shaft should be readily accessible so that inspections, repairs, and cleaning may be easily and systematically done. There should be no projecting rough areas at beams and fireproofing, where the electric cables will rub and consequently wear. However, these cables should be so hung from the bottom of the cab that they do not touch any part of the sides of the shaft, and so eliminate the makeshift of padding the beams or parts of the shaft that are too close to the cab, with quilted canvas.



The elevator machines come assembled and are hoisted in place by means of trolley beams especially placed for them. They are generally brought on the job early, which means that they are subject to abuse of many sorts unless steps are taken to protect them. The weather whips in on them because the outer wall of the building is not up. When the floors above are being poured, concrete splashes down. Workmen of other trades throw rubbish on and around them. It obviously is up to the superintendent to secure proper consideration for these expensive machines. They should be well covered by heavy tarpaulins and nothing should be piled on them. All details regarding their foundations should be strictly inspected. The lead pads or other vibration-reducing materials should be properly placed. The anchorage of the elevator machines, when placed in the basement, must be carefully checked. While they must be well secured, there must be no connection with the steel framework, lest the vibration be transmitted to the entire building.

The modern electric elevator is vastly different in respect to speed from the old type hydraulic elevator, which speeded up when carrying a light load but during the rush period of heavy loads slowed down considerably. The speed of the car should not vary more than permitted by the specification. The range of the car will also be given—as to what distance the cab platform is permitted to stop above or below the floor. Then, too, the clearance between the elevator platform and the door saddle in the shaft should be carefully checked. The building code probably prescribes a minimum and maximum, and care must be exercised to see that it is within these bounds. One danger of having it too wide is that a woman's narrow-heeled shoe may be caught in it.

Up until a few years ago it seemed that direct current gave more satisfactory results in elevator machines, hence motor generators were used to convert alternating current. In large buildings this is still a general practice. The superintendent must see that these machines, particularly if there is more than one, are properly ventilated so that the machines will not get too hot. The motors should of course be "40-degree C. motors"; that is to say, they must not rise more than 40 degrees C. above the room temperature, providing they are not in a small, confined space.

The supporting cables, or "ropes" as they are called by the mechanics, are an important part of elevator installations. They must not only withstand wear but must not wear unevenly on the drums around which they are wrapped. The way the ropes are fastened has a good deal to do with this. The proper way of doing this work should be insisted on by the superintendent: the conical-shaped socket, which is later fastened to the frame of the car, is pulled over the "rope"; then the end of the cable has its strands separated, or "wire-brushed," and the piece of hemp cut out from the centre. While this is being done there is a good opportunity to check up to see that the rope has a well graphited hemp centre. The term "wire brush" is used because of the resemblance of the end of the rope to that article when it is unstranded or picked out. After the rope is unstranded the wires are arranged around the inner edge of the socket and the ends bent back on themselves toward the centre. Then, after they have been thoroughly cleaned, hot metal AUGUST, 1933

is poured in, binding all the wires in the socket and forming a fastening which is very secure. Precaution must be taken in bending the wires to see that some are not pulled unevenly from the strand. If the pull on any one wire is uneven there will be high points on the rope; the weight will be transmitted to the straight part of the cable only, while the shirking projecting strands will wear the drum. It is evident that this uneven wearing on the drum is unfair to the next cable put on, because it will not fit the form on the drum.

The elevator cabs themselves should be carefully checked, both when they are being erected and after they have been completed. They should be turned over to the owner in good condition-not scratched or marred. If they are to be used for hoisting building materials, the cabs should be adequately protected against damage. Where there are two or more cars in a shaft, most codes require an access door in each cab so that the adjoining elevator may be used to take off passengers from the one which may be stalled between floors. It is of course desirable to have this emergency door inconspicuous, since it is seldom used. The inspector must see that there are no gaping cracks surrounding it. If there is a rail it must have smooth joints and a good appearance.



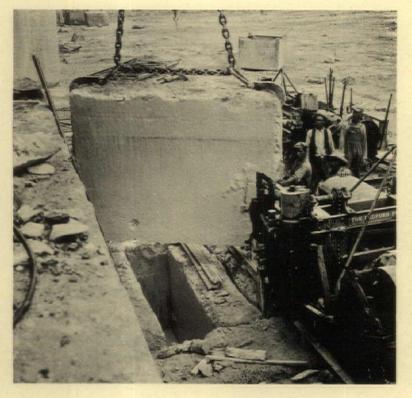
Most city ordinances call for complete and thorough tests of various sorts before the elevator can be put into public service. While the city assumes the responsibility for these tests, it is well for the superintendent to be present. Foremost among the tests are the bumper and the drop tests. The former is made by sending the car down upon the bumper to see that no defects are present in the latter. Sometimes the bumpers will crack, due to flaws, and have to be replaced. The drop test is one in which the car is allowed to drop free just as if the cables had parted. The cab is fully loaded with iron weights to equal the load it will be allowed to carry. The safety device then supposedly grips the rails, stopping the car. After the car has been stopped in its descent, it can then be released only by means of large wrenches and much labor. This does away with any easier means of release which might allow the car to descend before the fault had been remedied.

Quarrying and Fabricating Lim

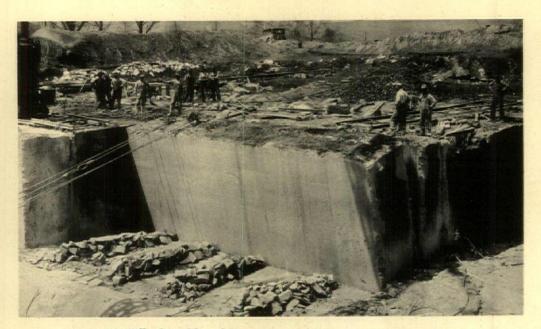


A PICTORIAL REVIEW OF THE MAIN OPERATIONS INVOLVED IN BRINGING LIME-STONE FROM THE QUARRY TO THE FINISHED BUILDING, AS PHOTOGRAPHED IN THE PLANTS OF THE INDIANA LIMESTONE COMPANY, BEDFORD, IND.

Oolithic limestone, the technical name for the building stone found in Southern Indiana, lies in a formation having a maximum depth of seventy feet. At the left of the photograph above one sees the "burden" which has first to be removed by "stripping." The stone is then removed by channelling, cutting an average depth of ten feet. Each cut is called a "floor"



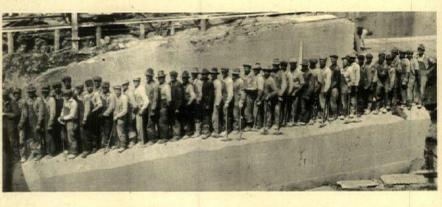
At left is seen the answer to the common question, how do you get the first piece out of a floor? The sides of the block are channelled (the chopping action of a number of steel drills whose points are at different angles) in the usual way, and then by a wedging action from the top, keeping a backward and forward movement, the stone is broken at the base with clean cleavage

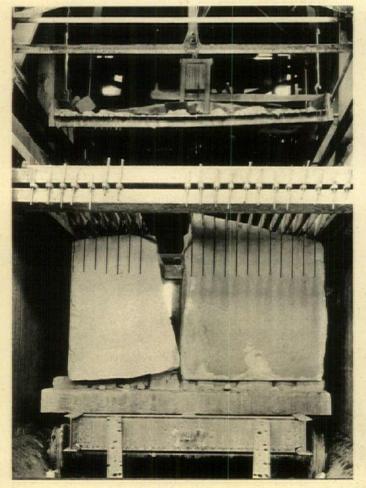


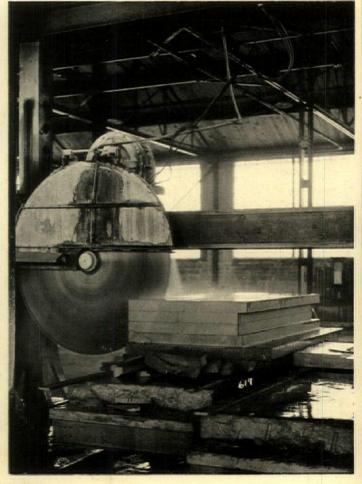
Pulling a cut. When a block has been channelled on four vertical sides, holes about six inches deep are drilled along the base of the cut. Wedges, inserted in these holes, are used to split the stone from channel cut to channel cut. Indiana limestone has no bed planes, the formation being perfectly homogeneous

One of the difficult problems in quarrying, naturally, is the getting out of large stones for specific dimension use. Here is a block of stone being cut out for one of the monolithic columns on the Mellon Institute in Pittsburgh

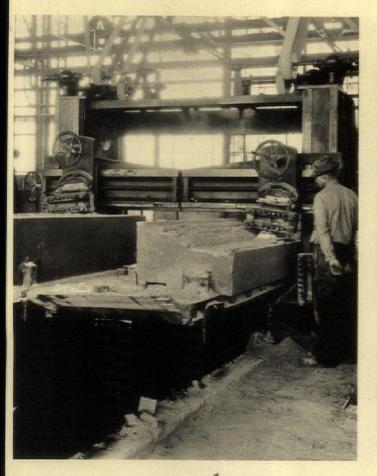
Below, two photographs showing the operation of sawing. In the one on the left, the blocks, as they come from the quarry, are being cut into slabs. In this operation can be secured such fine finishes as those made by shot sawing, chat sawing, sand sawing, etc. The second photograph shows slabs being sawn for jointing by diamond sawing







« ARCHITECTURE »



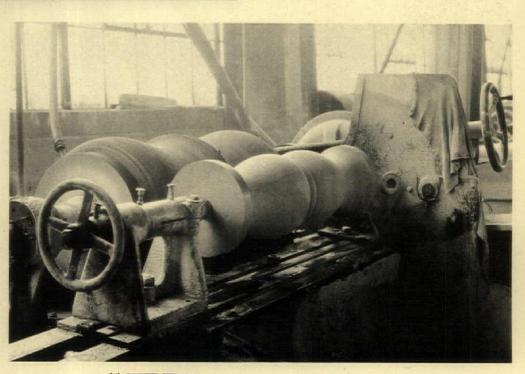




In the photographs above, two operations of machining are pictured: at the left, cutting a straight run of mouldings; and at the right, cutting mouldings on a curve where the stone is rotated against a stationary cutting tool. This machining process is accomplished by cutting edges of steel used with wet abrasives. The latter are sand, shot, chat (ground flint), depending upon the surface effect desired

Above, turning a monolithic column. In the operation of cutting on a lathe in this way, the cutting edge of steel removes a very small amount of stone at a time without the use of abrasives

At right is a baluster lathe in which the cutting is done by a process fairly recently developed, using carborundum, which gives the limestone a very smooth finish





A cut stone mill, where the problem is one of arrangement so as to necessitate the fewest possible number of handlings, most of which are made with the overhead travelling crane

The carving of a limestone capital, no longer with the chisel and mallet, but with a pneumatic hammer, with which a skilled workman is able to produce just as much delicacy of feeling



≪ ARCHITECTURE → 76

Saturday, June 3.- The efforts looking toward a survey and preservation of our historic national monuments, having made progress in several localities, is likely to become a national movement. Doctor Leicester B. Holland, chief of the Fine Arts Division, Library of Congress, and chairman of the A. I. A. Committee on the Preservation of Historic Buildings, is compiling a national list of buildings, either of architectural importance or of notable historic interest. Only buildings at least a century old are being considered for inclusion in the Atlantic seaboard tabulation-this tabulation being subdivided into lists applying directly to the various states and cities. No structure later than 1850 is to be included in the survey for any part of the country. A ballot has been sent to each member of the Institute with brackets for seven buildings, requesting informa-tion as to name and type of building, its architect, date of erection, original owner, present owner, features of archi-tectural and historical interest, and location. The returns are to be grouped first by chapters, where they will be compared for duplication, then sent to Doctor Holland for final compilation in a national list. It is hoped that some such respect and protection may be engendered here as that which exists in France in connection with the French historical monuments. Once a building in France is designated as a historical monument, the owners may not change it without the consent of the government.

Monday, June 5.—Lunched with Jef-ferson M. Hamilton at The League, where he told me some of his disturbing experiences with the termite, the latter pest turning suddenly from an academic question into a personal threat when it was found to have eaten away some of the timbers of Hamilton's own home in the South. Several years of investigation and experience have convinced him that it is perfectly feasible to prevent the entrance of termites into building construction through several simple structural devices. The problem of eliminating the termites when they have once attacked a building is not so easy, but here again Hamilton's experience and research have shown him effective remedial measures. With the steady movement northward, the termite has become a national menace to buildings containing structural timbers, and the architec-tural profession should be armed against it.

Tuesday, June 6.—Speaking of an imminent housing shortage, as we were recently, I see that James S. Taylor, chief of the Building and Housing Division of the Bureau of Standards, says that the United States today is short five hundred thousand homes. Naturally, he qualifies this by explaining that we should be short that many if employment conditions were to return to normal, permitting families that have doubled up or



The Editor's Diary

are living in make-shift quarters to be housed adequately once more.

Wednesday, June 7.—The New York Chapter held its annual meeting at luncheon today at The League, listening in the oppressive heat to reams of committee reports, which though tiresome to hear, represented a tremendous amount of work accomplished. Incidentally, the treasurer made the unique report in these times of having his disbursements less than his receipts for the year. The Chapter lost but eight members from its roll during the year, five of these by death. The president, Charles H. Higgins, turned over the gavel to the newly elected president, Ralph T. Walker of Voorhees, Gmelin & Walker.

Friday, June 9 .- When the details of the Regional Plan for New York and Its Environs were completed three or four years ago, it seemed another of those beautiful dreams which men apparently have the vision to create, but seldom to execute. George McAneny, president of the Regional Plan Association, however, brings out the startling and gratifying news that while the plan provided for an orderly development of this region over a forty-year period, one-tenth of it has now been accomplished. And the best part of this news is that, as the plan ripens into executed form, it will doubtless become more and more an acknowledged fact, consolidating the efforts of officials and citizens alike to continue it. The first four years are possibly the hardest.

Saturday, June 10 .- England, after fourteen years' experience with subsidized housing, has put an end to the practice, with certain exceptions. At the end of the World War, with a shortage of four hundred thousand houses in England, the Government tried to bridge the economic gap between the price that the ordinary wage-earner could pay for a home, and the cost at which such houses could be built to sell or to rent. Curiously enough in these fourteen years' experience, several changes in the subsidies, either up or down, have resulted at once in a corresponding rise or fall of costs. Quite recently the gap between what the tenant can pay and what it costs to provide him with shelter, has narrowed down, from two causes. In the first place, the price of money has fallen; the second, building costs have fallen. The British leaders now believe that, under these circumstances, private initiative and private capital are able to provide the necessary housing without government subsidy. There is still possible and probable the use of various forms of local aid where it may be specifically needed.

Monday, June 12 .- Whether due to the long and earnest efforts of Louis LaBeaume's Institute Committee on Public Works, or to the New Deal, a new dispensation of architectural procedure is going into effect at Washington. With the appointment of L. W. Robert, Jr., of Atlanta, as Assistant Secretary of the Treasury in charge of public buildings, word comes that Mr. Robert has called upon the Institute and the Engineering Council to furnish him with lists of competent architects and engineers in every State in the Union. Mr. Robert evi-dently intends to utilize the professions to the fullest extent in the forthcoming public works program. Full details as to the organization of the Treasury Department and other agencies which have in the past controlled public building, are not yet available, but it is likely that these are to be co-ordinated in some way so that the direction and supervision of all works for the government will be in the hands of one office. It would seem also, to be likely-though this has not been confirmed-that the design of this work will be put in the hands of private practitioners, the government office con-fining its activities to developing a source of technical information and a supervising force.

Wednesday, June 14.—The June num-ber of The Octagon will publish "A Housing Policy for the United States Government." It is a concise and true statement of the policy to be followed in connection with the provisions of the Re-covery Act. The whole statement is well worth reading, but the high lights that stand out are: New housing must take care of the needs of the lower-income government-aided housing groups. should be limited to low-price land (thus avoiding the error of which we spoke recently of subsidizing through the government aid the land owner rather than the building tenant); the essential standards of modern housing are the same for all economic classes; any kind of class segregation should be avoided; the quarters of the more well-to-do should be differentiated from those of lowerpaid workers solely by having more than the minimum dwelling space and mechanical accessories; the dwelling is to be conceived as a unit in a neighborhood community; no one size or type of dwelling and no single form of community plan should be developed into a stereotype.

Saturday, June 17.—John W. Harris, of the building firm of Hegeman-Harris Company, Inc., has just come back from France. He reports that the French were very dubious as to the effect of our building the new American Embassy building in that veritable holy-of-holies, the Place de la Concorde. As the structure has grown, however, and has taken its place so harmoniously in the architectural picture, they have become enthusiastic over the way in which Delano & Aldrich have fitted the new building so sympathetically into its environment.

Monday, June 19.—For the first time since April, 1931, the steel industry is operating at 50 per cent of capacity, according to The Iron Age. This is an encouraging sign when one recalls that the industry reached a low of about 14 per cent of capacity. Electric output in the week ending June 17 showed an increase of 9½ per cent over a similar period of a year ago. This is the widest gain since the turn seven weeks ago, and the seventh increase in as many weeks, each larger than in the week before.

Wednesday, June 21.—Lunched with Gerald Geerlings and W. F. Bartels, talking of some of the frightfulness that is found today in the low-cost speculative dwelling. In order to sell, it seems more than ever necessary that a dwelling should have a purple bathroom with "Roman bath"—whatever that may be; a tortured surface of interior or exterior plaster-or both; sunburst effects in the roofing colors; and what is known, I be-lieve, as a "Swiss basement." The sad part of it all is that every one of these horrors has sprung from some attempt on the part of the architectural profession to be clever. The speculative builders do not get these ideas out of their own heads, nor the clients'. Rather they are adaptations of what the builder or the client has seen in houses of a presumably better class. If this sort of thing goes on, the sad humor of Victorian jigsaw brackets, and the 1870 Mansard and cast-iron combination, will pale, for future generations, before our own contributions to the art of civilization.

Thursday, June 22.—Charles Z. Klauder over from Philadelphia joining Egerton Swartwout, Alfred Githens, Cass Gilbert, Jr., and myself at lunch. He reports that Philadelphia architects have not yet begun to feel the effects of the increased industrial activity, which is perhaps not surprising, since building usually lags somewhat behind improvement in business generally. The Public Works program gives every promise of decreasing this lag in the present instance.

Friday, June 23.—Arthur L. Guptill, one of the few men in this country with a real gift for teaching art, confided to me today that he has joined the ranks of artists and architects who are enthusiastic over the possibilities of the camera —a growing brotherhood, distinguished by such names as those of Frederick L. Ackerman and John Russell Pope.

Sunday, June 25 .- On board one of the new fast Boeing planes en route from the Newark airport to Chicago. Somewhere over Pennsylvania, I suppose. After a little bumpiness at the take-off, in the effort to get a deeper cushion of air under us, the going has been very smooth. We climbed to about three thousand feet and have been up and down perhaps one thousand feet, depending upon how the pilot finds the wind. Just now we're picking our way through a bunch of cumulus clouds, around one, over the next, partly through another. Just a small bunch of them, for now we're in the clear, crossing over a mountain range. Luncheon is served by an efficient stewardess, the various dainty items all sealed in oiled paper bags, the hot coffee or iced lemonade out of a thermos bottle.

The lady seated in front of me is trying to catch a little nap, her chair being adjusted by means of a lever so as to recline.

The mistiness of a warm, humid New York day is far below us; ahead a great bank of cumulus clouds lighted by brilliant sunshine. Looks as if a storm might be rolling up towards us from the west. Running into the advance guard of it now, with a little bumpiness, as if an elevator had slipped down a few notches and was caught by the safety device.

Now there are clouds below, beside us and even above, the latter showing blue holes where so recently there was unbroken blue sky. It is whispered into our cotton-stuffed ears that we are about to land at Cleveland. One hears the rattle of gears as our retractable landing wheels are unfolded from their nests in the wings. The earth comes rapidly up to meet us—there is no sensation of descending—and we taxi up to our gate at the airport. The air is hot and dry after those cool heights. Fifteen minutes to stretch one's legs and watch the plane being refuelled, then we are off again.



Flying above a sea of clouds

Must be out over Lake Erie, and the going rather more bumpy than anything we've had. The lady in front is not enjoying this—a touch of seasickness, and no deck rail! We're flying low now, trying to keep under the thickening mass of clouds. It is thick below us, too. As we bore through a cloud bank full of rain, I look for raindrops on the wing and window, but there are none—merely a film of water travelling horizontally over all outside surfaces. It is almost as if we were down in a submarine.

Clearer below now, with the cultivated fields making a very neat but irregular checkerboard, with greens of many shades, and the lighter ruled lines of the highways. Climbing higher now, trying to get above those clouds ahead. Suddenly an illuminated panel in the front of the cabin flashes, "Please fasten seat belts." Ordinarily these are fastened only when taking off, and again when landing, when the bumpiness is greatest. Instantly the stewardess comes up the narrow aisle with the word that we are apparently coming into some rough weather. We were! As she spoke, and as I reached for my belt, the plane dropped out from under us. I popped at least eighteen inches out of my seat, and it seemed to me that the little stewardess was going right through the top of the cabin. It grew darker ahead; a bolt of lightning struck earthward off to the right. More bumpiness, but nothing so unexpectedly severe as that first jolt. Darker ahead; dark above, and that ugly storm-yellow below. Water sweeping over the window glass-not slanting but absolutely horizontal against our speed of two hundred miles an hour. More lightning. I suppose there is little danger from that up here, since we haven't enough capacity to attract a big charge. We're through the worst of it. Clouds

We're through the worst of it. Clouds all around us, but the earth is once more visible. Looking back, the dirty yellow color extends right to the ground, with a vertical edge visible off to the right hard rain, I judge. Clearer ahead, with lakes below—little lakes and big lakes and still we bore through, the two motors drumming like the roar of a train over a trestle.

Climbing again. Here's another dark mass ahead. One really cannot write as fast as the conditions change. Trying to duck under the next cloud—yes, we did it, bumping somewhat. There's a flash of sun. Gone. Now thicker ahead and we're climbing steeply to hurdle this next one. Higher and higher. Blue sky a long horizontal slit of it ahead. The belt warning disappears. A bluish haze below. Coffee and cookies offered but not taken. Lake Michigan off to the north, and there is no horizon line marking it from the clouds. More houses below, smaller fields, more roads-converging on Chicago. And here we are, with a steeply banked turn, all set to see the Fair. Four and three-quarters hours total elapsed time from Newark !

« ARCHITECTURE »

Housing_Why, When, and How? By Henry Wright

Part One, dealing with Mr. Wright's extensive researches into housing for America, ap-

into housing for America, appeared in the July issue. In it he laid the ground work for an attitude towards housing that might well govern the extensive operations which will probably accompany the National Recovery Act movement. In the present sec-

Part Two

tion, Part Two, he builds on this ground work, recapitulating the experiences

and lessons learned from Sunnyside, Radburn, and Chatham Village particularly, and presents the principles established which light the path for our professional activities in the immediate future.—EDITOR.

V. THE CASE FOR GROUP HOUSING

E are now ready to single out two generic divisions of housing for more detailed study. These are the Group Dwelling and the Garden Apartment. Under these two concepts can be summed up the best past experience in improved housing. As classifications they are flexible enough both to include the best past types and to encourage good new forms. They offer an ample field for the best principles of planning, for good operating methods, community organization, and large-scale practice.

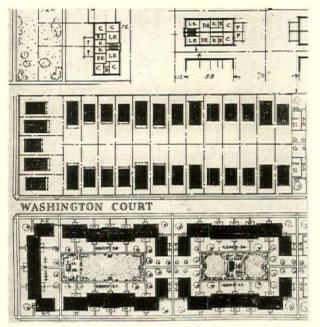
AVOIDING OLD LABELS

In pursuing housing history, we have been obliged to take account of various crystallized types. We have spoken of "single-family detached" houses, and "single-family row" ones. We have encountered "flats" both single and double, in buildings two or three stories high. Then we have spoken of "multi-family dwellings" and of apartment houses. All these terms have a limited usefulness as labels. As guides they are likely to be pernicious. Though our thought has too often frozen into these categories and has consequently been fitted to no mold but theirs, it must be warmed through once more by imagination and rendered more fluid. The builder of the Dark Ages plundered ruins for finished columns, lintels, and arch stones; but the monument he thus assembled was at best a most ingenious misfit. It is not in this fashion that we have evolved the technology of the modern suspension bridge; we must no longer do so for our housing.

While local habits and traditions are not to be ignored, it is particularly necessary to avoid dependence on any one house type or any one local variant. The needs of our family today are too varied to be served by just one kind of house, changeable only in the number and size of its rooms. Defects of our past housing practice have unfortunately been *embalmed* in our building and zoning laws.

Our criteria are of a more general and deeplying sort. They must be found in observing certain human needs common to everybody, whether the family be large or small and whether the people be young or old. For instance, every household requires good light and ventilation. The best means of securing this will be by some kind of shallow plan. Good light and good view, as well as the need for open recreation space, require massed spaces of open land. Since urban land is necessarily expensive, the purchase of additional quantities of it is to be avoided. The natural expedient then is to "borrow" vacant land that is useless in its present location. This can be done by rearrangement of the plan, eliminating dark side yards and alleys. This arrangement in turn leads naturally to building the houses themselves in closed groups or rows.

The accompanying diagram shows what is perhaps the most significant change in principle which must be introduced into our city planning, even where this planning is qualified by the best existing zoning regulations. Our whole process is predicated on the fact that land is already owned in the form of lots. Zoning has assumed that all we can legally do with these lots is to make the best of a bad bargain. This Best is not enough better than the average Bad to constitute much of an advance. The source of the deficiencies lies in the organization of the space into narrow strips (or lots) lying side by side. Naturally the side yards become narrow and rooms on adjoining sides destroy sunlight and privacy for one another on a mutual basis. Yet how much is to be gained by making these side yards a fraction wider by zoning? At best very little. Too often the result is to encourage the further elongation of the oblong space within



The lower portion of this plan shows two-thirds of a Sunnyside block with attached row houses and twofamily dwellings utilizing two-room-deep space. The upper plot shows the same amount of living space secured in ordinary detached houses and flats spaced according to liberal zoning laws. At the top are typical plans of two-family dwellings for both treatments. The interior garden court, which is the heart of the Sunnyside plan, is equal to the area of the excess front yards and side yards between buildings in the normal layout

the buildings, that was none too well arranged from the beginning, in order that the total building space might not be reduced. What we have been doing is merely to blow up a bad arrangement to larger and more costly proportions. We have not altered fundamental defects in the plan. The upper block plan as shown is made up of the usual dwellings of single or two-family type, with the width of the side yard that is required by the most advanced zoning laws. These dwellings are drawn with a floor space as nearly equal as possible to the space in the groups of attached single and two-family dwellings in a block at Sunnyside, Long Island, shown below. There are also shown the typical two-family plans obtaining in each case. The common garden courts in the central block of Sunnyside, so effectively used in this community, occupy a space just about equal in area to the aggregate of the useless side yards in the "normal" plan. Windows instead of looking into the adjoining houses look out upon the broad planted central area. Group planning assembles buildings and land for effective openness without extravagance.

The expedient of the row meets also the need for cheap though sound construction, permitting continuous foundations, continuous erection processes, and doubling along party walls. *Heat loss* must be reduced and maintenance simplified, if we are to reduce real rents, whatever other special requirements the family may have; and these needs too are met best by the compactness characteristic of the row.

It is impossible, so far as can be seen, to achieve a combination of these advantages except through group housing, planned on a large scale. And only after these fundamental requirements have been met do we come to variants for individual needs. But when we examine group housing we find that it permits sufficient flexibility to care for every specific departure necessary within its general framework. Thus any community must provide dwelling spaces of various sizes. These should be disposed mainly on either one, two, or three floors, organized in relation to vertical and horizontal divisions. The choice of the kinds of dwelling space provided should be dictated primarily by the considerations of privacy, safety, and good exposure. None of the familiar dwelling types of the past has met all these requirements satisfactorily. Group housing on the contrary is capable of meeting them under intelligent evolutionary development, and asks only to be freed from artificial restrictions whether of law or of mental outlook. Not all the problems have been entirely solved, but we can already count on adequate sound-proofing and group servicing to free group organization of its principal past defects.

THE GERM OF GROUP HOUSING

Put in a different way, group housing is a hybrid. On one side it derives from the row house; its other ancestor is the flat. In certain War housing projects, and at Sunnyside Gardens, two-family and even three-family dwellings or flats were freely combined with singlefamily dwellings in fully attached groups or short rows. This was possible by virtue of identical plan depths and similar methods of construction in both of these forms. The greatest flexibility and variety was achieved with respect to the types of dwellings provided; the diversity which was functionally required became the basis of considerable architectural variety and charm; and the flat itself was fundamentally improved by this new conjunction with the row house.

The older forms of row housing, such as those in Philadelphia, with fronts uniformly only 16 feet wide though the depth might reach 54 feet, well deserved the opprobrium they received; but against the row house in its new form





A street scene in Seaside Village, a War project since owned and operated by the Bridgeport Housing Company

Below, group houses typical of Sunnyside Gardens, Long Island, built in 1926 Here are four indications of the fact that group housing has been thoroughly tested. These pictures are typical of four projects employing in some measure the principles advocated in these pages A section in Mariemont, a completely planned community built near Cincinnati, Ohio, started soon after the War

Below, view of group houses at ChathamVillage, built by the Buhl Foundation at Pittsburgh, Pa.



such prejudice is ungrounded. As for the flat, the scorn levelled against it overlooked the fact that by the simplest and easiest devices the flat itself might have been surprisingly improved. *The whole problem of decent planning is to get broad frontage*; and so the first step in group housing is to abandon the lot line. The tandem room arrangement characteristic of the flat is squared up into a compact and convenient form, more efficient alike for building and for housekeeping. Above all, the narrow side yards are eliminated; all windows open out upon decently wide green spaces, and the rooms can be oriented to receive full and regular sunlight.

The group dwelling need not, however, be stigmatized even in the eyes of the antagonistic by too close a relationship to the flat, since it absorbs many of its essential characteristics from the apartment house.

GROUP HOUSING DEFINED

Within the concept of housing here envisioned we shall retain, for purposes of clarity, only two classifications (other than the detached single-family house), the "group dwelling" and

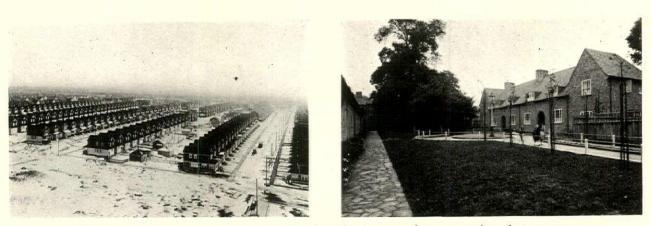


the "garden apartment." The distinction between the two relates to the presence or absence of common services. How deeply this cuts will soon become evident. For the moment, let us assert that the apartment house is a structure that includes (to whatever extent) halls or stairs used in common, which must be maintained through some kind or other of joint arrangement for service. The group dwelling gives each family direct access through its own entrance or private hall, maintained entirely by the occupant.

As against any of the older familiar dwelling types, "group dwellings" are distinguished as follows: More than two dwellings are erected in one continuous structure; that is, they are not semi- but fully attached. Their height runs from one to three stories. They have a broad-front, shallow plan, not over two rooms deep. They provide independent access to every suite at ground level. There is no necessity for internal stairs or hall space used in common by more than one family.

The groups may consist of a wide variety of dwelling types. There may be groups of:

a. Single-family row dwellings, one or two stories high.



The great speculative urge of 1924–25, stimulated by the general tax exemption of 1923 on new dwelling construction in New York, carried over for two years after the tax exemption terminated in April, 1924. At left, single-family detached houses on 25-foot lots, crowded together in soldier-like rows on wide streets. Here the density of twelve families per acre should offer ample space for generous organized openness. While New York acquired 100,000 flimsy dwellings such as this, London, under the policy of careful government supervision and a direct subsidy entailing no greater loss to the treasury, was acquiring almost as great a number of substantially built dwellings in orderly, attractive communities as pictured above to the right

b. Two-family ("flat") dwellings one over the other, each occupying its own floor.

c. Combinations of a and b, as in the Sunnyside group previously shown.

d. Finally, there may be three-story dwellings such as I first suggested in my March, 1932, *Architectural Record* studies, in which, in one way or another, the various floors are subdivided for use without requiring joint use of internal stairs.

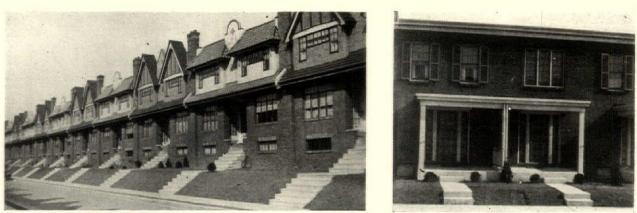
No longer can we differentiate between apartment houses and other group dwellings mainly on the basis of height. An apartment may be at times only two stories high, with either the front entrances or the rear ones in common. A group house, on the other hand, may be organized to occupy as many as three floors. The group house may be more complete in its service arrangements, such as heating and waste incineration, than many cheaper apartments. The border line between the two types may not be an absolute one in fact, and both kinds could be supplied side by side in a single large housing structure; but for clarity of presentation the terms will be used as outlined.*

The difference between hall service and nonservice which has been made the basis of our definition has more consequences than are often suspected. There is more involved in hall service than just the actual janitoring and lighting of halls and stairs, the care of gardens, and the greater first cost of fireproof stair walls and more costly maintenance of such publicly used spaces. There are managerial costs behind these, and these managerial costs exist even when there is nothing more to be done than caring for a few halls. With the final elimination of practically all janitor services, these costs can disappear. The owners of the rental structure may shortly be able to provide every tenant with an individual automatic heating device, or to contract for heating with a steam or other supply company, so as to leave no regular internal maintenance responsibilities whatever. This will relieve housing investment of many of its present unsatisfactory attributes.

It should be noted that the break in cost between non-hall and hall types does not necessarily occur at the same point as heretofore. The break between the economy gained from the two-story building, which is erected from the ground, and the three-story or higher building, which requires towers or hoists, will not hold good unless, as seems quite possible, the employment of certain new construction technics, involving light-weight pre-fabricated walls, aided by new forms of tractor hoisting equipment, should place the three-story building, especially where basement can be omitted, on a new footing of being erected from the ground. If this comes about the three-story building will become the least expensive form of construction, and the point of transition from low to higher cost construction will occur between three- and four-story dwelling heights. Add to this the possibility of placing some of the rooms of all the upper suites on the second floor, thus eliminating fire-proof stairs, penthouses, and parapet

82

^{*} The one point at which confusion might arise would be in respect to certain distinctively open-stair groupings, in which the common-entry stair would become so definitely an extension of the public sidewalk that the scheme might fall within either of the categories.



Photographs by courtesy of Philadelphia Housing Association

Travellers are familiar with the dreary and fantastic rows of houses in Philadelphia. The queer wooden boxes projecting from the second story of brick houses are due to a peculiarity of building code regulations, as are also the universal narrow width of 16-foot lots. The Philadelphia builder does give a lot for the money; the houses at the left above sell for \$5,390, those at the right above for \$3,990—the latter have a depth of 30 feet

walls around the roof, and three-story non-apartment or "group" dwellings would seem to promise the lowest cost possibilities on city land values.

It will perhaps not be necessary even to suggest what a range of space can be used by a wellequipped community. It can include, for example, simple, convenient, but incomplete shelter which can omit an actual working kitchen, since the occupants depend for food, entertainment, and guest accommodation on their proximity to a "mother" community building or apartment hotel. This arrangement is especially useful to those of semi-nomadic habits. On the other hand it may still retain all the functions of the complete individual house. The two types of development we shall study in detail offer ample opportunity to exhibit the basic principles of design and construction. They also enable us to study the introduction and development of joint amenities in recreation, nursery schools, and adult workshops, and an endless variety of other facilities, enriching the life of the community and providing fruitful employment for a growing leisure.

AMERICAN OR ANTI-AMERICAN?

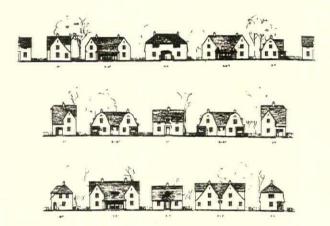
It is unfortunate that to a large number of people in this country the term "housing" represents something anti-American. Without question, the process it describes undertakes to meet conditions that are new and foreign to an America of the late nineteenth century—a period of homebuilding still vivid in the minds of those yet responsible for much of the mass thinking of today. These methods might have remained tolerably acceptable, had the supporting conditions not happened to shift away from under

« ARCHITECTURE »

them. How little progress we have made in this country toward adjusting our methods to modern needs is demonstrated in the sad story already told of the development of the St. Louis flat and its offspring. Because of such backwardness, those who have undertaken to propose new and efficient methods of planning have been forced to fall back upon the more advanced experience abroad. They have been obliged to refer to community planning that embodied particulars unhallowed in American tradition. These experiments of our own have, however, despite their European affinities, continued for a sufficient time and have proved sufficiently practical and conclusive to establish their validity as a basis for well-founded American procedure.

It is easy to leave out of mind that the essential accomplishment of these experiments is a return to a still earlier, truly American tradition, one that antedates even the crudeness of our nineteenth-century "progress": the tradition of the Colonial village. Despite the difference in the conditions then obtaining, the essential elements of modern community planning were already there: the "common"—land held by the community, around which the village was grouped; rational open spaces; exposure and protection for every house; an orderly arrangement with due regard for human amenities.

Nor is the validity of our newer experiments impaired by the fact that they are at variance with accepted and customary real estate practices that cater to our insistent retention of a scarcely practicable home ownership ideal. (When we think of these owned homes, there comes to mind an attribute not irrelevant in a discussion of foreign influence. Says the builder,



"Will you have it English, French, or Spanish ?" If the English or Spanish are quite thoroughly ancient, or in other words out of date, the product is considered appropriately American.)

It is in these significant departures of ours, through European or other available modern experience back to our own best tradition, that we The two illustrations shown herewith indicate progress in the method of grouping employed in largescale housing during the War. At the left, the elevations of the Newport News project, showing a num-



ber of distinct types which become noticeable as "repeats." At the right, are groups from Yorkshire Village made up of special units combined in a variety of sizes to produce group effects that avoid the more obvious repetition

may discover the roots of the new community. The necessity for organizing the community as a whole, to utilize efficient forms in moderate-cost dwellings, is becoming every day more insistent.

During the operations of the two Housing Boards that existed under government mandate during the War, intensive study was made at

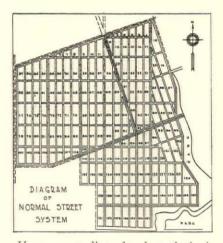


Above, a photograph and plans of a group of dwellings in Seaside Village in Bridgeport, designed by R. C. Sturgis and A. H. Hepburn, architects; the centre dwelling, flanked by single-family houses, is a two-family flat, the entrance to the upper floor being in the recessed one-story wing



At left, a four-family dwelling at Buckman Village, its plan a prototype for later apartments at Newburgh, Ithaca, St. Louis, and elsewhere. Above at right, a four-family group row dwelling at Mariemont

≪ ARCHITECTURE ≫ 84



Here are studies of a hypothetical garden suburb of New York. The normal plan at upper left provides a total area in streets of 190 acres (32.8 per cent of the whole 580 acres, not including an 80-acre park); and total salable frontage of 172,000 feet. The scheme at the upper right-hand corner provides a total area in streets of 135 acres

home and abroad which led to the housing forms then applied in some twenty or more important projects completed under these agencies. Since a majority of these projects were laid in the Philadelphia-Baltimore region, it was natural that their basic dwelling form was derived from the row house commonly used in that district. However, they bear only a distant resemblance to the narrow, awkwardly planned, monotonous rows so familiar to visitors to those cities, rows that continue in current building operations to this day.

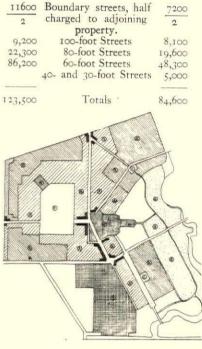
The individual house plan was widened out and squared up into a compact, cheerful, and livable form. Community interest was obtained through attractive variation of group design, and by breaking long rows into short groups of six to eight family units each, pleasingly arranged in block patterns and carefully adjusted to natural grades.

Certain of the projects, particularly Buckman Village, Chester, Pa., and Newburgh, N. Y., included detached and semi-detached houses on the one hand and small two-story apartments on the other. In Bridgeport the designers went further and successfully grouped vertical twostory houses and flats in contiguous structures. At Seaside Village one-and-one-half and twostory dwellings were grouped together. The latter were arranged, inside, partly as single-family homes and partly as flats, so that even an experienced student can scarcely distinguish the

« ARCHITECTURE »

85

Below are given the comparative figures for the lengths of street frontage in the schemes at left and right:





(23¹/₃ per cent of the whole), with a total of 114,300 feet; equivalent usable frontage of 147,000 feet. Centre diagram shows use areas: A, apartments; R, row houses; C, communal space; P, parks; G, subsistence gardens; I, light industry with central power. Store buildings are provided at several centres and are shown in black

difference from the outside. In 1922–1923 the town of Mariemont, Ohio, was started with a large number of architects collaborating. The dwellings in the various areas ranged from small apartments and group row houses to organized groups of detached single-family dwellings, the latter reaching into the higher-cost field. Among the other communities in which similar efforts were being carried forward might be mentioned Forest Hills, Long Island; Forest Hills, Boston; St. Martin's, Philadelphia; and Wilmington, Del.

Except for the War projects, however, these were all limited to the major purpose of demonstrating improved methods of land development for fairly high-class community building. This limitation was sometimes actually a hampering one, and the projects have only incidental interest in the evolution of planning for moderatecost housing. For this latter purpose we must turn to a group of interrelated projects at Sunnyside, Radburn, and Chatham Village, for which the foundation was laid in the organization of the City Housing Corporation of New York in January, 1924.

PRELIMINARY STUDY FOR AN AMERICAN GARDEN CITY

During the summer of 1923, in New York City, the author, in association with Mr. Alexander M. Bing and Mr. Clarence S. Stein, was commissioned by one of the foundations to make a theoretical study of a possible American application of Garden City principles, as they had been developed in England and other European countries, so as to apply them to local situations and practices. This study included:

1. Analysis of apartment-house plot coverage. This demonstrated the advantage of blocks larger than those typical in New York, and providing very greatly improved planning organization and sunlight exposure.

2. Plan of community development for an existing vacant square mile of land at that time in one holding in the Brooklyn sector, having adequate transportation facilities to New York. Taking this plot of land in South Brooklyn running down to the shore line, studies were made for a complete community of 25,000 population on 640 acres, or the equivalent of a square mile. The density was to be approximately the same as that in the average mixed residential sections of Brooklyn. There were to be single-family row houses, two-family flats, and apartments. The large number of suites that usually are placed above miles of unnecessary store fronts were to be replaced by apartments in buildings held separate from certain definite, orderly shopping centers devoted exclusively to commercial use.

The street system was reorganized to permit the orderly placement of these various uses. A land and improvement cost was reached, totalling \$4,250,000 for the whole tract. This included the reduction in the length of streets and utilities from a total of 124,000 feet, as shown

Below, a photograph through the middle portion of a block developed in the customary manner, utilizing rear yards and garages on an alley. Contrasted with this in the lower right corner is the centre garden court of a Sunnyside block, in which the distance from rear to rear of houses is the same as in the alley





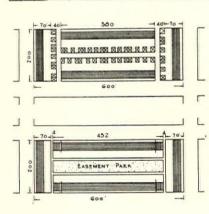
in the city map, to only 86,000 feet as required in the proposed scheme.

In the meantime, however, the property was acquired by a speculative syndicate. They held a gigantic auction sale and marketed about onehalf of the land, leaving the city street pattern as it was. The prices they obtained, if averaged up for the whole tract, would have brought the total to \$6,400,000; and this was with no improvements whatever, apart from a few cinder streets put in to facilitate sale. To complete the improvements would have cost \$3,690,000, bringing the total to \$10,090,000. But such improvements were not made-only cesspools and makeshift street improvements were later provided-and to complete improvement at the time of this writing would cost at least 50 per cent more because it would be a patch and piecemeal job. Thus we have raw land sold as lots for 150 per cent of the price of fully improved land under a good plan, or a difference between \$4,-250,000 as against three times as much, or \$12,-000,000, were the land to be fully improved now. The property as developed has already begun to blight, weighing on the owners and on the city alike.

SUNNYSIDE GARDEN BEGINNINGS

No actual project resulted from the foregoing study, although valuable experience was obtained. Those interested continued in the desire to do something in America commensurate with the Garden Cities in England, and in February,

> scheme. The centre garden merely replaces space normally occupied by alley and garages. These latter are assembled elsewhere in groups, as shown at left through an entrance gateway. The plans show how the removal of alleys adds building frontage to compensate for the space required elsewhere for garages





1924, was organized the City Housing Corporation, with Mr. Alexander M. Bing as president. This was followed by the purchase of about 1100 (20-foot) building lots, occupying about 70 acres gross, in Long Island City, which is closely connected by subway to New York City. This property was planned and developed during the next four years as Sunnyside Gardens.

Planning for Sunnyside was limited by the existing street layout, which followed the customary gridiron, with characteristic New York City blocks of approximately 200×600 to 200×900 feet. Not only did the buildings have to be planned to fit the blocks, rather than vice versa, but it was found that no major street changes could be made. This left at least one through street which would still have to serve as a major traffic artery, tending to cut the community into two parts and increasing the likelihood of accidents. In two minor instances, however, street-endings were vacated by the city and small blocks consolidated for the creation of more favorable building sites.

The building forms adopted followed rather closely the actual plans of certain types common in the Brooklyn and Queens area, including both the typical single-family row house and the twostory flat type dwelling with four rooms and bath for one family on each floor. This last type continued with minor variations as one of the principal plan types throughout Sunnyside, both in two-family dwellings and in three- and fourstory apartments. Later, at Radburn, it served with additional alterations as a two-family dwelling.

Though the plans in themselves were by no means radically different from those of speculative builders, they were used in a manner fundamentally different in every particular of group, block, and community organization. The contrast is eloquently shown in the block plans previously shown on page 86 and accompanying photographs, where a typical Sunnyside block is compared with a speculator's block built at the same time in the same borough. The dwelling types in both instances were almost identical in size and shape. In Sunnyside the usual wasteful, narrow side courts have been eliminated and the space thus gained has been concentrated in the centre of the block, from which garages have been removed. This has given the ample central garden court which is the chief characteristic of Sunnyside. This court actually paid for itself, as shown in the technical study of the costs of these central gardens and the removal of garages to near-by compounds, which may be found in a

pamphlet written by myself and printed in 1929 by the City Planning Institute.

The removal from the block interior of all alleys and garages left a strip of open land sixty feet wide between the ordinary backyard spaces of the dwellings facing opposite streets. Instead of adding this area to the individual rear yards, it was retained as a common park space, although to satisfy mortgage requirements the private lots were deeded back to the centre of the park and the park space set aside for common use on the basis of a 40-year easement.

These central garden spaces, found throughout Sunnyside with a combined length of nearly three-quarters of a mile, are the most distinctive contribution of this project to the technic of planning or housing in fairly congested urban areas. As a matter of fact, however, the architects' early studies of block planning were concerned less with provision of an internal common park space in each block than with an effort to eliminate narrow side yards and to group the garages, with the purpose of reducing the costs. unsightliness, and waste of internal alleys with garages. It was finally decided to remove the garages from the living blocks altogether, to a neighboring compound, utilizing sites of special shape unsuitable for dwellings. This made the internal block park possible and virtually inevitable.

These earlier studies, including architectural detail plans, during the first two years at Sunnyside, were developed by Clarence S. Stein and Henry Wright, architects associated, who were responsible for the general site development leading to the block arrangement with internal park areas and garage segregation. A part of the third year's development was designed by Frederick L. Ackerman, in accordance with the corporation's policy, likewise followed at Radburn, offostering variety in architectural solutions through the participation of several architects.

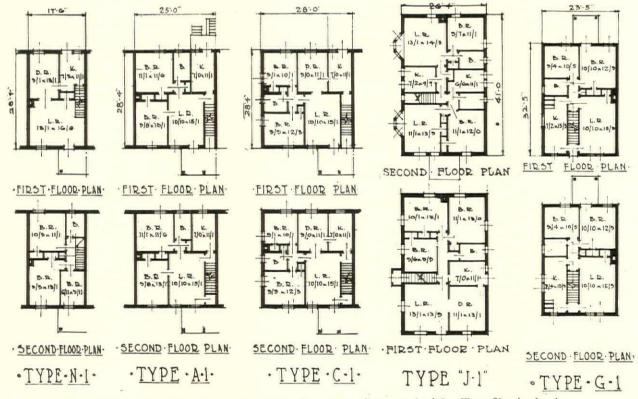
The important accomplishments at Sunnyside rested on the virtual elimination of the original lot lines. The architects were enabled to design both dwellings and apartments in complete blocks, irrespective of any lot-line divisions. In some parts the property did not take in full block ownership, and here there were opportunities to test out single-frontage units. Yet the outstanding advances were achieved through the elimination of the lot-unit limitation. Even in such planning as at Jackson Heights or in the Metropolitan Apartments, at about the same time, this lot unit had been retained, and though the size of the lot was larger than usual, it still imposed fixed limits on building size and shape which handicapped the free organization of building and open spaces.

In the first unit at Sunnyside the architects grouped within one and a half blocks three distinct kinds of accommodation: single-family, two-family, and three-story apartment dwellings. These were segregated into groups related to one another for architectural effect. Not until the second year was the practice begun of organizing both single-family and two-family units containing dwellings, in a single group, with as many as five different sizes or types of plan in one group. This intermingling thereafter became the planning basis for the entire project, and represents a specially significant advance toward "group housing." The third unit comprised two full city blocks 900 feet long each. Lengthwise these blocks were occupied by three row-groupings of one- and two-family dwellings, each such row terminated by a threefamily two-story dwelling set back to cut into the block. This divided these unusually long blocks into three interior courtyards, providing cross-walks at two points, increasing the apparent width of the court, and adding to the architectural interest. The three-family dwelling referred to was in fact a pure invention of the technician to accomplish three objectives: first, to provide both larger and smaller flats than in the other units, that is, a six-room on the first floor

and two three-room flats above; second, to utilize practically the full perimeter of the building advantageously, and third, to provide the breaks in the long blocks as previously noted.

No difficulty was found in the association within a single block of people living in singlefamily houses, in two-family or three-family houses, and in apartments. Neither was there any objection to their owning or renting from: (a) individual owners of two-family or threefamily buildings, or (b) the company, operating rental apartments, except that the company's competition eventually proved difficult for small owners who had purchased two-family and three-family dwellings, and who failed to get rich quickly in competition with the larger-scale management of the company. It may be questioned whether this difficulty was inherent, or whether it resulted from lack of knowledge at the outset that the company would build apartments for rent which would thus compete. The original purchase price, methods of payment, etc., for the houses sold were set up in ignorance of this last factor.

The development of Sunnyside was distinctly a pioneer and experimental process. In spite of careful study and investigation, mistakes were made, particularly in the case of the recreation facilities in the first unit, as later explained under "Recreation."



The release of lot limitations had a definite

Sunnyside employed for the most part the three types shown at the left. Type J-1 is the threefamily unit, while type G-1 provides a two-family scheme for an occasional variation

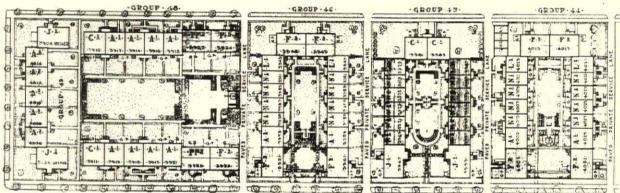
« ARCHITECTURE »

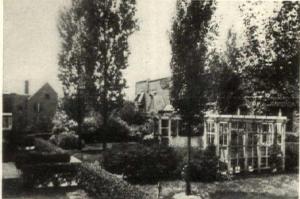
At right, one of the Sunnyside units, consisting of a three-family house, a nineroom two-family house, six flat-roof, six-room, single-family houses, one eight-room two-family unit and one ten-room twofamily unit. Below, the plan shows a Sunnyside block with part use of an



interior park, and part showing the cul-de-sac court.

The illustrations below show, on the left, a Sunnyside interior block park and, on the right, the culde-sac court used at the border of the property. Clarence S. Stein, architect

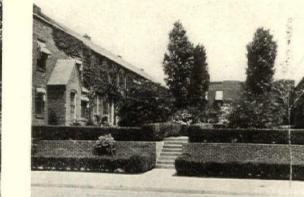




beneficial effect on the planning of the larger apartment units in the later years of the Sunnyside operation. It led to the development of the "perimeter" plan for large apartment units occupying a nominal city block. This simplified method of planning will be more fully covered in the last section of the book, but we may here pause to note the planned relationship between the larger apartment court and the two-and-ahalf-story residential units in the same block. The best example of this is Hamilton Court, which provides a broad opening toward the interior block court, and steps down from four stories to three stories at the end adjoining the lower dwellings. This group also provides necessary store facilities for the community.

More recently a new problem has been raised for Sunnyside by subsequent developments

« ARCHITECTURE »



around it, which have been almost altogether of a four- or six-story apartment type. These neighbors have not only brought a lot of crosstraffic into the Sunnyside community, but have advanced property values and hence raised tax assessments. The assessments have to be paid but it would be impossible for the owner to realize on the higher property value without breaking down the homogeneity of the present community. This situation was not altogether unforeseen, as the planners felt from the outset that the land at Sunnyside, though purchased at low cost, was intrinsically too valuable and too directly in the line of intensive city growth to be suitable for use by single-family houses, and was only barely possible for two-story multi-family buildings. The subsequent experience at Sunnyside raises the general question whether it is

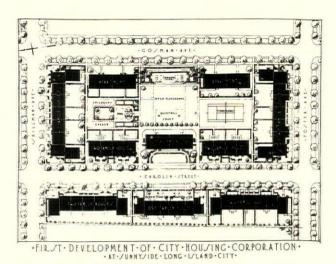
safe to build and sell smaller types of dwellings planned for less intensive use than is contemplated by a general local practice which inevitably results in exaggerated land values. Had the company itself retained ownership, the situation would be altered, since the difficulties of the individual owner arise not from decreased values but from taxes on *increased* values, on which he cannot realize because of disassembled holdings and long-term deed restrictions.

Although the architectural effect at Sunnyside is on the whole harmonious and apparently homogeneous, it represents a continuous evolution of fundamental planning and planning theory. The method of grouping that has been described underwent constant change in the earlier years and a still further development in the latest units at the border of the property. Here there was uncertainty as to possible adjoining uses. Cul-de-sacs opening off interior streets permitted these rim houses to turn their backs to the outside. This arrangement was highly experimental in respect to sale. After a test, however, five such courts were introduced, each of which had all its houses fronting on a courtyard providing for pedestrian entrance only. Between the rears there was a service drive. This variation from the normal was accepted by purchasers of individual holdings, even though some difficulties had to be overcome in deeding.

Another factor in the evolution of the planning was the effort to turn the dwelling around as much as possible so that the living-rooms might face the green court instead of the street. Limitations imposed by the street plan and code restrictions prevented this being carried out to the degree later achieved at Radburn or Chatham Village in Pittsburgh. The problems involved will be discussed when we come to Radburn, but at any rate in Sunnyside it was often possible to place the living-porch at the garden side even though the living-rooms themselves remained toward the street.

APARTMENT-HOUSES IN SUNNYSIDE

Apartment-houses were generally located near the transit lines, both for convenience of the types of families that were expected to occupy them, and in anticipation of higher assessed valuation for such properties. Wilson Court, the last apartment built in Sunnyside Gardens proper, was located on half of a block not entirely owned by the Corporation, and possesses only a partial garden court, while all others are of the full Garden Apartment type,



Block plan of first section at Sunnyside, in which onefamily and two-family two-story dwellings, and threestory apartments, are combined around a block interior with play space for children of various ages and adults. Play space for the later units was provided in Sunnyside Park, it being found somewhat unsatisfactory to combine play space for children and adults

and completely surround their gardens. The Phipps Garden Apartments, built later to occupy a part of the original Sunnyside tract, are an exception to the general rule with respect to location, being removed by several blocks from the subway. This exception was decided on when early studies revealed that grade conditions of this unfavorably sloping site were such as to require excessive costs for sewerage and drainage if devoted to smaller dwellings.

Co-operative apartments, which were included in the programs of the first two years, enjoyed only a qualified popularity, in spite of the thrifty living and sound investment which they offered. Although these co-operative apartments represented the lowest-cost dwellings in Sunnyside (and if tax exemption had been available would have been the lowestpriced dwelling space built anywhere in New York during this period), they have never been as popular as their low cost might have led one to expect. This is explained by the experience here and elsewhere that the lower-income groups who predominated in the earlier period do not have enough general experience in financial matters to appreciate eventual advantages of cooperative ownership, and are more content either to rent or to enjoy the feeling of outright independent ownership.

The notable success of certain projects under the State Housing Board and other moderatecost co-operative projects, are not attributable to any physical or financial advantage. Their success must rather be ascribed to an economic or racial solidarity among the groups housed, such as the Amalgamated Clothing Workers or the Negro occupants of The Paul Dunbar Apartments in Harlem, New York City—a solidarity which goes far toward insuring the success of a well-conceived co-operative project for these groups.

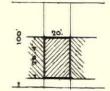
RECREATION AND COMMUNITY FACILITIES

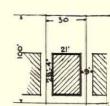
The theory at first was that each block should contain its complete quota of play space, not only for the smallest children but also at least for the medium-sized, and for adults in the form of tennis courts, etc. The plan of the first unit (page 90) shows this organization, which later proved impractical. It gave more than enough space for play area for the small children, while the more noisy play of larger children could more properly be removed to a special playground. This arrangement had the additional advantage of providing a play instructor so necessary to youngsters of this age. Likewise, the tennis court brought an undesirable number of people to the block court, who were apt to remain after dark and disturb adjoining occupants by the continuance of that animated discussion which is so desirable in its proper place. The eventual provision of a three-acre park took the place of the larger interior block areas, leaving in the residential block only the narrow park strips with small children's play courts.

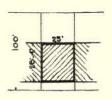
The variety, spontaneity, and vitality of the residents' community activities at Sunnyside, which has often been remarked, arises from the variety of families living there, a variety possible only by virtue of the diversity in dwelling types. But we may properly note and commend the policy of City Housing Corporation, at both Sunnyside and Radburn, of avoiding paternalistic forcing or "pepping-up" of such activities with the purpose of "showing off" these model communities. The astonishingly wide range of resident organizations and interests has been the sincere expression of what the residents wished to engage in and to support, whether it were a garden club, a dramatics group, or a medium for the cooperative purchase of paint and lawn fertilizer.

FACTORS IN SALE OF ROW HOUSES

Popular distrust of the row dwelling was neither expected nor encountered at Sunnyside, since New York's tradition has long included it, and it was quickly accepted on the basis of sale







Problem: Given an interior row house for a lot 20 by 100 feet, to cost \$5,660 without carrying charges or selling costs; how can a better house be gained by spending \$750 more?

To set the house on its own lot 30 by 100 feet with 9 feet for both side yards adds \$965 for side walls, and \$455 for lot. See table, page 94. The gain will be a few windows on narrow side yards looking into the neighbors' windows, and the expenditure of \$670 more than was desired

Or, add 5 feet to width of house in the row group, adding \$500 more for building, \$220 more for land, and \$30 for more windows—a total of \$750. Result: 25 per cent more room on both floors

rather than rental. Certain technical considerations deriving from the attached dwelling had, however, always to be borne in mind during the planning of the project. A paramount requirement was that of simple and legally describable property lines, both with respect to the ground plot and in relation to the junction of party walls, particularly at offsets, etc. It was desired, but not possible, to avoid the use by two families of a single entry-way or porch requiring painting or upkeep. The inevitable discrepancies which have arisen where one family paints regularly and the other does not, while not serious, have been one of the noticeable drawbacks at Sunnyside. This difficulty was later partially overcome by avoiding the use of wooden porches.

Other legal considerations involved the easement provisions for common access walks, utility lines, and for protection of window exposures against encroaching additions to buildings. Forty-year easements preserve the common open use of central court gardens, and deed restrictions require architectural approval of any exterior alterations or additions to the dwellings. All questions arising from the enforcement of deed restrictions are decided by a committee of trustees elected by the owners of a given block, and on which the Corporation has one representative.

RENT

There are contrasting advantages and disadvantages in a rental policy, with "company" title and authority. The company can secure economical and uniform upkeep; it can automatically preserve the proper use and can maintain the community atmosphere; it can permit the tenants to remain mobile, as modern life often requires. These advantages suggest that home ownership is no sine qua non of good housing or of satisfactory home environment. A still greater advantage of renting is that it favors advancement in design. Property lines no longer stand in the way of adjustments between two adjoining diverse units. For purposes of sale we need some new form of joint or stock ownership that does not require deed-line limitations. While not essential to group housing, such a form would be distinctly useful. Perhaps the best example in the past of design fully liberated from the restraints of deed ownerships is the interesting development at St. Martin's, Philadelphiathough this is a high-class community. Some parts of Mariemont, Ohio, are of interest, and the subject is completely demonstrated in the recent project of Chatham Village described in detail in this section.

HOW DID SUNNYSIDE TURN OUT?

It will be asked: who actually came to live at Sunnyside? Did it develop, like so many other housing projects for those with moderate incomes, more or less into a rich man's colony? The sales emphasis was addressed to moderately skilled manual or trade workers, many of foreign birth, and to various grades of the white-collar group. The range has been from policemen, chauffeurs, taxi-drivers, and mechanics of various trades to professional and business people. It is interesting to note that the predominant sales in later years were to these professional, artistic, literary, and business people, not in any way because prices had got beyond the level aimed at, but because Sunnyside offered the only decent and physically attractive community for living in that they could find within any reasonable economic limit in the metropolitan region. That Sunnyside is not a rich man's community may be seen from the median family income of about \$3000 reported in a survey of the community made in 1926. It has come closer to housing adequately the average wage-earner and whitecollar worker than any other desirably equipped metropolitan community.

Sunnyside has offered answers to a number of knotty problems in urban housing, and put its answers to the test. Not only its beginning but its admirable continuance prove that a fairsized community of 1,000 families, more or less spread over 50 to 70 acres, can acquire an entirely new community atmosphere and spirit. In this respect it is sharply differentiated from the surrounding area. Three distinct types of dwellings are successfully related: single-family, small multi-family, and garden apartments. A working relationship has been maintained between owners of single houses, owners of twofamily houses and their tenants, and the tenants of the company in the larger apartment units. These relations created obvious difficulties at first. There were human problems of the same sort as those raised by the deed restrictions, problems which required responsibility on the part of owners and led to the appointment of trustees within each block. The neighborly consideration which these efforts called forth, along with the physical advantages of the plan, helped to weld Sunnyside into a thoroughly conscious and workable community unparalleled in any similar experiment in this country.

In addition to these important social considerations, there were, of course, many minor details which called for painstaking solution in the field of technical organization. It is possible here to cover only a limited number of the most typical of these factors.

YARD AND SERVICE ORGANIZATION

The fact that the row dwelling cannot have the customary rear service entrance through the side yard, while it enhances quiet and privacy, also raises fundamental questions of service and access. Where an ash-producing fuel is used, as at Sunnyside, basement access is necessary and must be provided either through front areaways, by walks between groups to rear yard walk entranceways or by service lanes run between culde-sacs perpendicular to the street to reach areaways at the rear of houses. The latter arrangement is superior for access to laundry-drying vards and for delivery of ice if ice is used. The fully logical plan for row houses with traditional heating and ice-delivery is an arrangement in which kitchens and services face the street or access lane. This simplifies service circulation and preserves a central undisturbed court for living-frontage. It is, however, pointed out elsewhere how current evolutions in heating and other services have largely removed the need for frontage directly on the street.

Garages might be built integral with the row house where the lots are relatively wide, say 30 feet or so, with the service front of the house definitely turned toward the street. The danger of frequent automobile exits remains a factor to consider. In narrower plans, the garage must be provided elsewhere, unless, as at Chatham Vil-

92

lage and parts of Radburn, a hillside situation permits the placement of garages in the basement. Garage compounds may be concentrated at focal points, either within each block or on special nearby sites of small size or special shape unsuitable for dwelling use.

The disadvantage of having the family car at a slight distance from the house is compensated for by the absence of noise and danger, and by the improved appearance and use of the inner block park. The cost equalization of this scheme for garages has been explained previously.

PARTY-WALLS

Sound-proof party walls of reasonable cost are the outstanding constructional requirement of the row house. Neglect of this element will delay the popularization of the group dwelling more than any other single factor. No entirely satisfactory available form of party wall has yet been evolved for a low-cost construction, but the cinder concrete block as used at Chatham Village is a marked improvement on either brick or the usual concrete block wall.

FUNCTIONAL CHARACTERISTICS AND ADVANTAGES

Privacy against both sight and sound is greatly enhanced in the row dwelling through the abolition of the customary narrow side yard with windows opening on dwellings only a few feet away, and through the absence of noise from intruding automobiles and deliveries at the sides and rear.

Actual outlook and sunlight are superior to those of closely or even moderately spaced freestanding houses. All vistas are concentrated in the direction of larger open spaces, which with decent planning become attractive to the eye. Ample window area for light and ventilation is easily provided on these two exposures. The use of the full lot width and shallow building depth permits more livable room arrangements than with free-standing dwellings on the same or somewhat greater lot widths. There are no dimly lighted, stuffy side rooms, and the aggregate of space withdrawn from side yards contributes in large measure to the greater general openness.

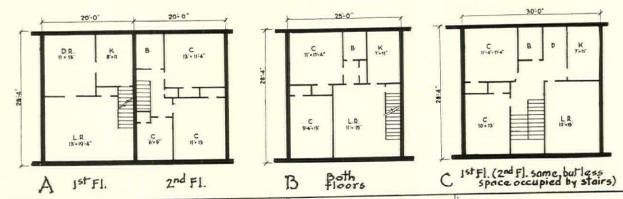
Group dwellings must, however, be properly oriented. It is obvious that since they have but two sides exposed, their direction must be such that it will take advantage of sun and summer breeze. This will affect both the direction in which the building groups run and the position of the rooms themselves. The former will vary with climatic conditions; the latter may be accomplished in reasonably shallow depth, broadfront building space such as is here advocated, and has been observed in recent good row house design. However, there is reason to believe from experience with certain modern German row houses that, given this proper orientation, it is possible to secure a more positive ventilation with openings confined to two opposite sides of the building than may be had through windows on two adjoining sides of a room. It seems apparent also that there are certain definite advantages in a comparatively shallow room with a sufficient amount of light from a single direction. In this connection it is interesting to observe certain modern free-standing houses in Germany built precisely in this manner, having two side walls entirely without windows.

Openness amd privacy are not dependent only upon actual spacing but also upon relation of space to outlook. A row house 25 feet wide has a far better relation to an equivalent open yard than an 18-foot detached house on a 25-foot lot. A well-planned community of group dwellings will produce a greater effect of openness than the provision of the same area per family in any type of detached planning. (Consider the unusual openness of English houses at twelve families per acre and their extensive gardens and outlook !) The row house brings to mind associations with crowding only because of the parsimony of the Philadelphia builder.

TECHNICAL ANALYSIS AND CRITICISM AT SUNNYSIDE

The insistence of the directing architects upon constant and continued experimentation at Sunnyside resulted in a certain degree of annual progress, and in the application of those new principles which gradually evolved through the technical process of design. This factor of progress was essentially limited by the lack of actual experience on the part of the designers, as well as by the dearth of similar experience or at least recorded experience, elsewhere in this country. Inasmuch as the company was organized with the express intention of eventually building a garden city, the architects, in 1924, made a trip to England specifically to study the experience in the two existing English Garden Cities up to that time.

Another factor that held back the early evolution of the design and swayed its character was the lack of cost experience elsewhere. The



Item	A - SINGLE-FAMILY HOUSE			B- SERVICED 2-FAMILY HOUSE (d)			C - NON-SERVICED 2-FAMILY HOUSE (e)		
	Interior Row	End Row or Semi- Detached	Detached House	Interior Row	End Row or Semi- Detached	Detached House	Interior Row	End Row or Semi- Detached	Detached House
Size	20x28.4	20.6x28.4	21x28.4	25x28.4	25.6x28.4	26x28.4	30x28.4	30.6x28.4	31x28.4
Cu. Ft. @ 20¢	17,000	17,425	17,900	21,240	21,665	22,140	25,500	25,925	26.400
Net Cubage Cost	\$3,400	\$3,485	\$3,580	\$4,248	\$4,333	\$4,428	\$5,100	\$5,185	\$5,280
Uniform Items (a)	\$1,420	\$1,420	\$1,420	\$1.420	\$1,420	\$1,420	\$1,420	\$1,420	\$1,420
End Wall		\$450	\$450 .		\$450	\$450	5 - 4 - 4 - 4	\$450	\$450
End Wall, Half Chimney			\$515			\$515	¥. 4.40*	14 - 16 - 16 - 18 - 18 - 18 - 18 - 18 - 18	\$515
Double Equipment (b).				^\$775	\$775	\$775	\$1.200(y)	\$1,200	\$1,200
Total Building Cost	\$4,820	\$5,355	\$5,965	\$6,443	\$6,978	\$7,588	\$7,720	\$8,255	\$8,875
(L) %	100	111	124	100	108	118	100	107	115
Lot Size	20x100	30x100	35x100	25x100	35x100	40x100	30x100	40x100	45x100
Lot Cost, Improved (c)	\$840	\$1,270	\$1,475(x)	\$1,060	\$1,450	\$1,655(x)	\$1,270 .	\$1,630	\$1,835(x
Total Cost	\$5,660	\$6,625	\$7,440	\$7,503	\$8,428	\$9,243	\$8,990 .	\$9,885	\$10,710
Cost per Family	\$5,660	\$6,625	\$7,440	\$3,751	\$4,214	\$4,621	\$4,495 .	\$4,962	\$5,355
(M) %	100	117	131	100	112	123	100	110	119
(N) %	76	89	100	81	91	100 ·	84	92	100
(N) %		117	131	66	75	82	79	87	95

(a) Uniform Items: Stairs, heating (except radiation), plumbing stack and fixtures, bath tiling, kitchen equipment. Porch costs omitted from all types.

(b) Double Equipment: Extra bath and kitchen, special stair hall. (c) Lot cost is based upon land at 10 cents per square foot in lot, with all public improvements and yard work amounting to about \$40 per front foot.

limited type of cost record kept by the general contractor furnished no adequate guide.

Because of this situation the management permitted me, in the winter of 1925-26, to make a critical cost study of the projects then under way. It so turned out that this was the most advantageous period in the work for making such a study, because this winter's construction consisted of only one general type of development in one general location. The work started advantageously about the middle of August and went forward consecutively except for the interruptions of a severe winter. For the spring market there were completed some 270 (d) Serviced two-family house is one in which first-floor occupant provides heat, hot water, and janitor service for second floor.
 (e) Non-serviced two-family house is one with separate heat-

ing plants and separate basement stairs. (x) \$25 added to basic front-foot cost of any lot for freestanding house, for side yard improvements.

(y) Extra heater and special stairs.

dwellings in one-family, two-family, and threefamily units, representing about one and a half million dollars' worth of construction.

The cost data collected represented perhaps the most valuable experience and the best basis for a technic of cost accounting that has been recorded either here or abroad. The subject is to be treated more fully in the manual section devoted to "Cost Accounting." The discoveries made not only affected design at Sunnyside, but proved the value of records continuously kept and analyzed by every agency engaged in any form of large-scale housing. The above cost table illustrates their application.

94

RADBURN

Though Sunnyside had carved a new figure within the hard shell of the city, it was not a garden town. There was still the desire to see what might be done, in the United States, comparable to Letchworth and Welwyn, given a free hand. Even so, English conditions could only be approximated. The permanent surrounding green agricultural belt, characteristic of the true Garden City, was not obtainable at Radburn. There were only limited possibilities



Plot plan of residential section at Radburn. Here are shown the safety-street plan and the arrangement of house groups on closed-end streets. Clarence S. Stein and Henry Wright, architects associated

for purchasing the necessary land, although, in compensation, there was some protection offered the town by the adjoining stream, country club use of surrounding area, and by other factors. Where Radburn retreated from the English ideal, it nevertheless made advances of its own. It was both planned and advertised as the "Town for the Motor Age."

May we assume that some of the contributions to the larger field of town planning are familiar through wide publication and need not be repeated here? There are, however, certain aspects of the experiment, bearing on the technic of community housing, on which attention might profitably be centred.

Radburn was laid out in "super-blocks,"

each enclosing from 30 to 50 acres. Though extremely different in appearance, they directly extended a Sunnyside principle, that of the central park. The shape of the block and that of the park were now freed from the arbitrary restriction of the city map. The cul-de-sac layout of minor service streets was also derived from Sunnyside and from English practice. It reduces the per-family cost of street improvements, provides seclusion from street noise and danger, and completely segregates pedestrian from vehicular traffic. It also makes possible the efficient use of a wide periphery of the superblock, leaving a sizable internal block "core." This core is not impinged upon by streets, it is freed from sharing in their improvement costs, and can serve as a sheltered park.

EVOLUTION OF DWELLING TYPES

Most of the houses are free-standing, singlefamily ones. Since the community was suburban, there had to be storage space for cars, so far as possible integral with the house and later with the two-family unit. The policy was one of sale. This was necessitated by the competition with other such suburban dwellings, and by the exigencies of securing needed mortgage loans. Too definite an adherence to a sales policy was undoubtedly a handicap to the 1930-31 program, when renting would actually have been the easier expedient. By that time the project included a fair proportion of equipped row houses at a low price; but the families at the income level to which these houses were addressed felt too much uncertainty in their financial outlook to undertake the permanent obligations of purchase. They would have been more ready to pay the necessary rentals, as experience elsewhere during this period proved.

The row house was not introduced at Radburn until the third year, and then with hesitation, since suburban people were accustomed only to the purchase of free-standing houses. Its inclusion was forced by the desire for reaching lower cost levels. The opinion of the management and the designers, on the basis of welldemonstrated experience, was that such group dwellings provided the only means of attaining cost reduction.

As a matter of fact, the experiment at Radburn was greatly handicapped by limitations of thought to the point of progress that had been reached at Sunnyside, where the factors of land and building cost had previously required a few tight and relatively narrow forms of row house.



width of plan as adopted later at Chatham Village obviated this limitation.

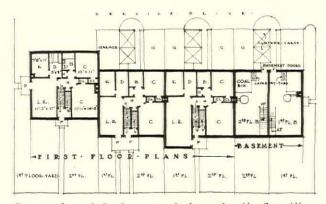
Small multi-family dwellings in the form of two-story flats for four and eight families in each building were also built at Radburn. But there these type of dwellings were built for rent by the company and not for sale. At Sunnyside the two-family dwelling had conformed to New York precedents, by which one family on the lower floor owns the whole house and furnishes complete service to the upper flat. In such an arrangement sale is obviously neces-

Here are two examples of group planning at Radburn. In the upper illustration there are groups of four singlefamily dwellings, with basement garages on the far side. James Renwick Thomson, architect

At the right, a group of four two-family flat dwellings which have individual stairs to half the basement for each family, accommodating individual heating plants and laundries

These at Radburn were hesitatingly expanded from 171/2 to only 181/2 feet. The making of these plans unfortunately failed fully to appreciate the implications of the cost analysis so carefully built up at Sunnyside. The use of this analysis later at Chatham Village showed-as might already have been clear at Radburnthat the 181/2-foot Radburn row house should by all means have been expanded to 20 feet. This would have given a third bedroom and permitted the other rooms to be proportionately improved in the \$8000 house class, for an added building cost of only \$150 and an added land cost of not more than \$75. In other words, it was certainly poor policy to handicap this experimental use of the group house when a 3 per cent added building cost and a scarcely larger total addition to the sales cost, including land, would have added 12 per cent more room within the unit and removed some of its most unfortunate plan limitations. These limitations included, incidentally, the fact that in the Radburn house, with its basement garage, the entrance for both the owner and the occasional visitor frequently was by means of the cellar stairs, which led only to the kitchen on the main floor. The greater





Group plan of the four attached two-family flats illustrated above. Fuel is received through the end of garage next to each basement space. Clarence S. Stein, architect

sary. At Radburn, on the contrary, the families on the two floors were given complete autonomy, in order that ownership might be retained by the corporation. This required an expansion of plan and rearrangement, giving each family part of the basement with separate entrance, separate heating plants, water heating, and other services.* Some of this duplication was advantageous in giving the second-story tenant

 \ast See plans for the two types of flats with table of costs on page 94.

« ARCHITECTURE »

96

better access to the yard and to laundry facilities; but the duplication of stairs, heating plant, etc., required by the company rental policy to obviate the necessity of one tenant doing janitor service for another resulted in a definite increase in the cost of the building per family housed.

Here again the Sunnyside cost analysis had not been fully exploited. The designers overlooked an alternative possibility. Attractive as the latest dwellings at Radburn are as they stand, arranged (see illustration) as an eightfamily group, with each family occupying a 41/2-room flat on one of two floors, the costs had been increased to a point where the flat arrangement was no longer an economy. Thus, while the Radburn examples of two-family dwellings constitute a very definite advance in exterior design, the dual facilities in these dwellings, while avoiding certain difficulties in the Sunnyside types, increased the per-family cost to a point approximately equal to a small $(4\frac{1}{2}$ -room) two-story row house as built later at Chatham Village. The latter would have had advantages of individual yards and private garages which would have reduced some of the company upkeep expense, so that rents could have been no more for the individual house, and undoubtedly their popularity would have been greater. In reaching this conclusion we must not condemn the flat altogether. In its more simple and less costly form at Sunnyside. it formed the cheapest type of small dwelling built either at Sunnyside or at Radburn and will, within its limitations, provide the same cost advantages elsewhere. Its difficulties as a rental unit may be overcome by some type of heating apparatus for upper and lower tenants separately. (For cost comparison see table in The Architectural Record, December, 1932.)

It was, however, not until the study for the Chatham Village project that these various cost comparisons became evident. Their release of the previous restrictions caused by the sales objective at Sunnyside and Radburn, and a realization of the value of the Sunnyside cost analysis, set the technical mind free of inhibitions and gave a new impetus to imaginative planning. There was the further factor in the Chatham Village studies, that the consulting architects were made responsible for estimating the full service costs for the rental dwellings rather than only the mere construction cost.

It is of the utmost importance to the architectural profession to employ such analysis not merely the conclusions advanced here, which, being the result of individual work, can-

« ARCHITECTURE »

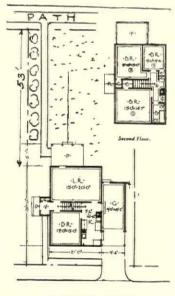
not be exhaustive—but careful gathering of actual rather than estimated cost should provide a sound basis for freer and more imaginative progress augmented by mutual exchange and constant refinement. Such processes are the *sine qua non* of any housing technic worth striving for. For the present, the reader wishing to follow up the subject of cost analysis is referred to Appendix No. 6 of the Report of the Committee on Design, The President's Conference on Home Building and Home Ownership, 1931, and *The Architectural Record*, December, 1931, December, 1932, and March, 1932.

Those using these references are here strongly urged to prepare corresponding material from their own experience and for their own locality, since the cost units or tables presented cannot, in the nature of the case, do more than illustrate view-point and method. A crib-book use of tables and statistics is quite as pernicious as the unaltered and unimaginative cribbing of stylistic details.

REVERSING THE HOUSE FRONT

An outstanding achievement at Radburn was the reversal of the house front in moderatecost dwellings. The street exists for service. In the days of leisurely carriages it was pleasant to look up and down the street to follow the town's social life. This is a dubious advantage in these days of the automobile. The streetfronting entrance that began as a convenience survives mainly as useless display. That the street should once more be relegated to the position of a service factor was an idea of many designers, including myself, long before the de-

One of the early plans for single-family detached houses at Radburn. It is provided with three separate house entrances. Later plans eliminated one entrance



ROADWAY

velopment of the unique Radburn street and "lane" plan. The evolution of this idea is covered in an article in *The Western Architect* for September, 1930. Unfortunately the full economics of the plan have not yet been worked out in an exposition that would be available to every designer. There is no room for it here, but only for a word of comment.

What seemed a very simple process, that of turning the free-standing house around to face the garden instead of the street, actually proved to be complicated, and required months of study. The rational form is not the easiest, when irrational forms have become the basis of far-ramifying customs. Even when the purchaser is enthusiastic over the change, his banker may remain hostile. The banker is often an enthusiastic exponent of "what the public wants"—namely nothing different.

The usual house with its front to the street wastes its opportunity to be well connected with the garden. At Sunnyside the first steps toward eliminating this waste had been taken, as already recounted, by the shift of the livingporch. The reversal of the whole plan at Radburn was one of the chief contributions there to housing in general. At Chatham Village we shall see the principle carried forward to a yet higher development.

CO-ORDINATING THE WORK OF TECHNICIANS

In the ordinary free-standing house, so small a matter as providing roof drainage is very simply cared for. Gutters are hung, downspouts are led, as the case may be, to the house drain, the dry well, or splash block; that is all. Not so in group housing. Here the architect, the engineer, and the constructor, to say nothing of the owner-all have conflicting fingers in the pie. The architect would wish to pitch and vary his roofs for mass effects, and place his leaders for inconspiciousness or symmetry; the engineer, charged with draining a given area to storm sewers, would insist that discharges from roofs be brought around as far as possible to the "lane" side of the house, from which the run-off to street catch-basins could take place on the surface of the paved service lane. This in turn raises the question of ice formation and danger; dry-well disposal may prevent other peculiar difficulties. The construction department, meanwhile, under pressure to keep costs down, would argue for the minimum number and maximum spacing of the leaders, while the owner-yet-to-come would be principally concerned with whether any of the roof above his house would drain to the leaders of his neighbor and cause trouble, or embarrassment, if his neighbor were slack about repairs. To make a long story short, it became a recognized policy and part of the regular sequence in designing any group of houses to require that a roof-drainage plan be evolved synchronously with grade plans, utility plans, walk plans, excavation plans, and all the rest. Such a drainage plan had to be jointly agreed upon by all three technicians involved, while a weather eye was kept on this, as on every other item, by the sales department.

The securing of visual vistas in the completed house groups was another endeavor in which every one had to learn by experience. In a number of places in the early groups it was found that even the most diligent attempts to visualize final effects from plans or even from perspectives or models, had failed to reveal all flaws. In spite of everything, a pair of garage doors would still constitute the closure for a garden view, or a telephone pole would locate itself irritatingly in the midst of an otherwise attractive outlook. At Chatham Village, later on, all utilities were fortunately carried underground without expense to the project itself; but as work progressed at Radburn the difficulty was solved by making and enforcing a rigorous plan which placed all poles, hydrants, and other such protrusions in the most inoffensive positions consistent with efficiency. It was also found that in certain vistas the shortcomings could have been "planted out," or the potentialities enhanced if the landscape architect and others had been apprised in time by fully co-ordinated plans. Thus it became the policy in later work to study carefully the vistas in all open spaces, including even the relation of minor openings between the houses in one tier to those in succeding tiers, in order that all offsets, planting, and other such elements might be visualized before it was too late.

RADBURN IN USE, THE RADBURN ASSOCIATION

Not the least important aspect of Radburn is the extent to which the provision of the rather elaborate though practical features of its new street plan and block organization, and particularly its system of central parks, stimulated the growth of community activities and cooperation. If these had been less wholeheartedly carried through, it would have been possible that the interior parks would have remained unused and neglected, as in many previous cases, even in certain English precedents. But the whole life of the community revolved around its central block park system. Once the motor-car was put away in the garage that was entered from the lane, the street was forgotten. All activities, including walking from one home to visit friends in another, took place over the park walks. Here children played because the things that attracted them were centred in the park or made accessible from its walks instead of from the streets.

These special provisions failed to conform to the usual locations in which the city government would naturally function. Their maintenance required a permanent organization with authority and ability to control them and keep them in condition. The Radburn Association, set up after an exhaustive study of similar though less comprehensive organizations elsewhere, holds the key to the present success of the project and to the largely voluntary resident clubs and other widespread community activities. At an assessment equal to one half (eventually a maximum) of the normal town taxes, the residents pay for a variety of services, such as park upkeep, walk lighting, play director, swimming-pool costs, including directors, association management, and legal expenses.

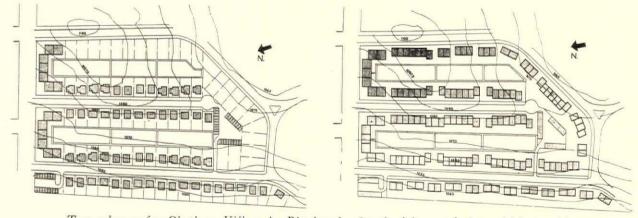
So satisfied were they with their bargain that, when costs of new dwellings during the early part of the depression had fallen to a point where the residents might have sacrificed their purchase contract and moved elsewhere at an actual cost advantage, they remained for the simple reason that nowhere else could they have both a house and the community surroundings and advantages represented by the complete "Radburn Plan."

CHATHAM VILLAGE

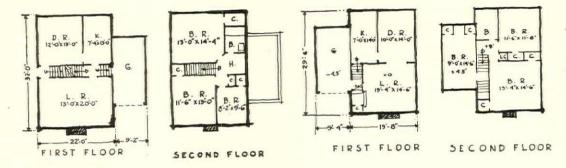
Chatham Village in Pittsburgh is the first, and apparently a very successful first, use of large foundation or trust funds as a capital investment in housing.

Mr. C. F. Lewis, the director of the Buhl Foundation, spent nearly two years studying the needs of Pittsburgh, and also checked up the experience of large-scale developments done under limited-dividend charters. After this he was convinced that an investment in housing would be thoroughly secure. Not until then did the closer study of the project begin.

The usual story at the time was that Pittsburgh was overbuilt. The investigation proved this statement to be a distortion. Whatever oversupply existed in certain high-priced dwelling types did not extend to dwellings within reach of moderate incomes. Indeed, so high were the rents that suitable space for these moderate incomes, particularly of the clerical groups, was almost non-existent. The full account of the survey has been published, along with the subsequent survey, by the Bureau of Business Administration, Pittsburgh University, which investigated directly the requirements of the clerical workers, their income capacity, and locations they principally occupied. The latter report is to be found as Appendix VI in the Report of the Committee on Large-Scale Operations of the President's Conference on Home Building and Home Ownership, 1931. This material will prove invaluable to those interested in housing problems of a similar nature.



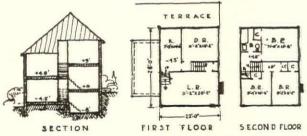
Two schemes for Chatham Village in Pittsburgh. On the left, a solution which provides eighty six-room houses to sell at an average of approximately \$10,500. On the right, another scheme utilizing the interior row house. The 128 row houses, it was found, could be sold for between \$7,860 and \$9,042. This is the scheme finally adopted



After the completion of the original survey, a search was made by men of experience, both in Pittsburgh and in limited-dividend housing in New York, for an appropriate site for a reasonably large development. The three sites finally considered all presented problems of hillside development. All three had remained unused, partly because of these physical difficulties. It was finally decided to erect, on the site at present occupied, a group of single-family houses to sell for not more than \$10,000 or at most \$12,000 apiece, on favorable time payments. It was anticipated that the low land cost would compensate at least in part for the unquestionably higher development costs entailed.

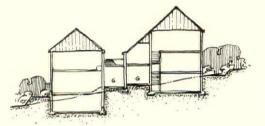
At this point the Foundation called in the architectural consultants to study the problem in terms of the general recommendations thus reached. The consultants were doubtful as to these premises from the outset. It did not seem that single detached houses could be brought within the income limits of the people to be housed. It was agreed, however, that they should first bend every effort to a solution in those terms. The early studies provided two schemes of allotment. In both, the lots were approximately forty feet wide and to be occupied by six-room brick houses, with, for the most part, built-in garages. These houses were based on the new Radburn types, but had to provide step-ups and step-downs to meet the steep gradients of the property.

Another type of house was arranged with two-story accommodations on four different



Plans for a detached house on four levels, to occupy a lot in Chatham Village on the lower side of a street running with the contours

At the left, plans for a pair of houses at Chatham Village to face the street, rising with a steep grade. The cross-section shown_below makes_clearer the relationship of the two



levels, with a half-flight drop between the front and back half of each dwelling, for use on the down-hill side of streets paralleling the contours. The two schemes of subdivision noted above were:

a. All lots to face the streets, which were to run approximately parallel to the contours, with a heavy rise in grade from the lower street to the one next above to be taken up in five different terraces, and

b. Lanes running perpendicular to a base entrance street that would be parallel to the contours, each lane rising the maximum possible for driveway purposes, with lots terracing at their side-lines, either individually or in pairs, as shown in diagrams.

An experienced local builder was asked to furnish estimates based on actual Radburn plans and specifications of similar type. These Radburn types were not recommended for copying, but were used as a working base from which the feasibility of the scheme could be judged as a whole. Plans would later have to be restudied in terms of plan details suited to Pittsburgh.

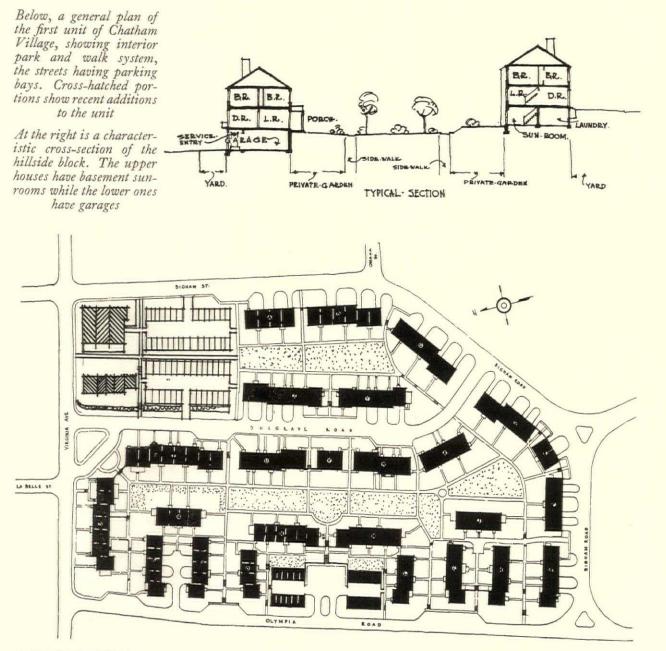
Carefully estimated in this fashion, the cost of the houses came to the high figure of \$9,500 to \$12,000, due to the unusually high construction costs for this city. Such prices would have required monthly payments, calculated on the basis of Sunnyside experience, of from \$75 to \$95 per month, not including heat. Although these costs actually fell within the prescribed range, they were uncomfortably near the top. The consultants therefore submitted an alternate plan, using the street system first mentioned above. Group houses were substituted for free-standing ones. The grouping of 4 to 8

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houses together permitted a total of 128 instead of 78 or 84 houses, the living-floor capacity per unit remaining almost equal. Selling prices could be reduced approximately 25 per cent.

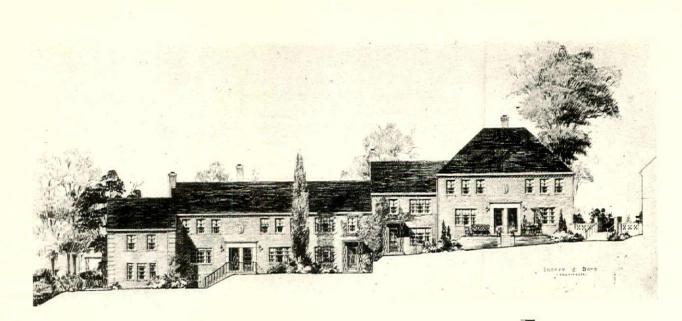
The alternative schemes were thoroughly studied by the Foundation Board. After careful consideration they instructed the consultants to develop a finished report on the basis of the grouped houses. Their dominating motive was far-sighted. Though it was improbable that the Pittsburgh home-seeker would accept houses in groups for purchase, yet it was thought better to build something *clearly within the price range of those needing the houses*, and if necessary to rent instead of attempting to sell. Indeed, upon more mature consideration, it was noted that there is no very great gap between renting and selling. In selling houses on long terms, the Foundation would not be relieved of responsibility any way for a long period of years. It might quite as well assume the responsibilities of ownership and management. This would not only give the Foundation better control of the project, but might prove actually more advantageous to those who were secured as its residents. Subsequent events have proved this step to have been very wise, and the limited experience to date indicates that the occupants are just as well if not better served and as happy as they would have been had they purchased.

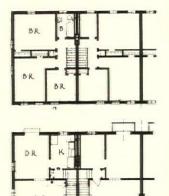
To the technicians, the decision to rent was a relief. It removed many of the limits placed on their technical approach in previous "plannedto-sell" non-profit-making undertakings. The



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At top of page, preliminary sketch of the garden side of Chatham Village group facing a slope of over 10 per cent. The vertical drops in elevation are less expensive than horizontal offsets introduced to relieve monotony in groups on flat land.

The floor plans show the two general types employed for the first unit of 125

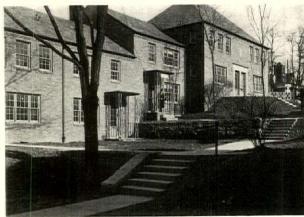
houses—a six-room house and a four and a half room house. The former was developed in two depths of approximately 26 and 28 feet.

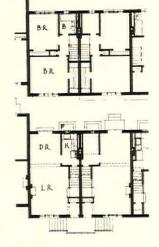
Previous plans at Sunnyside and Radburn had been 17½ and 18½ feet in width respectively. The third bedroom was very small. In this Chatham Village plan of 20½ feet front, the rooms are all larger and

problem became how to design the best possible, most efficient, and most economically maintainable dwellings, not how to meet the usual idiosyncrasies of the inexperienced family undertaking a purchase contract.

Not the least important aspect of Chatham







the smallest bedroom rendered serviceable in size and furniture space. The hall between living-room and kitchen permits entrance from basement garage without traversing the kitchen.

At Sunnyside and Radburn it had been assumed, on the basis of incomplete analytical study, that a four and a half room suite must neces-

sarily be built as a flat to compete in cost with the sixroom house. At Chatham Village, however, a very successful four and a half room house was developed to rent at about ten dollars below the six-room house, and proved especially popular.

The photographs show : above, a court running with the contours ; below, part of group shown at top.

Village was that it constituted the first careful adjustment of a low-cost housing development to a hillside. Although the consultants followed through the experience at Sunnyside and Radburn, a technic more or less new was necessary from the outset. On a hillside it was found that

you can secure a somewhat greater intensiveness of coverage without impairing openness and view. It was judged favorable, as it actually proved in experience, to spend liberally for a radical grading of the site into fewer, more or less regular, terrace levels, rather than make a lot of detailed adjustments by means of the final landscape treatment: in other words, to increase steam-shovel work and reduce hand power. Again, it was shown that grouped row houses could be fitted to hillsides with actually less expense than detached houses. One reason was the reduction in the number of terrace and step adjustments in spaces between dwellings. Another reason was the fact that the foundation wall of the row house formed a satisfactory retaining wall at much less expense than an independent wall without the weight and bracing added by the superimposed house structure. Naturally, orientation is a factor in this matter, and it was perhaps only by accident that the site of this first hillside development had a sufficiently favorable western exposure to permit these advantages to be taken.

The experience in this project is offered as a successful example of very necessary co-operation between a large number of agencies required in its procedure to the point of actual occupancy. The architects, as consultants, extended their original function to the point of interpreting both site and building costs into comparative rentals, taking into account financing, depreciation, and management. Their work was in no way intended to limit the work of the designing architects. Yet it was thorough enough to remain a reliable guide throughout all subsequent work. The consultant services were continued throughout the detailed design by both the architects and the engineers. Operations were held so close to the original cost estimates as to assure the Foundation at all times that the final results would conform to the rental figures set out in the original report.

The project suggests that 125 dwellings, the number completed in the first section, are enough to secure decided advantages through large-scale operations. For the greatest economy in management double the number might work better and would also give a more thoroughly balanced community, although the present number is not bad.

Aside from its more technical aspects, the Chatham Village project has demonstrated two very important things.

First is the advantage of rental over individual ownership to both the company initiating the project and the ultimate occupants. The advantages in providing greater freedom in design have already been pointed out. But the conditions for successful rental entail the mutual interest of owner and tenant in maintaining the best service at the lowest rentals possible, as well as an assurance of permanency of the tenant so long as his conduct does not conflict with the character and objectives of the community.

Second is the demonstration that the type of "group housing" which at Chatham Village is, for the time being, confined to single-family row houses, need not conform to the usual standards of the locality if it has assured merits and superior features which are suitable to the groups to be housed. In fact, the Chatham Village experiment goes still further in demonstrating that our young people of the more well-to-do classes are not satisfied with their present housing accommodations. Their available choice now is between an expensive single house and a small residential type apartment. It is very certain that no amount of abstract argument could have convinced such young people that they should live in a "row house"; but when superior row houses were built at Chatham, including practically automatic heating made possible by natural gas, numbers of such young people migrated from their natural locations in the east end of Pittsburgh to Chatham Village, although its location in an old southwest section would have been the last place they might have thought of living. Chatham Village is unique today in that on June 1, 1933, it was 100 per cent occupied at rentals representing a moderate return on the investment and a depreciation reserve.*

^{*}A very exhaustive study of the many practical architectural, engineering, and maintenance problems at Sunnyside, Radburn, and Chatham Village will be found in the "Manual of Practice" section of the completed book.

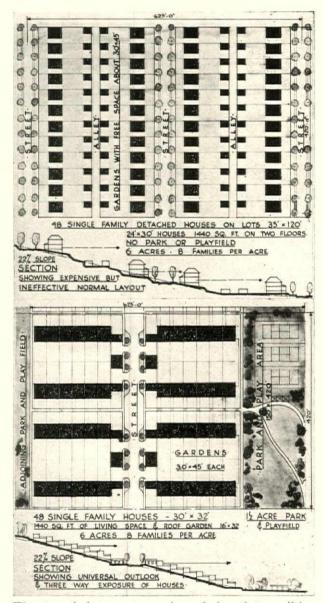
VI. ENTER THE GROUP DWELLING

HROUGHOUT the history of the War housing movement, of Sunnyside, Radburn, and Chatham Village, there is the gradual development and improvement of the better-known forms of group row houses, twofamily dwellings, and small apartments. But there emerges more than the improvement of familiar forms: there is an evolution embracing plans, servicing, and interrelationship, that forecasts the application of all the principles to some freer and more diverse form of emergent group dwelling, such as was described at the opening of the last chapter. Why should we go on, either confining our projects to one or another of these better-known types of homes, however valuable? And why fail to advance them all to a new position, in which, through some modern and adequate form of tenant-owner occupancy, they can satisfy requirements of a wider range? We need to provide not only for the diverse requirements of various types of family, but to consider this family as a developing, rather than a static, institution, so that its home must continue to satisfy its needs as these needs change. Moreover, why not provide for those equally deserving fragments and odd families that are a real part in the sum total of any actual community?

The changing human habits and attributes of the family have been dealt with previously; the changes in mechanical services for the home which render the apartment unnecessary and the group dwelling increasingly practical are to be presented later under the heading of "Evolutionary Factors." Let us here develop theoretically, or even practically in a few instances, the possibilities of a more comprehensive complement of group-housing facilities in the form of dwelling space, capable of wide variation but harmonious integration.

HILLSIDE GROUP HOUSING

The theoretical studies at the small summer school held at my New Jersey country home, in the summer of 1932, did not start out to do more than provide some interesting and provocative experimentation in site planning for a number of graduate students in architecture. The results, however, led to the discovery of a special technic for hillside housing, particularly for steep hillsides, which should in time open up a new field for attractive small dwellings particularly suitable for young people, near high-class suburban communities. The uniform requirements set forth at the outset were that every living suite should have a distant horizontal outlook, preferably from its living-room, and that each should be related to its own garden, either at the



The struggle between two points of view that condition the whole future welfare of American housing. In the upper plan, to provide individual autonomy, the entire tract is divided into forty-eight house lots. In the lower plan the same number of houses are arranged in a pattern requiring one-half as much of street area and no alleys. Each house has an outlook over its neighbor. A one and one-half acre park is gained in the low land. (Architectural League exhibition of Hillside Housing)

ground level or on a roof space of adequate dimensions.*

EVOLUTIONARY FACTORS WHICH PAR-TICULARLY ENHANCE THE EFFEC-TIVENESS OF THE GROUP DWELLING

SERVICE DEVELOPMENTS

Automatic refrigeration: This has now been perfected and simplified to the point where capital and use costs are little above those for ice refrigeration; the difference is easily compensated for by the better preservation of food and the greater flexibility of plans, through the elimination of awkward and objectionable ice-deliveries. It may be assumed that most desirable new housing will include this equipment.

Incineration: Small domestic incinerators, costing less than a hundred dollars for the mechanical unit, are now on the market, the flues for which can be economically associated with the necessary masonry walls of a group dwelling. The use of these flues in common by two or more families in group dwellings permits the use of incineration at an economic level where the freestanding single house could not afford it. Residual ash from these incinerators is estimated at about 5 per cent of the volume of the matter burned, which permits infrequent removal. Odor and smoke from properly installed incinerators of adequate size should prove negligible, but flying ash from papers, etc., must be guarded against by screening or other protection in the installation.

Heating with piped fuel: The experience of large model housing operations makes it increasingly clear that central heating plants for large buildings involve capital and wage costs which tend to outweigh the fuel efficiencies introduced. Partly in response to this observation there are being developed small individual heaters (using gas or oil, with the future probability of electric storage heaters to utilize cheap rates on off-peak loads) which operate at high efficiency with virtually no attention. These avoid the excessive capital and operating costs of large boiler plants, and in addition encourage thrift in the use of heat and hot water by rendering each family responsible for its own fuel bill. These heaters, in forms already available, need not be placed in the basement, but may under certain conditions occupy special closets or compartments on the living floors. This eliminates the necessity for

* The results of this study appeared as an exhibition at The Architectural League of New York and were printed in *The Architectural Record* for October, 1932.

basement space except as used for garden-level apartments or storage space.

The extension of natural gas at low rates into many cities of the north central and eastern portions of the country brings this type of heating into the range of practicability over large areas, while reasonably cheap fuel oil is universally available. Heat-loss is characteristically low in group dwellings because of party walls and superimposed living floors, and the ease of insulating the smaller areas of exposed walls makes these types of heating equitable for group housing even where fuel costs may be slightly higher per B.t.u.

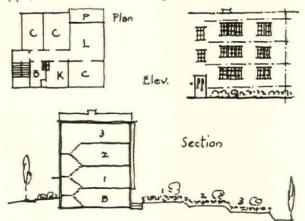
NEW FREEDOM IN BUILDING ORGANIZATION

All of the foregoing render the building plan itself more flexible and reduce the need for large apartments either on many floors or closely related in horizontal position, such as have been considered necessary in the past.

The incorporation of these service features endows with virtually all the convenience of the apartment-house the various forms of group dwellings, which retain a superior close relation to the ground, individual gardens, and greater privacy. Occupants may leave their homes unattended with no more thought for frozen pipes, the ice-man, or furnace-tenders, than they would in an apartment suite.

Freedom is gained for planning circulation within the dwelling. Where there is no need to carry ashes from the basement, or ice and garbage to and from the kitchen, rear service stairs (which have often been omitted from model housing projects even prior to these new service developments) are now wholly unnecessary, though many cities still do and may in future tend to retain them from habit or because of the requirements of archaic building codes. These latter should be modified. Fire egress by means of rear stairs, customary in three-story flats, is unnecessary in two-story buildings, and, in the special types of three-story buildings herein postulated, may likewise be unnecessary in view of fireproof construction developments, or may be provided by roof or horizontal fire-escape egress without complication of the building plan.

Street frontage for delivery access is no longer necessary, and the entire basis of house grouping with relation to the street can be entirely revised, with great gains in livability and economies of street costs. These should more than offset any additional costs incurred through any of the above-mentioned service facilities. In the article in June, 1933, ARCHITECTURE entitled "Are We Ready for a Housing Advance?" I gave great credit to the German architects and engineers for having solved in an admirable and progressively better way, in respect to access and orientation, the problems of community building as received by them. I claimed, however, that, good as these were as technical achievements, they were handicapped by the illogical assumptions which restricted their make-up to a combination of limited and segregated units, including, on the one hand, single-family row houses of an old-fashioned type, and on the other, repetitive modern apart-



Plan, elevation, and section of a very common type of four and a half room apartment—the Britz project in Berlin. The apartments are identical on each floor and throughout long building groups, the unit being about 30 by 32 feet. The section shows the basement access to gardens for each family

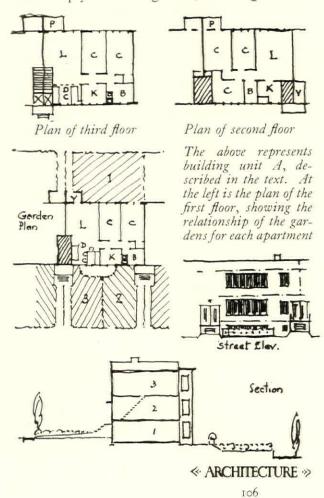
ments of very limited capacities and fulfilling a very definitely different set of requirements.

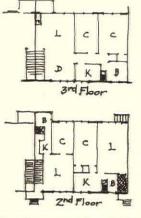
I then proceeded to suggest a set-up of assumptions which called for an intermingling in fact and in design of not only the above widely different housing types, but all the intermediate sizes and types of both one-story and two-story living suites, which might meet the varying needs of a diversified modern community. This extended to the considerations of method of rental or ownership, the latter necessarily on some joint-stock basis, and also to the amount and relationship to garden spaces and other community facilities.

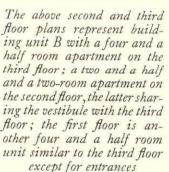
In the above sketch I have shown how the very attractive group of apartments at Britz does provide somewhat inconveniently for garden spaces for every apartment suite even in a three-story building having apartments identical in size. Yet there is generous provision of space for the gardens which surround the houses, these being the units in the second type of dwellings used in this project. There followed in the article very rough suggestions as to how a variation from these illogical assumptions might be worked out in a threestory structure, which would be in the nature of the "Group Dwelling" as envisaged in this section of the book. Since the page arrangement in the article was such as to permit one to follow only with difficulty the explanation of the diagrams, they are reproduced here in more convenient form.

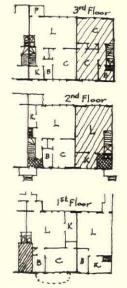
This and the opposite page carry the detailed plans and explanations, while at the bottom of the opposite page is the rough suggestion of the combination of the varied units into continuous building space. Community interest would be enhanced by variations in length and interrelation of such groups.

Our object is to replace the identical four and one-half room apartment units and uniform, segregated, single-family houses with a diversity of types. The first floor is dropped a few feet, to the top garden level; on the outside of the curve this puts it a few feet below the front yard. This will permit masking the minor rooms, which are placed on the side of the front yard and are shielded by a hedge. All entrances are directly at the exterior of the building. They are approached along paths that slope a little more steeply than the garden, reducing exterior









The C unit: on the second floor a two and a half room unit, and the lower part of a twostory unit of five rooms with bedrooms on the third floor

steps to a minimum. The first-floor entrances are on the opposite side, and are reached by an occasional archway through the building, such as already exist.

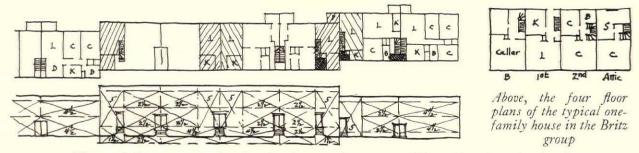
With this preliminary modification, which gives all floors their direct outside entrance, and necessitates only one flight of internal stairway (from the second to the third floor), we are ready to vary our types. Three different building units have been evolved, called A, B, and C, all of the same width and interchangeable. Building A might have identical four and one-half room apartments on all floors if the vestibule entrance were shared by the second and third. To give these two floors separate entrances and direct access to their respective gardens, a variation can be introduced in the second floor, giving it a second vestibule and one more bedroom instead of the dining alcove shown on the standard plan.

When we come to Building B we have on each—or either—side of the stair a four and one-half room apartment on the third floor; on the second floor one two and one-half room suite, and one two-room suite that shares the vestibule with the third floor; on the first floor is another four and one-half room unit similar to the one on the third floor except for entrances.

In the C unit there is on the second floor one two and one-half room unit and also the first floor of a two-story unit of five rooms, with its bedrooms on the third floor. The rest of the third floor is occupied by a three-room apartment. The ground floor can contain the usual four and one-half room unit, provided that the floor above is made to support the upper partitions; otherwise the ground floor can be divided into one two and one-half room and one one and one-half room apartment as shown.

A larger composition based upon A, B, and C units might then work out as shown in the plan and diagram. Any number of other variations would be possible without showing differently on the exterior, since the ground-floor divergencies would be hidden by the hedge. No basement is required, though a pipe and conduit trench might be needed along the outside of the front wall. Heating would be by small gas-fired boilers for hot-water radiation in each apartment separately, the apparatus for which is now perfected, eliminating all piping except gas and cold water to each apartment. The stacks for these boilers are provided in the plan. Waste would have to be carried to common points here and there in the development, unless incinerator stacks were introduced.

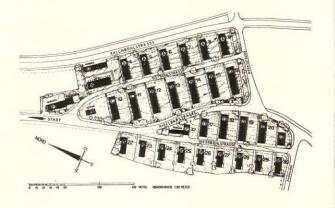
An excellent and almost unique illustration of many, though not all, of the proposed attributes of group dwellings has been actually in existence for a number of years at Neubühl, Zurich. The interesting conditions under which this development came into being as a group product on the part of certain of the younger architects is to be told elsewhere by another



Plan and diagrammatic elevation showing one of many possible combinations of units A, B, and C in two- and three-story dwellings. Any number of other variations would be possible without destroying the unity of the exterior as a whole

author. It is illustrated here just sufficiently to show the wide range of dwellings in a project with scarcely 200 suites. Apartments range from one or two rooms to four or five, with the possibility, by the shift of a door, of a fourbedroom, six-room suite in one side of the larger apartment units. There are four sizes of singlefamily row houses. Here a hillside has been used in stepping down certain groups almost as drastically as in the theoretical examples mentioned.





edeckter sitzdiałz

ohnraut

erdoeschoss

schlafrau

schlai

oedeckter sitzplatz

erdgeschose

schlatraum

schlairaum

me a bad vorplatz

opdeckter sitzplatz

kuctie

erdgeschoss

schlafraum

wohnraum

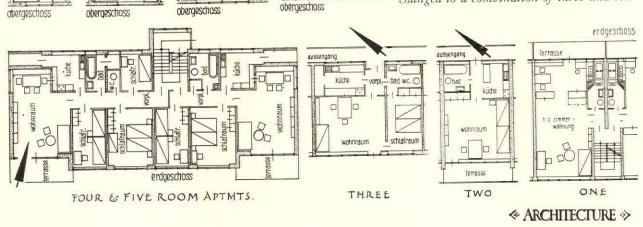
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All the illustrations on this page show the Neubuhl housing project at Zurich, Switzerland, the joint product of a group of architects. A total of two hundred suites provides apartments of from one to six rooms and row dwellings of two, three, and four bedrooms. Tenants must also be stockholders. There is a 400 per cent variation in rents, but the illustration above, of a one-room apartment, indicates that apartments for the most modest rentals have all the quality of the larger ones. Each dwelling has a wide spread of windows toward the south.

The four sizes of single-family houses are shown herewith in plan, and below, plans of apartments in various sizes. The four and five-room apartments are easily changed to a combination of three and six



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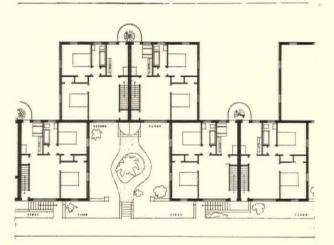
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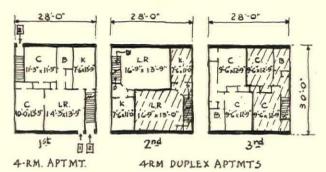
GROUP DWELLINGS IN RECENT AMERICAN STUDIES

Finally we have to present some of the many recent plans developed by certain architects, based more or less upon my own theoretical studies at various times. Some of these antedated my article in the March, 1932, Architectural Record. This latter should be reviewed by students in connection with this study.

Mr. E. H. Klaber, architect, of Chicago, has from time to time made studies of the group row house in contrast with Chicago's usual threestory flats. Mr. Norman N. Rice, of Philadelphia, has performed the reverse service for that city.

In connection with a possible housing project, Mr. Clarence S. Stein, architect, of New York, has developed a fairly complete series of twoand three-story units for group dwellings without common halls or janitor service. The most promising of these is one suited best to building rows running north and south. In this case he obtains an efficient use of three-story space for three four-room suites—one on the ground floor and two running through from the second to the

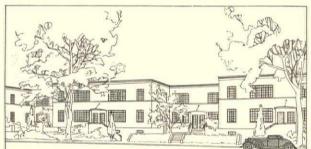


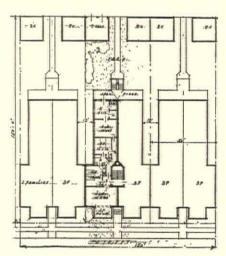


An ingenious arrangement by Clarence S. Stein, architect, for a three-story three-family house with four-room flat below and two upper floors shared by two four-room duplexes

third floor with stair entrance from opposite sides of the building, and arranged so that there is full cross-draft on both the living and bedroom floors. There still remains the problem of grouping these unit plans into effective community organizations, with due reference to exposure, sunlight, access, recreation, and other living requirements.

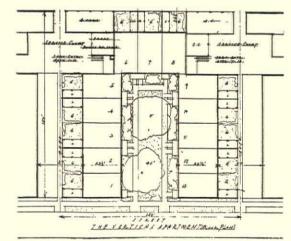
To certain readers a survey such as this may have proved not sufficiently dramatic. We have not taken the city map and boldly crossed it off with a big X with the idea of a "fresh start," entirely revolutionary and "modern." Such plans are generally destined only for paper. And at least we have not fallen into that other trap so inviting to the socially minded, of accepting un-

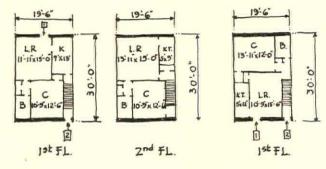


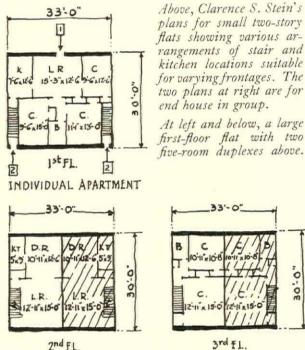


Above, plan and perspective of a study by Norman N. Rice, providing three exposures through a "crankshaft" grouping of units

Studies by E. H. Klaber, architect, comparing the typical Chicago sixfamily buildings on 50-foot frontages with (right) a grouping of three-story apartments as row houses









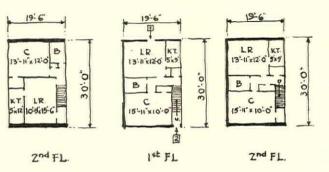
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DUPLEX APARTMENTS

challenged the figures laid before them by the land speculators and relying for a solution on the invincible powers of crusading good-will, on the principle, perhaps, that God helps children, fools, and the United States.

It has instead been possible to project new possibilities for modern forms of city housing that find their roots in the past but reach into a more hopeful future. We have passed in review a consecutive body of experience, where the designers have been given at least a fragmentary opportunity to let reason and imagination release themselves from prejudices and reservations. Under conditions, no matter how limited, of large-scale operations, the designer was able to be something of a modern technician, comparable in dignity and freedom to the technicians in our other arts and sciences.

In the United States we have a peculiar advantage over other countries in seeking liberation from set forms and limited arrangements in that we have developed to an extraordinary degree new structural and service devices. The oil-



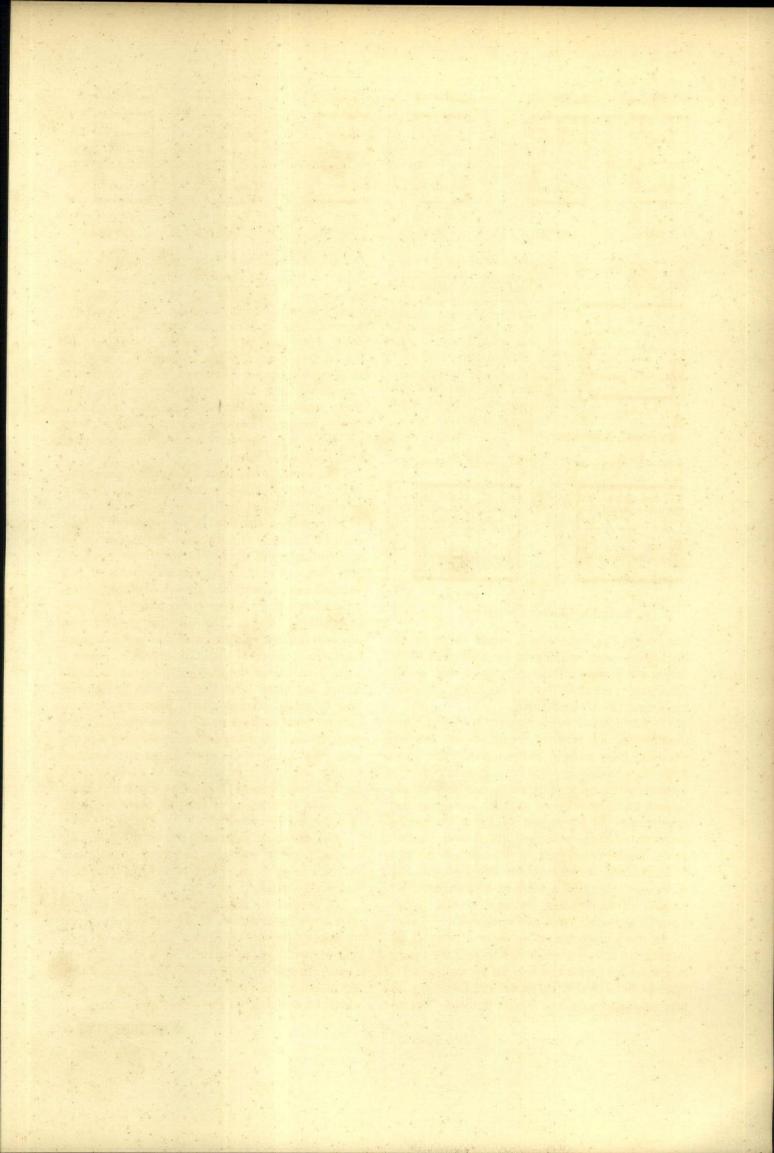
burning furnace, for instance, eliminates coal delivery, while the automatic refrigerator emancipates us from the ice-cart; dwellings no longer require street frontage. With such resources and such wealth there is no reason beyond our own inertia why we should not be the leaders instead of the laggards in the whole housing enterprise. However, if we permit the merchants and the advertising men to offer these new conveniences as gadgets, or as substitutes for good planning and environment, then we shall miss the fundamental benefits that they may contribute.

The attitude has been taken, throughout this work, that we cannot permit sentiment or pity to blind and divert us from our permanent aims. What benefit is there in "slum clearance" if the method adopted is such that the money is all spent at once and the city further impoverished ? Not only can nothing further then be done, but we shall have insured the growth of whole square miles of new slums, where today there is still only controllable blight. The popular general who has won famous victories with a huge loss of men has been a cause of ultimate defeat in many a war. To continue the analogy, the most valuable leader has often been the one who has known how to guard existing costly lines of communication; and such lines of communication are quite literally a main factor in the city's problem. We appear to be entering an epoch not of further expansion but largely of conservation. In those vast areas in our cities which it is actually most economical to rebuild, there is plenty of room for everybody.

But the most ingenious use of the T-square cannot perform miracles to stretch inadequate incomes so as to cover excessive land costs and financing wastes.

If, misled by land speculators, we embark once more either upon riotous expansion or upon mistaken "model-tenement" policies of congestion, we may, as already said, end with not enough people to go around. The group dwelling offers a sane intermediate medium through which to re-establish the urban community.

« ARCHITECTURE →





BANKERS TRUST COMPANY BUILDING, NEW YORK CITY

SHREVE, LAMB & HARMON, ARCHITECTS

From the rendering by Hugh Ferriss

ARCHITECTURE

✤ VOLUME LXVIII

SEPTEMBER 1933

NUMBER 3 🚸

The Bankers Trust Company Building

ALTERATIONS AND ADDITIONS TO A WALL STREET STRUCTURE OF TWENTY-FIVE YEARS AGO—SHREVE, LAMB & HARMON, ARCHITECTS

By Richmond H. Shreve

New York, occupied the lower stories New York, occupied the lower stories of the building at the corner of Wall and Nassau Streets which the company had built for its own use more than twentyfive years before.

In addition to this building, No. 14 Wall Street, the Trust Company owned and in part occupied the property to the west, No. 10 Wall Street, running through to Pine Street, and also the building on the north, No. 5 Nassau Street, known as the Hanover Bank Building, on the corner of Nassau and Pine Streets.

In spite of the annexation of space in these adjoining buildings and of numerous adjustments of working areas and staff organization, the "housing" was not fitted to the "machine"; it prevented the most effective operation and fell short of a true expression of the position and function of the company in this growing centre of the world's financial markets.

The problem presented to the architects was therefore that of devising more and better space for housing this business that had grown beyond expectation, and of providing for its further growth and evolution in the years ahead.

The site, comprising the eastern section of the block fronting on Wall, Nassau, and Pine Streets, is relatively one of the most valuable properties in the world. This high land value, the volume of urgent business arising from the financial district, and the need of effective interrelation of the banking floor and other departments placed a premium on space usefulness and the thorough study of the Trust Company's organization.

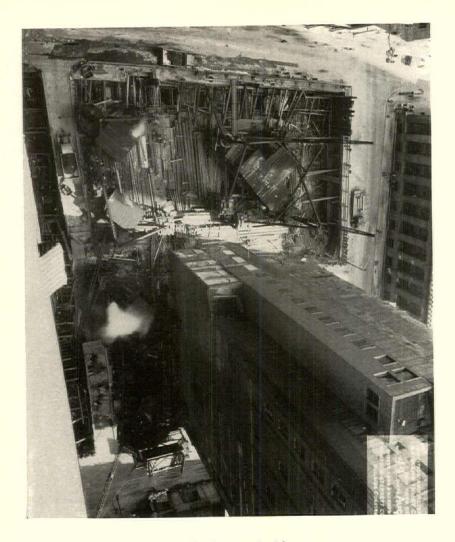
Some of the difficulties to be avoided or removed arose from the fact that the entrances to the building and to the Trust Company had become inadequate; that there was great congestion throughout the entrance lobby due to its

use at once as building entrance, elevator hall, and public passage from Wall Street to Pine Street; that the elevator system was inadequate or badly hampered, and that the great depth or thickness of exterior walls (over six feet of masonry) restricted the entrance of natural light. None of the buildings other than the original Bankers Trust Company Building were well adapted to the purpose for which they were being used. Satisfactory additional space might have been obtained by expansion vertically in the Bankers Building, but as there is a limit to the area in upper floors which can be effectively operated in connection with a public-contact first-floor banking-room, it was agreed that relief was to be more profitably obtained through lateral extension.

The first thought of the owners in this direction was to consider building only on the plot No. 10 Wall Street (running through to Pine Street), either (a) a temporary structure, or (b)one which might itself later be incorporated in a more extensive development without losing the space obtained by the erection of this first building. But the Bankers Building and the Hanover Building had floor systems of different heights and therefore at different levels, and it was necessary, along with other decisions, to determine at which of these sets of levels the floors of the new building should be placed.

Consideration was necessarily given to:

- (a) the use, amount, and subdivision of the new space, whether intended for banking use or for tenants;
- (b) the circulation both vertical (elevators) and horizontal (intercommunication) for the Bankers Trust Company staff, as well as for the public;
- (c) the conditions affecting the Bankers Trust Company business during the period of building operations;



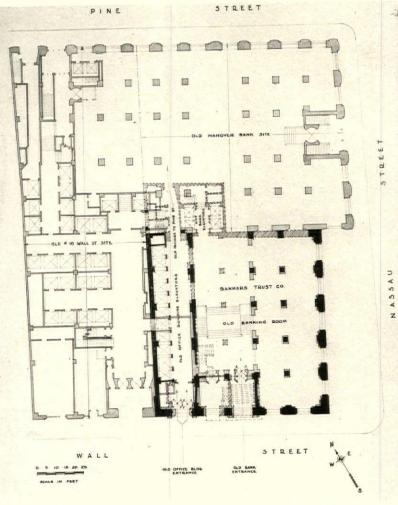
Its elevators were antiquated and badly placed in relation to the general plan of the three buildings considered as a unified floor space. The cost of providing in this building legal standards of construction and of exit and efficient heating and ventilating, plumbing and electric systems would have produced a return on capital invested not nearly so satisfactory as that to be obtained if the whole building were removed, a new and modern unit erected with floors at the same level as those of the original Bankers Trust Company Building and the new building on No. 10 Wall Street, and the structure on the three plots set up as one organized whole (page 129) instead of three badly related elements.

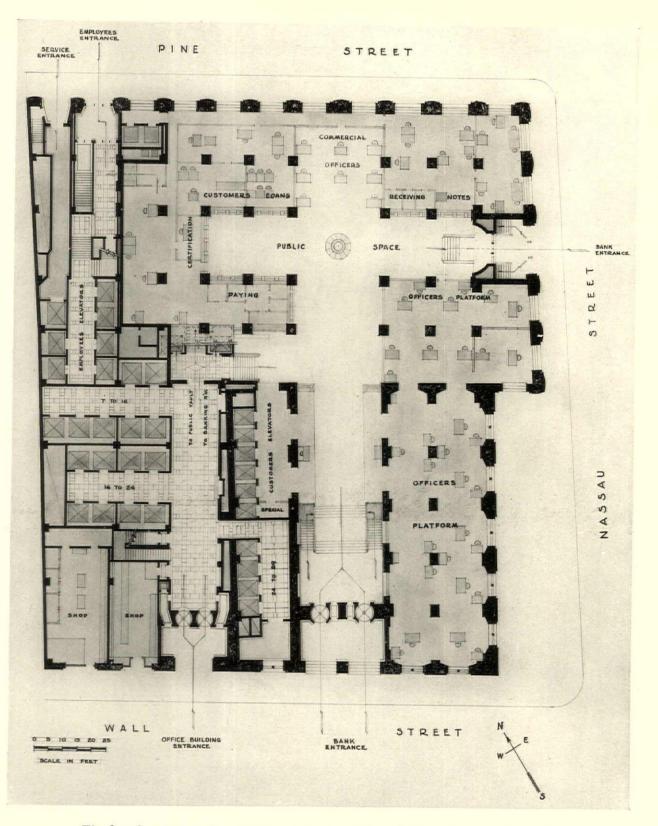
The analysis of the character and

At left, a progress photograph looking down on the site during demolition, the photograph oriented to match the plan below. On the latter the black represents old work retained; the heavier crosshatching, old work destroyed; and the lighter cross-hatching, new work

(d) the cost, whether capital investment or loss of income or other expense due to the building operation.

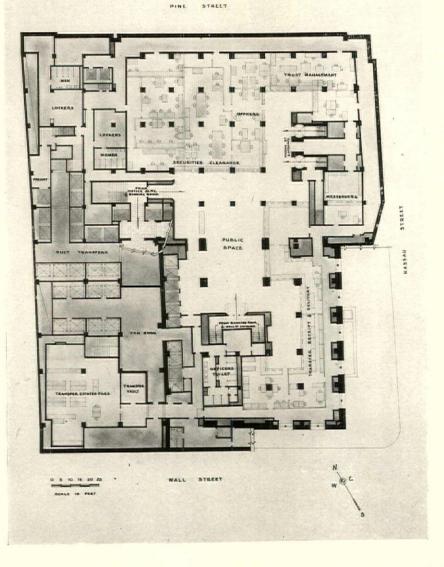
These points requiring consideration are mentioned in this detailed form because it was through study of them that a solution of the problem quite different from that originally thought of was arrived at, one which would not have been adopted at all had the analyses of the proposal to build been confined to the No. 10 Wall Street property, for in that case the Hanover Building would have been altered and retained. It was not a modern structure in appearance, construction, or usefulness. The exterior walls were of heavy masonry, so that window reveals were four feet or more in depth, and the natural lighting was further blocked by exterior projections not found in efficiently designed office buildings.





The first floor is entirely a public-contact area and recognizes at once certain fundamental divisions of use and circulation. Public access to the office building itself, as distinguished from the banking quarters of the Trust Company, is from Wall Street only, leading north through the main entrance hall to elevator groups serving all floors above the banking floors. The Trust Company's employees enter from Pine Street, passing south to elevators reserved for staff use only. The remainder of the ground floor is given over to the Banking Room and to the bank service elements necessarily placed at the first-floor level, including elevators serving all floors devoted to banking use, and elevators for customers' use leading to the public safe deposit vault

«ARCHITECTURE »



The Banking Room is entered from Wall Street, from Nassau Street, and from the entrance hall of the building. All three entrances are at a level between the Banking Room and the floor next below and serve equally well as entrances to either one, thus making Basement A (shown at left) virtually a second ground floor. Here are the public-contact phases of the Receipt and Delivery, Re-organization and Transfer Departments, the arrangement of open floor space and cages on this floor being particularly adapted to these operations.

Dominating the scheme of the building plan, but without losing harmony or dignity of treatment, are the qualities of practicality and efficiency. Safety in the handling of money and securities, orderly sequence in the arrangement of the processes of business, free but controlled circulation of staff and customers, an assured zone control of valuables, bank organization and public, these mark the arrangement of every part of the banking space. Never is the line of travel re-quiring protection, the "red line" as it came to be called in the earlier days of plan discussion, crossed by public traffic, and it is touched by officer or staff circulation or management only under conditions giving full protection.

From the vertical circulation, the hub of the building plan, radiate fanlike the arteries and areas of working space, clearly defined but in close contact, with boundaries capable of being shifted at will and areas which can be enlarged as required. All of this flexibility is made possible without loss of accessibility, safety, or usefulness. There is, of course, acoustical plaster over the banking rooms to insure quiet operation

use of the space obtained, of the vertical and horizontal circulation, of conditions affecting the owner's business while the work was being done, and of the expense, income, and return on the investment, made it clear that the economy of keeping the old Hanover Building was more apparent than real and that true economy lay in tearing it down and throwing it away. Not only was the new space created on the Hanover plot more useful, but there were many more square feet of that space on each floor of the new building, and, because of the new story heights, an extra story was to be gained in reconstruction without increase of cubical contents. Further, because the service and utilities group in this

« ARCHITECTURE »

only free unobstructed floor space and showed an unusually advantageous ratio between cube and useful area, or between capital cost and income. It was from this study of practical values

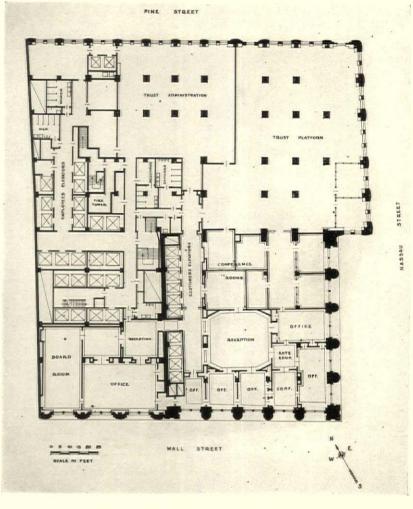
that the plan finally adopted was developed.

plan could be placed near the unlighted west

wall of the No. 10 Wall Street unit, the Hanover

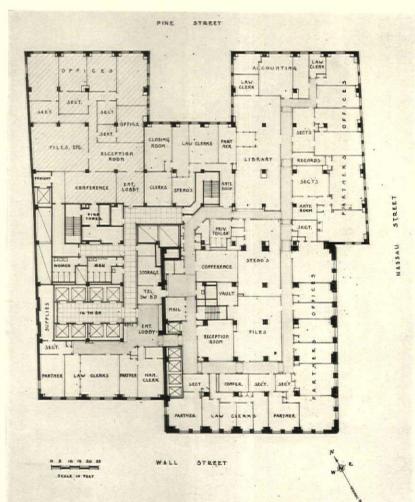
section of the new structure comprised virtually

Messrs. Purdy & Henderson were the engineers responsible for the foundation and steel work; Meyer, Strong & Jones, Inc., engineers in charge of the heating, ventilating, electric work, and elevators; Fred Brutschy, engineer for the plumbing; Thompson-Starrett Company, Inc., were the builders.



At left, plan of the second floor. In the new portion of the building on the Wall Street front there is the Chairman's Suite. Adjoining this, in the old portion of the building at the corner of Wall and Nassau Streets, is the President's Suite, extending north as far as the third column. Beyond this to the north is the Trust Platform (a "platform," in banking parlance, for those who do not know this long-established tradition, is a floor space for officers to which the public has free access). Continuing around the Pine Street front is the Trust Administration.

The executive officers in the Chairman's and President's Suites, and in the Trust Department, are in direct contact with the public through the bank of elevators rising from the main floor, and with all other departments by these same elevators. It will be noticed that the south elevator of this bank opens directly into the reception lobby; it is reserved for bank officers. Photographs of these executive offices will be found on pages 141 through 153



At left, floor plan of the twenty-second floor—representative in general of floors from the twelfth up. This particular floor is laid out for the use of a large law firm. Note the omission of the inside corner columns in the new portion of the building to permit of the maximum flexibility in the subdivision of these floors for individual tenants

« ARCHITECTURE →



Photograph by F. S. Lincoln

Office Building lobby, looking toward Wall Street. The floor is paved with Tennessee marble in dark and light pink; for the walls Tavernelle Clair and Tavernelle Fleuri are used; the ceiling is plaster, covered with aluminum leaf toned down by glazing, with ornamental bands of gold leaf; the metal work is of bronze, with light statuary finish. The color scheme, therefore, is tan, rose, and dull gold

> The old Bankers Trust Company Building, the "Tower of Strength," through its influence on the conception of the exterior design of the addition, produced several interesting problems. The advertising value of this Wall Street landmark, as well as the sentiment attached to it by the company, made it essential that any addition should be decidedly subordinated to its solid and robust architecture. On the other hand, the desire of the owners for an expression of the increased frontage on Wall Street led to the carrying through of the rustications and belt courses of the existing work at the ground-floor level. The illustration opposite shows the lower part of the new building on Wall Street

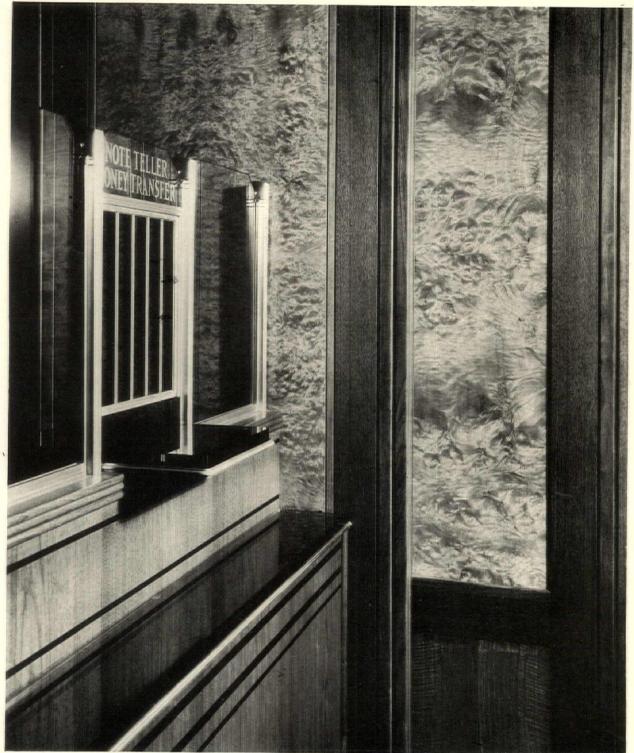






The main Banking Room on the first floor extends from Wall Street through to Pine Street, and from Nassau Street almost to the western lot line, forming an irregular T, each arm being almost 200 feet long. An enclosed mezzanine (a portion of the old second floor) surrounds the bottom end of the T, and under one side of it is the officers' platform. The desire to achieve an impression of the dignity of the institution and yet avoid the great coldness which is the usual result of such a desire, led to a treatment entirely of wood. The walls are of Oregon myrtle burl combined with a walnut base, the whole built up of flush panels, over 26 feet high and 4 feet wide, separated by recessed strips to give the movement and flexibility which the material demands. The piers and columns are also of myrtle burl set in flush frames of solid walnut. Metalwork in railings, window grilles, and in the duct grilles is of bronze





Photograph by F. S. Lincoln

One of the most difficult physical problems which a great modern bank has to face is the continual changing in the size and relation of its various departments, due to sudden emergencies such as we have had in the past few years. The immovable and inelastic bank screens of marble and heavy bronze have made any such changes in the banking-room layout a serious operation, both in cost of alteration and cost of delay. In answer to this problem a screen was evolved in which changes can be made literally over a weekend. The whole unit was conceived as a piece of furniture, built so that it could be cut or extended, moved bodily, or its wickets rearranged with comparative ease. The illustration on the facing page shows the general effect of the counter screen, a detail of which appears above. Opposite, the check desk in the foreground is of light Cardiff Green marble above a base of Verde Antique set in bronze frames, the counter being of clear plate glass. In the top of this check desk is provision for indirect lighting units



Entrance from Wall Street to the main Banking Room. The photograph is taken from the opening between the lobby containing the customers' elevators and the lower leg of the T-shaped public space, and looks toward the officers' platform through the opening at the right. In the left foreground is the information desk. To break the broad expanse of light marble flooring the area at the sides has been carpeted



Photograph by F. S. Lincoln

Above, the main Banking Room from the Wall Street corridor, looking toward Pine Street. Below, the officers' platform in the corner bordered by Wall and Nassau Streets, under a mezzanine floor. The view is taken toward the Wall Street end





Above, the Basement A banking floor, looking toward the stairway leading down from the Office Building lobby. Below, the Basement A banking floor, looking toward the Nassau Street entrance





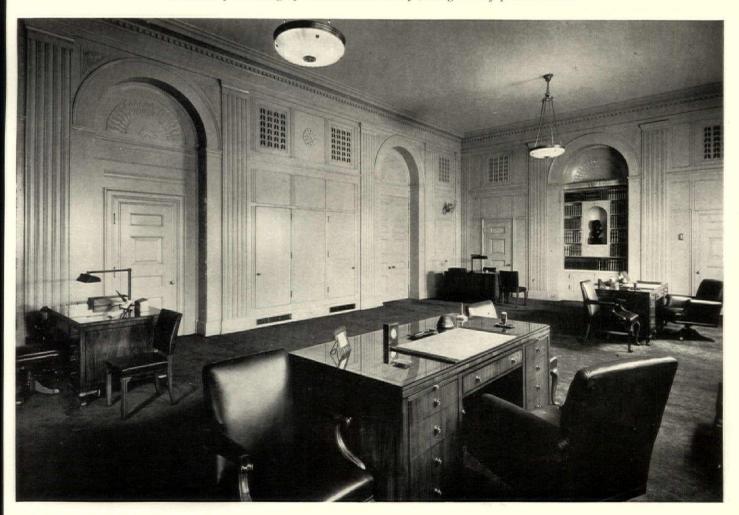
The executive offices on the second floor are reached by the customers' elevators from the main Banking Room. On the west is the Chairman's Suite, in French walnut—excepting the Chairman's Office, done in painted cherry. On the east is the President's Suite, occupying the front half of the original building, all finished in figured Burmese teak. The detail above is a corner of the board room

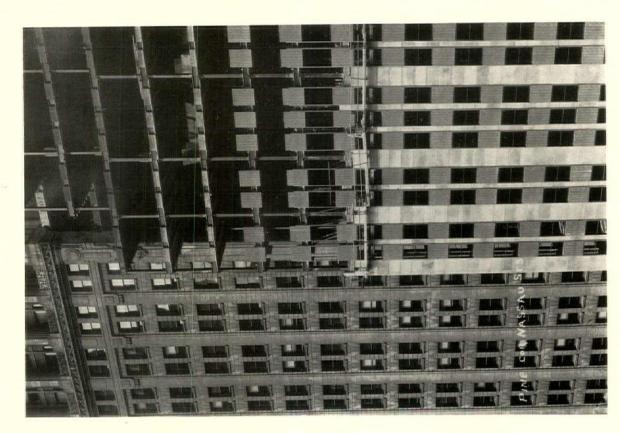


An office in the President's Suite, looking toward the Reception Room. Walls are of Burmese teak, the floor covered with a heather-green high-pile carpet. A finish closely matching the teakwood is given the bronze grilles of the frieze. In the furniture, French walnut has been used, inlaid with ebony; the lighting fixture is of bronze with translucent glass

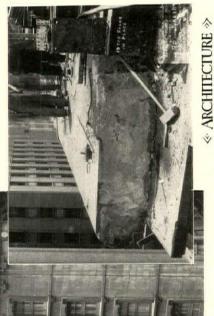


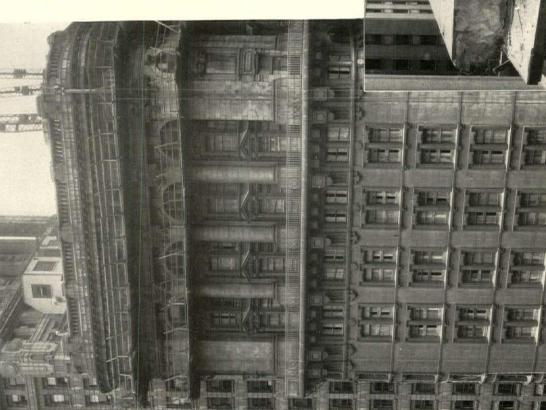
Above, the reception room in the President's Suite. Below, office in the Chairman's Suite. Here the walls are of French gray enamelled on cherry; the grilles of pierced wood

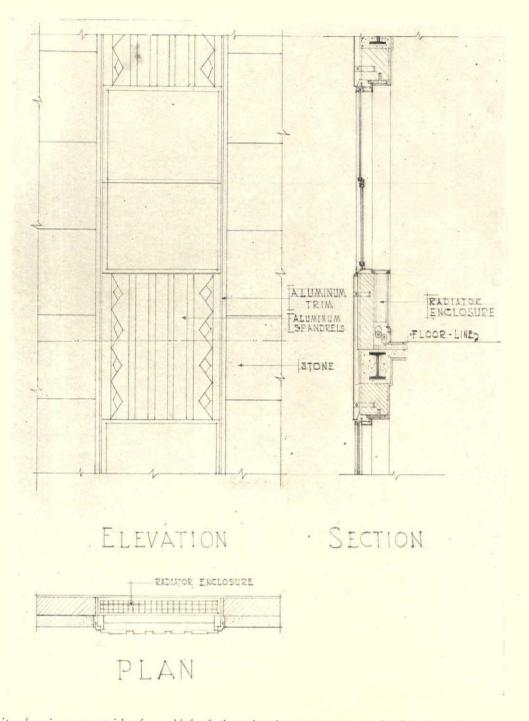




floors, stairs, etc.--the great masonry wall, some 24 stories high, being merely self-sus-taining, although more than six feet thick in the lower struction throughout. (Insert below shows the stone balcony view-point. The Hanover Building was erected in 1902. Its steel frame carried only its stories and of massive conor cornice member in the wall two progress photographs taken from almost the same parison of wall structures, the Here is an interesting comabove the 17th floor)







Contrasting with the heavy masonry walls of the old work is the structure of the new building. Within a space of 13 inches of wall thickness are placed the stone facing and brick backing, and within this same dimension room is found for the windows, the spandrels and aluminum trim, and the enclosed radi-

ators. This modern wall has its glass in part outside of its outer face, its radiators stand within its inner surface; only its thickness of a foot or so is lost from useful floor space in order to enclose the building. Its spandrels, trim, windows, and stone may be set independently and at varying levels without one "pier" delaying another. Speed and economy in the building work at the site are possible through the interchangeability of "standard parts," while their shop production in quantity makes for speed and economy in fabrication. The result is less space taken by the structure, less time required to build, lower cost, and higher income—altogether not a bad combination.

The design and execution of the work presented certain unusually difficult engineering problems. The chief of these in the new structure developed as the foundation was carried to rock, approximately 70 feet below the sidewalk. This was done through the opencut method without using air pressure, notwithstanding that ground water was encountered some feet below street level, that the Nassau Street subway tube had to be protected, that the pressure from three streets and certain neighboring buildings had to be held back, and that neither of the building foundations on the fourth side had been carried to rock.

Upon completion of the perimeter foundation wall the site was excavated and simultaneously cross-braced —and the steel was then set through planned spaces in the cribbing, permitting the introduction of columns and bracing girders.

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The program of construction was governed largely by the necessity of carrying on banking operations without interruption. This required a number of departmental "shifts" or rearrangements from time to time. The buildings to be demolished were to be vacated by the Trust Company and tenants on New York's spring rental date, and the first shift from these buildings to other working quarters therefore was set for May 1, 1931.

A new building was then to be erected on the vacated site, and business operations transferred to it in order to permit alterations in the old building. This second shift could be most conveniently arranged in the late summer, and was fixed to occur about August, 1932. The final shift to the combined new buildings and altered old building was desired to be made in March, 1933.

1933. These dates: May, 1931, August, 1932, and March, 1933, were therefore established as fixed points, and the organization of the work in drafting-room and in the field was planned about this general schedule.

The Progress Chart reproduced on this page was set up by the architects for the guidance of the construction committee, composed of the owner, architects, engineers, and builder, who met weekly or oftener in directing the work. It was agreed and noted on the chart that if the owner's fundamental decisions were made by April 1, 1931, working drawings would be completed, steel drawings made ready for contract, and foundation drawings ready for execution of work by July 1. These dates dovetailed with the May 1 shift from the old buildings and the completion of the demolition on the No. 10 Wall Street site on July 1, in advance of the Hanover Building demolition, to be completed September 1. The construction schedule then took control. The beginning of steel setting coincided with the completion of foundations, and other trades became active in sequence. The rapid construction of the building (in spite of nearly two months lost through a general strike) permitted the Trust Company to move to the new building over Labor Day, September 5, 1932.

The work of altering the old building was at once begun and was completed in time to permit the first departmental shift to be made on March 3, 1933, and the main banking room to open on the date set nearly three years before at the owner's choice.

A very involved and difficult construction contract had been completed on time, with a marked saving in cost and without interruption of the business of Bankers Trust Company.

« ARCHITECTURE »

SOME-not many-of the friends on my visiting list are educators. We are not professional educators in any accepted sense, for we do not run with the pack-we do not believe that real educators ever should, properly, or ever could, honestly, run with the pack. Hence, we are academic pariahs. The University Marshall does not speak to us-he looks the other way when we pass his round pink person on the campus. Incidentally, I fear, we are rather proud of our status. One derives vast amusement from the academic profession if one is careful to hang about on the fringe of it; one is quickly moulded to the standard sad pattern if he grows careless and allows himself to be drawn into its majestic, pompous whirls. One of my dearest friends is engaged in the same sort of education as I, myself, am. We have visited of late, quite frequently, and our conversation has turned, invariably, toward the problems and the pleasures with which we come into daily and hourly contact. My friend has just sent me a letter, and I consider his letter so important that I am eager to give it a much wider circulation than the quiet privacy of my files can ever accord to it. For obvious reasons, I must leave my friend in that happy state of anonymity which will assure to him the continued enjoyment of his job in these jobless days. I do, however, have his permission to print the edited version of his letter which follows. Everything he says, I have no hesitancy in remarking, I believe myself. All that he speaks of wanting to do, I have the temerity and the pride to state, I do -or try to do; with whatever success time alone can tell. Here, then, is the letter-or the greater part of it-appropriately edited so as to preserve the veil of mystery behind which my friend must remain.

"Dear Cunningham: Yours of the seventeenth is just in, bless you! I'm sorry if my last revealed an unusual state of mind, superinduced, I suspect, by too much to do and no time to do it. Perhaps, conditions have driven from me my sense of proportion—sort of depleted what store of humor I, sometimes, think I possess. That shows a disordered mind, does it not? Must be getting old and crotchety, dammit! But, by the Great Horn Spoon! it isn't my

Architectural Education

FRIEND

BY

Harry F. Cunningham Professor of Architecture, University of Nebraska

fault, after all; it is the way the world has with one, sometimes. One does not elect to do certain things-they are simply laid on your doorstep for you to stumble over when you open the door. You just have to take them in and care for them, don't you? Then the job starts riding one, instead of one's riding the job. Here, this afternoon, more things seem to need attention-because other persons appear to think so-than I can possibly dispose of. So, I chuck them all, for a while, and visit with you. What guilt I feel to think that I have given no attention to your discourse on the subject of an architectural education 'way last November !

"I suppose education, as it is practised today, has to be 'organized' in one way or another. But, what that organization is intended to do should determine what it shall be. If it is intended to produce mere cogs in the Great Machine (whatever that is) it will-or should-be one thing; if, however, it is intended to develop human beings along human lines it must be a quite different thing. My own little formula for 'education,' so far as schools are concerned, is about like this: The school should be, primarily, an environment made up of as serviceable a plant as possible, a staff of men equipped with experience in their several fields and possessing that rare, inborn ability to inspire and enthuse others. Students would come when they think coming would help them, stay as long as they liked, go when they wished to, and devote themselves, while they were there, to such work as really engaged their interest. There would be no attempt on the part of anybody to grade' them as to accomplishment. or to decorate them with degrees (which are quite comparable to the pink ribbons pinned to the fattest pig at the fair).

"That would restore the glory of knowledge and skill to its rightful place in the minds of a new generation, awaken those minds to an appreciation of the things really worthwhile in human life, and do away with the false objectives now magnified out of all semblance to sanity. And, isn't that exactly the attitude you have adopted with regard to your own children? I should do away with the thing usually re-garded as 'discipline,' that is to say, discipline imposed from without. The only real discipline for a free soul-and you've got to believe every soul is free by nature-is the discipline which it imposes upon itself. What that shall be must be self-discovered.

"Why must 'education'-when it seeks to 'organize' its efforts choose a view-point so different from that adopted with relation to sports? The young chap who would play golf can't wait, once a little experience in his own way reveals his deficiencies, to beat it to the coach and drink in every word the coach says, and profit by every example of the way to stand, to swing, to strike, to follow through. He will subject himself to the most rigorous discipline to overcome his own awkwardness, and why? Because he wants to improve his own game-he is carried forward, he progresses, by the urge of his own inner interest, his own self-animated purpose. As he grows he will, just naturally, take on studies in the history of the game, the manufacture of clubs, the science back of the whole business, the methods of the great players. He will, just naturally, study the adaptability of different clubs to different lies, and the differences in balls, their weight, their resilience. By and by, he will delve into the study of golf courses themselves, their engineering and landscape features, arrangement and lengths of links, design and management of golf clubs, their financing, the character of their membership, etc., etc.



"Now, let us hand this enthusiastic youngster a Course in Golfing and arrange a curriculum in accordance with the foregoing elements involved in the glorious game of golf. We will tell him he must study and recite in golfing classes on clubs, balls, links, finances, and all the rest of them *seriatim*; then we will tell him, at the end, that he does or he does not know it, and we will figure out and make a matter of record, the exact percentage of his knowledge or his lack thereof. If the percentage is high enough, we will give him a diploma testifying to all and sundry the fact that he is a 'Bachelor of Golfing.' Can't you picture the rebellion which would rise up in his soul if we were to pursue such a program applied to the game he wants to play? But, that is exactly what we are constrained to do, more or less, to these youngsters who come to our schools fired with some innate desire and a grand, eager enthusiasm to play one phase or another of the game of life. 'No,' we say, 'you can't do this now. You must do this other thing first and make such-andsuch a grade in it. We know, by our experience (?), the exact, precise order in which these things must be taken up. By and by, when you have learned all of these things, in their proper sequence, then you can do what you want to do. Now you must do what we know you should do.' Bah! say I, and I am cheered through the knowledge that I hear your own voice echo my 'Bah !

"But, our non-agreeing friends (and they are nearly the whole of the crew) say: 'Ah, would you just let them run loose and not make them get the fundamentals first?' How they miss the idea! As if a real teacher could have so little of an intimate part in Youth's development that *his* young friends ever could— or would—'run loose.' Just think of the joy and excitement of leading Youth's enthusiasms, all unaware of the leading, along pleasant ways; changing the ways as the enthusiasms ripen; helping Youth, all uncon-scious of the helping, to develop his own initiative, teasing him into it, if you will; Youth coming, all at once, to see for himself, the desirability of an ordered progress, an accumulating series of exercises. From his growing ability to trace cause and effect, he takes on-of his own free will-this and that because he wants to; as his experience expands, he comes to rely (but not depend) more and more upon the advice and judgment of his teacher, because Youth has discovered, for himself, the logic and the value of his teacher's judgment. Is this unorganized, undirected education-letting them 'run loose'? No! not in our cosmos. It seems to me to be the only real scheme of education, this drawing

out, from within the soul and spirit, of all their highest potentialities.

"May we not learn processes from nature? Take the plant. What can its 'educator' do for it? He can water it, provide light and sunshine, protect it from encroaching weeds, cultivate the earth around it; create, in other words, an appropriate, agreeable environment. From then on, it will take from what is at hand, exactly what itself knows it will need and profit by; nothing else can be done for it without doing violence to its plant nature. The flowering will be, must be, of its own kind, quality, strength, and virility. The one thing for the plant educator to do is to provide and preserve that healthful and rich environment so that the roots may go down in their own natural way, free to take, from their environment, what the plant requires to live and flower true to its race and its promise.



"But, we hear them say that the human mind is different-it has to be violently sprayed and pruned, bolstered and bent. Nature appears to have been careless, when she made the human mind, and one must adjust it, from without, using devices of standard pattern and approved origin. And all minds shall be treated alike, with these devices and inventions, whether the mind be of the order of the lily or of the genus of the cabbage. My God ! Wouldn't it be just common, human decency (as well as, paradoxically, almost divine wisdom) to give these human minds and dispositions and inclinations a chance to discover whether they are really lilies or cabbages? But, it can't be done, my friend, while all of the 'wiser ones' insist that all shall be lilies and treated as such.

"I think of a case here in my own school, where I strive to enlarge (as much as I can) this notion of freedom. A chap to whom was recommended the general survey course which we call 'History of Architecture' (but is really a sort of introduction to all the gay things men have done when they loved their work), didn't seem to think that it was what he wanted. 'All right,' said I, 'don't take it.' So, he went on without it, doing other things he thought he would like better. The things he 'liked' were those in which he felt an interest, those concerning

which he was intellectually curious. And even these did not occupy him so continuously as to hurt him-he worked only when he wanted to work at them. In his fourth year, this fellow thought he would like to take that 'history' course. 'Go to it,' said I. Not long ago, he said to me, with great earnestness: 'Mr. X, I think that is a great course-I think every student should be required to take it right at the beginning.' Said I: 'Suppose you had been required to take that course right in the beginning.' He looked at me a moment. Then he laughed and said: 'I get yuh.' Then I went on with some of this environment stuff and asked him if he did not see how it was dangerous to interfere with natural growth-that the human make-up must be ripe for whatever it attempts to assimilate-that only then can it develop in a growth that will make the most of every ray of sunshine, every drop of water, every nourishing surrounding condition. And he said: 'I see; everybody is not ripe for the same thing at the same time and cannot really profit by taking some things until he really wants to, and then-well, then it just comes easy and is great fun." I could rehearse dozens of similar cases—we both could. And, after all, this system (or this lack of *obvi*ous system) which I recommend is really founded upon real efficiencythe removal of frictions, the elimination of unnecessary motions, the clearing of vision, the concentration of the power to do, the fulfilling of the individual's destiny. For us who are interested in really teaching, the knowledges and the skills we would teach are possessed, or are accessible. All of that is 'on tap.' We just have to open the proper 'tap' and let it run out-easily. But, the one superlative need is for an endless patience to let each mind develop after its own kind-the kind being no responsibility of the teacher.

"Now, somebody wants to know about a 'curriculum.' Architects and teachers of architecture will agree to a certain set of studies for students of architecture. They will not agree individually, with each other, but what does that matter? No one student would be likely to take all of the subjects that would satisfy all of the makers of the set of studies—there would be more, I am sure, than any student *could* do in one term of enrollment, if all the things these architects and teachers

might think of were listed. But, I see no reason for curtailing the listif the available staff could handle the multitude of subjects. They would, all, constitute a field for the students' activities. One fellow might prefer to eat clover over here while another would elect to chew hay over yonder, even though both were admitted to the field at the same time and through the same gate. But, under the scheme of encouragement and non-restraining guidance, the one chewing hay would (in time, only) change places with the one eating clover, because experience, curiosity, suggestion or something else would have awakened an appetite not suspected or felt before. Why should the taste for intellectual pabulum differ from that for physical sustenance? Lack of this sort of 'education' in diet explains the fact that most people today are in various degrees of ill health. Instead of following the dictates of nature and discovering what their own physical apparatus needs and can manage with benefit to them, they read, and act upon, what somebody says is the proper thing for all the race. My good wife says that, by all the rules of the dietitians, I should have died twenty years ago. I may be wrong as to cause and effect, in this case, but I have tried to 'educate' myself in diet, for my growing body, after this fashion which I prescribe for the growing mind. And I suspect that I shall still not be dead twenty years hence, although I shall be, then, what is usually called an 'old man.' And let me tell you this: I think that, following this natural, free intellectual diet, all would arrive in due season, fairly abreast in the sense of need, if not necessarily in the degree of accomplishment; all would have covered the field and been well nourished in proportion to their respective potentialities. To force gorging on one thing until a nausea is created is not only to precipitate an illness and a distaste which incapacitates one for any more of that thing, but to weaken the general stamina required for the heavier diets that follow, even though they may be relished.

"However—and here's the rub our regime of natural freedom cannot be fitted into a system of grades and diplomas, a system which magnifies the importance of superficial trivialities and suppresses the one thing said to be aimed at, education.

Now, purpose is divided, and what that means in results is too familiar to talk about. But, into such a regime (for we follow it, you and I, pretty darned fully after all) we must try to fit a 'curriculum.' For these boys of ours have to go out among their fellows who have followed curriculums and been styled by the system and tagged with the mark of their style. Small wonder that the curriculum, no matter what we do to it, fits so damned badly into our regime of natural, intellectual freedom. And here, apropos of anything you like, it occurs to me that some persons tell me that my faith in the thing called 'human nature' is exaggerated. I prefer to think not. To me, human nature is pretty near the surest thing, in its behavior, that there is. Its reactions are the direct results of the stimuli to which it is subjected, and we should be able to see the unwisdom of our present processes by these very fruits of discontentment, impatience, discouragement, laziness, which we find hanging, in such profusion, upon the academic tree and which come straight from the customary violations of individual human natures. The recognized system is a damnable system, and there is no getting around that.



"What is the psychology underlying the present system? Does it not have something to do with the position in which the teacher finds himself placed-a position wherein he must get the student through certain arbitrarily assigned courses by a certain time and at a certain speed, unless he would draw criticism upon his own shoulders? It is said to be a reflection upon his ability, his discipline, his classes, his school, if a certain proportion of his students does not make a certain, arbitrary grade. Statistics have been worked out to determine these mattersgrave matters, indeed-of percentages, proportions, grades. Must not the teacher appear to be all-wise in his subject? Must he not carry a bluff, a false dignity, an aloofness from the very ones with whom, by the real nature of his calling, he should be in intimate contact and ready, with friendly understanding to help? Some of the most human of the psychologists know these things are so. Why must we-and worse than all, these voungsters-be ruled

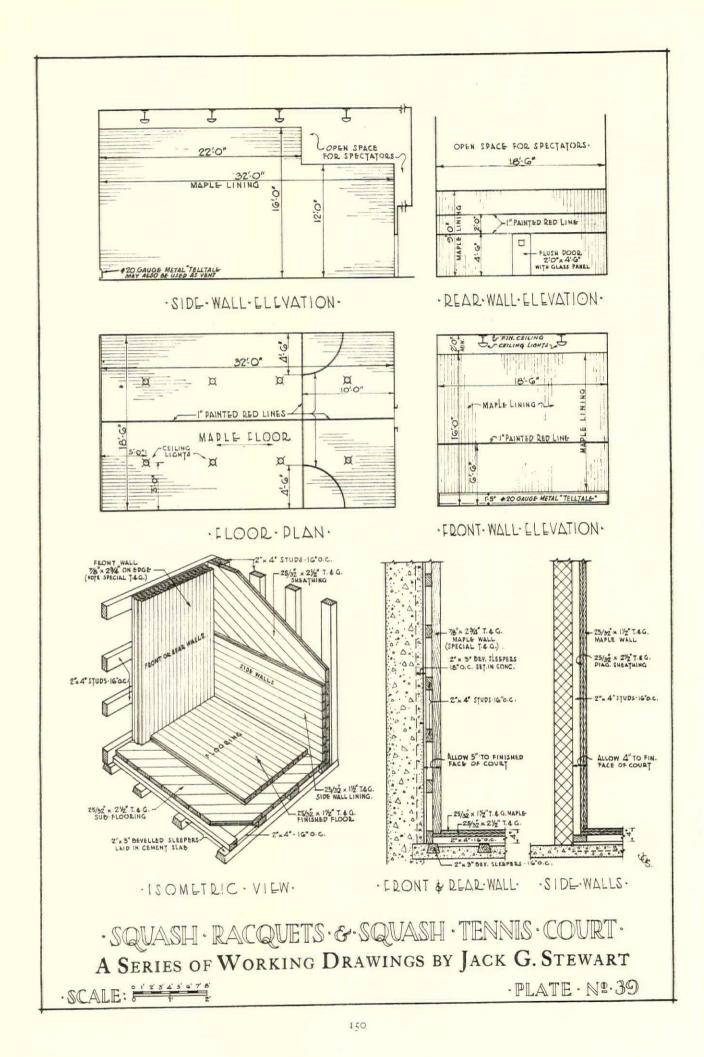
« ARCHITECTURE »

by a system devised by the other sort? Tell me, am I altogether crazy?

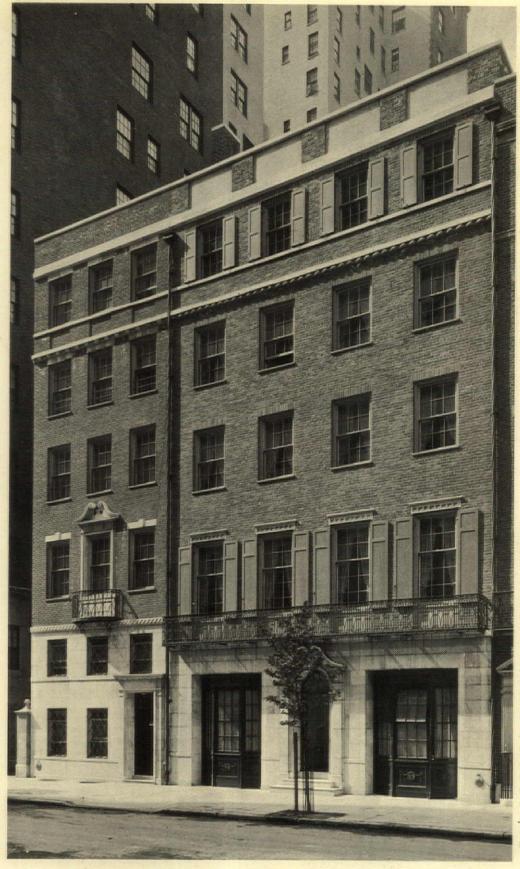
"Now, look at me. I can remember only three or four of the courses I took in school-it was all chemistry and physics and mathematics and statics as I remember it now. I do not use any of it directly, and I never did. I have forgotten all the formulæ-forgot them the day after the final examination. But, I was brought up, as one says, in the liberal atmosphere of an intelligent, wellscholarly educated, gentleman's household, where the reading of the Scriptures, for example, was a fine art and a delight. The children were held to the responsibility of deciding on all matters pertaining to themselves. I know that I distressed my father greatly, because, as a child I did not like to read and didn't do it-my brother and sister did. Yet I remember a few times when my father tried to induce me to read; once on a dare that I just couldn't subject myself to the dis-cipline of reading Macaulay's "His-tory of England." I did read it, but not because I liked it-it was merely because I wanted to show him I could do it. What a reason! Since maturity I have been told that I read everything that is printednow, I like to read.

"But, I hasten to add that I do not know that I should have been any better educated if I had liked to read in my early youth and had done a lot of it. As regards other things in which I felt a youthful interest, and which I pursued when I should have been at my lessons, I am far ahead of my brother. But I had to get what I wanted then, out of hours and out of bounds, as it were. And these things-things that I stole from the 'system,' you might say-I have always valued much more highly than the things I had fed to me through the regular channels of the system. However, out of the environment of the home, from the influence of my father, through the wise attitudes of three or four of my teachers toward my wayward curiosities, I assimilated things which nourished what was me. (I observe, with relief, that 'me' is now permissible, so used.) Nobody could have made a scholar of me, nobody could have made a business man of the youth that I was. I wonder if anybody could have made me a better architect or teacher. I could

(Continued on page 172)



Photographs by Samuel H. Gottscho



Mr. Hoyt's house is one of a group of seven city houses, four on East 71st Street and three backing up to these on East 70th Street. Six were designed by Mr. Embury and one by Mott B. Schmidt. There is unity in the group, achieved through common materials and by some uniformity of horizontals, even though the number of stories differs in adjoining houses. A carefully chosen common brick and Vermont marble are used for the façade of the Hoyt house, the balcony railing being of wrought iron

AYMAR EMBURY II, ARCHITECT House of Richard F. Hoyt, New York City



Here are two photographs of Mrs. Hoyt's boudoir. In the illustration above, showing the fireplace end of the room, the woodwork is a full-bodied green, as is also the rug; upholstery, dark green damask. On the other three sides of the room, the walls have been covered with imported panels of paper. Its color scheme includes a background of pink which, it will be noticed, carries across the fireplace end as a frieze beneath the cornice. The colors of the birds and flowers are fairly dark—blue, green, yellow, etc. Draperies are of taffeta, between flame and peach, the under-curtains of ecru net with plaited ruffles; sofa upholstered in peach velvet. Miss Shotter, Inc., interior decorator



Monday, June 26.-The Producers' Council is holding its Tenth Annual Meeting here in Chicago, and we started the session with a visit to the Exposition, where Clarence W. Farrier, assistant director of operations, told us something of the special problems encountered, and how they were solved. Lunched at the Century Club, which is a Chicago organization foresighted enough to provide an extension of its club facilities over one of the restaurants in the grounds. A banquet this evening at the Blackstone, over which Robert D. Kohn presided as toastmaster, brought together representatives from a number of organizations in the architectural and building world. Among these it was a pleasure to meet many old friends: E. J. Russell, I. K. Pond, Pierre Blouke, F. P. Byington, J. C. Bebb, William Jones Smith, Earl Reed, J. C. Bollenbacher, Alfred Granger, and others.

Tuesday, June 27.—Another day spent in seeing the Fair, my impressions of which are set down in the August issue. At dinner the Producers' Council found a cool retreat from Chicago's 100° F. in the basement of the Architectural Club, where C. Herrick Hammond spoke briefly of the gradual welding together of Council and Institute policies during the past three administrations of the Institute.

Wednesday, June 28.—While the members of the Producers' Council—or many of them—formed their foursomes to try out the golf links of one of the country clubs, I tramped many of the eighty-three miles said to be required for a complete circuit of the Exposition.

Thursday, June 29.—I see that the art world of Chicago is seeking an outlet for its works on the public space near the Art Institute along the lake front. Here, as in Washington Square, New York, artists have pre-empted a market-place for their wares, parts of which, like the curate's egg, seem very good indeed.

Friday, June 30.—Air travel is looking up. In the eight flights a day of a single transportation line from Chicago to New York, I was able two days ago to get a reservation in only one flight, and in that for the "second section." When I finally got to the field there were three planes making this one scheduled flight, all filled. The journey back east, with following winds carrying storm clouds again, was no less interesting and enjoyable than the flight west. I look down from somewhere over Pennsylvania, see a city that I do not recognize, and am told by the mate, "That is Easton. We'll be in in twenty minutes!"

Saturday, July 1.—Edward Alden Jewell says that in spite of the fact that everything at the Chicago Fair is described in terms of size and number, the



The Editor's Diary

fine arts end (in the Art Institute, and not inside the grounds) "is quite as impressive in quality as in bulk . . . for the show is, frankly, magnificent," which reminds me that the exhibition of photography inside the grounds is one of the finest examples I have ever had the pleasure of seeing.

Monday, July 3.—Richard P. Raseman, secretary of The Cranbrook Academy of Art, tells me that in response to the announcement of the advance training course in the field of architecture, a considerable number of applicants who are practising architects are taking advantage of these as yet slow times to prepare themselves more fully for the future.

Tuesday, July 4.—We make our respectful salams to Doctor Albert Kahn, of Detroit. In conferring the degree of Doctor of Laws, the University of Michigan called him, "a leader in contemporary architecture, whose creative imagination is attested by imposing structures that combine utility with dignity and beauty. Great industrial plants and towering office buildings in Detroit and elsewhere have risen responsive to his dream. By expressing function and purpose in harmony with massive strength and artistic design, they bear witness to the progress made by American architects and challenge comparison with historic monuments."

Likewise we salam again to Doctor Eliel Saarinen of Cranbrook, Doctor of Architecture—"architect, city planner, designer, whose achievements are known here and beyond the seas. Formerly associated with the university, he was called to translate the vision of Mr. George G. Booth into reality at Cranbrook. Under the magic of his art, stones and mortar rise in new and compelling forms of beauty and remain enduring monuments of his skill."

Wednesday, July 5.—In line with the unmistakable trend from employment in actual production of goods towards employment for services, it appears that nearly ten times as many Americans are now engaged in professional work as there were sixty years ago. The advance has been most striking in the newer professions, the number of en-

« ARCHITECTURE »

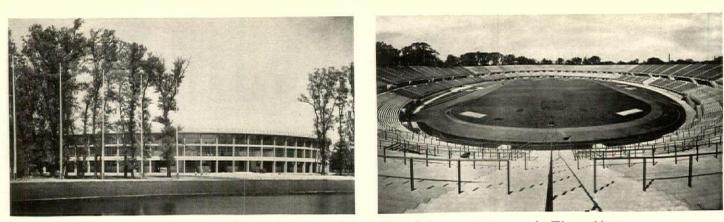
gineers having increased more than thirtyfold between 1870 and 1930. Designers, draftsmen, and inventors have increased in numbers still more rapidly than the engineers. "The two thousand architects of 1870 were probably more nearly adequate in number for their task than the twenty-two thousand in 1930," according to The President's Research Committee on Social Trends. I judge that by "twenty-two thousand," the authors mean architects and all the other members of their organizations, for there are no such number of architects in the United States.

Thursday, July 6.—Down to the Princeton Club with Ted Embury, Aymar Embury's son, to see some murals, colorful and full of humor, that he has just completed for one of the private dining-rooms.

Saturday, July 8.—I see that John Russell Pope has the job of remodelling the Frick property at Fifth Avenue and Seventieth Street, New York City, to make of it a public art museum, as provided for in Mr. Frick's will. A million dollars is to be spent in the alteration, maintaining the residential character of the house, but providing a new reception room, cloak room, entrance gallery, inclosed court, and a lecture hall, together with a seven-story art library.

Monday, July 10.- A deep gloom set-tled upon The Architectural League at lunch time today when word came that Joseph Urban had died early this morn-The loss of Urban as an internaing. tionally known artist was great enough, but still greater was the sense of personal loss among those who knew him intimately. Here was one of the great souls of our time. With the stupendous amount of work that he managed to do by laboring night and day, there was a modesty, a diffidence, and a dependence upon the opinions of others quite surprising. When Joseph Urban talked with even an obscure youngster in the field of art, the youngster was made to feel that his opinions and criticism were of the utmost value and help to the master. This was no mere pose, either, for Urban had an almost unbelievable mistrust of his own ability. When producing some work of art he would apologize profusely for his ineptitude, and attempt to explain in his English, still touched by Viennese, what he really had been trying to accomplish. Great in bulk, magnificent in his enjoyment of the good things of life, simple as a child in his modesty, Joseph Urban in passing leaves a niche that can never again be filled.

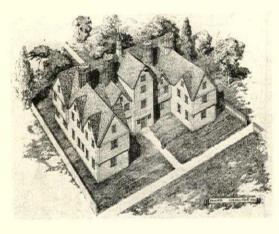
Tuesday, July 11.—Unlike the city of Cleveland, New York is apparently quite unready for the great forward push of housing that seems imminent. There are plenty of schemes offered, but (Continued on page 156)



The new Vienna Stadium, to seat sixty thousand people in a great open oval. The architect, Otto Ernst Schweizer, utilized the fine old trees of an existing park. Reinforced concrete is the material used. The upper tier of seats is reached by staircases, the lower tier by tunnels leading from the glass-enclosed ground floor

Architectural News in Photographs

At the right a pen drawing from "Old-Time New England," representing a conjectural restoration of the first building at Harvard as developed by Samuel



Eliot Morison and Perry, Shaw E Hepburn. The building, called "Old College," was begun in 1638, and by 1677 what was still left of it was demolished

The new building for the Insurance Company of North America, at 99 John Street in lower Manhattan, has recently been completed. It was designed by Shreve, Lamb & Harmon





The new home of Springfield Safe Deposit & Trust Company, Springfield, Mass. Thomas M. James Company, architects and engineers

The new City Hall and Court House of St. Paul, Minn. Ellerbe & Company, Holabird & Root, associated architects





A preliminary perspective of the United States Post-Office at Milton, Pa., which building is now under con-struction. Harry Sternfeld, architect



A new building for the National Institute of Pharmacy will be erected on Constitution Avenue, Washington, D. C. Office of John Russell Pope, architect



A new commercial building for the use of Bell & Howell Camera Corpora-tion in Hollywood, Calif. Marshall P. Wilkinson, architect

The recently com-pleted office building for Westchester County at White Plains, N.

The new building for the Portland Art Association, Portland, Ore., completed late last year. A. E. Doyle and Associates, architects



Y. Morris & O'Connor, architects



Below, the Eye Institute, a recently completed unit in the Columbia Presbyterian Medical Center, New York City. James Gamble Rogers, architect



Below, the new home of the Union Club at Park Avenue and 69th Street, New York City, the fifth home of the club. Delano & Aldrich, architects



(Continued from page 153)

so many of them are basically wrongand the trouble is that the public is not sufficiently informed to know that they are wrong-schemes which have no real justification in our future economy, and likely to be swept into being by a demand for housing betterment and slum clearance that is attaining all the attributes of a public movement. Too long we have sought, preached, and begged for slum clearance, without paralleling these efforts with investigation and study as to what really should be done. Now the danger is that the idea will be accepted so enthusiastically that we shall go ahead with an unstudied rush of building. Particularly does it seem that we are in danger of subsidizing the owners of land, rather than the tenants of the new housing.

Wednesday, July 12.—Three years ago the Lincoln Building was put up opposite the Grand Central Terminal, representing an investment of about 27,000,000. Yesterday it was sold in a foreclosure auction to the first mortgage bondholders' committee, on a bid of \$4,750,000—one of the most dramatic evidences of New York real estate liquidation ever encountered.

Thursday, July 13.—Twenty-five of his close associates here in the office gave a luncheon today to Robert Bridges, celebrating his seventy-fifth birthday and a magnificent period of some fortyseven years in connection with Charles Scribner's Sons.

The appointments of new architect members to the Advisory Board of the Park Association of New York City show careful thought and good judgment in selection. Clarence S. Stein is chairman, the other members being Frederick L. Ackerman, Henry Wright, and Ralph T. Walker. This group replaces Arthur L. Harmon, Thomas H. Ellett, Francis Y. Joannes, William E. Moran, and John Sloan.

Friday, July 14.—Charles L. Borie, Jr., of Philadelphia, joined a luncheon table group today at The League, and told me that the architects' survey of the worthy early work in Philadelphia has now been completed. It will be recalled that the architects divided the city into districts, with architect captains and drafting cadets to search out and record the early work in each section worthy of putting into measureddrawing form.

Saturday, July 15.—Contracting awards in the thirty-seven states east of the Rocky Mountains during June totalled \$103,255,400, according to the F. W. Dodge Corporation. This was a gain of almost 34 per cent over May, but \$10,000,000 short of the volume for last June.

Monday, July 17.—Some one has dug up the fact that the White House originally cost about \$350,000 to build, which included \$500 for James Hoban, the architect. Rebuilding, additions, redecorations, and other expenditures since the original construction, bring the figure up to about \$10,000,000 total investment in the building.

Wednesday, July 19.—There has been, heretofore, real difficulty in putting one's hands easily upon biographical material concerning the early American architect. One would find a bit here and another bit there, making the search for adequate information slow and difficult. The 'Dictionary of American Biography' bids fair to clear this trouble. This is to be a work of twenty volumes, including names of those who have made some significant contribution to American life. No living person is included. In Volume XI, which appeared on June 16, I find a splendid biography of Benjamin Henry Latrobe-practically six pages, or over five thousand words, on the man who, in 1815, was asked to take charge of the rebuilding of the Capitol in Washington.

Thursday, July 20.—The news is finally out concerning the personnel to direct the housing division in the N. I. R. A. Robert D. Kohn, of New York is to be director; N. Max Dunning, of Chicago, assistant director; and Eugene H. Klaber, of Chicago, chief of the technical staff. There have been named also consultants: Henry Wright, New York; Mrs. Edith Elmer Wood, New Jersey; Frederick L. Ackerman, New York; Jacob Crane, Jr., Chicago; Russell Black, Princeton; Coleman Woodbury, Chicago; Harold D. Hynds, New York; and Tracy Augur, Detroit. Approximately half of these names—mostly the latter ones—are well known as landscape architects and city planners.

Friday, July 21.—The National Association of Real Estate boards makes a semiannual survey of the market. In the last one of these it was found that in one-third of the American cities of over five hundred thousand population there is an actual shortage in single-family dwellings. There are a few less attractive elements in the picture, however, such as the fact that money for mortgage loans is practically nonexistent.



Saturday, July 22.—Howard M. Robertson, one of the foremost exponents of a rational modernism in England, wrote an article on "The Outworn Mode" for the New Year's number of *The Architect* and Building News. E. N. Jenckes, Jr., of *The Springfield Republican*, took the liberty of questioning the statement by Mr. Robertson to the effect that we had rather overplayed the use of classic styles in this country in connection with our utilitarian structures. He had remarked that American power plants sometimes

« ARCHITECTURE »

had a full classic façade with tall smoke-stacks in the rear. There may be a few such-Jenckes recalls a generating station on the Delaware River near Philadelphia, but the practice is surely not common, and certainly not typical. As a matter of fact, our industrial architec-ture may well be given credit for having first recognized honest functionalism developed without the need for decorative details from past eras. Mr. Robertson agrees, however, that "practically every phase of Continental modernism has been worked out in the early industrial architecture," which is interesting in which is interesting in view of the extravagant claims frequently advanced by some of our literary architectural critics to the effect that the continental style is an entirely new thing for which we in America can claim no credit.

Monday, July 24.—Harold Stone, The Washington Post's roving reporter, has discovered at the University of Virginia some partly carved capitals of native Virginia sandstone which Thomas Jefferson wanted to use, but, on trial, found the sandstone too soft to handle. Jefferson tried stone from the quarry of General Cocke near Bremo, also from a quarmy near Richmond. After spending nearly fifteen thousand dollars he gave it up and sent to Italy for Carrara marble which was carved over there.

Tuesday, July 25.-Lunched with R. H. Shreve who was telling me of the workings of a fellowship his firm maintains in the office for a student from Cornell. Cornell selects the man, and Shreve, Lamb & Harmon agree to pay him thirty-five dollars a week for a year. He is allowed to pursue any particular branch of architectural work that his fancy dictates; he may try to write specifications in a new way if he feels so inspired, or he may go out on the job and see how it is being built. Shreve says that most of these men ask to be put to work detailing some such simple thing as a window box, feeling that they know very little of such minor commonplace elements. Personally I should think that the firm's thirty-five dollars a week might well be listed under the heading of philanthropy, for there are few men fresh from the architectural schools who are worth their salt the first year in an architect's office.

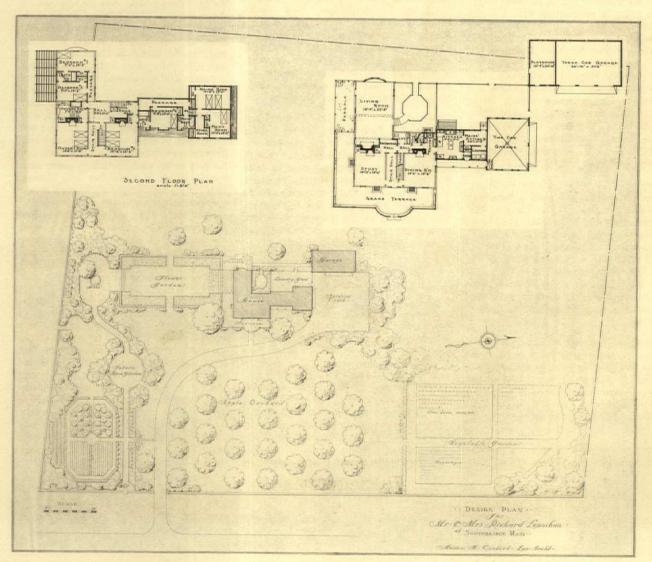
Thursday, July 27.—Ralph Adams Cram says that the greatest work of art which man has ever produced is a High Mass in a Gothic cathedral of the fifteenth century. In it every art that man has ever devised, or had revealed to him, is brought together in one great unity. It combines not only architecture, sculpture, and all the arts dealing with lifeless materials, but also music, and is, through this combination, made "the very greatest and most powerful stimulus to the generation of high emotions."



House of Richard Lennihan, Southbridge, Mass.

LAURA M. Cox, ARCHITECT; MRS. MASON M. CONDICT, LANDSCAPE ARCHITECT

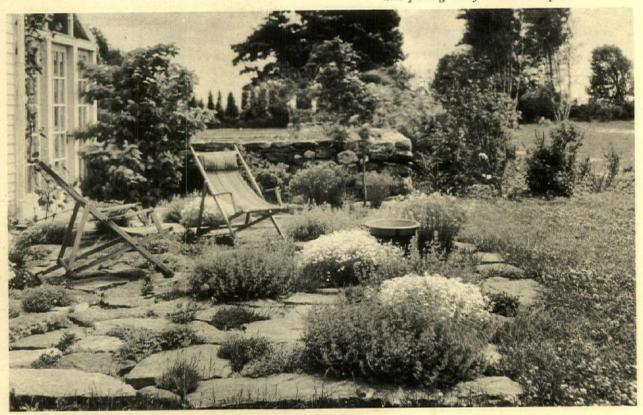
Below, plan of the plot, with first and second floor plans at larger scale





The living-room ell to the left rear, the service wing, and the garage at the right, were separate buildings on the plot and were added to the main house in the remodelling. The front terrace railing was found in the attic

Below, a corner of the stone terrace adjoining the end of the living-room. All of the stone for garden walls and paving was found on the place





Below, a view looking out from the awning-covered terrace off the living-room into the garden, with its pool on an upper level. The plot was originally a cornfield

The client asked the landscape architect to provide a flower garden adjoining the living-room, a secluded play spot for the children, which would be a future rose garden, and a small vegetable garden



« ARCHITECTURE » 159



Fireplace end of the living-room. In the left corner may be seen the entrance hall leading past the stairs to the front door

The house is built of white clapboards, with ox-blood shutters. At the extreme right may be seen in the distance a corner of the detached three-car garage and playhouse, added later

A corner of the kitchen, in which the walls and woodwork are orange-yellow. The painted panels are copied from old Quimper plates. Floor and counter-tops are of linoleum





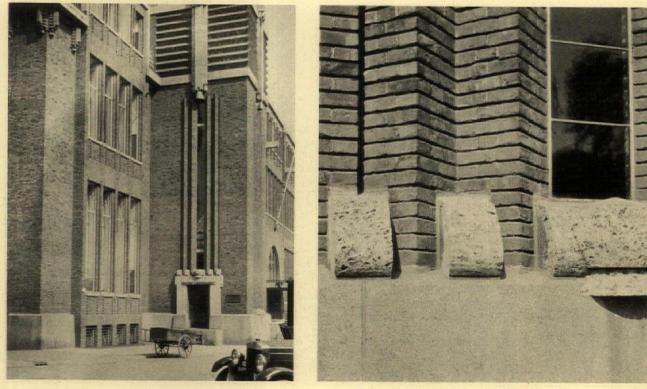
Current Dutch Brickwork By Gerald K. Geerlings

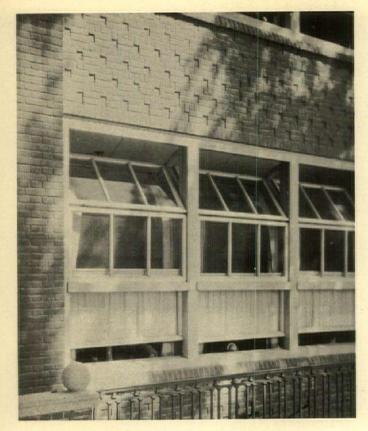
₩₹*\$#HE current brickwork of Holland is as old as her mediæval churches, and as modern as the 1933 calendar. The At forms it has lately assumed are the result of the recent types of buildings: the moving-picture theatre, office building, power-house, and school. These have demanded large windows, economy of ornament, and an expression limited to absolute utility. The concrete and steel skeleton has also brought about natural changes affecting brick usage. But the actual brick details-the resourceful combinations of stretchers and headers, the introduction of panelled forms, the lively inventiveness of patterns-these are a continuation of the heritage of the past. Holland has no quarries, and only very limited forests in the east, so that brick has always been her one and only natural building material. Stone was necessarily expensive to import, and the painting of cement quoins to make them appear to be stone was never a popular substitute. Their builders have therefore learned to work with a limited palette, and with the available pigments have come to appreciate their every possibility. In America the

modern movement finds us poring over imported books, desperately hoping to cull enough good ideas from them so that we will not have to think them out ourselves. But with the Dutch it is not so. The *ensemble* is a product of frank expression; the details are a natural development of a wealth of brickwork tradition.

For the American architect who may not be in sympathy with the present tendencies in Dutch design as a whole, there is at least a wealth of suggestion in the various details. The manner of securing vertical accents, of pulling forward horizontal courses, of depressing headers in panels, of alternating stretcher and rowlock courses, or placing stretcher courses vertically in spandrels-all these and more can be gleaned from the observation of current Dutch brickwork. In the examples which follow it is to be hoped that the reader will approach them with an open mind, to discover what is good and what is applicable to his practice. Before a motif is condemned as unsuccessful, it will be worth the trouble to ascertain if it be not so much a deficiency in the design as in one's own preconceived ideas and preferences.

Post Office, Utrecht. Although one may pick a quarrel with the general design if he so wishes, the detail offers suggestions in harmony with the most restrained form of conservatism. First of all, the brick is pleasant in color—pinkish tan to yellow predominating, with some lively salmons scattered throughout. Then, to accent the horizontality, only the horizontal joints are raked out. Strong vertical accents are accomplished by the favorite Dutch trick of laying up piers at 45 degrees to the face of the building. Perhaps most useful as a suggestion is the travertine texture given the concrete

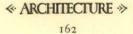




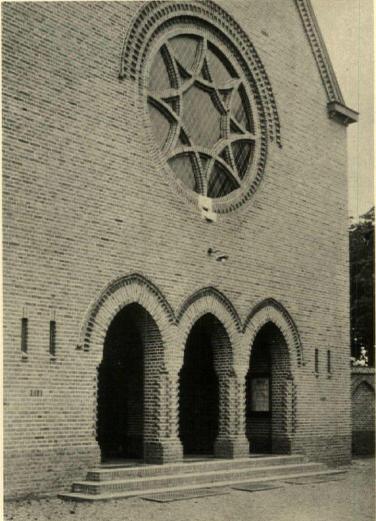
The two illustrations above show a lowergrade school, near the Cathedral, Utrecht. Dutch brick spandrels possess a sense of rightness of design which those of most of our own modern buildings lack. Seldom, if ever, is there a mixture of various colored bricks, but the variety of surfacing is relied upon to promote even greater color contrasts. Here there is a simple enough scheme of making every third course a rowlock, and in the two intermediate courses, alternating two stretchers (which line up vertically), with a recessed header. Close examination will disclose that every alternate brick is a square header in the rowlock course. The window-sills are moulded with a 45-degree slope at the outer edge. The wall coping and ball are of cement. The wood is painted cream, and the cast-iron railing black.

The surfacing of the pier (upper right) corresponds in purpose to that of fluting a column at just such an entrance problem. It is a good example of making the ornamentation an integral part of the building. The tapestried pattern is obtained by depressing every alternate header—all courses being of headers

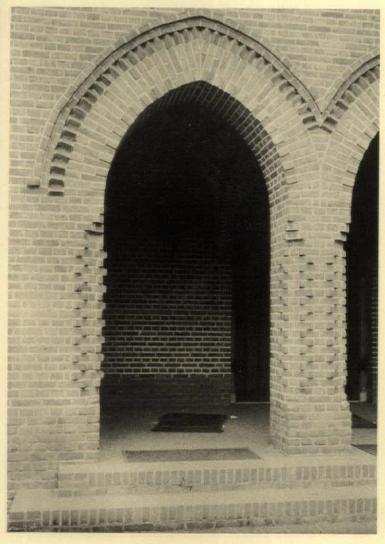
> Entrance to a church at Hillegom. One may cavil at the tour-de-force of the brick tracery, but the designer was on surer ground in his entrance detail—an enlarged illustration of which is shown on the opposite page

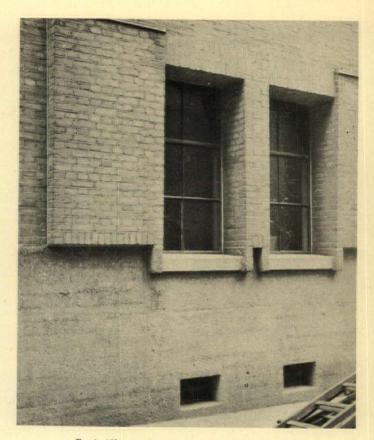










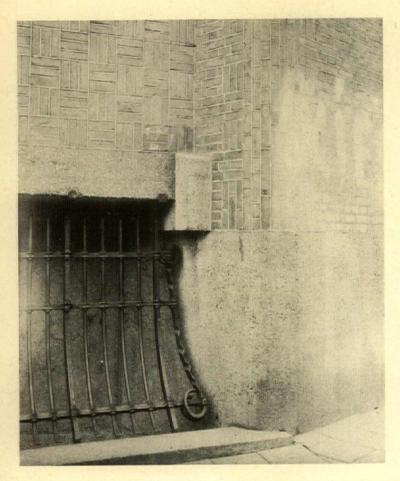


Both illustrations above are from a powerhouse on Delftsche Canal, Rotterdam. In theory it is simple enough to discourse on the rightness of expressing utility in terms of beauty, and frankly exposing structural forms without a veneer. But in actual practice it is not so simple to achieve. Yet in this building the concrete lintel and spandrel over the door, the ends of the concrete lintels over the windows, and the sills beneath them, as well as the outer face of the concrete roof slab, are as decorative as travertine. The businesslike simplicity of the window mullions over the door, and the vertical pattern of brick along the left corner are sufficiently interesting to offset the vandalism of campaigning politicians in painting the base with whitewash.

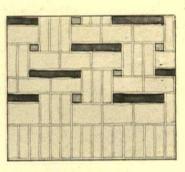
As to the illustration above at the right, if the piers flanking the windows did not project, if the concrete sills did not carry the mullion and piers, if the brick had run down to the pavement—what then? A repetition of the usual puerile power-house window, considered unworthy of the architect's study. The bricks span a color variation from yellow ochre to a dull gray-pink tonality

Detail of the church entrance at Hillegom. There is an amazing dexterity here in the use of brick. Note the very slight projection of headers on the inside line of the arch; also the way in which this right-angled edge has been corbelled back to cut the pier corners

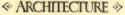
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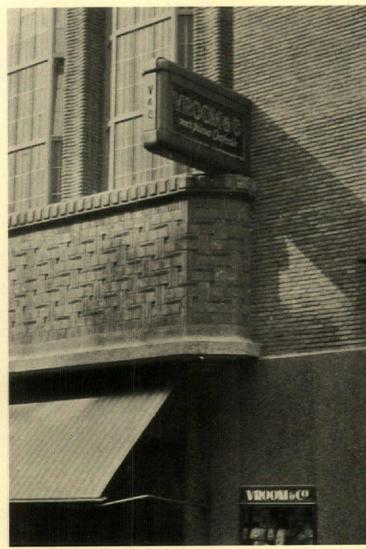


Another detail of the power-house on Delftsche Canal, Rotterdam. Here the corner is rounded off by seven rows of stretchers laid vertically. The corner shown at first glance appears an intricate pattern of dovetailing the usual horizontal courses with the special vertical ones. Yet the detail shows how ridiculously simple it really is. Without the groups of three vertical stretchers which flank the seven vertical courses, the latter would be pathetically out of place. Incidentally, this manner of rounding off a corner on a short radius is the only way it can be done in brick without the use of special shapes



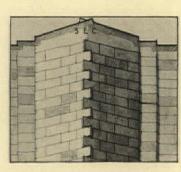
Detail of department store, Vroom & Co., Amsterdam. The most arresting detail of this store façade is the pattern of the projecting horizontal panel above the first-floor awning. While there are wide variations in the color of the brick, from yellow through yellow-browns toward red, one's interest is chiefly stimulated by the manipulation of the surfacing. Regular stretchers are laid upright in groups of three, special short brick are placed with their wide, flat faces exposed, while specially surfaced stretchers project slightly, and special small square headers are recessed. The base course of the panel is of cast concrete, the sill of terra-cotta. The surmounting piers are laid up with curved front faces, which are so much in vogue with modern Dutch architecture, and which seem in questionable taste unless at a large scale





Power-house, Baan, Rotterdam. This version of a power-house is a lucid translation of absolute utility without frills. It expresses strength and kilowatts in every brick. The walls and buttresses go about their jobs like brawny stokers, and do a manly job of it. A concrete skeleton is evident beneath the brick, and actually apparent on the face of the roof slab, window-sills, and base (the latter unfortunately victimized by a current election when this photograph was taken). The mullions of the window above the door are laid at 45 degrees to the face of the building. The brick is dull gray-red in tonal effect







Nationale Bankvereeniging on the Vredenburg, Utrecht. On the façade of this little bank the only ornamentation has been accomplished by the manipulation of ordinary brick, and the application of some free-standing wrought-iron signs. If the pilasterpiers had straight, flat faces, and the spandrels had no accents, the façade would shriek mediocrity. But as it is, only the round columns at the entrance corner seem in poor taste. The remainder of the façade employs brick extremely well—the rusticated ground floor, the window lintels laid up with vertical joints, the simple but effective piers, and the spandrels with their square projecting headers. The brick, dull red

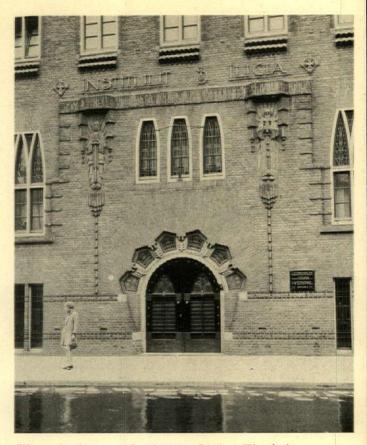
« ARCHITECTURE »

Below, a bank at Haarlem. If a disciple of Vignola does not agree with this design, he must at least admit that it has followed the same principal tenet on which the Classic is built—that of maintaining harmonious unity throughout. The design of this bank is preferable to the modern use of Classic in many schools, banks, and libraries, which make an archæology projet out of the entrance motif, while the rest of the building goes begging in paltry factory tatters. This façade is not far removed in feeling and parti from the French provincial Gothic churches, and can be recognized as such if the ornament detail, roof material, and tower profile be imagined as changed. And moreover, the designer has created—not merely copied a jumble of excerpts

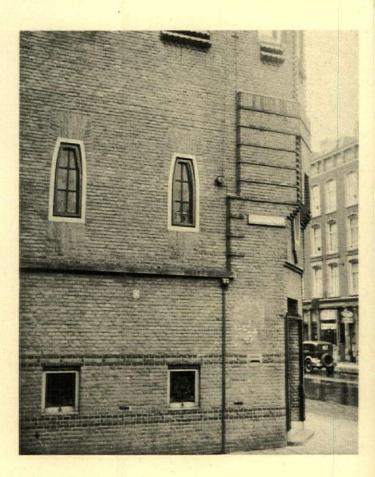


Corner, Institut St. Lucia on the Lijnbaanstraat, Rotterdam. Subtract the battered windows, the heavy upper sills, and the remainder still brings the number of good ideas up to a creditable sum. The handling of the corner is unusually deft, as the offsetting base gradually steps itself above the second-floor window. Also noteworthy are the projection of every sixth course, and the pseudo corner quoins (opposite and slightly below the queer window). The brick creates a dull, gray-red tonality; the darker courses above and below the basement windows are black



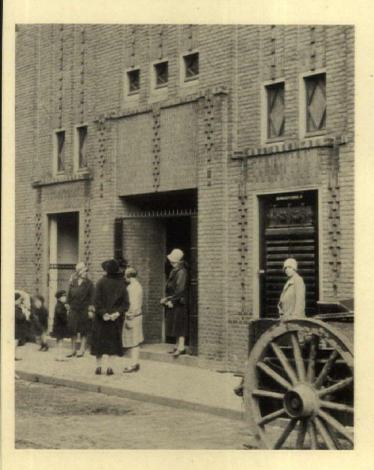


The main doorway, Institut St. Lucia. The designers felt the need, which we may regret, of going outside their brick palette. With the dull gray-red brick they have used figures of moulded terra-cotta, and tiles of blue, buff, and red in the arch over the door. This latter is of orange varnished wood, with wrought-iron ornaments. The four single-course base lines are of black headers





Side entrance to the Institut St. Lucia. Granted that the art glass windows and the heavily lunging sides of the doorway are not worthy of emulation. But every pioneer gets blown off his course now and again. There are excellent ideas in the manner of stopping the long vertical window panels at the left, by the sloping sills (which are a bit overdone, perhaps), and the heavy jamb of the door which affords shelter. The base of the offset (to the upper left of the door) gets under way neatly



Side façade of the Bourse, Amsterdam. While this building was one of the forerunners of the new manner, its utilitarian façade on the narrow street washing its starboard side, has remained practically unphotographed and unsung. The fault which the conservative residents have found with the building from the very first is all the more marked on this elevation. What they say sounds like certain opinion in America, "You can tell what the building has in it. All the large and small rooms are so frankly shown on the outside, that they disclose the plan and purpose of the entire structure." In other words, "Long live the age of architecture when banks, court houses, and Christian Science churches all look alike!"



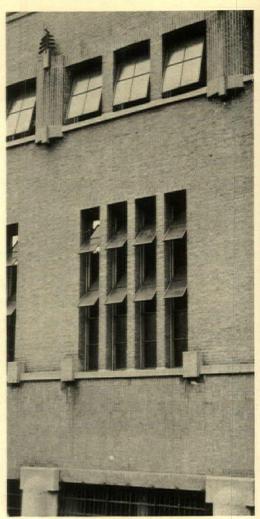
Bewaarschool, Rotterdam, on a little street between the Kruikslade and Aert Van Nesstraat. One of the outstanding virtues of Dutch brickwork is that where the masonry is load-bearing, it is laid in a straightforward horizontal bond, but where it is decorative, as at doorways, or merely a wall covering as in a window spandrel, liberties are taken within the natural bounds of the material. The brick on the whole are a dull gray-red, with a few black and soft yellow ones introduced for ornamental accents. Window-frames are painted yellow, and the muntins dark green

« ARCHITECTURE »

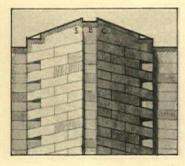


At left, a moving-picture theatre, Rotterdam. By this time most architects realize the futility of designing modern threatre façades without yards and yards of free space for display signs, and make proper provision for advertising area which the management will usurp if not voluntarily given it. The plain brick wall of this Dutch theatre serves well as a foil for the advertising. The vertical tower, with alternately black and white glass, is illuminated at night

> At right, another detail of the power-house at Rotterdam. The basement needs a maximum of light, and receives it. Sufficient support for the building above is expressed in the projecting concrete piers and the wide frieze of herringbone pattern brick. The tall windows, with their patrician proportions, are centred and anchored to the voids below, by the projecting concrete accents on the sills. The chamfered piers of the top floor form a very necessary interruption to the flatness of the façade



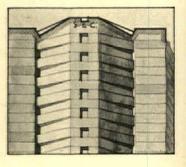
Commercial building adjacent to Catherine Bridge, Utrecht. The problem of obtaining moulded brick in Holland is apparently as difficult of solution as in this country, but the Dutch designers have managed to obtain as many ornamental effects as though they had all the moulded forms of their forefathers with which to work. The



≪ ARCHITECTURE ≫ 168



accompanying sketch (left) indicates the skilful manner in which this pier is laid. The intermediate piers and mullions carry the vertical enrichment across the façade, and prevent its being stranded on the widely spaced large piers. The color of the brick varies from pinkish red to yellow ochre. Below, a detail of the intermediate piers



Some Pitfalls in Supervision

D an important part D of modern building Construction, and should not be neglected by the superintendent. To have a

ventilating system in a building break down because of lax inspection is a poor recommendation for the superintendent and his employer.

The inspection of the ductwork should begin as soon as the first truckload of the sheet metal arrives on the job. The gauge of the metal must be checked; likewise the manufacturer's name appearing on the sheets should be compared with that in the specification. No brand, other than that specified, should be accepted without the architect's authorization. If the work is not made up it may be difficult to check the gauge, because different thicknesses will occur in different places. However, this can be followed up as the work is being laid out. All joints and seams should be examined to see that they have been executed in a workmanlike manner. All important elbows and bends may well be checked for radii at this time. A sharp elbow or bend will materially slow up the subsequent flow of air in the duct, and therefore should not be passed unless it is satisfactory to the architect or engineer who laid out the work. There must be no change in the width or depth of the duct without good authority, or a check-up by the superintendent. If the duct sizes do not agree with the plans, the entire matter must be gone into further. It should be kept in mind that, while the same cross-sectional area may be present, it does not follow that the same efficiency of air flow will occur. If, for instance, a duct 18 by 36 inches is changed for one 12 by 54 inches, the same cross-sectional area is obtained, but not the same perimeter or efficiency. In fact, the flow is lessened by this change over 4 per cent, and will further decrease proportionately with the narrowing of the duct.

When the ductwork is started one of the important considerations is that of adequate support. No deviations from the details should be allowed. All floor supports should be firm, and yet so constructed as to eliminate the transmission of any vibration or rattling. Hangers should be securely fastened to the ducts and then adequately attached to their supports. The superintendent may find here that galvanized

By W. F. Bartels

XXXV. DUCTWORK

straps or hangers are used to support copper ducts, or vice versa. This should be studiously avoided, as there is always the lurking danger of electrolysis present. The num-

ber and frequency of hangers should also be given careful attention. An omitted hanger may cause a bend in the line, thus permitting water to accumulate in the duct and subsequent rusting to occur.

All large areas of sheet metal, forming ducts, should be braced as called for by the plans and specifications. All re-enforcing angles of the size called for should be incorporated with the cross joints to give stiffness to the duct, and suitable anchorage for the hangers or supports. No more bends than are absolutely necessary should be contenanced. If it is necessary to change a duct size in order to maintain an established headroom, the superintendent must see that the change is made gradually, and not accomplished within too short a distance. Where ducts go through walls, a lintel, such as an angle or other suitable form, must be demanded by the superintendent. The duct contractor and mason will argue that the duct is strong enough to support the wall, and that the latter will arch over it as soon as it is set. But none of these arguments will compensate for the loss of area in the duct if it is bent in by sagging masonry. Nor is there any assurance that future vibration will not bring down the section of wall. If the duct occurs in a hung ceiling and pierces a fire wall, double vigilance must be exercised, because the contractor will probably omit the wall entirely over the duct, particularly if it is a wide expanse.



From time to time the superintendent should inspect the insides of the ducts. There must be no projecting edges inside that will collect dirt. While the superintendent is inside the duct, it would be well for him to have some one outside with a good flashlight. By having the light flashed along the seams and joints a good check is obtained on the general tightness of the work. The corners probably will be the most faulty spots, and afford the most likely indication as to whether workmanship has been good or bad. Generally the contractor will take more time to explain how holes at these junctures "are bound to occur" than it would take him to eliminate them.

The superintendent must carefully check the plans and specification against the job to make sure that any copper ductwork called for in damp places, such as shower baths and steam rooms, is installed. In some places there may be combinations of black iron for a certain distance, and as conditions change, galvanized work. All these items, as well as the gauges and weights, must be checked. Where any copper ductwork joins galvanized work the specification will probably call for an asbestos washer so that there will be no danger from electrolysis.

If there is a fan, it should be checked along with the motor. The superintendent must see that the fan and motor foundations are as shown on the plans. Some of their noise and vibration will be transmitted through the ducts—hence the necessity for alert supervision. The canvas, connecting the ductwork with the fan enclosure, will be banded tightly to the end of the duct and to the fan, but loose enough between them to avoid transmitting vibrations as it might if stretched too tightly to connect these parts.

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In making an exterior check of the ductwork the access doors should be gone over to see that they have the proper hinges and fasteners, and that they are properly attached. The dampers will be checked to see that they are all provided as called for. Then too, any special requirements of the Fire Department or the Board of Fire Underwriters will be gone over to see that they have been complied with. Mesh that is called for in back of the grilles must be installed. The superintendent would do well to make sure of this as its omission is something to be regretted in the finished appearance, as well as in other respects, such as allowing paper and debris to collect.

When the registers and grilles are being installed the superintendent must keep a constant lookout to make sure that they fit tightly against the plaster. Any minute space will result in those well-known smudges which gather around loose grilles, like dirty fingers projecting from them. It may even be necessary to insist upon some form of a washer to go between the grille or register and the wall. But, whatever may be used, it will pay the superintendent well to insist upon a tight job here.

Before the ducts are turned over for opera-

tion they should be well cleaned, and a general recheck made. A small workman can get into most ducts and do a good job of the cleaning, but no matter how much dirt there may be in the ducts, the contractor prefers to blow it out. It is cheaper. It is of course realized that the smaller ducts will have to depend on the air force for their cleaning. The superintendent should make sure that this blowing out of the ducts does not occur when there is any fresh paint in any of the rooms having outlets, otherwise a dark sandy paint job may be the result.

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The painting of ducts, as is true for the painting of any work, must be carefully watched. It is good practice for the superintendent to insist upon the duct throats being painted-generally black-before the grilles are put up. This does away with refitting the latter with subsequent marks on the wall, or a poor fitting job. The chances of getting faulty workmanship are prevalent enough without trying to reset grilles. The specifications may call for special paints to protect certain ducts against fumes, such as those from acids and other chemicals which may have a deleterious effect on the sheet metal. It is self-evident that the painting of small ducts for such places should be done before the sections are erected, so that only touching them up is necessary after each piece is put in.

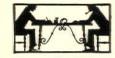
There are still two other items in connection with ductwork that the superintendent must inspect: soundproofing and insulation. The specifications probably call for insulation to prevent sweating, loss of heat, or absorption of heat. The material to prevent these from happening must not only be put on to look well, but must be there to stay. The insulation will probably be glued to the duct, and then, as a possible preventative of its falling off, tied on with copper wire. The superintendent should see that the adhesive material is according to regulations, and that it is adequately applied. The wire binding must not be carried too far without being tied. Otherwise if one wire breaks it might let several lengths of insulation fall, if their adhesive had also "quit on the job."

The superintendent will of course inspect and check the tests required by the architect to ascertain if the air changes and velocities called for in the specifications have been produced. Any sin of omission or commission will of course be remedied before the building is turned over for occupancy.

CONTACTS



DEVOTED TO A BETTER UNDERSTANDING OF THE BUSINESS SIDE OF ARCHITECTURE AND ITS RELATION TO THE INDUSTRIES



PAINTING is one of the oldest building trades and it has survived through the ages without any material change. We find it practised now much as it was hundreds of years ago.

But, springing up side by side with the painting in our modern buildings, we find new trades, or new modifications of old trades, particularly associated with metal and glass. The finishes of the latter have been modernized and are in keeping with the contemporary character of the products themselves, and show up the painting to anything but advantage. The metal trim, with its factory finish, makes the painted wall treatments appear crude and inelegant. This is a condition that those who are engaged in the painting trade cannot ignore without serious danger to themselves and their trade. It is clearly the result of comparison between the old-fashioned hand trades and the modern factory production.

Articles produced by the latter method are under systematic control and produce standardized results of a comparatively perfect quality, while those produced by hand on the job vary according to the relative skill of the individual mechanic producing the actual work.

The situation that faces the painting trade is that it will either have to change its methods and improve the product or the architects and owners will continue to seek, and ultimately will find, another solution of the problem; they will struggle to find a kind of wall and wall finish more uniform in surface and, at the same time, more durable than the present painted plaster. It seems obvious that the problem is not one of paint alone, because a finish is no stronger than its underground. The plaster that is being used today is not hard enough to withstand any serious amount of wear and tear; nor is its application sufficiently level, even, or smooth, to present a surface comparable to the perfection of finish of wallboards and wall sections now on the market.

A decided need exists for a harder plaster finish; one which can stand a reasonable amount of wear. The

The Dilemma of the Painter

By Harold W. Rambusch

plastering trade, as a whole, will have to deliver a better surface than that usually produced. We find, occasionally, walls and ceilings that may be called perfect. Our modern technicians have proven that, if it can be done in one instance or on a given area, it can be reproduced in quantity.

Given a strong and perfect surface, the problem is directly in the hands of the painters and paint manufacturers, who will have to supply materials that can be applied under job conditions and produce surfaces and finishes that will satisfactorily compare with the sprayed and baked products of the factory methods.

The problem of the manufacturers presents several phases: the first has to do with the appearance of the product itself; the second has to do with the practicability of application under job conditions.

In discussing the appearance of the object, we encounter, first, the problem of color, which represents no difficulty. Quality of surface is more difficult to solve. In this age, where texture of surface, at least on utilitarian projects, seems quite secondary to the quality of finish, we find that gloss and mattness of surface are specifically required to fulfill definite needs. The lighting engineers want matt surfaces for their reflecting areas, particularly the ceilings, while those who are in charge of upkeep require a reasonable amount of gloss on wearing surfaces. Gloss and mattness also fulfill definite useful elements in the esthetic appearance of the room.

The manufacturers at present are encountering serious difficulty in producing surfaces in semigloss or matt finishes without sacrificing the cleanliness or the ability of the surface to shed dirt and to resist stains. At present paints can be had in semigloss or matt finishes, but they are easily soiled, and the dirt and stains cannot be readily removed.

As the second part of the manufacturers' problem, we find the need of recognizing job conditions. There are nearly always other trades working at the site, with the result that the air is agitated, and dust is raised which, settling in the fresh paint, naturally stays and disfigures the finish. It therefore becomes a problem to reduce to a minimum the amount of time between the application of the paint and its setting. With modern lacquers used in the plants, this time has been reduced to minutes, but in New York, unfortunately, and in many other large cities, the use of the spray gun has been prevented by the labor unions. This condition, of course, is clearly up to the painting contractors to remove by negotiation with the labor unions.

In the meanwhile, and until this condition can be removed, it is necessary to find paints that can be applied by brush and that will set in a few hours, thus reducing the time during which surface has to be protected against dust. It is admitted that this is not the simplest of problems, as a paint that sets too quickly does not permit the mechanic enough time to apply it neatly and without There are, however, paints laps. on the market that have brought the time of setting (which used to be twelve to fourteen hours) down to three or four hours. We need to shorten this time to one or two hours, and we shall then have overcome one of the greatest difficulties in applying paint under building conditions.

Conditions have also made the problem of the painting trade more exacting in that the modern trend has been toward the elimination of glazes and antiqued surfaces. The painter has become accustomed to relying upon antiquing and glazing to cover up many faults and imperfections in finish, but he has also figured upon these glazes to pull together the color scheme. With the elimination of antique the problem of matching and harmonizing colors becomes much more difficult and precise. Colors and tints now have to be studied and applied directly to the finished surface without the common denominator of a glaze. This requires, on the part of the painter, considerably more knowl-edge of the harmony of colors and their esthetic appearance. The same applies to the metal finishes so often used on ornamental plaster or moldings. These have to be placed and used with colors and tints so that the scheme balances within itself. This condition has arisen partly because of the modern trend of using metal and paint, and partly because of the general schemes worked out in our buildings where metal and paint and enamelled surfaces are applied separately, in various elements, to form a scheme.

An example of the use of tints and metals thus separately applied in a scheme of decoration may be found in the ceilings of the vestibules and foyers in the new Metropolitan Life Insurance Company Building on Madison Avenue, New York. This instance clearly shows the relation that exists between such a scheme of painting and its fitness in connection with the utilitarian treatment of the marble walls, metal grilles, glass, and metal doorways.

We are living in an age which has made tremendous strides in the use of metal and glass and in the finishes in which these products are produced, and unless those trades which are still carried on at the site, such as plastering and painting, are brought to the same high standard of excellence they will ultimately be eliminated.

It would seem that when the problem is so clearly put up to these two trades they should be able to recognize it, face it squarely, and eliminate the somewhat home-made appearance their work still presents.

Part of the difficulty also lies with the mechanics themselves. They have been brought up on the jobs and have, through generations, built up their own ideas of craftsmanship which, unfortunately, are ill-suited to modern conditions. These traditions develop individualism and private opinion. They are, however, fighting a losing battle against the standardization of the modern factory system, which has created a new type of mechanic who is willing to forget his own opinions and act according to formula.

ARCHITECTURAL EDUCATION

(Continued from page 149)

have made a better *man* of myself had I been fortunate enough to live in the kind of school I have tried to depict.

'And now, dear man, what say you to this afternoon's scribbling? I have forgotten that time was passing, I have neglected the thousand things that my 'betters' have decreed I was to do this day. But I have done exactly what I wanted to do, and it isn't often that we old uns get a chance to do that, is it? If you would preserve my reputation for reasonable sanity (which merely means, of course, apparent conformity) don't, for heaven's sake, 'peach' on me; I mean well, as you know. . . au revoir. X. Y. Z."

.

When I had read that letter, I felt that here was a great letter (another proof to add to the many I have, of the fact that the old-time fine art of letter writing may not, actually, have perished from the earth). My friend had put into vigorous, fresh, direct words what many earnest persons must have been thinking and trying to say, for a long time. Of course we realize-my friend and I -that a certain part of every young mind's development must be accomplished along standard lines and according to standard formulæ. Such a part would include, for example, the fundamentals of grammar and the use of language, mathematics, history, natural sciences. But, all of these fundamentals should be attended to before Youth enters into the fair, free pasture upon which the university gate should open. An enthusiastic, sympathetic attention to these fundamentals would fill the very young mind with that desirable quality of "intellectual curiosity' which would make a sojourn in the university pasture a joyous adventure, a splendid wayfaring-therefore a profitable sojourn. It is conceivable that, even in a university, there will be necessities for providing certain standard patterns to which the mediocre can be moulded, with the least effort on the part of the moulders and with the minimum pain to the moulded. But, is it not, likewise, conceivable that less willingness to believe the customary dictum that the "majority is mediocre," and more willingness to provide and preserve the opportunities

« ARCHITECTURE »

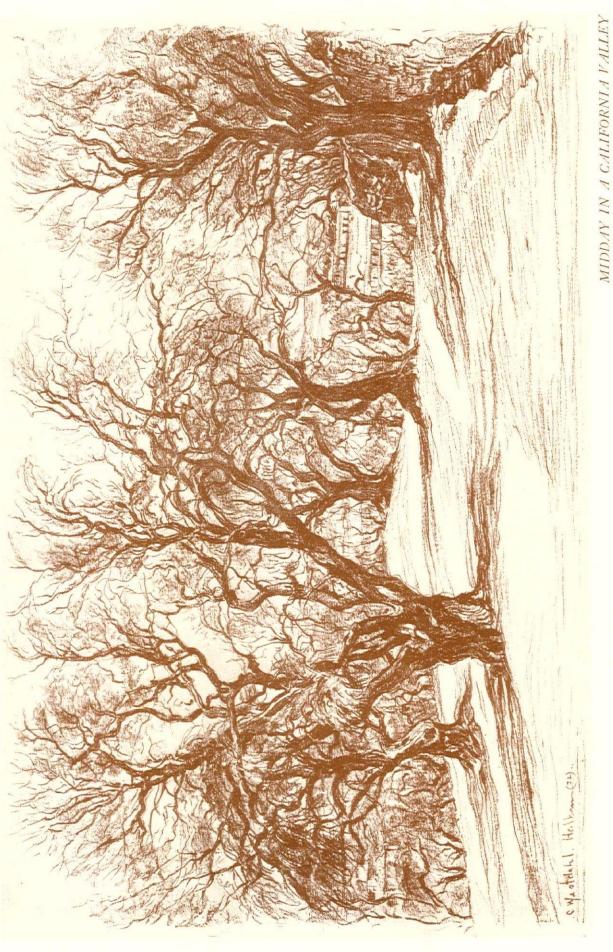
of a rich, free environment might, in time, open our eyes to the possibility (which may have been, all along, an unperceived fact) that the mediocre are *not* in the majority but, decidedly, in the minority? May it not be that the majority *appears* to be mediocre because of the system which disguises and disfigures it, and is not really thus by nature? At all events, it would be great fun and perhaps a great advantage to society—to see an experiment, on a much larger scale than that to which an individual "academic pariah" can operate in his own classes.

Of course, such an experiment would labor under the disapproval, and the verbose scorn, of organized education." It is obvious, perhaps, that such an experiment would be quite purposeless in many of the fields wherein Youth elects-or is forced-to seek standard nourishment. It would not be suited to elementary types of engineering study, although one can imagine its application to more advanced phases of real engineering, and one can see that there might come of it a new and delightful kind of engineer who would throw away his handbooks and his slide rules and employ his imagination. It would not be suited to the pharmacy trade nor the dental profession, one suspects, nor even to the elementary stages of medical study, although the doctors have always paid honor to human nature and its right of free choice once the essential stepping-stones had been passed over. It would-when it had shown its value-do away with teachers colleges, with their stultifying statistics, their false psychologies, and their other innumerable types of canned foolishness. But, ah, how beautifully it would adapt itself—this "noble experiment, hu-mane in motive"—to training in the creative fields; philosophy, literature, history, the classics (who says there is no field for creative work in the classic field ?), architecture and its allied arts of painting and sculpture! It would involve a sort of revolution in fields that have been called — by courtesy? — "intellec-tual." But, it would be a bloodless revolution after all, for the things against which enthusiastic human nature would revolt are dead already-they only need to be gath-ered up and buried.



From the study in sanguine Conté crayon by Carl W. Heilborn

♦ ARCHITECTURE ≫



ARCHITECTURE

✤ VOLUME LXVIII

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Richard Averill Smith Arlington Memorial Bridge. McKim, Mead & White, architects

The City of Washington Today By Edwin Bateman Morris

Signal CE the time when the site of Washington was first selected as a good geographical location wherein the capital city of a nation of the first magnitude might grow and unfold, there has been without doubt ample thought expended upon the method and plan under which this growth and unfolding might take place.

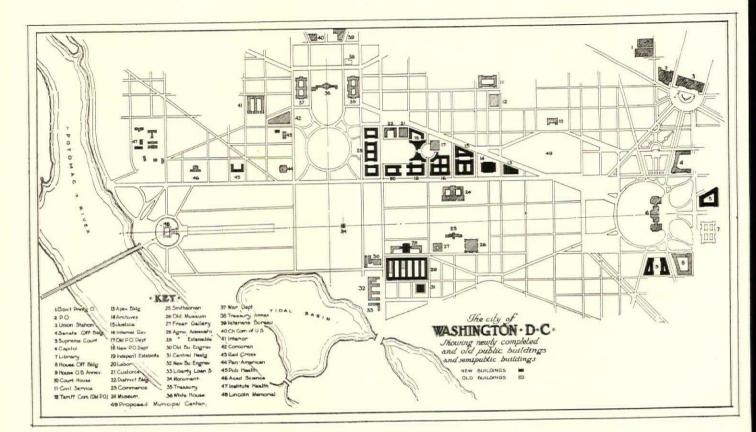
The brilliant L'Enfant gazing at a bare and unpopulated plain projected himself far into the future, seeing, what was then concealed to the world, that the thirteen struggling states would one day expand into a great power and that the desert acreage upon which he stood would eventually be the foremost city of the world. His imagination saw a metropolis of beautiful vistas, down avenues of splendid architecture yet to be built, but in his mind certain to be built.

Through the years the L'Enfant plan became almost a constitutional requirement. The circles and wide streets and centre planting and sidewalk trees were placed and kept with an almost religious fervor. We have Thomas Jefferson's suggestion, so inept to meet modern conditions, that trees be planted in the street gutters so that the automatic irrigation thus provided would cause them to grow to the tall and stately proportions befitting the metropolis they would adorn.

It was all looking toward the future, planning and preparing for an imaginative architectural city. The generations, through a century and a quarter, did little to provide such a city, but they were meticulous to rule out any act or construction or plan which would prevent any future generation from providing it.

McKim spent untold energy and thought on a great city to come. The McMillan plan for Washington represented energy and thought and unstinted patient toil. Studies for the miraculous beautification of Pennsylvania Avenue, bristling with colonnades and pediments and domes, were prepared and exhibited and presented to Congress.

In 1910, the first Fine Arts Commission was appointed, whose most important duty was to



protect and nurture the unborn city, to see that nothing arose to cripple the building of the beautiful and compelling architecture of the future.

But the architecture did not come. Every generation had a dogged faith that a forthcoming generation would miraculously build it, and tirelessly and energetically prepared the ground in the same manner that it had been tirelessly and energetically prepared since 1800. But the building generation did not arrive.

For years the unfulfilled sumptuousness of the L'Enfant dream and the later corollaries to it were a matter of ironic comment. The "city of magnificent distances" became, as time went on, just a city of distances.

The cluster of important buildings around the Capitol was linked to the cluster of important buildings around the White House by the shabby, dingy length of Pennsylvania Avenue, which was a thing to apologize for.

It was said that Woodrow Wilson, riding up this dreary thoroughfare after his inauguration and looking out at the Greek lunchrooms, the German delicatessen, the Chinese laundries, and the Jap bazaars, received his first inspiration as to Internationalism.

People thought of Pennsylvania Avenue as the place where Harvey's none-too-beautiful restaurant served steamed oysters, or where Maid's, beside a frog-inhabited pool, provided inner nourishment in a melancholy outdoor setting, or where Shoomaker's, purposely shabby and untidy, furnished statesmen with juleps and straight whiskey whose flavor was presumed to be enhanced by the packing-boxes and litter round about.

The untidiness of Shoomaker's might have been the theme for Pennsylvania Avenue. It was a packing-box sort of street. Perhaps old residents and legislators of long tenure of office had grown to have for it, as many did for Shoomaker's, an affection based upon its familiar dirty façades which, like one's old pipe and old slippers, were a great comfort to the person grown used to them, but a source of sharp pain to the newcomer and the casual visitor.

Many great minds, through the years, looking with concern at the Pennsylvania Avenue buildings and knowing what an unfortunate impression these shacks made upon visitors and especially upon foreign visitors, said: "Something must be done about it." But time rolled on and nothing was done. Like Mark Twain's weather, everybody discussed it but nobody did anything about it. The problem was too large. The nation, the Congress, the purse-bearers said: "It will cost too much."

And then one day almost casually the whole thing was settled and the dream, long cherished, became a tangible project.

The Great War was over. The smoke and stir and haste and confusion of the conflict began to clear away. The nation and the Congress and the purse-bearers, deflating activities to a peace-time basis and intent upon reducing the nation's expenditures to a state of normalcy, got out Uncle Sam's rent list for the dozens of office buildings occupied by government agencies in Washington—and received a shock.

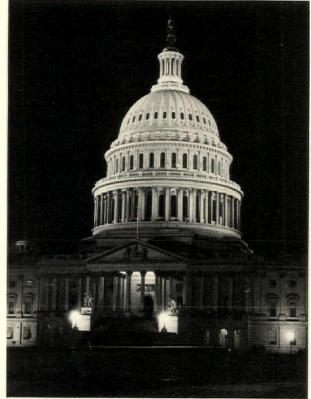
The war-time agencies had been abolished or contracted and removed from scores of rented edifices. But there still remained the Department of Commerce, the Labor Department, the Department of Justice, the Interstate Commerce Commission, the Bureau of Chemistry, the Bureau of Public Roads, the Bureau of Agricultural Economics, the Civil Service Commission, and numerous other activities which were housed in high office buildings and other structures all especially constructed by private interests to rent to the government, and financed generally upon the premise that the rents over the period of a ten-year lease would pay for the construction cost of the building.

This made a very heavy rent list to be met by the Treasury. When the purse-bearers, adding this up, recovered from the shock caused by its total, they fell into a very serious line of thought which resulted in the final conclusion that it would be cheaper for Uncle Sam to be his own landlord. And thus a great group of government-owned buildings—long a much-cherished pipe dream, became almost in a moment an actual certainty.

Congress, long sympathetic to the idea of city development, and especially to Pennsylvania Avenue development, fell into line. The money was at once authorized, with a restriction against placing any of the new buildings north of Pennsylvania Avenue.

That definitely made certain that the avenue connecting Capitol to White House would become an architectural street instead of a virtual slum. Added to this was the project that got under way to perfect a wide swath of open landscaping between Union Station and the Capitol.

These two architectural and landscaping projects, the one beginning where the other left off, promised an astounding transformation of the city. The development of Pennsylvania Avenue, at first considered as a housing project, flowed naturally into the Botanical Gardens of the Mall, into the Capitol grounds, into the Capitol-Union Station esplanade, and right to the door of the station. There was thus put



Richard Averill Smith

The dome of the Capitol as seen from the south front at night

under construction a broad ribbon of landscaped architecture from the city gateway.

All this is now sufficiently completed for it to be certain that one can proceed from the station to the White House, to the Lincoln Memorial, along stately and studied paths, beside which actual stonework and actual planting is coming into being where formerly there was but theory.

Architecture will now escort the visitor all the way. And from the Memorial he goes across the imposing Bridge to the Virginia shore, the axis of which leads directly to Arlington House, standing high and commanding on its hill. Also from the Virginia shore starts the charming new roadway to Mount Vernon. Thus, one will go to nearly all the major points of interest of the capital over well-considered and wellplanned and beautifully picturesque pathways. The dream of a century is realized.

The thought that cannot but occur to one is: If L'Enfant and McKim could have lived to see the day!

So great was the importance of the architectural development of Pennsylvania Avenue and so laden was it with the dramatic possibility of success or failure that the government recruited, from among the best minds of the pro-



Fairchild Aerial Surveys, Inc.

The official part of Washington as it appeared from the air in the summer of 1923: note the temporary war-time structures between the Union Station and the Capitol, and between the Capitol and the Washington Monument

fession, a group of advisers who are usually spoken of as the Architectural Consultants. The list of names of those invited to serve upon this board has never been made public, but it is said that so great was the surprise at the possibility of there being an actual architectural development in Washington, that many well-equipped architects incredulously declined positions in this very responsible group.

These consultants shouldered many obligations, and not the least of those was the one concerned with the architectural style to be followed in the design of this epochal group of buildings.

As is known, the style at length decided upon was following the Classic theme, varying it in the different buildings, according to the touch of the individual architect, from a severe Italian interpretation of that theme to the freer and lighter French one.

It was seemingly the part of wisdom for the consultants to decide upon the motif or module that they did decide upon. The city and the visitors to the city were ill to the point of nausea from the heterogeneous mess of the city. People who thought about it, even the lay observers, said: "Give us conformity and continuity."

The sense of restfulness and calmness provided by the use, in the Treasury Annex and the building for the Chamber of Commerce of the United States, of the same order that appears in the old Treasury Building, was so valued and so well approved that the consultants felt that this module must carry through on the new group. Architecturally and sentimentally it was a compelling idea.

Criticism of this decision and generally of the architectural style adopted arose from many quarters. The strongest criticism came naturally from those who felt that in the face of the virile Modernic trend of this age, it showed a lack of understanding to cast this great—if not this greatest—architectural venture in a traditional style.

This is a matter that can be readily and accurately decided upon a hundred and fifty years



Completion of the U. S. Senate Office Building, showing the C Street colonnade and the First Street wing. David Lynn, architect of the Capitol; Wyeth & Sullivan, consulting architects

from now. But not now. In that distant future it will without doubt be apparent either, (1) that Moderne has been established as the great American style, or (2) that architecture as a whole has immersed and dissolved Moderne, appearing with a new and pleasant flavor as a result, but that it is still the same old architecture, free to pick its motifs from any age its inspiration prompts. At that point one will know whether the Classic touch in the Triangle was in error or not.

At the present time, however, one must admit wisdom if not certainty for the Classic selection. The Classic style for public buildings to date has stood the test of time better than any other. And the Washington buildings were to be built to last a long while.

While the amount of money expended has



The new House Office Building. Designed by Allied Architects of Washington



The interior court of the new House Office Building, in the centre of which is a fountain. Designed by Allied Architects of Washington



Addition to the Library of Congress, with one of the architectural elevations above, and a recent progress photograph of the work below. David Lynn, architect of the Capitol; Pierson & Wilson, consulting architects; Alexander B. Trowbridge, consultant





Fairchild Aerial Surveys, Inc.

Air view of the Capitol and its immediate surroundings taken in 1922. The plaza between Union Station and the Capitol is encumbered with temporary structures. Below, the architects' drawing of the Capitol as seen across this plaza from Union Station. David Lynn, architect of the Capitol; Bennett, Parsons & Frost, architects





Fairchild Aerial Surveys, Inc.

A view from the air almost similar to the one shown on the page facing, taken in May, 1932. The plaza between Union Station and the Capitol has been cleared. In the foreground is the new House Office Building close by the original House Office Building. The Library of Congress is easily recognized, with the Folger Shakespeare Memorial Library just above it, and to the left, the site of the Supreme Court now in course of construction

Below, the plaza as it now appears from Union Station looking toward the Capitol, with the Senate Office Building at the left. There is a parking space for automobiles under the level of the fountain. David Lynn, architect of the Capitol; Bennett, Parsons & Frost, architects

Richard Averill Smith



little to do with the matter of architecture, it is interesting, as a yardstick by which to judge the magnitude of the project, to give consideration to the cost of the buildings completed and under contract which go to make up the Triangle. This totals upwards of \$53,000,000, of which sum the largest contract is represented by the Commerce Building, approximating fifteen millions, and the smallest, Archives, approximating six millions.

The Commerce and the Internal Revenue buildings, the first of the Triangle group to be completed, are impressive and seem fittingly to denote government occupancy. The Commerce Building, especially, in its splendid setting, grows upon one as it ages and mellows and settles into the scene.

In the morning, with the sun on its high forehead and its colonnade sparkling against dark shadows, it prophesies the future impressiveness of the great plaza upon which it will face. In the evening, the light from the west falls across the ancient trees of the Ellipse and glows faintly pink upon its sturdy entablature and pediments.

If we can cast ourselves a few months into the future we can picture the group almost completed, smiling down upon the Mall, a lovely and impressive thing, awe-inspiring in its magnitude. There will naturally be unfavorable comments against it, for all great projects invite such comment, but certain it is that the extending dignity of it cannot be criticized. Its commanding composition will never fail in emotional appeal.

One of the most interesting things about the group is its speed of growth. In the past, projects of such magnitude—and there have been but few of them—have slowly and deliberately crept toward a far-distant day of completion. Generations pass, centuries pass, before there has even been the hope that the last stone will ever be laid.

Whereas in the case of the Triangle, our own



Richard Averill Smith

Detail of the United States Supreme Court Building. Cass Gilbert, architect

« ARCHITECTURE *



Above, the west façade of the Supreme Court, as shown by the architect's preliminary perspective (drawn by Schell Lewis). Cass Gilbert, architect

Detail of the east front of the Supreme Court as recently photographed

generation saw it started and our own generation will see it well on the way to completion. A miracle in itself!

As has been said, we could wish for an architectural old home week in which it might be possible to call back L'Enfant, Bulfinch, Walter, Thornton, Strickland, Hoban, Mills, McKim, and the man who first uttered the crack about "magnificent distances," and let them see the new city.



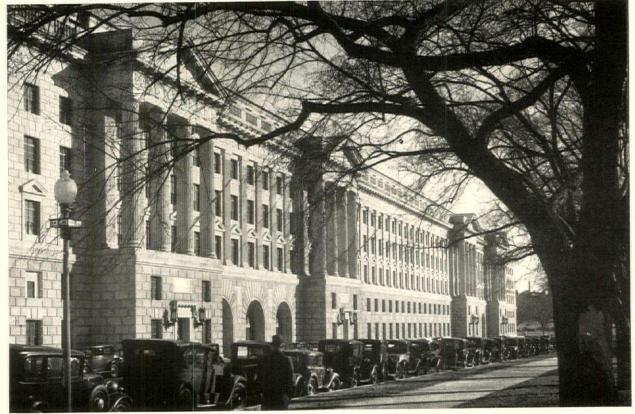
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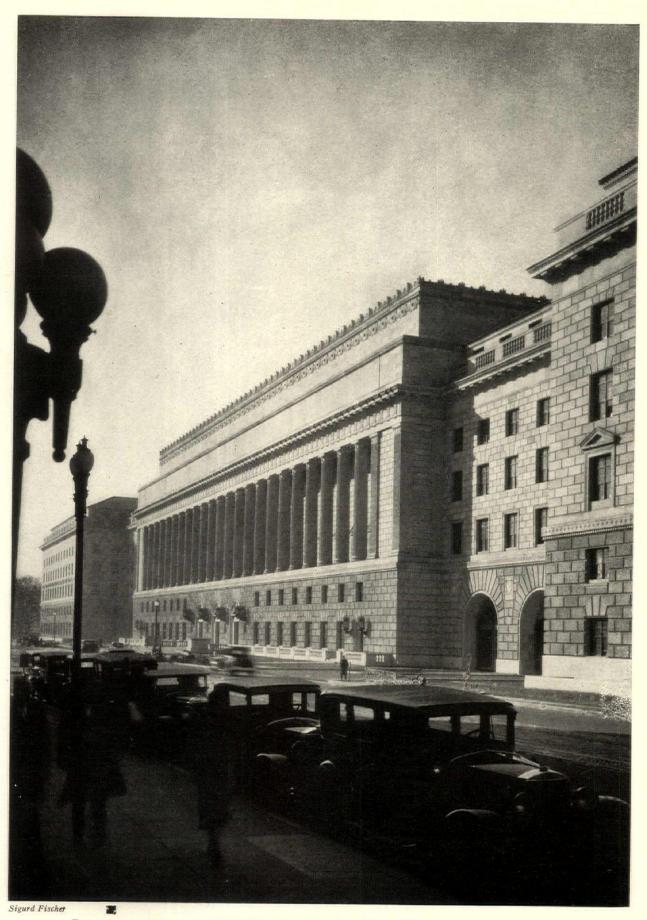
Fairchild Aerial Surveys, Inc.

Air view of the Triangle as it appeared June, 1931, the Department of Commerce practically completed at the right. The old Treasury Building is in the central foreground





Sigurd Fischer



Department of Commerce Building, the east front which will face, in due time, a large open space at the end of the Triangle. See plan on page 190. York & Sawyer, architects





B Street elevation of the group building for the Department of Labor and Independent Establish-ments. Arthur Brown, Jr., architect; Supervis-ing Architect of the Treas-ury ury

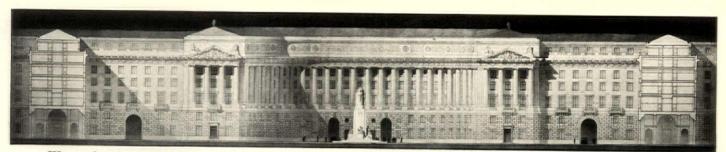
A recent progress photo-graph of the central portion of the above

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Below, the same building looking north along B Street, or as it is now called, Constitution Ave-nue. Just beyond the building shown in eleva-tion above may be seen the building for the Bu-reau of Internal Revenue, and, beyond that, the building for the Depart-ment of Justice

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West elevation of the Post Office. This is the façade that will face the east side of the Department of Commerce at the end of the Triangle. Delano & Aldrich, architects

A recent progress photograph showing the central curved wall on the east elevation of the Post Office Building

H. H. S.

Below, a recent photograph of the west front of the Post Office Building. Delano & Aldrich, architects

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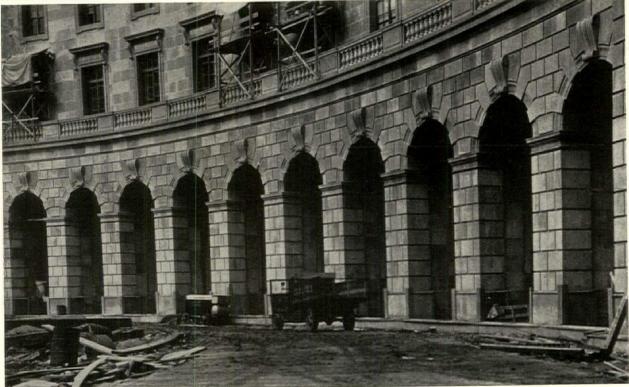


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H. H. S.

Three views of the Post Office Building in course of construction. Above, at left, northeast wing; above at right, the east front, with a corner of the Internal Revenue Building at right. Below, the ground-story arcade on the east curved front. Delano & Aldrich, architects

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Bureau of Internal Revenue, as it appears on the Constitution Avenue front. Designed by the Supervising Architect's Office. Below, a detail of the main entrance on Constitution Avenue

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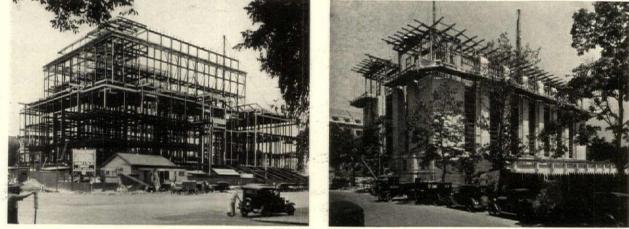
The Department of Justice: above, as shown by the architects' preliminary perspective; below, a recent progress photograph. Zantzinger, Borie & Medary, architects





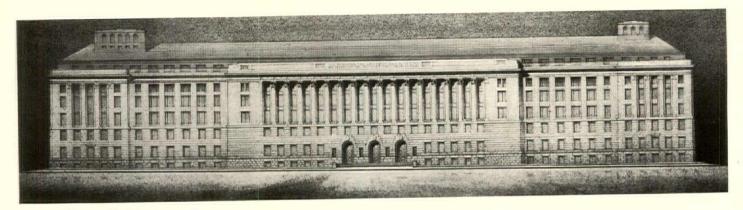


Preliminary perspective of the National Archives Building. Office of John Russell Pope, architect. The drawing is by Otto R. Eggers



Richard Averill Smith The present status of the National Archives Building The present status of the Central Heating Station Below, preliminary perspective of the Central Heating Station. Paul P. Cret, architect; United Engineers & Contractors, Inc.





Above, Department of Agriculture Extensible Building—the 14th Street elevation. Office of the Supervising Architect, Treasury Department

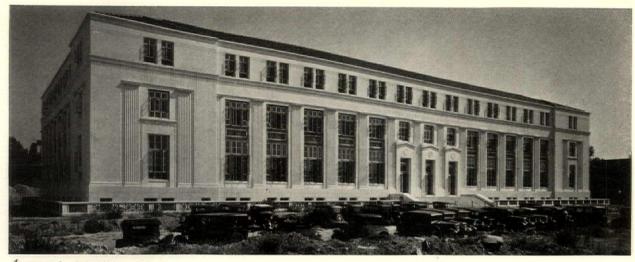
A detail of the above building on one of the long sides. The ends only are of stone, most of the work being of a warm gray brick

Rideout

Richard Averill Smith



Below, the 14th Street end of the Department of Agriculture Extensible Building. The structure covers three full city blocks, the interior of the rectangle providing six parallel courts as shown by the plan on page 190



A recent progress photograph of the U. S. Public Health Service Building, which is not far from Mr. Goodhue's National Academy of Sciences. J. H. de Sibour, architect. At the right is a detail of the main entrance

Photographs by Richard Averill Smith

Below, building for the Institute of Health, which is in the group along the Potomac north of the Lincoln Memorial. Office of the Supervising Architect, Treasury Department







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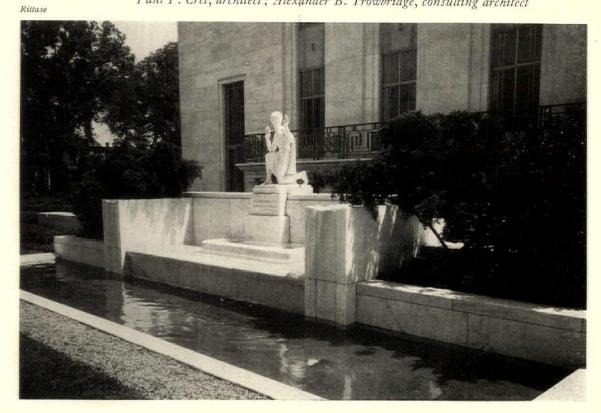
Reading Room in the Folger Shakespeare Library. Paul P. Cret, architect; Alexander B. Trowbridge, consulting architect

« ARCHITECTURE »



Horydczak

The Folger Shakespeare Library : above, the main front, on which the sculptured groups below the windows represent characters from Shakespeare's plays, by John Gregory, sculptor. Below, the Fountain of Pan on the west end of the Library; Brenda Putnam, sculptor. Paul P. Cret, architect; Alexander B. Trowbridge, consulting architect





Photographs by Richard Averill Smith

Arlington Memorial Bridge: above, from the Arlington side looking toward the Lincoln Memorial. McKim, Mead & White, architects. Below, a detail of one of the piers on the Arlington side; C. Paul Jennewein, sculptor



« ARCHITECTURE »

These Houses We Live In

An Anonymous Lament

ROFESSIONALLY my life is divided P into three parts as was Cæsar's Gaul —the design, construction, and deco-ration of better-class residences. As a life for me it has its definite merits: it demands most of my energies and absorbs most of my interests. And that is no real hardship, for in return it yields me the pleasure of creating, with my bare wit and will, objects that possess color, form, and texture-reality, in short. And, more satisfying yet, a sense of having created, by mastery of technical processes, order out of chaos, something where nothing was before. However, it has its flaws. My path, philosophically, is not an easy one, my destination not at all apparent. Daily I meet question after question that I simply cannot answer to my own satisfaction. The thing that assails me is doubt-doubt as to the end, the worth, the final appropriateness of all my devoted labors.

Here in the South-perhaps more than in any other section of the country-the residence remains traditional and conservative, determinedly an affair of "style" and "period." And the more of these houses I design and build, or have a hand in designing and building, the less able I am to avoid the conviction that they are increasingly at variance with the world around them. Although the suburban home is a modern institution-that is to say, a product of this day and age, inconceivable without the telephone, the motor-car, and the power linenevertheless it is not really modern in conception, construction, or function; or at least not nearly as modern in any of these particulars as it should be. It becomes more and more of an anachronism, in spite of the host of splendid machines that it has absorbed in an effort to keep abreast of the times. I often hear architects referring (a little smugly) to the great progress made in residence construction. I myself see no such progress; or I see it only in detail, not in general outline, and certainly not commensurate with progress in other lines of human endeavor.

The plain truth seems this to me: The "style" house of today is hopelessly antiquated, a deceitful and patched-up old wench dressed in the trappings of another day and looking always to the past for more tricks of allure. How I can believe this, on the one hand, and conscientiously continue on the other to design "style" houses, may best be explained by following the "style" house step by step from inception to completion; and by opposing it, step by step, to its antithesis and would-be successor, the "modern" house. And you will understand that this combat is purely one of rhetoric. I cannot abandon architecture, regardless of its inconsistencies; I have to eat.

The most important thing in any architect's life is a client. And by means more involved and less businesslike than in any other profession I stalk and bag this desirable bird. By "pull," by "contact," less often by sheer prestige, I land him—producing the papers before he can change either his mind or his architect. Once signed up, his problems are my problems—as Ruth once said to Naomi—and they lose no time in arriving. Among the first, naturally, is that of location. Generally the client will have solved that for me by acquiring a plot of ground on his own initiative. At any rate, his or my selection will lie along that road most desirable at the moment, near the smartest country club and each year further from the downtown district.



Here I meet the first of a long line of ugly spectres-that of the instability of the land upon which we have to build. This state of flux is no new thing to the American community, as the rings of growth in any city will testify; but of late years this tendency toward swift, ruthless, and unpredictable change has accelerated itself until it has become the dominant characteristic of the community. A chain store, an airport, or a filling station can start a desirable neighborhood into a decline. Yet these are only externals of changes far less ponderable and against which, as an individual, I feel more or less powerless, for it seems beyond the power of any one to improve the loosely woven and poorly designed fabric of the Southern city. The individual is not interested in the question (How could he be?) beyond his own especial desires; and the solutions that present themselves to me-either to check this flux permanently and continue the "style" house, or to design a house perfectly amenable to change however swift-are so abstract as to have no meaning to the average client intent upon keeping up with the Joneses. It were the better part of wisdom to let them lie unmentioned. Suffice it to say, each house gets by this stage of its development without any intelligent provisions being made for its future in a fluid and ever changing community. The spectre stalks the world unlaid.

Having gotten by that bogey as any child would-by closing my eyes-I open them upon the stern reality of sketches. Questions of style and plan are coincident but the former usually comes first. I have five main styles to show him -French, Colonial, Italian, English, and Spanish, and all the infinite variations between-and my course of action is hopelessly predetermined. The client has only to indicate his choice, press a button as it were, and the machinery of design begins to function along the lines of that particular style. Any of an hundred factors, however, may influence this choice. It may be that he comes to me with no convictions, and I am forced to make his selection for him. Or again he will study plates, home and garden magazines, the published work of famous firms, and the houses of friends-and like as not decide upon the one style that I cannot see as a proper setting for him and his family. At any rate, whatever his choice, it will lie within the narrow bounds of tradition, and only within these bounds may I exercise my intellect.



The one obvious escape from this bondage is the "modern" house: yet in the South of today this is no real escape at all, for the simple reason that its existence is not seriously considered, either by the architect or his client. All too often the architect is perfectly content with his "style" house; and even if he has advanced ideas, he runs the literal risk of raised eyebrows and questioning glances from the client to whom he is rash enough to broach such a subject. This prejudice is so complete, so deep-seated, that it almost defies explanation; and it lies as deep in me as in my clients. That, next to his instinctive distrust of it, is the reason I can offer no convincing argument for it-I am far from convinced myself. Intellectually, I think I can see the light; but emotionally I am hopelessly prejudiced in favor of tradition. It is in the hope of seeing the anatomy of this prejudice that I offer this comparison.

Indecision generally disappears when it comes to plan. The client comes to me with a list of his requirements in his hand and it is almost comic to see how much more positive he is about creature comforts than about artistic surroundings. He wants a drawing-room, a dining-room, and a library: and these readily accessible to their respective appendages-the stair hall, the butlery and the kitchen, the lavatories and powder room. There must be an everincreasing number of baths and dressing-rooms, and these in close proximity to the sleepingrooms. These are fundamentals, and no consideration of "style" or "period" can outweigh them in my client's eye. It is here of course that the scales are reversed in favor of modernism-for its first corollary is that form follows function, and that is the essence of plan. Pure plan is in reality modern, an honest expression of contemporary requirements. And only as far as it becomes looped and tangled in the architectural coquetry of the exterior-only that far does it approach deceit. As a matter of fact (my clients remember this) most "modern' houses will show a deliberate affectation of spectacular shapes and arrangement, of oddshaped rooms and unfinished partitions that have no basis of fact in contemporary life as we know it in the South. This is unfortunate and must disappear in its evolution, for utter honesty is modernism's biggest asset.

It is of course impossible to draw a sharp line between pure plan and pure design; and, past my resentment at having no choice but to employ one of the styles as a medium of expression, when I have again reconciled myself to the inconsistencies and absurdities of period design, then I can begin to think in terms of the selected style and enjoy it immensely. For there is a certain devilish delight in pitting one's focused wits against the exigencies of budget, contour, and climate. This applies equally to either the "style" or the "modern" house, of course; but from an accumulation of experiences I have come to the conclusion that the former gives me the more lasting satisfaction. Since the one appeals to the senses, the other to the intellect, I suppose this statement explains itself. At any rate, you will not think it odd if I solve difficulties in the classic manner: for in college I cut my teeth on the Orders, memorized Vignola and the height of the Butter Tower, garbled vast quantities of precedent, and was taught to keep my eyes always on what had gone before. And this, I think, was as it should be, as one cannot face the future without a knowledge of the past. But it is only natural that I dabble in it freely, selecting such details from it as I care to use or can afford.

There is by now a definite goal toward which I am working-a chosen land and era to be recreated here in Tennessee. It must be a perfect picture, whether of Elizabeth's England, Josephine's France, or the Italy of the Medici. To this end I have a list of devices limited only by my ingenuity and taste. I can pitch a roof to any angle that the style demands. I can thicken walls to the point of extravagance to gain the deep reveals that certain types require. I can hold fenestration to a minimum (at least on the entrance front), and build great useless chimneys wherever I think the mass requires them. I bend everything to one end; nothing escapes my passion for a perfect picture. And I can very conceivably give my client a better country seat than any Elizabeth possessed; or a manoir more perfect than La Lanterne, complete to the last detail. But any and all of these houses will be based upon the premises of a permanence that simply is no more. They will cling to the shifting earth, defy progress, oppose themselves aggressively to change. They are doomed to tragedy before the blue-printer gets them.



On the other hand, if I am genuinely modern and not modernistic (we deal now with ambiguous terms), my house will be honest, exactly what it seems to be. The roof will be of a nature to suit the climate and the family, the windows will have for reveal only what the minimum in wall allows, the chimney will locate the heating plant and not the entrance door. Everything not essential will be discarded, including any hint of permanence, and frivolities will be conspicuous for their absence. The fabric will be concise, simple, fluid, and cheap. The only drawback is that, so far, the modern house is none of these. Its technological processes are as expensive as those of the traditional house, and its thesis of permanence is almost the same; it is neither concise nor (as yet) simple. But granting that it will achieve all of this, what have we? The expression of a mode of living distasteful to most Americans and perhaps already as dead as the phase through which we have just passed.

After an agonizing period of corrections, changes, indecisions, and shrinkages, the sketches stand accepted and the first installment of my fee is payable. Working drawings are begun, partly the most exhilarating work, partly the most excruciating drudgery. But being in a more or less executive position, I can delegate the latter part to the draftsman. There is now no longer any question, even in my heart of hearts, that this will be a Colonial (or Spanish or French) house, like the last one, only better. The client satisfied, I suppose I should be—at any rate it is too late to equivocate. I now sweat over details like the best of them leaded fanlights, columned porticoes, oriel windows. I lose myself in sheer detail, molds that have been used two thousand years and still intrigue the designer, proportions that one cannot beat. I here approach the very kernel of architecture, catch my breath at the sheer loveliness of some old example, bite my tongue and hold my breath while I try to grasp and—inevitably —to improve it.

This is the sweet hell-fire of creation that keeps me an architect-these inspired flashes of the whole theory of design, this glimpse of the panorama behind me-the breadth of what has gone before me, the incredible variety of what men have made of wood and stone. I perceive in a flash what they were after, and strive to do as well. There seems to be nothing they haven't done or tried to do, and I never cease to marvel at how successful they were, at how little design has ever or will ever deviate from certain set theorems. In trying to grasp and master these theorems I fume and sweat, make many nervous trips to the ice-water cooler, stand finally in trembling delight before, let us say, this doorway I have made. Here is good mass, suave adroit line, purposeful molds, intelligent use of light and shade. Superb. But when the heat of creation has cooled, I look at it again, squinting. Beautiful, yes: but what business has it got in a steam-heated house? How meaningless all this ornament when a Cadillac stops before it.



The pleasure I derive from making a house a well-designed and smooth-running machine technically as well as esthetically satisfying—is great. Obviously here modernism would be my best medium—for in the period house I have to be as clever in dissimulation as in invention when I handle the machine. Indeed, the possibilities of modernism in this respect are limited only by the danger of making the machine too evident, obtruding the steam pipe and the conduit more into the scheme than is necessary. This form of aggression is most evident in contemporary European design; and it is this very tendency which makes me shy away from modernism. A balance must be struck between the intellect and the senses. We cannot live in houses that require deliberate intellection to appreciate them. Thus the modernist labors under the almost insuperable difficulty of disassociating the humanities from established forms of design. We cannot be happy in a house that appeals only to the brain—we have not that much brain. We are too fecund, too earthy, loving the rounded corner and the devious way; we are still more human than not, despite all the talk of the mechanization of man.

Alongside the working drawings inevitably grow the landscape plans; and here my work is sheer delight, clouded with no misgivings, unless it be a scanty budget. This may be partly due to my deep affection for growing things. But deeper than that, I insist, is the pleasant sense of freedom I experience the moment I get from under the "period" roof. Of course there is still style to consider-three main ones to be exact: the lovely English garden, sumptuous without being forced, formal and informal at once, fertile in interest-human; Spanish-Italian gardens, highly stylized yet escaping rigidity by their flair for spectacle and their breath-taking ingenuity with water; and French gardens, magnificent, flat, sombre, and mostly sullen. Of modernism here there is scarcely any need to speak, as attempts at it have been few and unhappy. Indeed, given simplicity and intelligence, any garden will be modern because it will be timeless; and foolish is the man who tightly labels a garden "Smith fecit: 1933" and smugly thinks he has started a "modern" style.

Yet style in the landscape is neither so rigid nor so autocratic as in the house. I can take a few liberties without presenting photographs of my precedent. I can elide and combine and invent. I may err, of course; but a garden, like a lovely woman, may be allowed a little leeway in matters of good taste. For any garden that has its quota of sheep manure and water can never be wholly bad, however faulty its design. It will carry in its heart at least a clue to immortality.

At long last the working drawings are completed and, as a rule, I am glad of it. Three months' close application sees about the limit of my interest in any mere drawing of a house. But when operations start, when the house begins to assume the aspect of reality, then my interest knows a rebirth. I experience once again the pleasures of design; it is difficult to wait until the different parts take form. The place begins to look weirdly unlike any prints or models I have seen of it—longer here, taller there, generally surprising yet supremely familiar withal. Details that left my hands weeks ago as blueprints come back into my sight in beautiful reality. And I never fail to know a mild amaze at this transmutation, the mysterious processes by which a flat and unintelligible drawing has become a lovely pine room or pedimented doorway. I have a delight in these details that surpasses that of mere possession. I like to sit and feast my eyes on them; or move about, seeing how they stand the test of perspective. I like their feel, their round, their luscious reality.

And yet I eye these details critically, believe me; they will never bear a gaze more conscious of their faults. I like to study them carefully, weighing them, discovering where I have done well, where failed, and why. I am proud of this critical ability, and nothing dismays me as much as studying something and being able to reach no conclusion about it—having it elude me, poise grinning just beyond my grasp. It is a splendid, ruthless power, and the penalty of possessing it is this: a widening sense of the futility of all this clever and laborious use of archaic detail. For the periods—the reputable ones at least—seemed to have ceased with the advent of the machine.

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The whole conception of the "style" house is the very ancient one of building with the human hand—and building to stay. Thus its disadvantage is inherent, as to build either by hand or to stay is economically unsound today. Blithely I ignore that fact: I want a house with a "handcraft feel," and I'm going to get it. I demand hand-made brick, hand-modelled tile, handwrought iron. I chip the slate, stagger the shingles, adze the wood, model the plaster. I sandblast the stone, whitewash the brick, rust the iron, tarnish the copper. I abhor the garishly new, seek a deliberate atmosphere of age and soft decay. To that end I will hang pseudo batten doors from pseudo strap hinges and fasten them with pseudo box locks. I will glaze steel sash with ancient bottle glass; by fair means or foul, the steps shall be worn, the cypress filled with worm holes and the pine with knots.

I list these instruments of atmosphere not in sarcasm but in statement of fact. This is a bare fraction of the deceits, the tricks and dishonesties to which I stoop in my simulation of usage and slow time. Philosophically, they put me on the

rack. I am emotionally satisfied by the delightful textures and surfaces these various mediums afford; yet I am intellectually convinced of their absurdity, their almost criminal waste. Nevertheless, how do I fare with the "modern" house? I deal no longer with elevations but with three-dimensional masses; and they are never as attractive in stern reality as in a perspective sketch. I like the idea of big windows to admit the light, and curved corners to keep out the dirt, but I shiver in the chilling, antiseptic light that falls about me. I admire the honest masses of the different parts but shudder at their lack of kinship with the landscape; the way they patronize the soil, ignore the trees, make few concessions to either man or God. I admire washable surfaces but am never easy in an operating-room.



There is one point upon which I am crisply positive, however: and that is the cost of suburban America-"style" or "modern." There is nothing in America as lavish of money and perverted ingenuity and human labor as the great house of today. It is a strange fact that, as the size of the house increases, expense per cubic foot doubles and quadruples itself. If the home attains anywhere a semblance of the order and economy found in the factory world, it is in its lowliest form-the mill village bungalow. And this fact disturbs me most of all. I am well aware that the average house of \$75,000 gives employment to a whole colony of artisansbricklayers, carpenters, electricians, etc. But the fact that they build a unit so ponderous, so unsusceptible to change and antagonistic to growth, and so useless to any one but my client, makes me feel that, in the last analysis their labor will be wasted. I can easily excuse the vanity of it-great houses have always been an expression of vanity-but I cannot ignore the futility of it. For twenty years is a too generous allowance for the fashionable life of any such house, anywhere. Defenseless and builded upon sand, it will transform itself into a girls' school or an undertaking establishment as the chain stores creep nearer.

Contemporary or traditional, the technological processes are approximately the same; the cost in terms of dollars or energy will be parallel, with (at present) a shade in favor of the "period." We struggle—and so unintelligently—against forces of inertia so great that they frighten me. Our construction methods are almost ante-

diluvian. It may be true that the excavation is now by steam-shovel instead of hand; it is equally true that the walls are built, as in the Middle Ages, of the smallest possible units. It may be true that we have scores of splendid roofing materials, but the rafters are raised, one by one, along the casual lines of trial and error, and roofs are still known to leak. I am never sure of a dry basement, regardless of waterproofing, until after the first hard rain. The heating system must be fired to see if it acts as the engineer figured and as the steamfitter installed it; just as the plumbing system must be filled with water and peppermint to see if it either leaks or smells. To one who demands action of a motor-car and music of the radio, there is far too large a factor of human fallibility in residence construction. Such instances of outworn technique are so numerous that it must seem malicious to list more; suffice it to say that before modernism can enjoy any wide degree of success, it must embody in construction as much advance as in design.

When the contractor has flown, leaving behind him that wan-eyed group whose duty it is to patch plaster, wash windows, and clean up litter, the house approaches that last and in many respects most fascinating phase—decoration. Here I am as far from reality as I shall ever be. There are so many periods to choose from that I am nonplussed. As a matter of fact, I have all along had a definite idea of what characteristics certain rooms would take, but it is not too late to change and certainly not too late to elaborate. For if I am clever enough I can do what was not largely possible on the exterior —blend four or five "periods" into one adroit whole.

The walls are my first consideration, and these I either canvas and paint or hang with old wall papers or fabrics. If I cannot afford an old paper or fabric I antique a reproduction; or I antique the paint; or stipple the canvas, or any of a hundred things to attain the effect of age. For by some strange contagion I revere the old, revile the new. From abroad I import mantels, reckless of time and expense. The pine room comes either from Charleston or England, and the chandeliers from New Orleans. And here, let me say, I have no scruples against torturing electricity into wax candles and making it to burn as tallow; for mine is that ancient conception of the light's source being more important

than the light itself. Any scruples I might have are stillborn; the "period" admits of no other treatment of kindly light.



The furnishings are either antiques or reproductions of antiques, or a suave blending of both. Their style will be a question of preference-my own or my client's. In 1918 it was eighteenthcentury French, last year Early Americana, this year Directoire and Empire. Each style has its own personality, its fascinating possibilities, its most obvious characteristics; yet there is a point in any one of them where accurate distinction is lost, where that style merges gracefully into its next of kin. They are thus all the more intoxicating to work with because-like some liquers-they mix so well. In fact, one achieves such a sense of absolute mastery over color and form and balance in using these ancient doctrines of design that it is difficult not to become intoxicated. Ethical perspective is lost, one does to the room whatever the exigencies of the "period" demands. No small point of honor can keep one from a room that "clicks."

Fleeing all this, you see me running straight into the arms of contemporary design; yet here I pause again. For, recoiling from too much deceit, I run the risk of being too honest for mere man to endure. I must not make the background too austere, too confidently "modern" for good Hepplewhite and Chippendale. I must not make the criminal error of slaughtering one period of proven worth to make way for a new vogue—as happens so often—as happened in the ante-bellum South when good eighteenth-century English stuff gave way to the rosewood atrocities of Mallard. I must tread lightly, walking the narrow line of taste.

Beneath all my elegant labor, my striving for effect, a masquerade of the most diabolical cleverness is going on. Heating units lurk in panelled reveals, the thermostat (keeping the room at 72° Fahrenheit) hides in that old barometer case. The radio and the talking-machine both of which the manufacturers have succeeded in making hideous—crouch behind yon painted screen, and the piano looks anything but mechanical in its period case. I have gilded the telephone in the French manner, built in the mechanical refrigerator, recessed the bathroom fittings to disguise, in so far as possible, the fact that the room contains its three essentials water-closet, lavatory, and tub. Two things alone have got me beat—the telephone jack and the light switch. There is simply no period treatment for them, and they must, from their very nature, be visible. I therefore either goldplate or ignore them.

I have done a house for my clients, and no detail was too small for my closest attention, my most devilish ingenuity. To the best of my ability I have given them a picture of the age and land they chose to re-create, very possibly a better picture than a genuine one could have been-but alas! not one destined to as long a life. For, clever as I am, I cannot intelligently expect any house of mine to remain smart for more than ten years; after that it needs must be "done" again. And it seems to me that, in the last analysis, this is the case only because the entire house has lacked authenticity from its very inception. It has not the spontaneity, the genuine emotion that makes great works immortal, that makes Mount Vernon as fresh and charming today as it was in 1790. When Washington built Mount Vernon he did not coldbloodedly select a style that appealed to him; he had no array from which to select. It never occurred to him to build anything other than the Colonial house he did, an intelligent and polished version of what a country gentleman in Virginia needed in the last quarter of the eighteenth century. And it seems to me that we will miss authenticity until we have a style so intimately, so unmistakably ours and none other's, that it will not occur to us to delve in the past.



What this style will be I cannot begin to suggest-I am certain only that it will come. I do not even know of any way in which its arrival may be speeded up, unless it is by the very process of debate and compromise through which I have so tediously dragged you. For reasons which I hope by now are clear to you, I cannot embrace modernism nor yet lie with the traditional; my argument threatens to become unintelligent, I shall not rest easily tonight. I shall be troubled by the wraiths of machines smuggled between floors, concealed in closets, crammed between walls; by the ghosts of those arteries of heat and light and power who work so supremely well that they may be buried alive in stone and mortar, in lightless obloquy. I shan't escape the feeling that I have done them wrong.



Better Practice By W. F. Bartels



A critical reading of present-day specifications, even those from offices nationally and internationally known, reveals at least two common shortcomings : first, the continuance of outworn provisions ; second, the substitution of mere verbosity for explicit direction. The building crafts move on, but too frequently the architect's specifications fail to keep pace; the writer of specifications, in far too many cases, is ignorant of improved technic in the building trades and fondly believes he is hiding this ignorance behind a flow of traditional phrases. The tolerant contempt with which a skilled artisan views these lapses is not a pleasant thing to witness. Either the architect must set his house in order, as to specifications and detail drawings, or risk discredit, not only for himself but for the profession as a whole.

It has seemed to us that ARCHITECTURE might render a service in seeking out the latest and most fully approved technic from among those most skilled in the various trades, passing along to the profession our findings as weighed and approved by a man of long experience in supervision on the job—W. F. Bartels. This series of monthly articles will not parallel, necessarily, the usual order of building procedure. Next month, more about plumbing.—EDITOR.

PLUMBING: (A) ROUGHING

1-DESCRIPTION OF MATERIAL

THERE is nothing which is more essential in a specification than precision. Particularly is this true for plumbing. But it is worth the extra effort. It works to the advan-tage of all. The architect saves his own time when the building is in progress, which would later be lost in arguing and explaining; the superintendent in the field is called upon to render fewer "interpretations"; best of all, the owner saves money. This latter is of course effected by lower plumber's prices. In estimating the job he is forced to take chances because of ambiguous specifications, consequently he tacks on enough extra to protect himself. Given definite information, he can cut off this insurance. The chances he takes are necessitated by lack of information. But the architect is prone to think, "I always give the contractors full information." Maybe. But maybe not, as for example, the quality of the fixtures is seldom definitely specified. The plumber knows that a "hard-boiled" super-intendent may insist upon firstclass fixtures, while similar houses of the same type in that neighborhood "seconds"-not as satisare using factory-but much cheaper.

2-CAST IRON

Cast-iron pipe should be specified as either "standard" or "extra heavy." The local code must be consulted to ascertain where each may be used. It is probable that all except those lines above ground, in a private residence, will be required to be "extra heavy." The pipe should be uncoated (so defects are not hidden), free from sand holes, cracks, or other flaws. Sometimes the latter are so small as to be negligible, but this is better left to the superintendent's discretion. If "patent fittings," as they are called, are to be used, they should be mentioned in the specification. An intelligent use of these by the plumber will often save money. The material costs more, but there is a considerable saving in labor.

3-SCREW PIPE

This general heading covers steel or iron pipe that is put together by means of threads rather than by calking. Where a large job is done with cast iron there will be parts, such as the vent branches and some waste lines, which will be screw pipe. These should be specifically denoted.

The pipe should be lap-welded and galvanized. The ends of all pipe should be required to be reamed whether for waste or vent purposes. This takes off the burrs and prevents stoppages. The weight should be "standard" unless exceptional duty is required of it, in which case it should be the type known as "extra heavy."

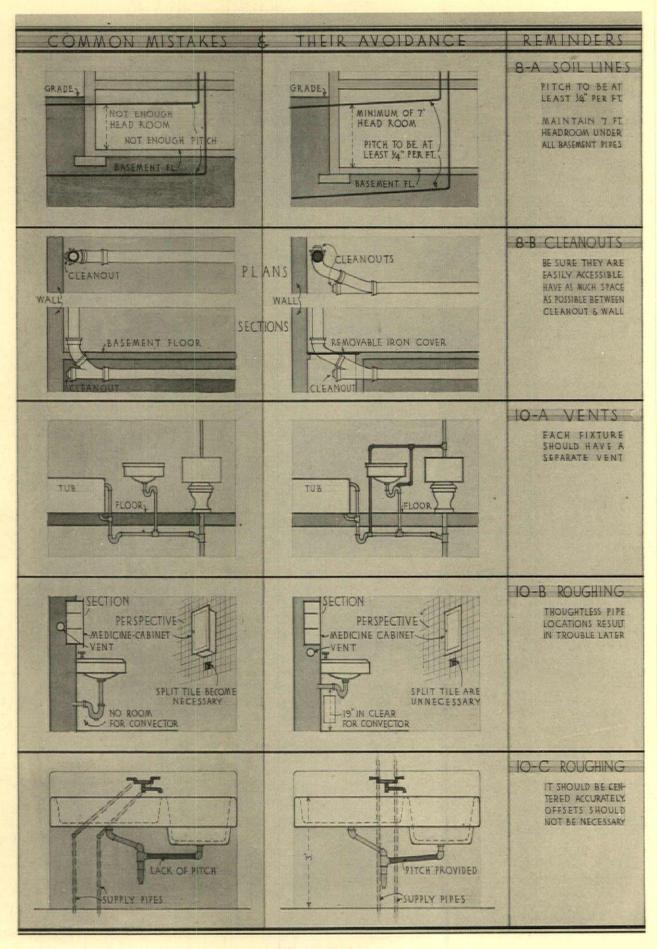
4-SPECIAL USES

The architect may be called upon in special work to provide waste lines for particular purposes, such as acid discharges from laboratories, hospitals, commercial plants, etc. These lines should be carefully mentioned in the specification. They entail more expensive materials, and, due to their nature, are more difficult to erect. Whether they be of earthenware or of an acid-resisting metal, the manufacturers should be consulted for special features, such as asbestos joint-calking instead of the usual oakum, the more frequent placing of hangers, and other important data.

5-SIZES

Although tests have been made to prove that 3" soil lines can be satisfactory, in most cases it would seem more practical to make them 4" (as required by most codes). While 2" waste lines are ample in residences, they may be found to be slightly constricted for multi-family dwellings, particularly if the kitchens are back to back. Cumulative grease from the sink of a combination fixture in the 2" line may cause a heavy discharge from the laundry tray to result in a disagreeable "backup" into the adjoining kitchen. On all work the sizes should be

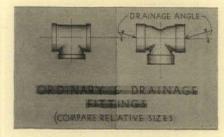
On all work the sizes should be carefully figured out and the results carefully analyzed. The larger the work the more carefully all facts and products should be investigated. A large job may illustrate. When a modern office building was completed and the toilet facilities were in full operation, the discharged water took up so much of the soil line that it formed a piston-like ef-



fect. This in turn causing the water seal of a urinal to jump out on the floor. For the same reason the freshair inlet became an outlet for a fine spray of water. While these conditions would not happen on the small house, they do illustrate the necessity for careful consideration so that pipes have an adequate bore.

6-FITTINGS

Drainage fittings differ from ordinary fittings in both use and size. Therefore they should be noted in the specification and taken into account on the plan, because they are more bulky than the regular fitting. All drainage fittings are recessed so that there is less danger of a stoppage. Also they are tapped differ-

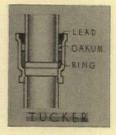


ently. A length of pipe screwed in them will be found to slope at the rate of $\frac{1}{4}$ " to the foot. This obviously is to provide a pitch to carry the water and waste matter away.

Many times a specification will be found prohibiting the use of "any bushings whatsoever in the system." A valuable clause, this, but one which sometimes works a hardship on the contractor. If it were modified so that with permission they might be used on vent lines, it would be decidedly helpful.

Tuckers are sometimes forbidden also, but this should apply only to

horizontal lines and to places where other connections may be used. These handy fittings allow batteries, or groups, to be made up and then have their loose end firmly



connected by means of a calked joint or tucker. The architect should state, however, that where they are used rings must be provided. These rings, around the pipe to be tucked in, prevent the oakum from getting into the pipe when it is calked down.

7-SLEEVES

From the time the piping enters a building through an extra heavy sleeve in the exterior wall, until it passes through the roof as a vent, sleeves are important. They are not only a construction necessity and a maintenance reducer, but essential to a neat finish. Needless to say, they should be specified, be it for a line through a finished brick or plastered wall, or a branch through a concrete slab. It is impossible to make a neat job without them.



8-INSTALLATION

Inasmuch as the basement contains the vital organs of the plumbing system, it is well for the architect to give this portion of the building serious consideration. The sleeves should be furnished by the plumber and set according to the architect's direction. When coming through exterior walls they will, of course, be made watertight. If there is a septic tank it must be given careful thought and study. There should be a separate line from the kitchen waste, going through a grease trap, before entering the sep-tic tank. This will be well worth while, because otherwise the grease will soon clog the tank and its outlets

If the leaders are taken to drywells, the latter should be a liberal distance away from the house to prevent the cellar from becoming damp from the rain water backing up. Then, if there is a possibility of a sewer in the future, pipes should be run so as to anticipate future cutting and repairing in order to connect them if allowed or desired. However, many towns do not allow rain water to be discharged into the sewers. The plumber should be required to give definite locations on the plans of the dry-well positions.

The architect should determine the elevation of the sewer in the street, and determine the feasibility of plumbing fixtures in the cellar. Often with a high sewer and a lowset house there will not be enough pitch for the house drain. (See drawing 8A, page 220.) This should be at least $\frac{1}{4}$ " to each foot. If the line runs overhead there must be at least 7' headroom. Cast-iron pipe must be laid so that the flow is from hub to spigot.



The base of all stacks should be properly supported, and wherever a change in the direction of the pipe takes place, cleanouts should be provided. If the pipe is under the floor, suitable holes or boxes must be made and covers provided so that the cleanouts may be accessible. (See drawing 8B, page 220.) All cleanout plugs should be of brass. The house trap should be provided with two cleanout plugs.

The house drain, if carried along the ceiling, should be supported by hangers at least every ten feet. This distance should be shortened wherever a branch intersects the line. Hangers of an approved and suitable type should be called for, and the contractor warned that chain or wire will not be accepted. Lines running underground should be supported on piers of masonry, and after they have been inspected, should be backfilled, by flooding with water each shovel of dirt put around them.

Floor drains should be provided, but are advisedly carried to a separate dry-well so that the leader discharge in a heavy storm will not flood the cellar.

9-STACKS, LEADERS, VENTS

Although a stack supported at its base is more than dependable for two stories' height, it is well to specify that it be securely anchorednot merely shimmed tight with a wooden wedge, as is sometimes done. The sleeve through the roof should be given careful consideration, and the exact type desired specified. If the leader be an interior one it will of course be of iron. If on the exterior, it should run into a cast-iron leader projecting above the ground. All vent lines must run above the roof. It is good practice to "wash the heel of the vent." This means nothing more than putting a fixture on the lower end of the vent. The water from this fixture will wash down any dirt or rust collecting there, which otherwise might eventually close the vent.

Many architects object to any

connections made to lead bends, and the plumbing trade admits that these soldered connections will crystallize in about twenty years—due, they say, to acids in the wastes. It is probably well to avoid this practice.

10-BRANCH WASTES AND VENTS

All branches should be dimensioned and given the proper location, attention being called to these locations. The architect should always keep in mind, however, the state of the building when the roughing measurements are given. The points from which the measurements are given should be such that they exist at the time the plumbing roughing is being installed.

Foremost in the architect's mind will be the question of his client's future comfort and satisfaction. It will be necessary to give thought to the proper size of such things-and specify them-as the waste lines from tubs. Too often these lines may be within the minimum code requirements, but take entirely too long to empty the tub. Using 2" is good practice, but if not specifically mentioned, the architect may find them to be $1\frac{1}{2}$ " in size instead, which is too small for rapidly draining the tub. This same precaution would of course apply to laundry trays. The waste from the latter should have as little level run as possible, so that the grease and lint from the washing will not have a chance to settle in the pipe. Specify the size of trap for these fixtures.

An architect, visiting a client for whom he had erected a house, was assured that the house was perfect except for a foul odor in the bathroom. The odor seemed to come from the shower stall, yet it disappeared for a while after any one took a shower. The architect investigated. He found that upon flushing the watercloset a gurgling was heard in the shower stall. Not long thereafter the odor again announced itself. A glass of water thrown in the stall stopped the odor. He then remembered that the plumber had prevailed upon him to omit a separate vent from the shower because there was "already a vent for the bathroom." The price of this omission cost his client the trouble of always throwing a glass of water in the shower drain every time the watercloset was flushed. (See drawing IOA, page 220.)

For the architect to allow the plumber to travel his own way in laying out his vent lines, is to invite trouble. The modern bath has built-in accessories of many kinds. Medicine cabinets, laundry hampers, paper, soap, glass, and toothbrush holders are some of the fixtures taking up a certain depth of the wall thickness. If a vent line so rises that it interferes with any of these built-in features being fully recessed (see drawing 10B, page 220), it means considerable and useless expense to move the vent. The other recourse is to put the fixture in an inconvenient location. (See drawing 10C, page 220.)

The up-to-date house should not have in the bathroom an exposed radiator or steam pipe which might burn any one. One modern solution is to have a convector under the lavatory. To achieve this the architect must specify that no pipes or wastes under lavatories are to emerge from the wall at a distance below 19" from the finished floor level.

11-PIPE CROSSINGS

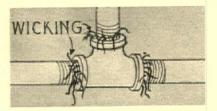
In having pipe work laid out the architect must always keep in mind the difference between the diameter of the pipe and the cross sectional area they will occupy. Particularly is this essential where they cross each other. Pipe sizes are inside diameters, yet too often the architect's office forgets to allow for pipe thickness. Also, if covering is to be used, this must be taken into con-sideration. A 3" iron pipe with 1" of covering is scheduled to pass over a 2" iron pipe. The measurement given centre to centre at their passage is 3". If the pipes were hung absolutely accurately (and what pipe is?) the clearance between the pipes themselves would be .063". The latter figure is that into which the I" of covering would have to be

squeezed. If one pipe were cast iron they would not pass. These are important items to bear in mind, particularly when the pipes get into a huddle.

12-WORKMANSHIP

The term "roughing" should be considered a misnomer on the job. The roughing of wastes, vents, etc., should be just as carefully done as any finished part of the work on the job. The fittings and connections of steel or iron pipe may be made with red lead and oil.

Wicking consists in wrapping the threads with a cordlike wick to

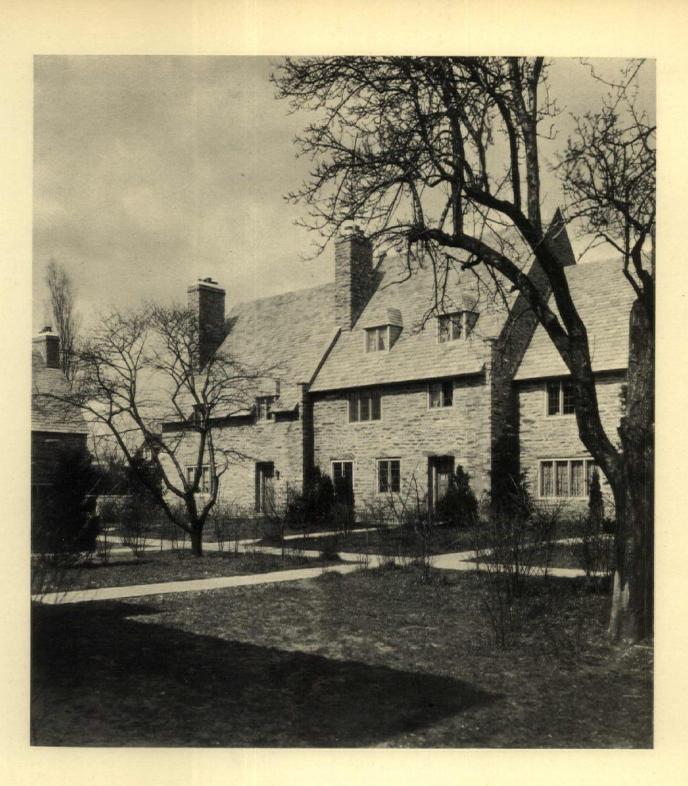


make sure it does not leak. This is poor practice and is generally done to cover slovenly workmanship. It is better to prohibit wicking entirely. The architect's superintendent may then at his discretion allow a little where he sees fit. Without this prohibition the architect might find great wads of it hanging from every connection like "bearded moss. All threads should be sharp and full. Short threads should not be allowed. The dies should be fully turned onto the pipe. Fittings must be adequately made up on the pipe and those caught by just two or three threads rejected.

The cast-iron roughing should have connections first calked with picked oakum and then with soft pig lead. The amount per joint generally runs upward from 12 ounces per inch of pipe diameter. It should be specified that all is to be run in at one pouring, and no subsequent pouring of a washer of lead on top of cold lead will be allowed. It might be stated that in case of excessive leaking the lead calking must be removed and weighed. Then if found wanting all joints must be proved. This will take the joy out of using much oakum and little lead.

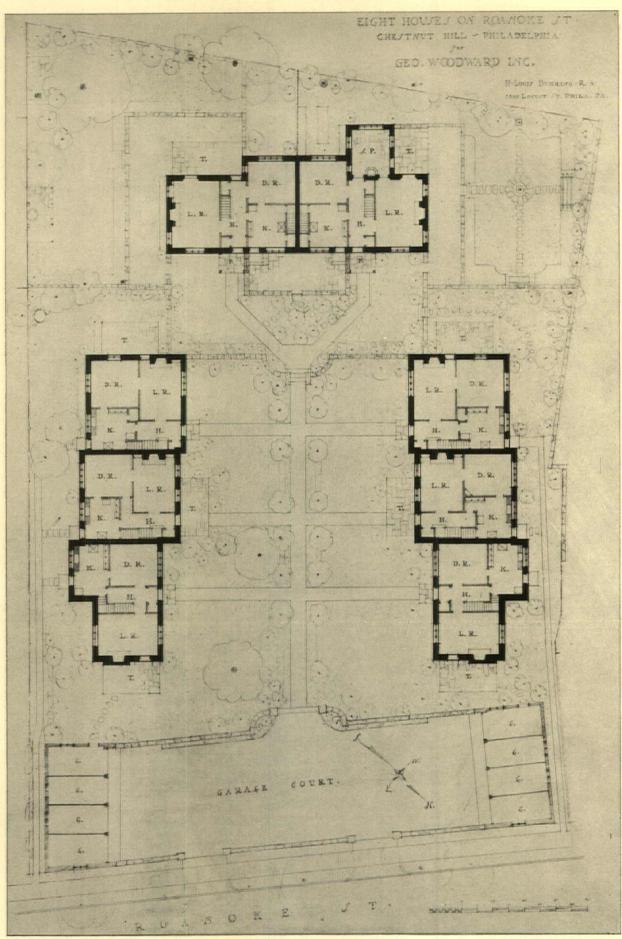
Next month Mr. Bartels continues his new series with another subdivision of Plumbing—Water Supply. The Editor will welcome suggestions relating to this series, particularly those dealing with technic developed and found satisfactory in meeting special geographical conditions

« ARCHITECTURE »



Group Houses, Chestnut Hill, Pa.

Philadelphia has much to answer for in the development of the row house on narrow-front lots. Nevertheless, to her credit must be reckoned a few achievements in present-day housing, such as this group of eight built for Dr. George Woodward at Chestnut Hill, as designed by H. Louis Duhring, architect. The troublesome problem of housing the motor-car has been solved, as the plan on the following page shows, by the incorporation of a garage compound at one end of the property



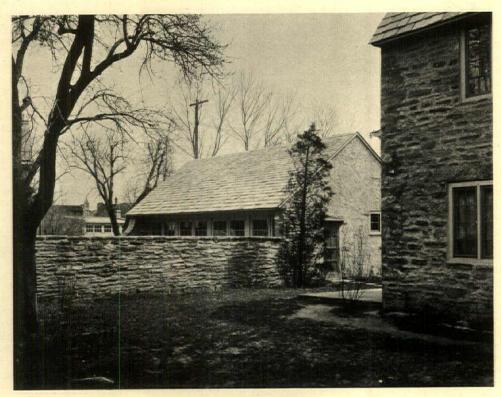


« ARCHITECTURE »

Mr. Duhring has treated the garage compound as a major element, not as something of which one is ashamed



The possibility of building with the local Chestnut Hill stone means that the battle of exterior appearance is already half won. Gray slate is used on the roofs. Below, one end of the garage court behind its stone wall



Tuesday, August 1.—Jacob Feld, a consulting engineer of New York, has worked out an interesting equation regarding the economic height of tall buildings, based on plot area. His survey includes the 331 buildings in Manhattan that are twenty or more stories in height. The group follows fairly closely the equation: S (number of stories) equals area of plot divided by 700. Incidentally, he discovered that in spite of these 331 buildings that are twenty or more stories in height, the average height of building per unit area of plot in Manhattan is less than six stories. Moreover, the total area that these buildings occupy is only 142 acres of the total 12,000 acres in Manhattan.

Wednesday, August 2.—These are days calling for action in housing. They are also days in which we should be wise to stop, look, and listen before rushing into unconsidered schemes. The National Conference on Slum Clearance, which met in Cleveland early in July, called attention to many danger signals on the road ahead. These were pointed out in a series of resolutions summing up the findings of the Conference. Among the vital considerations are the following:

Every large-scale housing project should be a part of a comprehensive plan of the community.

Speculative profit should not be countenanced in any housing project --particularly in the price paid for land.

No slum clearance project should go forward without consideration of the needs of those living in the area to be cleared.



Thursday, August 3.—Flew to Washington on an early morning plane. Had long known the sad story of the Philadelphia row house, but the sadness and futility of it is never realized so fully as when one sees from above those closely packed blocks as a whole, and the pity of it is that this lack of ventilation and sunlight and open space is all so unnecessary.

Called to see Robert D. Kohn, the newly appointed Director of Housing under the N.R.A., and found his office seething with activity and the creation of a working system. Caught a glimpse of N. Max Dunning, and found Mr. Kohn's office in the efficient hands of Jefferson M. Hamilton, Assistant to the Director. I picked up, wet from the press, an official document setting forth the purposes, policies, functioning and organization of the Federal Emergency Administration of Public Works. There are several highly significant provisions in this document under Part III-Housing. Some of these echo the resolutions passed by the Cleveland Conference mentioned above, namely, that any housing should dovetail into a long-



The Editor's Diary Z

term plan for the economic development of the community; projects involving a low ratio of land cost as compared with labor and material cost will be favored.

The basic provisions of the Federal aid to housing should by this time be well known, yet I find misconceptions and lack of understanding rather general. To States, municipalities, or other public bodies, the Government will make a grant up to thirty per cent of the cost of labor and materials employed in the project. The Administrator will loan money for approved housing either to public bodies or to corporations in amounts not to exceed seventy per cent of the cost of labor and materials employed, provided that these bodies are publicly regulated as to rents, dividends, and interest on securities. Loans are granted for a period not to exceed thirty years at four per cent. The procedure involved in utilizing this Federal aid is to bring a specific project before the Emergency Administration, the project having been carefully worked out in accordance with the policy formulated, and it will be either approved, or re-jected with suggestions as to how it might be made to conform.

Friday, August 4.—Lunched with Edwin B. Morris, learning something of the enormous program of public building construction that is being carried out in the city of Washington. The present issue attempts to tell this story more fully—the spending of more money for building in a single community than has ever been done in the history of the world.

I must confess to having had many misgivings as to the final architectural result of the new architecture in Washington, particularly the Triangle. It has seemed almost an impossibility to enclose so much space in this particular area, conforming to the Classic precedent already established in Washington, without achieving mere mass and monotony. The work, however, has gone forward far enough to allay such fears. The buildings individually have distinction, and are not merely extensions of the same row of columns and windows. However, the progress photographs on other pages of this issue speak for themselves.

With Edwin B. Morris to see the work that John J. Earley and his architectural associate, J. R. Kennedy, are doing for Zantzinger, Borie & Medary's Department of Justice Building. Earley's work, while known among a few, has by no means been made familiar to the profession generally. The earlier examples, among which was the Church of the Sacred Heart in Washington, designed by Murphy & Olmstead, established a new form of expression in plastic materials. This latest example, for the main public corridors of the Department of Justice Building, carries this new art a step forward. The story is too long to set down here, but it must be told in these pages before long. Back to New York on an early eve-

Back to New York on an early evening plane, marvelling chiefly at the number of baseball diamonds this country possesses.

Monday, August 7.—Researches of the Construction League of the United States show that in 1929 every tenth person gainfully employed in the United States depended for his livelihood on construction. The total of construction in that year, incidentally, was eleven billion dollars.



Tuesday, August 8 .- Talked with Egerton Swartwout as to when a corbel is not a corbel. The dictionary defines corbel as "one of a series of brackets, often ornamental, projecting from the face, especially the external face, of a wall; used for support." Which definition seems wrong on almost every count. We agreed that if a support were a bracket it would not be called a corbel; that a corbel is no less a corbel because it is on an interior wall. And a corbel surely does not necessarily have to be one of a series. This term, like many others in architecture, will be confused in the student's mind if we do not soon have available a dictionary of architectural terms-a task I have been working on at too distant intervals over the past few years.

Thursday, August 10.—After considerable thought and discussion as to the architectural profession's status with regard to N.R.A. codes, one has been evolved and submitted. The first feeling that prevailed, maintaining that the architects, as professional men, needed no code, has given way to a feeling that much good might be achieved by bringing the whole construction industry, including the architects, under an agreement. The decision is a wise one, for there are several important goals to be achieved, and these can, perhaps, be achieved readily and quickly in this manner. For one thing, the code establishes more firmly in the public's mind the minimum fee of six per cent, with revisions upward for residential work costing less than twenty thousand dollars, for alterations, decorative and cabinet work, and also justifies a lower fee for operations involving substantial repetition of larger units of design. It tends to eliminate the unfortunate practice of "free sketches," and, not the least important, it establishes immediately a procedure for the selection of a contractor in competitive bidding on a basis other than the old one of price alone, and without bid peddling.

Saturday, August 12.—It is encouraging to see the interior decorators welding more firmly together their American Institute. In the annual conference held at Chicago in June, an imposing array of the best-known figures in what is now coming to be a profession, were assembled to consider relations with the trades, with the architects, and with the client. William R. Moore, first president of the Institute, turned over the gavel to Frank W. Richardson of New York.

Monday, August 14 .- Those of us who are interested in housing watch the papers daily for news of the first schemes to be approved by the N.R.A. They seem slow in coming, and I am very much afraid that the reason is that the community groups are not ready with the right kind of schemes. Approvals by the N.R.A. are not going to be made on the basis of "any excuse to spend money, and thereby help employment in the construction industry." That is in the construction industry." one of the aims, but paralleling it is the necessity for spending this money in the right way. The men of Cleveland seem to be nearer a real grasp of the situation than other communities, but even they seem not fully armed with all the bulwarks of a sound scheme.

Tuesday, August 15.-In putting into effect his new policy with regard to the architectural design of public buildings, L. W. Robert, Jr., Assistant Secretary of the Treasury in charge of public buildings, asked the A. I. A. to provide him with lists of competent architects in every State. Eager as the Institute has been for such recognition of the profession in the Government's architectural activities, it side-stepped the request very neatly, and for reasons which are not hard to see. Obviously the Institute cannot recommend certain of its members for public work or for any other purpose, to the disadvantage of other members. The procedure it suggested has been followed, namely, the sending out of a prequalification form to all registered and listed architects, putting up to them individually the job of presenting their qualifications for public work.

Thursday, August 17.—When I visited the Century of Progress Exposition in June, the space allotted to architecture was conspicuously vacant. I see that the Annual Architectural Exhibition League of Chicago has now moved its show into this space on the second floor of one of the General Exhibits Buildings, and the work will be on view throughout the rest of the Fair. I understand that there are some drawings of the old World's Fair of 1893 included.

Saturday, August 19.-John H. Mil-lar, who writes Millar's Housing Letter, a particularly vigorous publication in behalf of better housing, has a good idea. Why should not the Federal Government use its power to reinforce local planning agencies and particularly by making available the authorized 30 per cent grant for emergency planning activities on the part of municipalities and States. The Government's big housing program will not get as far as it should without good planning, and this planning has not been done to any great extent. It would seem that we shall either lose time in bettering the employment situation or build some ill-considered work-or both-unless we really do some planning at once.

Monday, August 21 .- The first projects approved by the Division of Housing, N.R.A., are announced, with loans as follows: \$3,500,000 to Neptune Gardens, Inc., East Boston, providing 700 residential units totalling 3,170 rooms at \$8.50 per room rental (brick two-story row houses, two-family houses, and three-story apartments); \$2,025,000 to Spence Estate Housing Corporation, Brooklyn-a slum clearance project contemplating six-story semi-fireproof elevator buildings-508 apartments, 21,150 rooms, at \$11 per month; \$845,000 for a model housing project of hosiery workers in the Kensington district of Philadelphia - three - story semi - fireproof buildings providing 292 apartments, 1,074 rooms at \$8.40 per month; \$3,210,000 to the Dick-Meyer Corporation for a project at Woodside, Queens Borough, New York, providing ten sixstory semi-fireproof elevator apartments with 1,632 units, 5,644 rooms at \$11 per month; and \$40,000 to Suburban Housing Corporation, Hutchinson, Kans., for twenty four- and five-room houses, each on a two-acre plot, to rent at \$30 per month.

Wednesday, August 23.—It would seem to prove something—though I do not know just what—that while Sir Gilbert Scott, the Romanist, is designing the Liverpool Cathedral for the Church of England, Sir Edwin Lutyens, a member of the Church of England, is designing the Roman Catholic Cathedral for Liverpool.

Friday, August 25.—Coleman Woodbury, of the University of Chicago and Secretary of the Illinois Housing Com-

mission, calls attention to the desirability of insulating large-scale housing projects against encroachment of neighboring deteriorated areas by means of parks, boulevards, the railroad right-of-way, or some other such natural bulwark.

Saturday, August 26. -- Down to Princeton to see the new house which Alfred Hopkins has built for his own use -an interesting adventure in the use of stone facing backed by cinder blocksthese latter are used in courses of two depths and are painted with a cold-water paint. The stone itself is the outside cut of limestone—the channel face, mixed with a small percentage of shotsawn pieces, giving a remarkably pleasing texture and color. In the main rooms, Mr. Hopkins's aim was to secure a feeling of masonry structure as distinguished from the usual plaster skin. For the ceilings, however, of these rooms he has used molded plaster glazed down to an ivory tone against the foil of the plain masonry wall surfaces. Photographs in an early issue will indicate the individuality which has been secured in this house, with its music room and owner's quarters joined to the house by an arcade, and with its garden court already possessing an atmosphere of maturity through Mr. Hopkins's efforts and those of Mrs. Ellen Shipman Andrews, who did the landscape work.

Monday, August 28.—Closely paralleling our amazement and gratification over the launching of a great program of public works runs the realization that we are not ready with our plans. Here is the money with which to build great things and we do not know just what to build or where. Long-range planning has never been one of our strong suits. It is at least somewhat encouraging, however, to note that during the past two years, bills providing for such longrange planning of public works have been introduced in at least eight State legislatures—California, Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, Washington, Wisconsin.

Wednesday, August 30.—Over to Newark, N. J., to see the progress of the Prudential Insurance Company's housing development for negroes. Here is one particularly interesting variation of the housing subsidy. Two city blocks, end to end, were acquired by the Insurance Company, and a strip over one hundred feet wide running through the whole length was sold to the city as a park area. This left the cost of the land chargeable to the development comparatively small and the rentals are about \$9 per room.

about \$9 per room. Edmund C. Stout is the architect and has designed a six-story walk-up building, fireproof, the reinforced concrete frame being faced with a special largesize hollow brick, 5 by 5 by 8 inches in two colors. Wood sash are used throughout with a type of sash balance which does away with cords and weights.



The Italian Stone Pine, near Pompeii

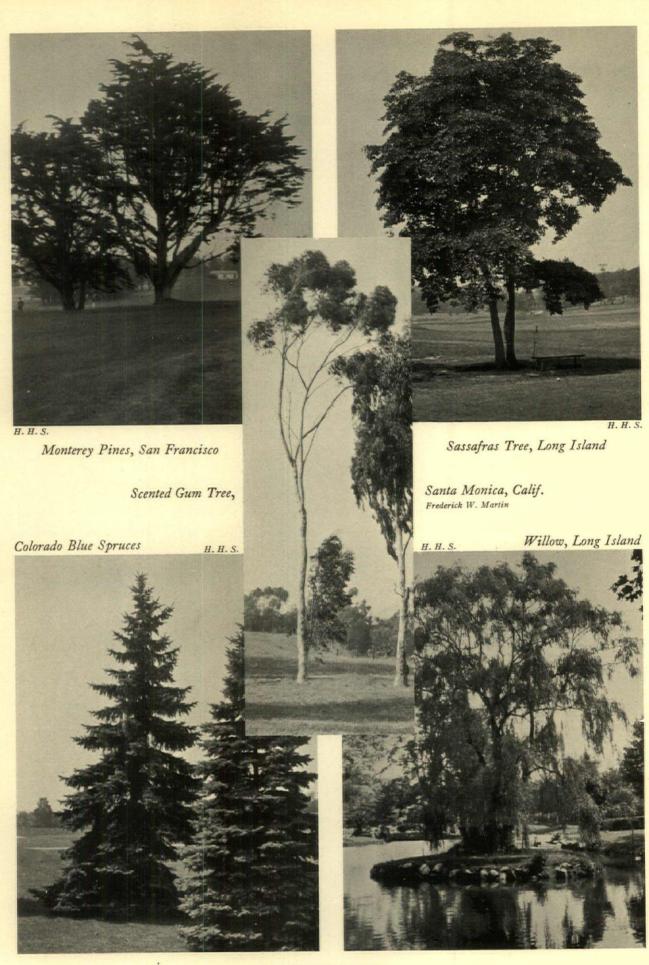
When You Draw Trees

These photographs are assembled in the hope that they may be of service when the architect makes his perspective. Too frequently his trees look as if they had started out to be a topographic survey and had ended as a cross-hatched diagram. Trees have a character that is rather easy to catch with the pencil—if one selects his species. Which leads one rather directly into the conclusion that the architect knows very little of plant material or of its proper disposition in relation to his architecture, and the best way out is through collaboration with a landscape architect



Harold Parker

The Valley Live Oak, of California





White Birch, Long Island

Locusts on a Long

Elms along a New England village street



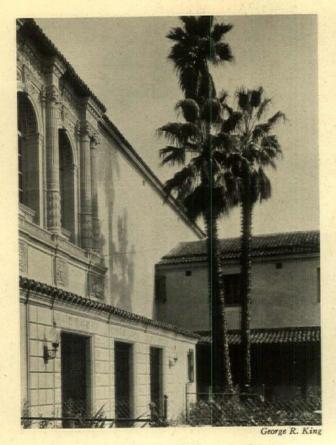
Red Oaks, Long Island

Island golf course

The Cryptomeria of Japan at home on Long Island

« ARCHITECTURE » 231

Ward Provents



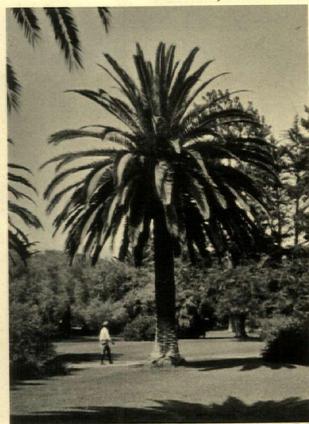
Fan Palms in the Pasadena Library patio



Douglas Firs, along Puget Sound

Date Palm, Santa Barbara

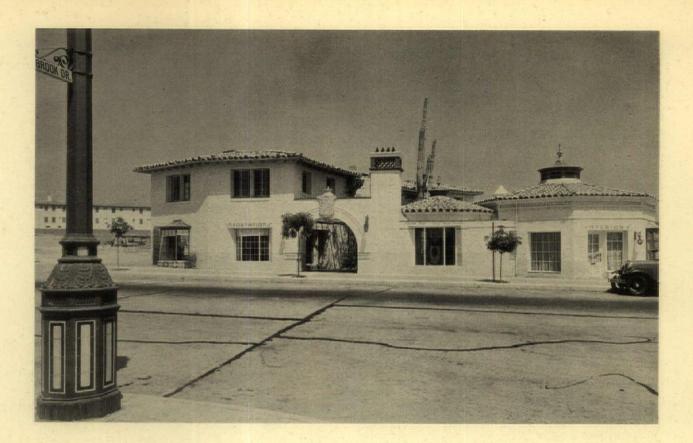




Frederick W. Martin

* ARCHITECTURE *

H. H. S.



El Saquero

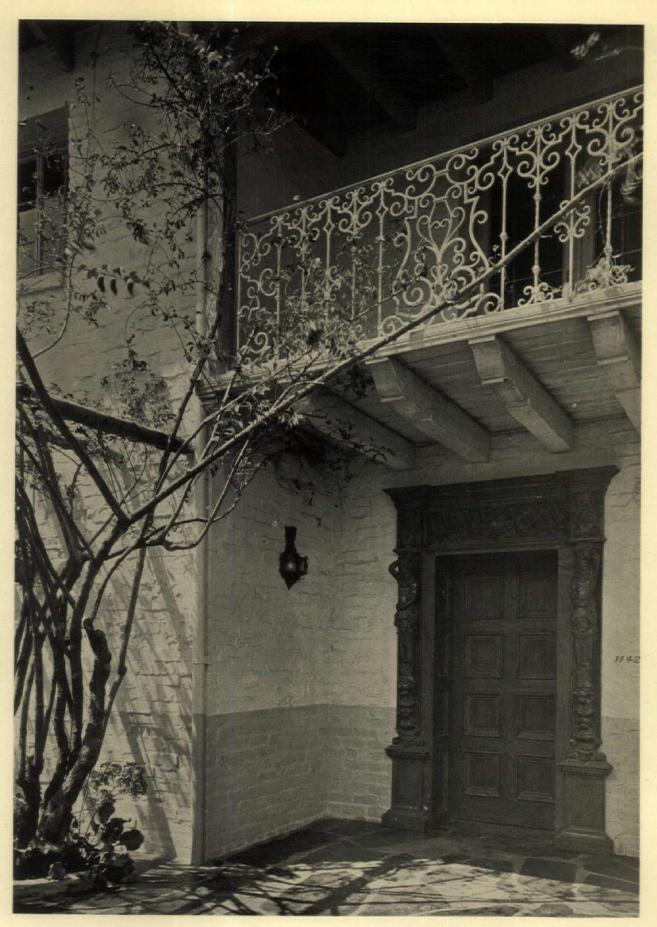
A SHOPPING CENTRE FOR WESTWOOD VILLAGE, LOS ANGELES, CALIFORNIA, AS DESIGNED BY JAMES N. CONWAY AND DRAVER WILSON, ARCHITECTS





El Saquero, Westwood Village, Calif. James N. Conway and Draver Wilson, architects

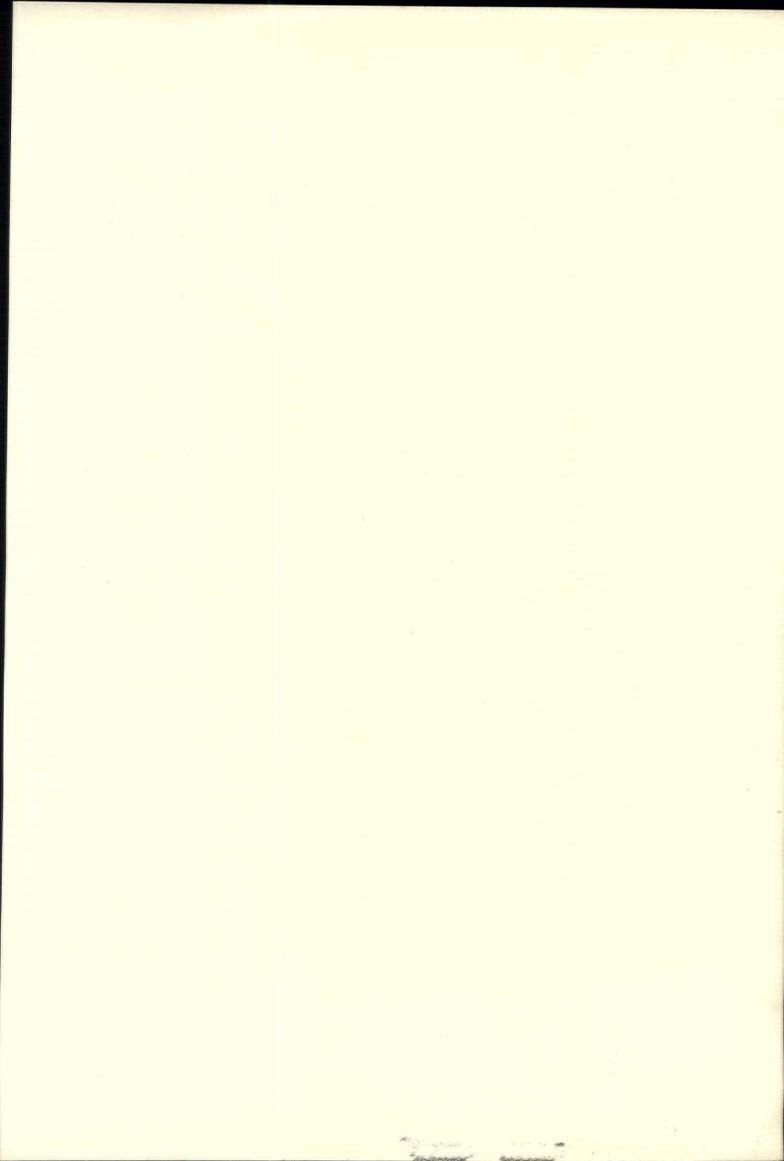
ARCHITECTURE >> 234

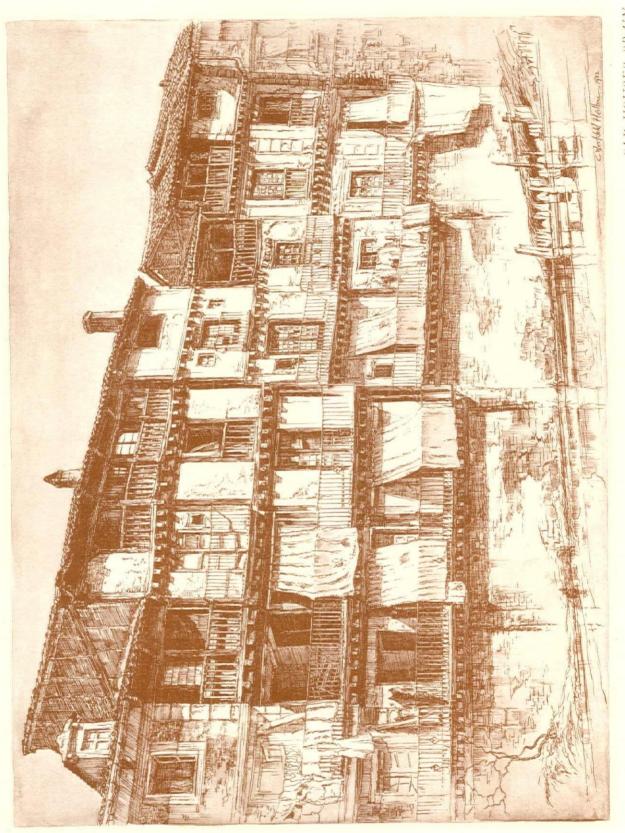


El Saquero, Westwood Village, Calif. James N. Conway and Draver Wilson, architects



El Saquero, Westwood Village, Calif. James N. Conway and Draver Wilson, architects





OLD HOUSES, SPAIN From the drawing in pen-and-ink and wash by Carl W. Heilborn

♦ ARCHITECTURE ≫

ARCHITECTURE

✤ VOLUME LXVIII

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Modernism Yesterday, Today, and Tomorrow By Rexford Newcomb

*** HAT is modern architecture? We hear W our friends talking about "modern" architecture and indeed "contempo-ary" architecture as though it were something new, as though the world had never before been face to face with the problem of interpreting into architecture a changed attitude toward life, or with the necessity of expressing that architecture in terms of new materials. To an extent, of course, the present is a unique moment in the experience of man upon this planet but, while it is true that no moment or event ever exactly repeats itself, the fact remains that, as humanity lives out its cycles of existence in this world, circumstances remarkably similar to circumstances of bygone days do recur. It is this very recurrence in the ongoing pattern of human life that makes history valuable as a guide for the present and precedent worth considering.

If one takes an historic view of life he will come to the conclusion that "modernism" has always been with us and that so long as man works at those processes which result in civilization, will always be with us. There have always been innovators, monkeys who insisted upon walking farther out on the limb than any monkey had ever dared walk before. This very tendency has made for all that change in the condition of man and the environment that he has created for himself which we call civilization. But there is also in man a peculiar imitative streak that serves as a safety-valve to too much innovation and tends to perpetuate patterns of life that have already been tested and tried. Those who delight in walking out on limbs that have never before been walked upon we call "progressives," or today in the architectural field "modernists," and those who are content to do things upon a pattern similar to that of past days we call "conservatives." This line of cleavage runs all through life and it is

not surprising that architects find themselves today divided into two camps.

I think, however, that in the *normal* individual there is an interesting balancing of these two tendencies, resulting in a condition which, while it slows up what the ultra-progressive would call "progress," acts as a serviceable deterrent in the majority of the considerations of life. In the scheme of human economy we need the outer fringe of the ultra-progressives but we need also the more quiescent body of balanced individuals who keep the race from ruining itself. The historian is constantly cognizant of the fact that while events change, humans do in various times and places behave consistently like humans.

I wish we might have the time to make a side excursion into history to discover how consistently prevalent in human life and its manifestations has been that spirit which we today call modernism. We should meet such worthy architectural innovators as old Imhotep of Egypt, the designers of ancient Assyria, Persia, Greece, and Rome. We should come to know Allan of Walsingham, William of Sens, Brunelleschi, Leonardo da Vinci, and a host too numerous to mention. We have had architectural innovators since the beginning of the art and it is largely to their daring that most of the change (witness I do not say progress) is to be attributed. There were innovators in Greece who transformed the archaic wooden and sundried brick temples of Hellas into shrines of polychromed white Pentelic marble; innovators in Rome who, through the invention of an arch, raised vaults and domes of masonry above some of the most magnificent enclosed spaces that the world has ever seen, and turned the courses of rivers into the fountains and basins of the great metropolitan bathing establishments; innovators in France who dared give us the paradox of roofs of stone above walls of glass;



A conservative expression in concrete. The ornament was all cast integrally with the construction. Norton Memorial Hall, Chautauqua, N.Y. Otis F. Johnson, architect

Brunelleschi, that early innovator of the Italian Renaissance, who, through the introduction of a material strong in tension to take up the lateral thrust always present in arched structures, was able to set an unbuttressed dome atop the Cathedral of Florence. And so it has gone down to our day, by an empirical process; the innovators little by little have conquered their environment and ushered in forms and manners that their more conservative neighbors thought ridiculous and unlovely.

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But what factors occasion changes in architectural expression? While changed conditions in the social, economic, political, and religious orders of life make for a gradual change in art expression, the phenomenal changes in architecture come about through:

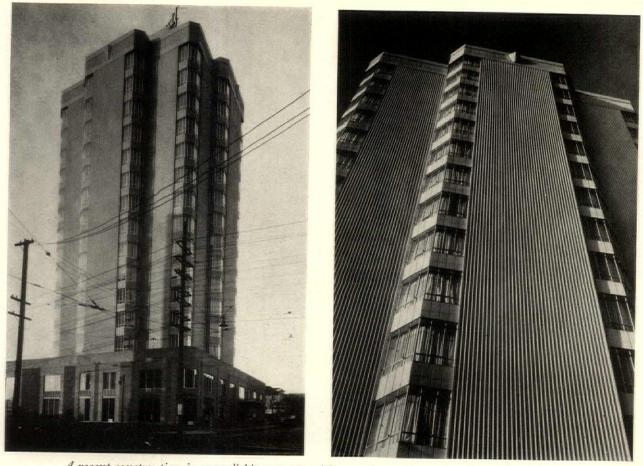
1. The introduction of new materials.

- 2. Changes in the handling of an *old* material.
- 3. A changed system of construction made possible by an introduction of new materials.

 New inventions (like electricity and the elevator) which markedly affect construction processes and architectural form.

Perhaps without exception all the great styles of the past have been made possible by, or were based upon, either a *new palette of materials* or a *new system of construction*.

In many respects the task that confronts us today, the problem of using a whole new palette of materials and at least two new systems of construction (steel and concrete), is not unlike the artistic task which the Gothic architects of Ile de France faced at the middle of the twelfth century. Ever since the downfall of the Roman Empire in the west, they had striven again to be able to erect over the altars of their religion an imperishable vault of stone, like that which the Roman architects so well knew how to construct during the Imperial Period. By 1145 they had succeeded in reaching a logical and craftsmanlike solution of the structural phases of the Gothic system but the vaults were heavy and graceless, the buttresses clumsy and brutal, and the piers and shafts anything but beautiful. The mechanical solution was at hand, the structural



A recent construction in monolithic concrete with no reference to past styles, and entirely dependent upon the limitations and possibilities of its material for any architectural charm it may possess. Edmond Meaney Hotel, Seattle, Wash. Robert C. Reamer, architect

technique was perfected, but an adequate and logical *esthetic* expression thereof still remained to be found.

The story of the search for the beautiful in Gothic architecture is a fascinating one but one that is familiar to the architectural profession. We need not repeat it. It was, however, just as real a problem and one quite as elusive as had been the conquering of the constructive phases of the style. It took a hundred years to solve it, and that in the face of the fact that for centuries man had been building in stone and had by this time presumably mastered his material.

Today, of course, we face a variety of materials and an infinity of constructive systems the like of which no previous period ever encountered. Added to this is a constantly changing array of mechanical inventions that affect construction practice and modify architectural form. Thus an adequate esthetic for so fluid and changeful a body of architectonic materials is not as yet possible, and every architectural essay must in such a flux period be considered only in the light of a "progress report" in an evolution toward an adequate artistic interpretation of these new materials and new systems.

Added to these material considerations are the less tangible social, economic, and other human processes that are at work and about which the average architect knows very little and apparently cares less. Of course it is always difficult to get the pulse in so fluid a period, but if I have any guess as to the trend that foremost architectural thought in this day is taking I would say that it is tending toward a new horizon that will have to do more and more with the social and human factors and less and less with questions of abstract design; more and more with the problems of catching and expressing the tenor of modern life and thought, and less and less with archæological argument and stylistic considerations. Of course the ability to express life in terms of architecture depends upon a mastery of the means to that expression. Our problem therefore resolves itself into two major considerations:

- That of trying to find out what this rapidly changing modern life is all about.
- 2. How best we may interpret that life in terms of the available materials.

These remarks may give you a clue to the criteria by which I believe we should judge modern architecture, and in fact I see no reason why we should not use such measuring sticks in the evaluation of all architecture, ancient or modern.

In my estimation an architecture that does not completely minister to life (physically and spiritually) is not worthy of the name. An architecture that ministers to life is a functional architecture; an architecture that attempts to express in plan and mass the activities of life that take place within its walls and beneath its roof; an architecture that cares little for archæological precedent and stylistic form but seeks to fashion whatever beauty it may express within the limits permitted by its function and the materials of which it is built; an architecture that is sincere, plays fair with the life which it shelters, and plays fair with the substance of its creation; an architecture which meets its problems in a simple, direct, and craftsmanlike manner and does not seek to imitate so-called modern forms from other lands or strive for an empty and stilted originality; an architecture that plays fair with precedent, retains that which is current and valuable, and discards that which is outworn and meaningless; an architecture which is not so much concerned with being "modern" as it is with being serviceable, honest, and true. Are these not fair criteria by which to measure the architecture of a new day?

I presume that I should say something about the materials of modern architecture. Perhaps the architectural substances that have most saliently influenced modern design are the metals-particularly steel-glass, and concrete. This problem of seeking an architectural expression in these materials is not so new as some of us assume. It goes back about one hundred years, and dates from the early attempts of Henri Labrouste and his confrères to give iron a place in the esthetic of architecture. His success in the Library Sainte Geneviève and the Bibliothèque National in Paris was considerable. The début of glass in any large way practically dates from the construction by Sir Joseph Paxton of the famed Crystal Palace, erected for the London Exposition of 1851.

During the 'sixties great progress was made in the technical development of cast- and wrought-iron building shapes, which in turn made for their artistic employment, but metal

did not much influence building construction until the perfection of manufacturing processes made possible the production of steel that was cheap enough to be used as building material. This significant event took place in 1884, and architects of the city of Chicago made substantial contributions in the structural application of that material to architectural problems.

This all resulted in the metallic frame embodying a new and unique system of construction and a new structural logic. This has been with us for some years, but we have not as yet completely solved the esthetic implications that came in the wake of this structural development. We are making progress, but one of the present-day problems of the architectural designer consists in finding a logical and defendable esthetic for the steel frame.

Concrete is another material that offers a unique challenge to the creative architect of today. Portland cement has been upon a commercial production basis since about 1890. During the past thirty years engineers and inventors have explored the physical and chemical problems connected with it and have provided us with the mathematical equipment necessary to intelligent structural design and a technique for handling this valuable medium for architectural expression. As yet, however, we as architects have done little toward the solution of the esthetics of the material or the systems of construction to which it has given rise. For the most part we have been content to use concrete as the bony substance of our buildings, covering it with various materials and refusing even to mention it upon the face of the structure. Now this is perhaps not to be wondered at. The artistic employment of any new structural material invariably lags behind the perfection of the mechanical technique connected therewith. This is inherent in the very nature of such problems.

There has been a good deal of mixed thinking about the nature of concrete. For a long time it was thought of as "fluid stone" and often treated as stone even to the extreme of using it to make rock-faced concrete blocks. *Concrete is a plastic*, but is not a plastic like clay or wax, to be modelled into place. Its plasticity consists in its ability to be *cast* into practically any shape necessary to or encountered in the building art. In my estimation here *lies its greatest artistic value*.

Willing to take almost any shape, it, unlike many other materials, is impressionable when young but stubborn and difficult to change



A sensible and beautiful rendering of the functional steel members. Concourse of Union Station, Chicago, Ill. Graham, Anderson, Probst & White, architects

when once set in its way. When set up it has a crystalline quality not unlike stone, and therefore should not be cast as one would cast lead, iron, or other such plastics. Some one has said that "Concrete is stone, yet *not* stone." In essence it is a plastic that petrifies—becomes stone. This eventual granular character, and the necessity of "pulling" the moulds or forms from its surface, must always be kept in mind during its design.

Thus we might go through the whole gamut of that infinite variety of architectural stuff in which we are trying to express ourselves. Most of us have little first-hand knowledge about these materials we are expected to use. Thus today we see materials perfectly good and noble in themselves imitatively tortured into something which they are *not*, simply because of our inability to sense their possibilities and limita-

tions—the physical and esthetic natures of them. Thus excellent rubber floor coverings masquerade as marble, good plaster palms itself off as stone, clever pressed-steel doors, desks, and cabinets claim to be mahogany, pressed enamelled steel sheets simulate ceramic tiling, and concrete attempts to finesse itself as cast stone with mouldings, undercutting, and the other earmarks of stone that has been worked with the chisel.

At a recent convention of material men I advocated the establishment of "esthetic laboratories," in which architects and other designers might have the opportunity to get first-hand experience with materials. The designer is today too far removed from the craftsman. Further, it seems to me that if it is essential to have laboratories for the study of the strengths and mechanics of materials, it is just as essential to have laboratories or studios for the study of the

> Monolithic concrete with ornament cast integrally by the use of waste moulds. Hoffman Candy Company Building, Los Angeles, Calif. Charles F. Plumber, architect

esthetics of materials. One fact is plain. We shall never succeed in forming a modern architecture until we master the esthetic of the materials in which we work.

Esthetic solutions are slow-going processes, and we may not expect to solve immediately all the problems connected with our art, but we are expected to bring to the practical and artistic tasks before us the same creative ingenuity which has characterized forward-looking and rational architects down through the ages. If we do this, in time a new architecture, as assuredly predicated upon the living considerations of our day as the great past styles were predicated upon the material and spiritual backgrounds of their time, will come into being. We do not need the materials or the forms of the past but we do need the creative daring and courageous attack of the architects of other days!

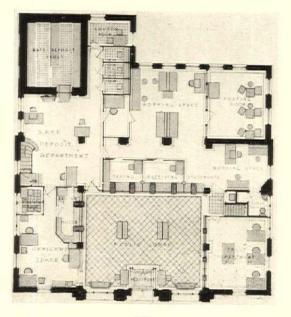


≪ ARCHITECTURE ⇒
 258



First National Bank, Amherst, Mass.

LESTER KINTZING, ARCHITECT



As befitting a community of New England in which the architecture is rather consistently of a single type, the building is an individual one following Colonial traditions, but, bowing to modern requirements, strictly fireproof throughout

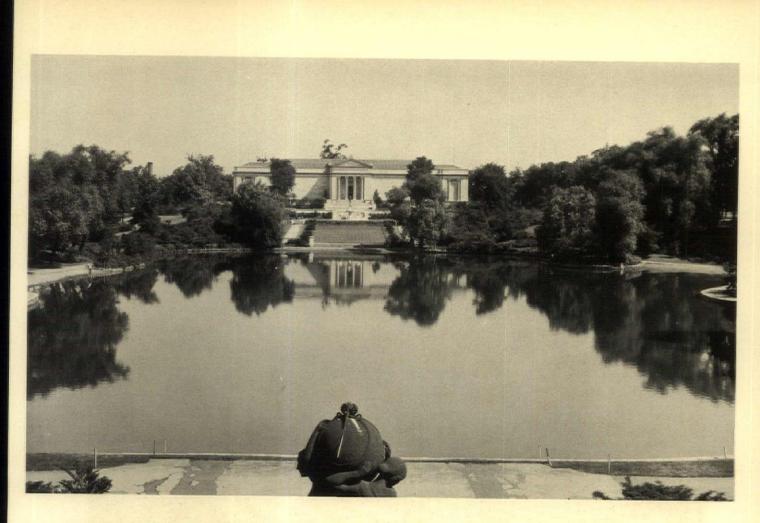
The walls are of red brick with Bedford limestone pilasters and cornices, granite base course, and graduated slate roof; windows are of wood, painted to match the stone. The building was erected, furnished, and decorated by Hoggson Brothers



Above, the architect's preliminary perspective of the main banking room. Below, the public space of the main banking room as executed. The wall surfaces, pilasters, and vaulted ceiling are painted an old ivory, the ceiling being of a lighter shade than the walls. The floor is of Tennessee marble, the counter screen being of marble with a maple top screen and bronze wickets



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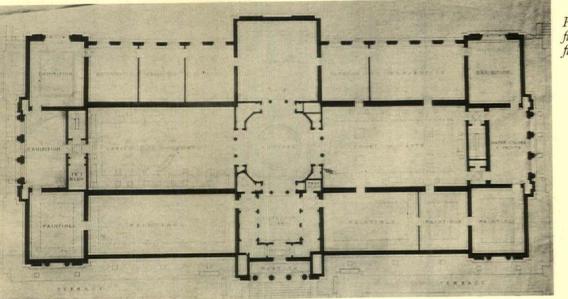


Cleveland Museum of Art, Cleveland, Ohio

HUBBELL & BENES, ARCHITECTS; OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

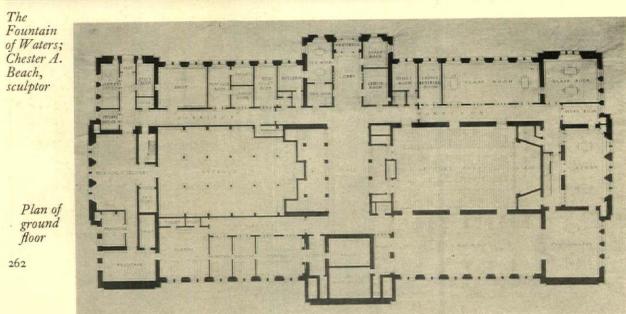
Photographs by The Cleveland Museum of Art

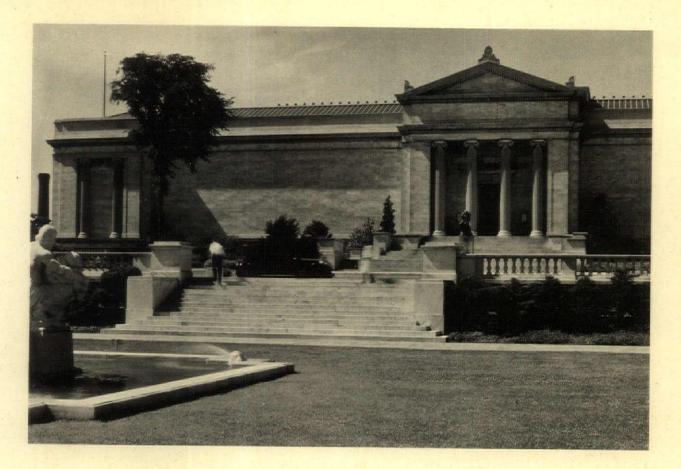






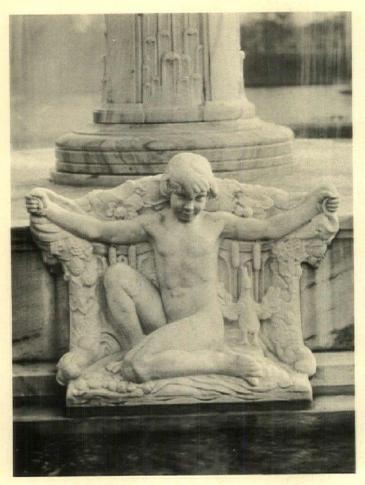






White Georgia marble has been used throughout for the exterior walls, recalling the best materials of Classic Greek work, and proven as enduring under the rigorous climate of Cleveland. As will be seen in the plans on the opposite page, the scheme of providing two main entrances, one from the driveway on the ground floor, and the other by the steps from the garden on the first-floor level, is of great aid in handling crowds







A detail of the fountain in the Garden Court



The motor entrance at the ground level

A view across one end of the museum



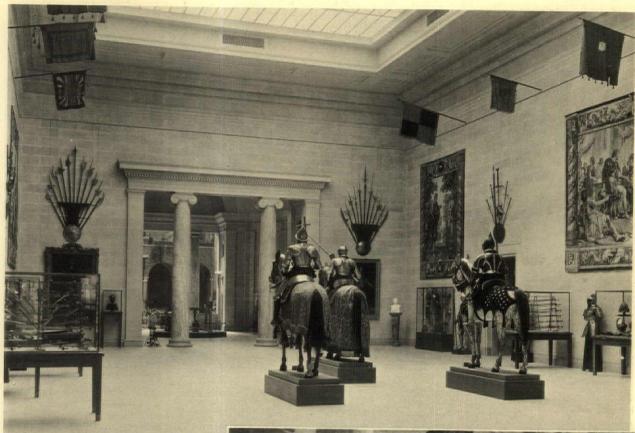
Looking from the Garden Court into the rotunda and beyond to the Armour Court



The Garden Court, the walls of which are of common brick, the columns being of granite brought from Italy

A detail of the Garden Court as seen from the loggia end—the end opposite the rotunda

> ≪ ARCHITECTURE → 266



The Armour Court, the walls of which are finished in Cleveland sandstone



A detail of the Armour Court, looking through the entrance from the rotunda



The Library, which is on the ground-floor level, adjoining the lecture room

Below, a classroom—the one located on a corner of the ground-floor level

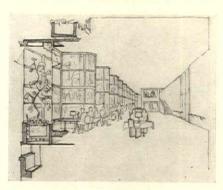




The Architectural Observer



HERE is a clever idea as worked out in a restaurant in Frankfort-on-Main—the Palmengarten, of which Elsässer, May & Hebebrand were the architects. The long south wall is entirely given over to a con-



tinuous plant window. This, due to its projections, forms pleasant interior niches, each of which is surrounded on three sides by glass and growing plants. Throughout most of the day the room is flooded by sunshine with pleasant variations of light and color.

THE problem of controlling light satisfactorily as it comes through large windows is one that has seldom been solved to the designer's complete satisfaction. The illustration shows a model office in an exhibit, "Interiors of Tomorrow," arranged by McMillen, Inc., interior decorators. Instead of fabric



curtains of any type, which seemed rather difficult to reconcile with a functional office interior, the decorators used vertical vanes of polished aluminum. Cords control these, both at top and bottom, so that the window may be entirely closed or only partly so. In addition, it is possible to deflect the vanes at any angle so as to reflect light into the room instead of allowing it to come through directly in too great volume.

A POOL in the Century of Progress Exposition, appearing in the garden of the Communication Centre, shows a new development in the technic of decorative terra-cotta. Voorhees, Gmelin & Walker, architects; Hildreth Meière, painter; and the Atlantic Terra Cotta Company's

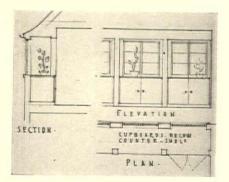


technicians collaborated in working out a method of transferring designs in ceramic colors by which effects similar to mural painting can be easily and economically obtained. Modeled reliefs, heretofore necessary to enable the polychromist to separate his color effects, are no longer necessary, nor is it essential in the interests of economy to use duplication of design.

The silhouetted figures, symbolizing the spirit of electrical communication, are in a rich deep blue glaze against the background of an Oriental green; the latitudinal and longitudinal lines of the globe are in ivory white, only one-eighth inch in width. The pool is almost twentytwo feet in diameter, and this pictorial composition is under eighteen inches of water.

VOLKART & TRUDINGER,

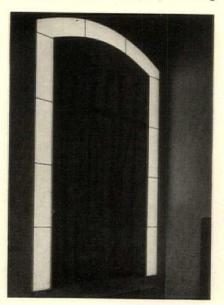
architects of Stuttgart, found an interesting way of keeping their roof lines lower than the second-story ceiling without making those who use these upper rooms uncomfort-



ably aware of the fact that the outer portion of the ceiling height had been cut down. The effect of the deep reveal in the windows, and the practical consideration of cupboard space gained, are details worthy of emulation.

*

VARIOUS writers on interior decoration have called attention to the difficulties imposed upon the designer by the fact that daylight illumination provides light from the windows, while night illumination customarily utilizes an entirely different set of sources. In the General Electric Lighting Institute at Harrison, N. J., an attempt was made to overcome this difficulty by locating



the artificial light as a frame around the window openings. This particular example was a part of a temporary installation designed by the engineering staff of the General Electric Company, and details for a permanent feature of this kind have not been fully developed. It would seem easy enough, however, to devise a shallow metal box in place of the trim, painting this with flat white inside, and covering the open face with the proper kind of translucent glass. Here the box was seven inches wide by eight inches deep, with the lighting of fifteen-watt lamps on six-inch centres. Relamping is accomplished by moving the strip at the side of the glass. The glass here is flashed crystal and opal separated and held in place by narrow metal binding strips.

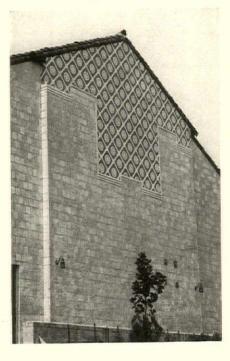
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THERE are not many examples of true sgraffito work in this country, but here is one example which W. R. Yelland has developed



for the exterior of a public school in Oakland, Calif.

The running floral design is in





dull blue, rose, and brownish red. When the building was about ready for its sgraffito work funds were running low. Rather than give up the scheme, the architect selected the best of the plasterers, and went at it with him. The plasterer performed the actual work, while Mr. Yelland outlined the design on the wet plaster, working freehand as the work progressed. The base is of hollow tile; over a base coat of stucco the various colors were applied in thin smooth layers, and cut through to the color desired.

On the pediment end a thin dash of stucco covers the wall of hollow tile with the additional colored plasters laid over this for the sgraffito work.

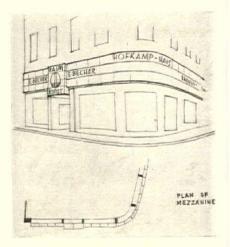
THERE is no lack of ingenuity and inventiveness on the part of America's restaurateurs to provide unusual surroundings for their guests. In contrast, however, with the too frequent attempts to be startling and bizarre is the course followed by Schrafft's in one of its Fifth-Avenue stores in New York. An upper floor of the building has been remodelled-as nearly as structural conditions permitted-as an exact reproduction of the Alexandria Room in the American Wing at the Metropolitan Museum of Art. The theme has been carried out even

« ARCHITECTURE »

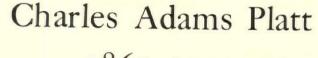
to the details of furniture, silver, and china. The work was done under the direction of Charles E. Birge, architect.

-88-

IN altering an old store building at Wuppertal, Hans Becher, architect, divided his high ground-floor space to add a mezzanine. The masonry wall supports were removed, and steel substituted. En-



closing the mezzanine, the continuous, cantilevered, and projecting glass band serves to light the new mezzanine exhibition space, also the signs by means of night illumination inside. Incidentally, being accented horizontally, this band distracts the eye from the axial discrepancy between the openings on the first and second stories.



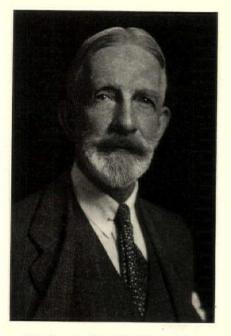
1861-1933



AN APPRECIATION BY ROYAL CORTISSOZ

TO spend a long life in the creation of works of beauty, to care unswervingly for the things of the spirit and the mind, to wake the love of innumerable friends through the promptings of a generous heart-to do all this is surely to fulfill a high destiny. Such was the achievement of Charles A. Platt. He was an artist in the very core of his being. Upon his personality and upon his work there was ever a gracious accent, as of one to whom a lofty standard came, in the old saying, as natural as breathing. He was a traditionalist, turning to the lessons of the past with unhesitating confidence. But never was there an artist who more decisively proved that tradition may energize progress and lead to essentially modern accomplishment. His superb Hanna Building, in Cleveland, is based in its broad lines upon a Renaissance palazzo but it is accurately adjusted to the uses of commerce, and the adjacent Hanna Theatre is one of the structures in this country in which the practical problems in-volved in a building of the kind are perfectly solved.

That was like Platt. He designed from within outward. He looked first to his plan and then made the façade an expression of its purpose. He knew all about "functionalism" long before the modernists began to use the term. When he designed the beautiful Freer Museum, in Washington, he made it not only a monumental work externally but gave it a fairly unique status in matters of lighting, the arrangement of rooms, corridors and so on. He leaves behind him the drawings for the vast National Gallery, projected likewise for Washington. Their realization in stone will give to the United States a fabric devised only after exhaustive study of the principal museums of the world and a sifting of the concrete issues that belong to the installation of works of art. Platt was a constructive architect, if ever there was one, for whom a public building or a private house had to have organic life.



Charles A. Platt died September 12 at his summer home in Cornish, Vt., after an illness of six weeks. Born October 16, 1861, his early training led to the study of painting and etching, His landscapes were in the Paris Salons of 1885 and 1886 and various important medals and awards came to him. Returning to America in 1887. after studying at Julian's under Boulanger and Lefebure, Mr. Platt became interested in landscape architecture through his brother, trained at Harvard. Together they went abroad to see and study the great gardens. One re-sult was Charles Platt's book, "Italian Gardens," published in 1894. Through his landscape work he gradually came to focus most of his efforts upon architecture. Though many monumental works have come from his hands-the Freer Art Gallery, University of Illinois buildings, Astor Court apartments, and many others—he will be remembered best by his country houses. He designed wellover a hundred of these, and each bears that indefinable something, closely knit with restraint and suave grace, that was Charles A. Platt.

The words of appreciation by Royal Cortissoz appeared as an unsigned editorial in "The New York Herald Tribune," September 15.—EDITOR.

It is as an architect that he is most widely known, but to look back over his fruitful career is to see upon how many adventures his artistic passion launched him. He was one of the founders of the American school of etching, producing many plates in his earlier years, plates marked by a firm, fluent line and by excellent composition. Only last winter an exhibition at the Century Club, summarizing the work as a landscape painter that coincided with and followed upon his work as an etcher, demonstrated again his technical ability, his sensitiveness to nature and to beauty, and his original charm. His book on the en-chantment of old Italian gardens was the first on the subject to appear in this country, and on turning from the brush and needle he figured as a consummate master of landscape architecture. Platt, in a word, could do anything that an artist could do. The Lowell fountain back of the New York Public Library, for example, is a testimony in its dignity and grace to the ease with which he could deviate from the ordinary path of the architect and develop a sculptor's aptitude.

He has left a noble mark upon American art, one significant of taste, of refinement, of pure beauty. He had creative power and used it with remarkably balanced judgment. Of his traits as a man those who knew him will cherish grateful memories. There is an old designation that comes to mind from out of some byway of Stuart literature, "Carluccio Dearest." It belongs to Charles Platt. He will be remembered through his works. He will be remembered for the endearing manner in which he served as president of the Century Club. He will be remembered for his unselfish labors as president of the American Academy in Rome, labors directed with intense solicitude to the allying of young talent with an inspiring ideal. He will be remembered also as "Carluccio Dearest"—kind, gentle, good, a man to tie to and to love.

HOUSES OF STONE. By FRAZIER FORMAN PETERS. 163 pages, 8½ by 11 inches. Photographs from drawings and photographs. Westport, Conn.: 1933: Frazier Forman Peters, Inc. \$3.50.

The author, who is his own publisher for this book, has been building houses in Connecticut for some years. He believes in stone walls, and takes considerable space in his book to explain the difference between the traditional stone wall, the veneered stone wall, and the Flagg stone wall. Starting with Mr. Ernest Flagg's system, Mr. Peters has developed certain modifications of his own along the lines of economy of erection.

ALL THE WAYS OF BUILDING. By L. LAM-PREV. 304 pages, 7 by 9¼ inches. Illustrations from drawings. New York: 1933: The Macmillan Co. \$3.50.

Here is a book written for children—the story of man as a builder throughout the ages. It is intended for the child of twelve years or over, but considering the present knowledge of architecture on the part of laymen generally, we would suggest that it would be an excellent book for one to persuade the less informed layman, or his wife, to read aloud to the children.

THE CARILLON. By FRANK PERCIVAL PRICE. Preface by HERBERT AUSTIN FRICKER. 228 pages, 37 plates, 6½ by 9¾ inches. Illustrations from drawings and photographs. Printed in Great Britain. New York: 1933: Oxford University Press. \$7.50.

The progressive march of the carillon has been one of the interesting elements in ecclesiastical, educational, and monumental architecture in this country. The author, who is carillonneur for the Dominion Government at the Houses of Parliament, Ottawa, Canada, and who formerly was carillonneur at the Laura Spelman Rockefeller Memorial Carillon in New York, has filled with this book a real want in the literature of music and of architecture. The work is for the student carillonneur and for organizations contemplating the installation of the carillon, and is full of little-known facts.

STANDARDS AND SPECIFICATIONS FOR METALS AND METAL PRODUCTS. Prepared by GEORGE A. WARDLAW, under the direction of A. S. MCALLISTER. 1359 pages, 73⁄4 by 1½ inches. Illustrations from drawings and photographs. Miscellaneous Publication No. 120. Washington: 1933: U. S. Department of Commerce, Bureau of Standards. \$3.

The Bureau of Standards offers this encyclopedical volume covering nationally recognized standards relating to the metals as adopted by the industry in its many branches. It covers not alone the standards and specifications, but methods of testing, analyses, heat treatment, and the like.

- WIND PRESSURE ON A MODEL OF THE EMPIRE STATE BUILDING. By HUGH L. DRYDEN and GEORGE C. HILL. 31 pages, 6 by 9 inches. Illustrations from drawings and one photograph. Research Paper No. 545. Pamphlet binding. Washington: 1933: U. S. Department of Commerce, Bureau of Standards. 5 cents.
- DEBT AND PRODUCTION. The Operating Characteristics of Our Industrial Economy. By BASSETT JONES. 147 pages, 6¼ by 9¼ inches. Illustrated with graphs. New York: 1933: The John Day Company. \$2.50.

The profession knows Bassett Jones as an authority on elevators and other things. Coming to the conclusion that the literature of economics, as applied to our present-day problems, does not fit the case, he has undertaken to set down certain facts. As might be expected of an engineer, Mr. Jones is dissatisfied with words as such. There are about twenty-two thousand of them in the English language, most of which may mean almost anything one takes them to mean. Therefore, Mr. Jones writes in mathematical formulae rather than in words. Moreover, he courts no argument. He says that either the statistics employed by him or his method of analysis may be fundamentally in error in which case it is a matter for proof, not for argument.

PRACTICAL ENGRAVING AND ETCHING. A Book of Instruction in the Art of Making Linoleum Blocks, Wood-Engravings, Woodcuts Made on the Plank, Etchings and Aquatints. By E. G. LUTZ. 248 pages, 5 by 7¼ inches. Illustrations from drawings. New York: 1933: Charles Scribner's Sons. \$2.

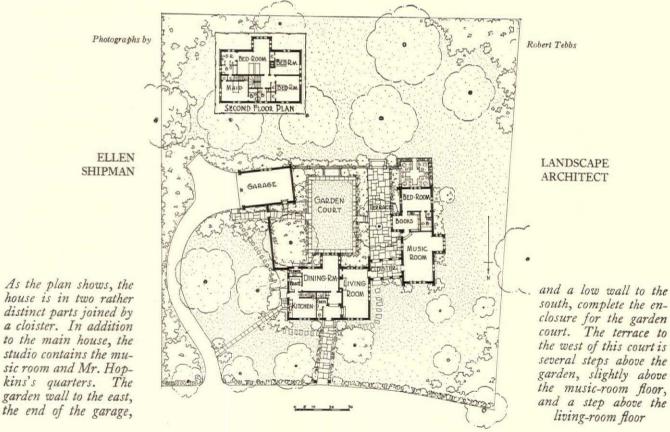
E. G. Lutz has proven in many books his ability to teach through the printed word. In the present volume he makes clearly understandable the cutting of linoleum or wood blocks, and the technical processes of etching and aquatint. His own drawings leave no step of the various processes in doubt.

- INDUSTRIAL LIGHTING. Part 1, Docks, Warehouses and Their Approaches. By J. S. PRESTON.
 Illumination Research Technical Paper No. 14.
 34 pages, 6 by 9½ inches. Illustrations from graphs and photographs. Pamphlet binding.
 Printed in Great Britain. New York: 1933: His Majesty's Stationery Office (The British Library of Information). 20 cents.
- THE REDUCTION OF NOISE IN BUILDINGS. Recommendations to Architects. By HOPE BAGENAL and P. W. BARNETT. Building Research Bulletin No. 14. 29 pages, 6 by 9½ inches. Illustrations from drawings. Pamphlet binding. Printed in Great Britain. New York: 1933: His Majesty's Stationery Office (The British Library of Information). 20 cents.



The house from the west, with the music-room end in the foreground

House of Alfred Hopkins, Architect, Princeton, N. J.







South end of the studio building and the low wall enclosing the garden. On the exterior Mr. Hopkins has used limestone four inches thick backed by cinder block. This limestone is in a mixture of channel-face and shot-sawn slabs, giving variety of texture and color

South end of the studio building, as seen from across the garden court. There is a small lily-pool visible in the lower left corner of the photograph

« ARCHITECTURE »

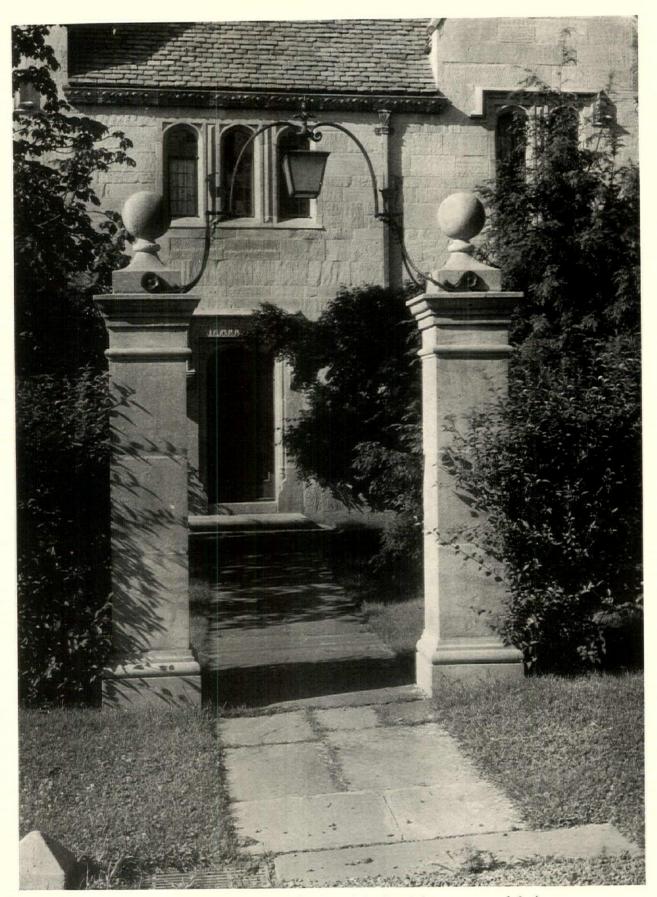


The terrace, which overlooks the garden to the right. In the distance is the cloister joining the two buildings. A graduated heavy slate has been used for the roofs

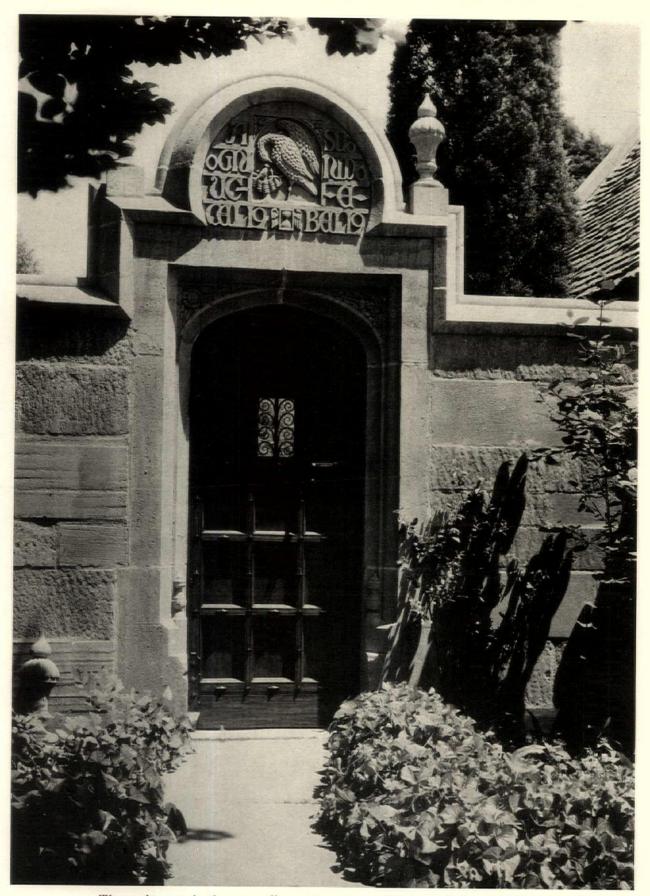
Looking across the south end of the garden toward the end of the garage. Pigeons have made their home in the loft prepared for them, and add to the Old-World character of the place

« ARCHITECTURE »





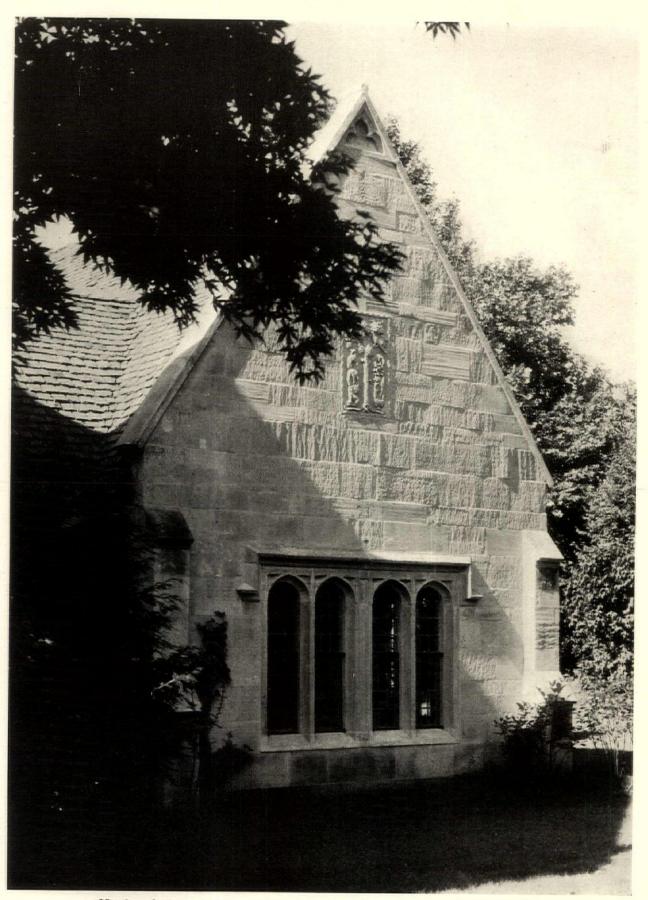
The front entrance from the east. In view of the size of the property and the location of the existing trees, Mr. Hopkins gave up the debatable advantage of leading the driveway entrance to or near the front door, as may be seen from the plan



The garden gate in the east wall near the garage. A free translation of the inscription would be : "To every bird its own nest appears the most beautiful." This and the capping of the wall are of cast stone



Mr. Hopkins has achieved a remarkable unity in his stone work, even though the exterior wall is of limestone, and the mullions and trim are of cast stone. The latter were made by a wax-mould method which avoids any suggestion of a moulded product. The gutter and downspouts are of lead-coated copper



North end of the studio, with the windows of the music room. The raking light brings into relief the texture of the stone work, and indicates that it was not alone through a choice of cutting, but also through judicious setting, slightly out of the plane, that the great charm of the wall was obtained





The south end of the music room, showing the doors leading (left) to the terrace, and to the book room. The organ loft is over the latter room, and the sound enters through a wood grille in the book-room ceiling

The dining-room. Here limestone was used for the inside facing



Throughout the interior, Mr. Hopkins has sought a feeling of masonry structure rather than the usual plaster veneer. These walls are of cinder block, painted a very light buff with a cold-water paint. The stone of the fireplace is all cast

The doorway leading from the music room to the book room. In the former the walls are of cinder block, painted, but any sense of coldness that might be expected from this is dispelled by the warmth and intricate design of the plaster ceiling, tinted ivory and antiqued

« ARCHITECTURE »





The breakfast bay, forming an ell in the dining-room, and giving an intimate view of the garden. The moulding and carving of oak in the doors and ceiling beams are the more effective for the foil of stone walls. In the interior decoration the Hutaff Studios collaborated with Mr. Hopkins

Rake, Riser, and Tread: I A PROPOSED SOLUTION OF THE STAIRWAY'S ETERNAL TRIANGLE By Jamieson Parker, A.I.A.

I seems a curious fact, when one thinks of it, that in prehistoric times man solved one mechanical problem with such perfect success that in all the centuries since—including our admittedly clever twentieth—he has never bettered his invention. The stairway remains our best device for moving the human body, by its own effort, from one level to another.

Two other means of ascent and descent, the ladder and the ramp, are probably of equal antiquity, but they both actually are special cases of the stairway adapted to their special conditions. Stairways proper are inclined at angles varying from about 8° to 48°. Below 8° the ramp is more practical, and as steepness increases above 48° the stairway gradually becomes a ladder.

Even more remarkable than man's contentment with a mechanical device so extremely ancient is his apparent lack of desire to find out anything about it. Through untold ages he has stumbled up and tumbled down, skinned his knees and broken his bones, using stairways which somehow seemed wrong; but, whatever he may have discovered in the past about stair proportions, his total present knowledge of the subject seems to be summed up in three arithmetical rules, each supposedly containing the secret truth, each giving a widely different set of answers, and each, if taken seriously and followed, capable of producing stairways of worse proportions than common sense will allow.

Both laymen and architects know that stairways are comfortable or uncomfortable, safe or dangerous, depending on their design, which, like other kinds of design, includes first, basic form, and second, detail. The basis of form is the proportion of tread and riser. The treatment of details, such as size and shape of nosings, materials used, handrails and methods of construction, is an important part of the subject; much could be written on these matters, and it happens that a good deal of useful information on them is now available. But this article has in view the far more neglected question

of proportions—their functions, usual methods of calculation, and possible improvement by a new standard.

A few simple facts underlie the consideration of stair proportions. One riser together with an adjacent tread form one unit of a stairway, the purpose of which is to receive one unit of the ascending and descending motions. Riser and tread are the vertical and horizontal components of a diagonal resultant motion of the body. A stairway for the use of many persons should obviously be designed in scale with the average body's most natural movements; therefore, whatever the pitch, or rake, the combined effect of riser and tread should approximate some constant. This is not a constant of effort, because the work done in ascending one unit in a steep stairway is greater than in a less steep one, although they may be equally well proportioned. Nor is it a constant of pure *motion*. The motion accomplished by the body is less on the steep stairway, just as the effort is greater. If it were clearly one or the other the problem would be less confusing. Ascent and descent are performed by that machine, the human body, with its complex interaction of bones and muscles working against nature's impediments of inertia, friction, and gravity. What this machine does in moving over a stairway unit, up or down, involves motions, efforts, and forces of different kinds, all combining into a unit of mechanical action.

The comfort and safety of a stairway depend primarily on the value of this constant. If the total of riser and tread is too great, ascent and descent become tiring successions of more or less spasmodic efforts instead of series of natural rhythmic movements. On the other hand, too small a unit causes discomfort by cramping the free swing of the body, and danger from the tendency to overstep.

This idea of a constant unit of action leads to the logical and correct conclusion that for differently pitched stairways to be equally satisfactory an increase in the riser should accompany a decrease in the

« ARCHITECTURE »

tread, and vice versa. Can this constant be found, and a law derived from it to guide us in the rates of change? If there were such a law it seems not unreasonable that it should express summation, as by addition or multiplication. For instance, an 8'' riser requires about 9'' or 10'' for the tread; if we make a rule that riser plus tread ought to equal 17" or 18" we have provided a constant and a simple variation of the right general type. Inches taken from the riser are merely added to the tread. As all architects know, this is actually one of the old standard rules-though indeed a very poor one. When it appeared that for some riser heights this rule failed to "work," other systems of summation were tried; however, not one has been found so consistently reliable as to gain exclusive acceptance. Authoritative reference books have therefore adopted the expedient of stating several rules without expressed preference; as, for example, in the following quotation from Kidder's valuable "Architects' and Builders' Handbook":

"Several rules have been given for proportioning the run to the rise:

"(1) The sum of the rise and run should be equal to from 17 to $17\frac{1}{2}$ inches.

"(2) The sum of two risers and a tread should be not less than 24 nor more than 25 inches.

"(3) The product of the rise and run should be not less than 70 nor more than 75.

"These rules apply only to stairs with nosings."

Referring to the last statement, it would seem that nosings have actually nothing to do with the proportions of rise and run, because no matter how wide or narrow the nosing may be, the *relative* widths of the treads are not affected, nor the *relative* dimensions of treads and risers; and proportions concern only relative values.

In the following discussion the width of the tread (T) is regarded as the horizontal distance between successive riser faces, and the riser height (R) as the vertical distance from one tread surface to the next.

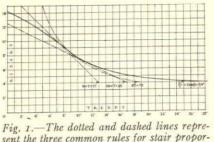
Examining the three common rules, as correctly stated by Kidder, one first notices the evident fact that no two can agree for all values of either R or T. A clear picture is seen by plotting graphs of the three equations, assuming optional constants. (See dotted and dashed lines, Fig. 1.) R + T = 17 and 2R + T = 25 are straight-line equations agreeing at one point, where R = 8, T = 9. RT = 75 is a hyper-bolic curve meeting 2R + T = 25at two points, namely, $R = 7\frac{1}{2}$, T = 10, and R = 5, T = 15. R + 7T = 17 almost agrees with RT = 75where in the latter $R = T = \sqrt{75}$, about 82/3, but differs with increasing rapidity as the risers become lower. The following table gives a few values for comparison:

TREADS FOR VARIOUS RISERS AC-CORDING TO THREE COMMON RULES

	4	5	6	7	8	9
$\overline{R+T} = 17$	13	12	II	IO	9	8
2R + T = 25	17	15	13	II	9	7
$RT = 75 \dots$	183/4	15	121/2	105	93/8	81/3

It is evident from the above that these three rules are inconsistent as guides for proportion. Their only close approach to agreement is for risers of about 8".

Many experienced architects have learned, by the costly method of trial and error, how to employ these rules discreetly; just when it is safe to use a certain one of them and when it is not; when this one should be compensated in such a way, or temporarily discarded for that one; and when they should all be abandoned in favor of some better proportions discovered in practice. The architect may use some of the rules for preliminary calculations, or quote them lightly as general guides to draftsmen, but as final authority he mistrusts them. His faith actually abides in his own mental experience table; he has repudiated the rules without fully admitting it. Students, however, and architects in early practice (and their clients) are deprived of such beneficial experience, and seeing the rules set forth in the best reference books, they conscientiously try to follow them and do the best they can with the hit-and-miss conclusions. That the resulting stairways are often hit-andmiss affairs is not unnatural.



sent the three common rules for stair proportions. (The significance of the solid curved line will be discussed later)

The occasional malformation of a stairway is of course distressing to the owner and architect and all who suffer from its use. But by subtle suggestion rather than direct misguidance the old rules have done a much greater harm than this, and will continue to be a damaging influence as long as they are taught and published for reference. Collectively they have distorted even the well-trained architect's sense of proportions for all stairways with low risers (6" or less) because it is here that they agree, in effect, by giving their most extremely bad values. A resulting fact is that with few exceptions the so-called "easy" stairway has treads so deficient in breadth as to be really comfortable only for small women and children; the average adult finds it "easy only to fall down on. It is true that experience generally has taught the architect to add a few inches to the widest treads given by the rules, but not realizing the greatness of their error, and probably holding in the sub-conscious a surviving trace of his early faith in them, he very seldom adds enough.

An example of such a stairway might be found at the entrance of an important public building. The visitor approaches on the sidewalk at his normal walking gait. Reaching the first step and starting to ascend, he finds he must suddenly change his motion in one of three ways: either (1) curtail his stride, maintain his rhythm and lose speed, or (2) maintain his speed at a curtailed stride by accelerating his rhythm, or (3) increase the whole scale of effort by taking two steps at a time. But all of these ascending motions are uncomfortable, be-

> Mr. Parker concludes his article in ARCHITECTURE for December, explaining in detail how his proposed formula is derived and giving diagrams and tables facilitating an understanding and use of the principle.—EDITOR.

cause they make a break in the natural flow of movement enjoyed on the level. Without good eyesight and close attention the abrupt change may cause a stumble. A similar discomfort is met in descending and the danger is much increased. Holding back the stride to fit the steps requires more braking power against gravity. If the tread is overstepped the fall will be serious.

Stairways with treads too wide are also uncomfortable though not so dangerous except in extreme cases. This fault is a rare one.

There is obvious need for a new standard of stairway proportions, based on practical investigation and expressed, if possible, in a simple, trustworthy rule. The writer has sought to accomplish this and here submits the results, believing they will provide a better standard than any now in common use.

Analysis of the stairway unit discloses not two but three elementsriser, tread, and angle of rake-any two of which establish the third. Riser divided by tread is the tangent of the angle of rake. The steepness, hence the whole character, of a stairway depends on the rake; therefore is it not reasonable to consider it the fundamental element? Imagine an inclined plane of clay, out of which, with knife in hand, we are to carve a stairway. We may work to any scale—such as a minute stairway for elves, or a huge one for giants. But the ratio of tread and riser, at any scale, will be the same. Our definite object is to determine a pair of values, for each angle of rake, suited in size to the most natural movement of the average adult human body.

For any given rake the pairs of tread and riser values depend on the establishment of either one of them. Of the two, which should have first consideration? The riser is the unit of up or down motion and the tread is the unit of forward horizontal motion. The functions of a stairway are ascent and descent-up and down-therefore it would seem that the riser is second in functional order of the three elements. The tread would then come last, being merely the measure of supplementary horizontal motion. So we have first the rake, fixing the total shape of the stairway, then the riser or unit of vertical motion, and finally from these two the tread, which spaces the horizontal motion in scale with the vertical.



Better Practice By W. F. Bartels



A critical reading of present-day specifications, even those from offices nationally and internationally known, reveals at least two common shortcomings : first, the continuance of outworn provisions ; second, the substitution of mere verbosity for explicit direction. The building crafts move on, but too frequently the architect's specifications fail to keep pace ; the writer of specifications, in far too many cases, is ignorant of improved technic in the building trades and fondly believes he is hiding this ignorance behind a flow of traditional phrases. The tolerant contempt with which a skilled artisan views these lapses is not a pleasant thing

to witness. Either the architect must set his house in order, as to specifications and detail drawings, or risk discredit, not only for himself but for the profession as a whole.

It has seemed to us that ARCHITECTURE might render a service in seeking out the latest and most fully approved technic from among those most skilled in the various trades, passing along to the profession our findings as weighed and approved by a man of long experience in supervision on the job—W. F. Bartels. This series of monthly articles will not parallel, necessarily, the usual order of building procedure. Next month, the hot water service.—EDITOR.

PLUMBING: (B) WATER SUPPLY

13-INVESTIGATION

BEFORE writing the section of his plumbing specification dealing with water lines, the architect should make several investigations. First, he should determine the kind of water the district provides. Several of the larger pipe manufacturers furnish analyses gratis, as well as advice concerning which pipe to use for such water. Having chosen the pipe, he should next find out what the water pressure in the main will be at the place he expects to have it tapped. This will help him determine whether or not he can call for flushometers with the assurance that they will work. Next, the architect should determine what size tap from the main is allowed by the local ordinances for the type of building he is planning. If he feels that it would be too small for the building's requirements, he may be able to get it changed, or possibly bring in two lines to his building from the main.

14-SPECIFIC DESIGNATION OF MATERIAL

Materials should be specifically mentioned and the extent of their use outlined briefly. If lines of a certain material are to be used up to a certain point, and from there on different pipe, they should be so specified. If one class of pipe is to be used for certain lines only, these lines should be specifically mentioned. This does not mean that the architect should limit his specification to one particular brand. Far from it. To do so might be against the interest of his client. But it does mean that the compeBy 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., 17-A, 17-B, etc.

tition among bidders should be limited to the particular quality called for. Many architects do not believe in long specifications. But specifications should be long enough to cover all points necessary to safeguard the owner's interest. However, merely because a specification is long, it does not necessarily follow that it is complete, any more than it follows that a short one is incomplete.

15-SAMPLES-STANDARD BRANDS

It is well for the architect to keep to time-proved, standard brands in his specification. This saves his client from being a "clinic patient," and having various experiments tried out on him. To make experiments at the expense of a client is unfair, unless the latter fully realizes his position. To further safeguard himself the architect should call for a sample of practically everything to be used. In the last few years many manufacturers have put out a "competitive line." While this bears their name, it is not the product glowingly described in their advertisements. A sample submitted will prevent the architect from hav-ing the cheaper product "put over" on him by an unscrupulous contractor, who, while he knew what the architect meant, legally could provide the less desirable product.

It is advisable for the architect to scrutinize the sample closely and compare it with the other lines of the same manufacturer.

16-SIZES

The thickness, as well as the size, of the pipe should be carefully stated. In the average house standard thickness will probably be adequate, although some thought should be given to whether or not a heavier line might well be used from the main to the inside of the building. That regular brass pipe, and not the tubing, is desired, should be so stated by calling for all brass pipe to be I. P. S. (iron pipe size). Also the diameter of all lines, from mains to branches, should be stated. The lines should be adequate. If there is more than one bathroom in the house remember that other fixtures may need water simultaneously. It is better to have pipes oversize than undersize, as any one who has soaped himself and then had to wait for water, can testify. Remember that to double the capacity of a line costs less than 25 per cent more for everything, including labor. If it is possible, a size or two larger than the tap at the main should be used to carry the water into the building. Then, once inside the building it should be increased one size again. This will lessen the pressure drop through friction, to a minimum. If flushometers are to be used the manufacturer should be consulted in regard to size and pressure necessary for their operation, because in most cases the standard 1/2" tap allowed will not suffice.

The work to be covered by the specification should be carefully surveyed. If the contractor is to obtain or furnish meters, fish traps and other necessary items, it should be so stated. The use of materials should be given careful thought, and this thought transferred to paper, so that the plumber will know from reading plans and specifications what is expected of him, and not have to rely on mind reading.

17-CUTTING AND FITTING

In cutting pipe there is generally a burr formed on the inside of the pipe. The specification should call for this to be removed. Leaving it on results in a loss in the crosssection area of the pipe. In small sizes this loss is far greater than would be supposed. For brass pipe it is advisable to call for a friction type of wrench to be used, rather than to have the pipe chewed up by the careless use of Stillson wrenches. All wicking should be prohibited in the making up of joints, and nothing permitted except boiled linseed oil.

18-LOCATION; SUPPORT; PROTECTION

The hot water lines should be located from 6" to 12" away from the cold water lines; crossing of the two should be avoided. All lines should be well supported by adequate hangers and supports. However, fill lines for house tanks should not be anchored to any structural steel. If this is done there are grave possibilities that the pump vibrations will be carried through the house. All lines and branches should be run so as to drain to a low point in the cellar, at which point a valve should be provided. No lines should be run in outside walls if it is possible to avoid doing so. Any lines so run should be covered, as will be described later. Nor should water or any other lines be run in such places as fire walls, or other vital locations, where in case of trouble serious damage might result. And of course, pipes over or near entrances should be avoided. If there are two lines entering the building, as there should be for every large one, it is necessary to have these lines crossconnected. The roughing will be lined up so that all valves project from the finish the same distance. Walls should not be curved or slanted in order to catch all the

valves and avoid burying them in the wall. All pipes should be capped when the roughing in is completed, to avoid any dirt or rubbish getting in them. These caps must be kept on until the fixtures are set.

19—GENERAL REQUIREMENTS; NOISE AND MOVEMENT

The plumber should furnish the necessary cut-off required at the curb line, and should supply an extra heavy sleeve where the line comes through the exterior wall. This he must make watertight. It is prudent to require a swing after the line enters the building to take care of any shifting or movement due to expansion or other causes. Sharp bends in the lines are to be studiously avoided. Air cushions above all fixtures should be called for in order to take up the shock caused by the quick closing of a valve.

20-VALVES AND FITTINGS

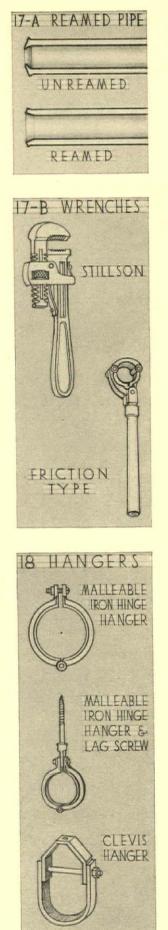
Definite locations and types of valves should be given. A little extra money spent for valves in the proper places will be well repaid. Valves should be of a good quality but need not be expensive. What might be termed cheap valves should be avoided.

Fittings, such as elbows, couplings, tees, etc., are generally made in two types: regular, and cast-iron pattern. The first are good on all regular work where the pressure is not too great and the size is normal. In large sizes and where high pressures are used it is better to use the cast-iron pattern type, which is distinguishable not only by its additional size and weight, but also by its heavy shoulder in contrast to the bead or flat band of the regular type.

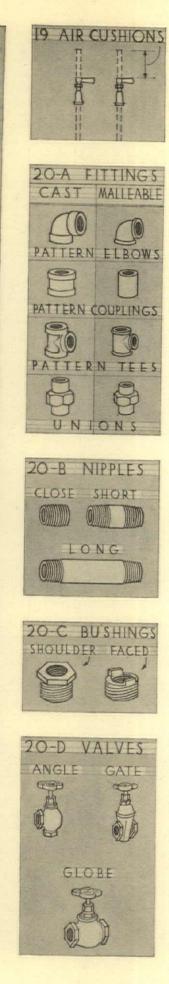
type. Nipples should be specified whether they are to be standard or extra heavy. Many engineers prefer not to use close nipples, and if they have to use them specify the extra heavy type, but plumbers will not install them unless forced to. Close nipples can be avoided in most places by good workmanship. Elbows and tees should be the

Elbows and tees should be the standard type of a well-known brand. It pays to specify recognized manufacturers' products because if they supply defective material, in most cases they will not only furnish new material, but pay for its installation as well.

In good work, rights and lefts are generally called for where unions



²⁸⁶



might otherwise be used. They are indeed more workmanlike but are more difficult to install and hence are avoided by most mechanics.

Many times, bushings are prohibited without a genuine, logical reason being given. The architect may feel that they slow up the water, inasmuch as they would form a shoulder in the line in the case of most small jobs. The plumber is more familiar with the real reason, however, and he generally will forbid them, even if the architect does not. Mechanics are prone not to make the bushing-up tight, and, with only a few threads caught, any bending or swaying will cause a leak. Instead of specifying bushings it is preferable to state that reducers must be used.

Check valves are used where it is desired to have the water flow in one direction only. They are very convenient to install in a domestic hot water system to make certain the direction of flow. Angle, globe and gate valves are a part of the plumbing or heating equipment of almost every building. Globe valves are better adapted to steam systems because they are better modulators than gate valves.

It is well, even on the small house, to have all valves tagged and a chart furnished. This is very convenient particularly if one is going away and wishes to leave instructions.

Jumpers or cross-overs will seldom be necessary if the work has been properly laid out.

21-COPPER TUBING

Copper water tubing has come into extensive use in alterations and repair work. It lends itself to installations where it would be difficult if not impossible to use ordinary pipe. It eliminates costly cutting and patching through the fact that it can be drawn through cramped spaces. In many cases bends may be used instead of el-bows, but care must be taken that the pipe is not flattened in bending, causing it to lose its cross-section area. Likewise, it must be protected from materials bumping and denting it. Where connections to rigid pipes are necessary fittings may be The obtained for this purpose. architect should keep its possibilities in mind.

22-GAS PIPING

Before the architect specifies gaspipe sizes he would do well to consult both the local ordinances and

« ARCHITECTURE ≫

the local gas companies. The sizes they demand will be minimum ones. The plumber will be required to connect any line or meter the gas company furnishes, and must supply all valves, fittings, and other accessories necessary to complete the system. Proper drips must be put on all lines. No lines are to be run where they may be subject to damage, such as by trucking; and, if possible to avoid it, not where the condensation of cold water lines may drip on them. All the lines must be properly supported. Rights and lefts are to be used instead of unions, because of the danger of leaking. In residences proper attention must be given to the placing of the kitchen stove in order that its gas outlet may be located in the most advantageous place. It is better to exclude the stove from the plumbing contract, or in it to have a certain cash allowance made, in case it is desired to change the style. But the connecting up of the stove is to be included in this contract.

23-CUTTING AND PATCHING

Cutting and patching is an item to be given careful thought in any trade, particularly plumbing. If the work is necessitated by the plumber's own mistakes or carelessness, he should not charge for it. If other trades are responsible for his having to do excess cutting, they should pay for the work. But no cutting or patching should be done without the superintendent's permission.

Checking over some plumbing lines one day on a job, I found that a plumber had brought a 1½" line directly across the middle of a room having 3" by 8" beams. He had cut out a section of each beam fully 2" square for the pipe, but had no conception that what he had done would weaken the beams. I asked him why he had done it and he replied, "Oh, I didn't want to bother the carpenter."

24—PAINTING

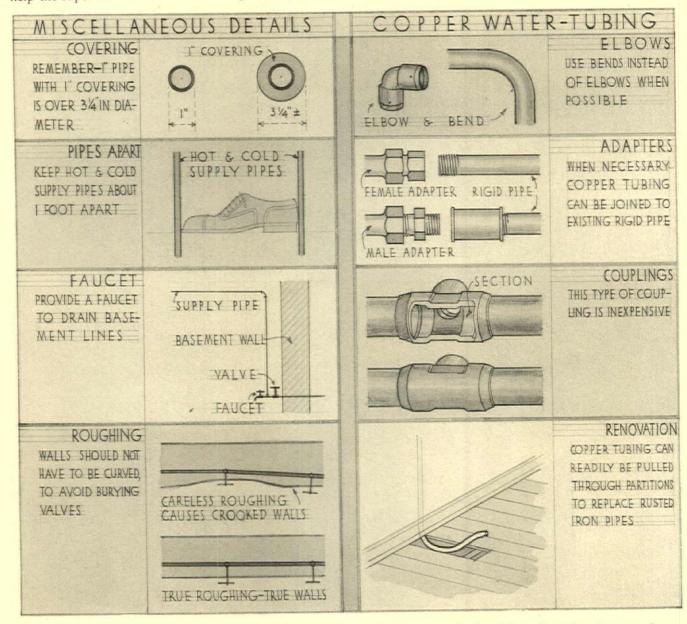
A definite statement covering which pipes are to be painted is far better confined to one lucid paragraph in the specification (even though a cross-reference must be made), than to drop casual hints from time to time. The former is more definite, specific and satisfactory for every one, because the manner, color, and extent of the painting can be more adequately described.

All lead bends which come in contact with cinders or cinder concrete should be painted with two coats of asphaltum paint for protection. Besides painting to prevent the acid in cinders from attacking lead pipes, as an additional means of protection they are often encased with roofing paper. Gas lines in cinders should also receive two coats of asphaltum paint. If two coats of paint are specified for exposed pipes, contrasting colors will help the superintendent.

25-TESTS

The architect should make the demand in his specifications that he is to be given notice of, and must pass on, all tests. First will be the water test, which should be given to see that all the waste, vent, soil and leader lines are tight. Then there will be an air or water pressure test on all the water lines to make certain there is no leakage. The pressure applied in the latter test is generally one and a half times the greatest pressure that will be present

when the system is working. Next, a test should be made on the entire gas system with a pressure of 10" of mercury showing on the gauge, and the system "holding tight" at this reading. Some local authori-ties also require a flange inspection between toilet floor flange and lead bend. After the fixtures are set a smoke or peppermint test is required in some communities. The traps of the fixtures are filled, of course, and the test is to detect any defective lines or fixtures.



When figuring clearances, remember that pipe covering increases the sizes considerably. The inspector's foot is a convenient measure of dis-

tance between hot and cold supply piping.

Make sure that a faucet, rather than a cap, is provided for bottom drainage.

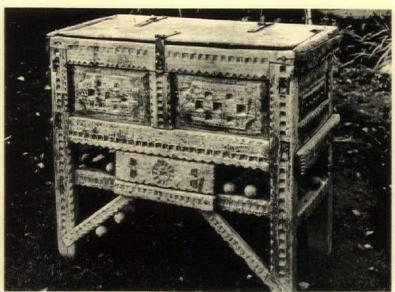
Consider the finished wall when placing valves in the roughing.

Get long easy bends without flattening, for your flow lines, to decrease friction and noise.

Copper tubing can be joined to rigid pipe where necessary, by adapters.

Here is a new and effective type of coupling or, as shown here, tee.

Copper tubing has a special usefulness in remodelling existing work.



Taos, N. M.

Spanish Architecture of the Southwest

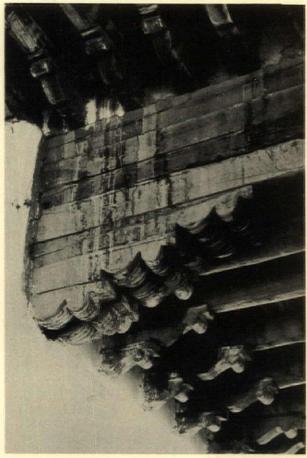
SOME DETAILS OF WOODWORK AND ADOBE CONSTRUCTION AS DEVELOPED FROM THE SPANISH WORK IN SPAIN AND IN MEXICO, TOGETHER WITH SOME MODERN ADAPTATIONS

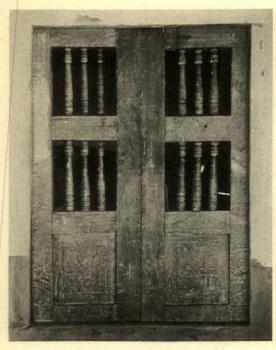
A chair loft or balcony from the church at Santa Cruz

An old chest



Vigas (beams) and their supporting brackets, from Santa Cruz church





Doors of the church at Trampas

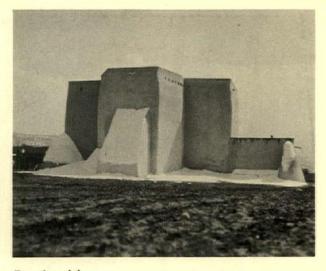


A sheltered portal at Penasco

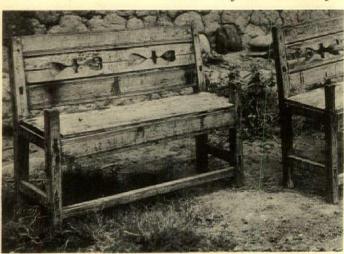


An adobe inn of stagecoach days, Santa Fé

Old benches from near Trampas



Ranchos del Taos, an Indian Pueblo church



« ARCHITECTURE » 290 Beneath the portal of an adobe house at Chimayo





Portal of a house near Alcalde

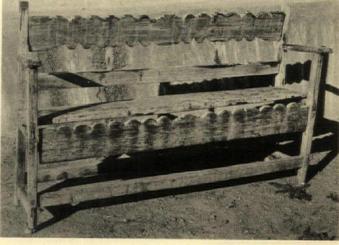


Patio doorway, Art Museum, Santa Fé. I. H. Rapp, architect





A home at Santa Fé—with the typical portal or covered porch An old bench from Penasco



« ARCHITECTURE » 291



Church at Taos

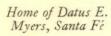
A confessional in the

sanctuario, Chimayo



The home of Frank Applegate, Santa Fé

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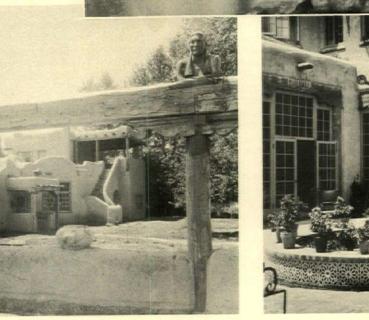
Home of Mrs. Mabel Luhan at Taos



The home of Frank Applegate, Santa Fé

Reginald D. Johnson, architect

Patio of La Fonda. a hotel at Santa Fé





Friday, September 1 .- One hears underground rumblings as to the creation of a draftsman's union. I think it is unlikely that this will come into being, at least in so far as the architectural profession is concerned. Nevertheless, there are indications here and there that the architectural draftsman is suffering, like most people, from the fact that his employer is taking advantage of the present low labor market. There is a temptation-which only some altruism will conquer-to the architect who has just gotten his first job in a year or two, to employ the necessary drafting force at the lowest rate he can get. This, in the present demoralized architectural drafting market, is too low to constitute a living wage. It would seem only the fair thing for the architect fortunate enough to find new work, to share these benefits with those of his old or new organization who have borne also the heat and burden of the day.

Saturday, September 2.- John H. Millar expresses a thought tersely when he says, "There is a lot of waste in government to be eliminated-almost as much as in business. For example, seven milk wagons going past the same house every morning; a hundred thousand more oil stations than are needed; armies of insurance and real-estate agents pounding the streets; industries with four times the plant capacity that the market in a boom year can absorb, etc." Which reminds me of a remark made by Professor Walter Rautenstrauch. Some one asked him whether the new sort of social betterment he visioned did not call for government by engineers. The professor replied: "By no means; government by engineers would be quite unfortunatealmost as much so as government by politicians and lawyers has proven to be.'



Monday, September 4.—Ohio has crashed through with the first Public Housing Authority Act, largely through the efforts of Ernest J. Bohn, a Cleveland attorney and chairman of the recent National Conference on Slum Clearance in that city. This means that here is the first state housing authority eligible to receive a grant of 30 per cent of the cost of labor and materials from the Federal Government, and possibly even a loan of the other 70 per cent.

F Wednesday, September 6.—I have never yet read anything of Leicester B. Holland's that was not well worth reading. His "Toward a Nudist Architecture," originally delivered to the Philadelphia Chapter at its annual meeting, and now reprinted in the Octagon for August, is something that no one should miss.



The Editor's Diary

Friday, September 8 .- I hear that the Phelps-Stokes Fund is about to undertake a comprehensive study of slums and blighted areas. Professor James Ford, of the Department of Sociology at Harvard, the man who edited the twelve volumes of the President's Conference on Home Building and Home Ownership, will direct the investigation. The work is expected to require eighteen months, and will include the study of the causes of these slums, their prevention, elimination, and conversion for proper housing for other uses. My only regret is that the investigation could not have been completed by this time so that we could proceed with building under the Public Works Act with a more assured knowledge.

Monday, September 11 .- To Albert Stewart's studio with Electus Litchfield to see the plaster models of a frieze around the top of the Albany Post Office and Court House, designed by Gander, Gander & Gander, with N. R. Sturgis, associate architect, and Electus D. Litchfield, consulting architect. The architects are trying a new techniquea continuous band eight and a half feet high into which is cut a shallow relieftwo inches at the most-by means of pneumatic cutting tools. As may be recalled from the preliminary perspective of this building, there is no cornice, the decorative frieze encircling the building with the attic windows penetrating it. The cost of a full sculptured frieze, of course, would have been prohibitive, but Mr. Stewart has developed a most interesting technique in securing a representation of post office and court activities through a succession of flat figures on the surface of the model with the background cut away. There is only the slightest suggestion of drawing on the flat surface, with shallow incised lines.

Tuesday, September 12.—Under the N.R.A. a loan of twelve million dollars goes to Cleveland to be used for housing by a limited-dividend corporation organized under Ray T. Miller's Business Recovery Committee, of which Ernest J. Bohn is chairman. The housing will be of varied types two- and three-story apartments, two-story rows of fireproof flats, row houses. There are about four thousand family residences to be built on sites including about one hundred acres in the heart of the slum area, just east of Cleveland's downtown business section. Rentals will be between \$8 and \$8.50 per room. This is by far the largest loan approved thus far under the Federal Emergency Administration of Public Works.

St. Louis wins approval for a loan of five hundred thousand dollars for its Neighborhood Association to build three-story fire-proof apartments in a downtown slum area, to rent for \$9.67 per room per month.

Wednesday, September 13.—There has been a good deal of general talk to the effect that slums are expensive luxuries. Here are some figures, according to the Indianapolis Community Plan Committee: In one particular sore spot of that city the cost to the municipality is \$92,775, while the tax income from the same area is \$11,312, so this particular slum of Indianapolis is costing the city more than eight times the income.



Friday, September 15.—Rhodes Robertson in from one of his peregrinations about Vezelay. He is one of those few fortunate mortals able to own a house in France, and commute more or less leisurely between France and America. I hope soon to show in these pages some of his latest sketches made with block crayon.

Saturday, September 16.-The restor-ation of Williamsburg seems to have reached a plateau on which the action will pause while the gains are being consolidated. Mr. Rockefeller has spent over eleven million dollars in this work in the six years and more that it has been under way. Three hundred fifty-two buildings of modern construction have been torn down, fifty-seven Colonial buildings have been restored, sixty-one Colonial buildings have been constructed, two business blocks containing twenty-five shops and stores have been erected. The end, of course, is not even in sight. I rather imagine, however, that progress will henceforth be made more slowly as more property is gained by the corporation through the termination of long leases.

Monday, September 18.-Talbot Faulkner Hamlin calls attention, in The Nation for August 9, to the disturbing condition in which the architectural profession has been left by the depression: if architects were producing the same amount per capita in 1932 as in 1928, out of seven architects and draftsmen at work in 1928 only one would be busy today. In 1928 the work, amounting to something over three and a half billions, was shared by nine thousand offices. In 1932, the half billion of work went to only fifty-three hundred offices; however, the figures for these four years show a total of ninety-seven hundred new architects. Of course, the bulk of the latter figure is probably made up of draftsmen out of a job who have hung out their shingles.

In the profession of architecture, as in industry, the smaller office is the one which rides the storm with less damage than the large one. One of the saddest findings of all is that in 1932 the total income for architectural practice was at best less than one-fifth the income in 1928.



Tuesday, September 19.-In all the talk concerning functionalism in the house, there seems to have been very little consideration given functionalism in the garden. Raymond Hood was telling me today at lunch of his own convictions regarding the desirability of designing a home so as to provide as much as possible outdoor useable space -that there should be a gradual transition from definitely enclosed space to the garden itself. In his own house he has a paved terrace sheltered by an overhanging second story, and provided at one end with a fireplace. This outdoor space is sheltered from the north, is not screened against flies and mosquitoes, but is used even at meal times from very early spring up to the first of January. Even a rain does not drive one indoorsit takes a raw fog to do that. The point Hood makes is that in designing the immediate garden surroundings too many of us are apt to aim at what will look well and accord with our preconceived ideas of garden beauty. We lose track of garden usefulness and the garden's function as outdoor living space.

Thursday, September 21.—Professor William A. Boring, head of the Columbia School of Architecture since 1919, has been granted a leave of absence for a year, and Professor Joseph Hudnut is Acting Dean. He is going to revamp the architectural course, too, covering construction methods more extensively, and co-ordinating design and construction more intimately. The problems in design will be based rather more carefully upon the actuality of architecture —there will be less of "an embassy for a foreign government in a national capital" and more of "a branch department store for a suburb."

Saturday, Septe mber 23.-Clarence Stein says that the bankruptcy facing our larger cities is not so much the result of municipal corruption as of the double load of supporting slums and blighted districts together with the vast expansion of highways and public utilities, which possibly has been said before, but he brings up some new facts: in Detroit the seventeen square miles forming the central core of the city are all blighted with the exception of a few small groups of modern buildings; in Cleveland the Housing Committee of the Chamber of Commerce and the city has found twenty-two of its seventy-one square miles of the city unfit for human living, and unremunerative as property; the lower east side of New York lost 53 per cent of its population between 1910 and 1930; practically every ward within a three-mile radius of Philadelphia's City Hall lost population between 1920 and 1930. In most urban communities the number of subdivided lots is nearly twice as great as the number in use. The physical structure of our nineteenth-century cities fits the needs of our twentieth-century life about as well as a covered wagon would serve a presentday continental tourist. We need a new setting for a new era.

Monday, September 25.—With James H. Blauvelt and Stanley R. McCandless to see the exhibition of modern rooms at Macy's, together with designs for houses by various so-called skyscraper architects. Harvey Corbett, Raymond Hood, Ely Kahn, Leonard Schultze, Arthur Harmon, William Van Alen, and Lawrence Grant White had been asked to design a small country home to fit modern life. The newspapers seemed to



Pattern ≪ ARCHITECTURE ≫ 294

think that it was something of a heavenborn inspiration to bring the brains of this steel-structure group to bear upon the problem of the small home. Perhaps, though it seems to me something rather like calling in a gynecologist to operate on one's eye.

Tuesday, September 26.-Up to Worcester, Mass., to see the opening of the Memorial Auditorium designed by Frederic C. Hirons in collaboration with Lucius W. Briggs. With a seating capacity of nearly four thousand, a large stage which serves not only the main auditorium but a small theatre on its other side, and a Memorial Hall of magnificent proportions and unusual restraint, Worcester now has one of the great civic centres of the country. In observing the finishing touches to lighting, organ, sound amplification apparatus, and decorations, I was impressed by the constantly growing necessity for collaboration of the architect with many other experts in the creation of a modern building. Peter Clark was much in evidence supervising the stage equipment; T. F. Bludworth busy trying to adjust his sound amplification to the last fine point of efficiency; the organ-tuners adjusting electrical controls; Professor Sabin of Harvard observing the effects of his acoustical treatment, and probably wondering just what dif-ferences the inclusion of four thousand people would make in the reflection of sound waves.



Thursday, September 28.—J. C. Bebb was telling me at lunch today that there is a possibility of making a permanent park feature in Chicago of one of the great observation towers supporting the "Skyride." Instead of scrapping these six-hundred-foot observation towers, it seems as if both should be utilized permanently rather than being thrown into Lake Michigan with most of the rest of the Century of Progress Exposition.

Saturday, September 30. - Winold Reiss, who has just been appointed Assistant Professor of Mural Painting at New York University, says that "mural painters should keep in mind that after all it is the other fellow who owns the wall; sometimes the owner of the wall has some very definite ideas of what he wants or what he does not want.' Which leads us back to Rockefeller Center and some of the difficulties the management is having with its mural painters. Having dismissed Diego Rivera and covered up his work, they seem now to be trying to answer Frank Brangwyn's question. Having been asked to paint something representative of the Sermon on the Mount, he seems puzzled as to how this can be achieved, leaving out, as had been requested, the figure of Christ.



U. S. Post Office, Hempstead, L. I.

TOOKER & MARSH, ARCHITECTS; JAMES A. WETMORE, ACTING SUPERVISING ARCHITECT OF THE TREASURY

Photographs by Wurts Brothers

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a second floor over this space is at present utilized by the Government for recruiting purposes, thus providing economically for future expansion

The exterior of the building is of brick in pastel shades of brown and red; the trim of limestone. As will be seen from the plan, a small amount of space in the rear and on



The metal work of the main entrance and the windows across the front of the building are of aluminum, as are also the lighting standards flanking the main entrance. The sculptured panels over the windows, and the abbreviated cornice, are of limestone

« ARCHITECTURE »



The public space is developed in a color scheme of several greens and aluminum. The floor is of terrazzo. Aluminum appears in doors, grilles, check desks, and lighting fixtures



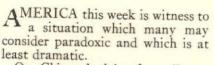
Above, a corner view from the rear, showing at the right the mailing platform. The only part of the building below grade is that under the rear end block, providing for boiler-room space and storage. Below, the workroom, which has a wood wainscot and wood block floor



CONTACTS



DEVOTED TO A BETTER UNDERSTANDING OF THE BUSINESS SIDE OF ARCHITECTURE AND ITS RELATION TO THE INDUSTRIES



On Chicago's lake front lies a great World's Fair-from beginning to end a glorification of the scientist and the engineer, an exposition of the physical achievement of the machine age.

To it this week have come America's engineers. But while they look and appraise, while they acclaim and are acclaimed, the world declares that the machine age they have created has failed and is responsible for our present economic and social debacle. "You have contributed to man's leisure, comfort, and convenience," add the challengers, "but the results have been mental flabbiness and weakened morality. There has been no true progress." Such are the charges thrown at the work of the engineer.

Has engineering contributed to progress?

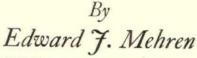
Has there truly been a century of progress ?

But there is another reason for facing the charge. Even were our social and economic systems intact and orderly, the meeting of these societies at such an exposition would demand a discussion of this kind. The machine age has been consistently under challenge for a score of years and more particularly since the close of the World War. Its effect and impact need inquiry, for engineering is now the basis of our economic system, it determines our social order, it goes down into the life of every individual and affects him for weal or for woe.

The present depression, therefore, does not dictate the topic. It does make it more pointed and more pertinent.

When we speak of progress we mean movement or development in a desirable direction. I conceive that humanity is travelling a long road whose desirable direction and goal are the happiness of all mankind, accompanied, first, by a wide diffusion of this world's goods; second, by the highest order of intellectual development of which individual men are severally capable,

The Contribution of Engineering to Progress



PRESIDENT, PORTLAND CEMENT ASSOCIATION

Excerpts from an address before the Joint Dinner of the National Engineering Societies during Engineers' Week at A Century of Progress Ex-position, Chicago, June 28, 1933

and third, by high moral attainment, which may be expressed as that ' 'peace with God and peace with ourselves that surpasseth all understanding." This is the goal, this the ideal.

But the long road that mankind is travelling is cut by ravines and chasms, some shallow, some deep and precipitous. The ravines and chasms are greed, exploitation, oppression, war, hunger and famine, insanitary surroundings, disease, ignorance, vice-and all those other hindrances which interfere with man's progress. At the beginning of recorded history, humanity toiled down into each of the chasms, forded the streams, and toiled up the opposing banks. Progress was slow.

In time, advancement of the arts, better social organization, education and religion, built bridges across the streams, at first only high enough to clear the flood. Further advances raised the bridges to higher levels, made them safer against floods, and reduced both the descent and the upward climb. Could the job ever be completed, we would build a bridge over every chasm from bank top to bank top. The chasms in effect would disappear and humanity would go forward joyously on a high road—a true high way—to its destiny. Using the simile of the road, our

questions can be paraphrased in

this way: "Has engineering helped to build bridges over the chasms, has it raised them to higher levels, has it made them more secure, has it brought nearer that high road without dips, on which humanity can go forward joyously to happiness, to more uniform enjoyment of this world's goods, to high intellectual and moral attainment?

I take it that it is entirely unnecessary to speak of engineering achievements in themselves. The whole world concedes that in every branch of engineering our machines, mechanisms, processes, and structures outstrip those of any previous

day. We are interested here, however, their effects.

Our first inquiry properly relates to the influence of engineering on social progress; that is, on the distribution of wealth, on its effect on men-its effect on them externally and in their relations to others.

The question of wealth deserves special consideration. Wealth to-day is not only greater in the aggregate, but more widely diffused. The distribution is not entirely equitable, but it is not so disproportionate as those imagine who think only of private property and forget the immense treasury of community wealth. The first is the possession of the individual; the second, the possession of all, for their comfort, convenience and use. In community wealth never were people richer-in the number and quality of streets and roads, in the purity and amplitude of water supply, in the sanita-tion and lighting of cities, in fire and police protection, in courts of justice, in medical, educational and recreational facilities.

How can we account for this increase in the standard of living, this extraordinary social progress, this wide diffusion of wealth?

The explanation lies in a profound but very simple fact, as funda-mental and as elemental in the economic order as the commandment, "Thou shalt not steal," is in the moral. If we are to appreciate the



significance of the engineer and the engineering age, if we are to comprehend the world through which we have been passing, if we are to penetrate the present economic convulsion, and understand the economics of what is ahead, we must understand this primal fact and let it sink into our consciousness. That fact is this:

that through the engineer's development of power we produce wealth more rapidly today than at any previous period in man's history.

It is this increase in the rate of wealth production that has given us the facilities, conveniences, comforts, and advantages of which I have spoken. To this do we owe our great private and community wealth, our high standard of living, our high level of social advancement.

We come now to the second part. Has engineering contributed to intellectual and moral development, has it bridged at higher levels the chasms that have held back his spiritual progress?

Here our critics will rage. The age is decadent, they tell us; we are flabby intellectually, we have backslid morally. We have much information, they say, but little wisdom; alert perceptions but little culture; athletic bodies, but no rigidity of moral character.

Are we able to answer the indictment?

There may not be a single luminary today of the brilliance of Shakespeare, or Dante, or Aristotle, but our age *is* one of striking intellectual vigor and activity. We must not make the mistake of coloring the entire Elizabethan age with the stature of Shakespeare, nor think that the whole Greek world was up to Aristotle's level.

If our galaxy has not a dominant luminary, it nevertheless has many great suns. In every line of human thought, the output of our researchers is prodigious. If an age is to be judged by the sum total of its contribution to human knowledge, then ours must be given high rank.

Each age, too, has its own Zeitgeist, the spirit of the age. Ours is science, pure and applied. In those fields we are making an intellectual contribution of stupendous proportions. In astronomy, physics, chemistry, biology, medicine, engineering we stride with seven-league boots.

We claim, too, as an intellectual accomplishment the spread of education, common, secondary and

higher, to the masses of men in the Western world. To reclaim people from ignorance, to open to them the storehouses of knowledge and of wisdom, to make possible, yes easy, for any one who wishes to secure it the very highest education, is indeed an accomplishment of which the machine age may justly be proud. That the education of the will has not gone along as lustily as the education of the intellect is a charge we will have to admit, but it does not completely negative the intellectual achievement.

But what of our moral life? Who shall judge it? Not I. There is no more difficult task for the historian than to determine the moral tone of an age—to strike the average from king to peasant, from president to humble citizen. In this respect no age can be sure of its appraisal of itself. The human soul—the millions of human souls of the Western world —cannot be weighed nor calipered.

Certainly we are not morally what we would like to be or ought to be. That can be said of our intellectual stature as well.

But if our age has not risen to the intellectual and moral standard that we would wish, if we have not raised to top height the bridges over the chasms that handicap our intellectual and moral lives, the fault is not that of the engineer, but of the very teachers, religious leaders, economists, and statesmen who are today his critics. We find here another fundamental and elemental principle that should be stressed as strongly as the rapidity of wealth production. It is this: that the engineer has created an environment far more favorable to widespread intellectual and moral growth than the world hitherto has ever known.

Let that in turn, be our challenge.

Here is an environment for spiritual growth such as the world hitherto has never known. Possibly humanity moves too slowly to make full use of this environment at once, but blame not the engineer for the failure.

It is because the economist, financier, the statesman, the teacher, the religious leader have not been able to keep pace with the engineer that untold difficulties arise. The more rapid creation of wealth has changed the whole base of Western civilization. It is the misunderstanding of this factor and the failure to recognize its profound and all-pervasive influence on finance, business, the

distribution of wealth, national and international politics, and on human thought and outlook, that have thrown the Western world into its present crisis and baffled its statesmen.

Machine-power agriculture on the one hand, and industrial development on the other, have removed millions from their attachment to the soil, concentrated them in the cities and deprived them of their security. As Dr. Steinmetz put it, they have been exposed to the three great fears-fear of unemployment, fear of illness, fear of an unprovidedfor old age. And while this has been brought about by the progress of power, the statesman, the financier, the economist have not kept pace and found ways of banishing these fears and, by using the new wealth, restoring the security that men enjoyed when attached to the land.

Second, there has been tardy recognition that too large a proportion of the wealth created by the machine has been reinvested in more machines and too little diverted to consumable goods and community services. It is one of the keen lessons of this depression that an age that creates wealth as fast as this one does will have much of that wealth confiscated during depressions if too large a proportion goes back into the extension of production facilities. Here again, finance and political economy lag behind the work of the engineer.

A final illustration: Highway transport—the combination of the hard road and the automobile—has made township government and small counties obsolete—survivals of the horse-and-buggy days. Township governments should be abolished, counties consolidated. The automobile makes it logical, but the politician insists that the anachronism continue.

But be assured that we are mastering, we will master the new instrument. Much of what has been going on in Washington in the last three months is an effort in this direction. The phrase "the forgotten man" is not a mere political catchword but the expression of a fundamental social philosophy.

Our contention, then, is that we engineers have not only builded higher bridges across the chasms, but have furnished the materials for still higher bridges if the statesmen, economists, teachers can learn to use them.





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

ARCHITECTURE

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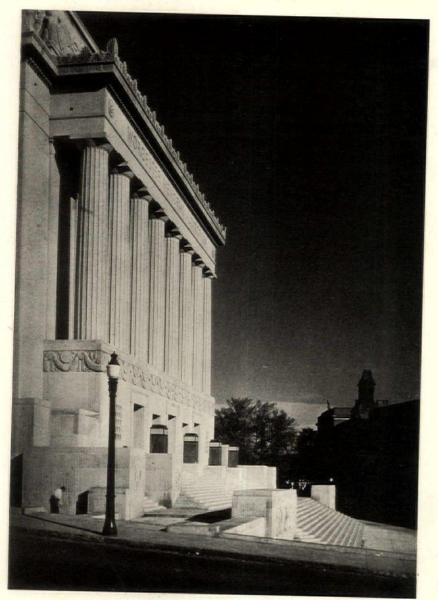
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The Worcester Memorial Auditorium

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

By Henry H. Saylor

A the past from what had slipped into A an endless present, the thoughts 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.

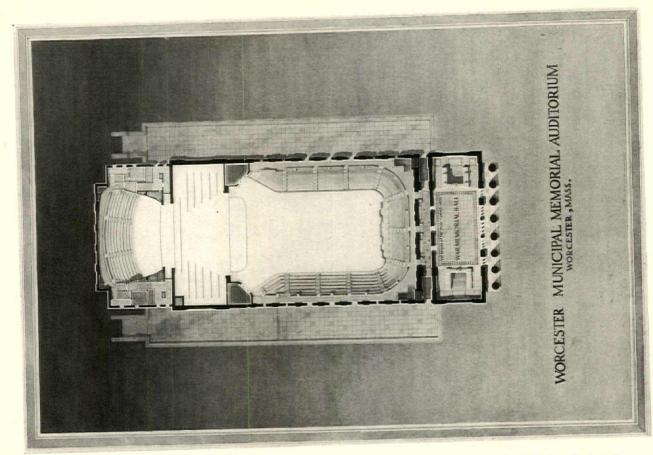
The city of Worcester, Mass., chose to combine the two conceptions. The need for a com-

munity 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:

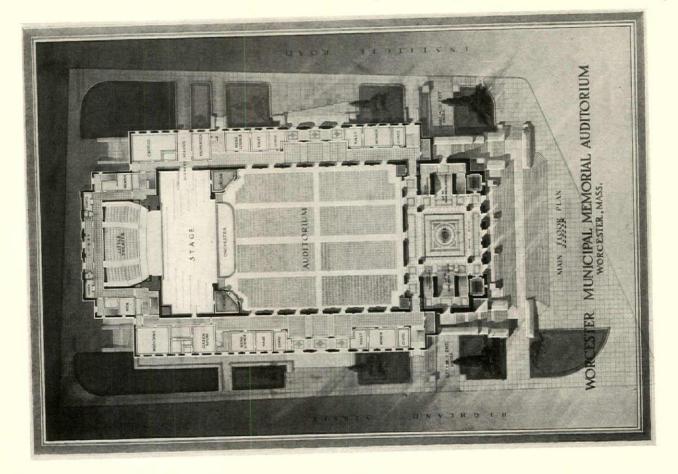
TO HONOR THE SERVICES IN WAR OF HER SONS AND DAUGHTERS AND TO NOURISH IN PEACE THEIR SPIRIT OF SACRIFICE A GRATEFUL CITY ERECTED THIS BUILDING

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



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





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



Kicnura Garrison

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

« ARCHITECTURE »



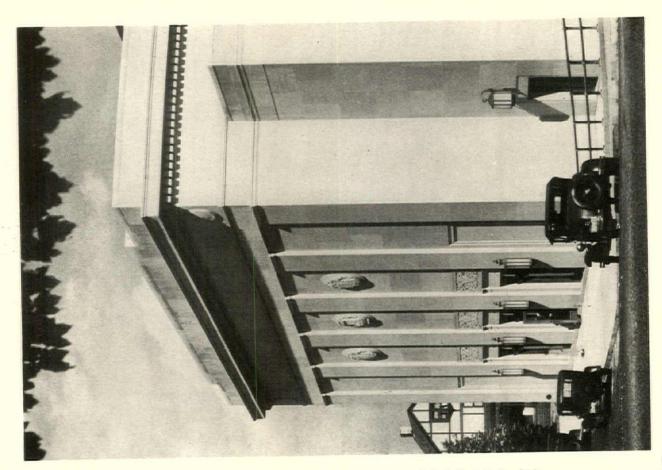
Photographs by Richard Garrison



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

« ARCHITECTURE »



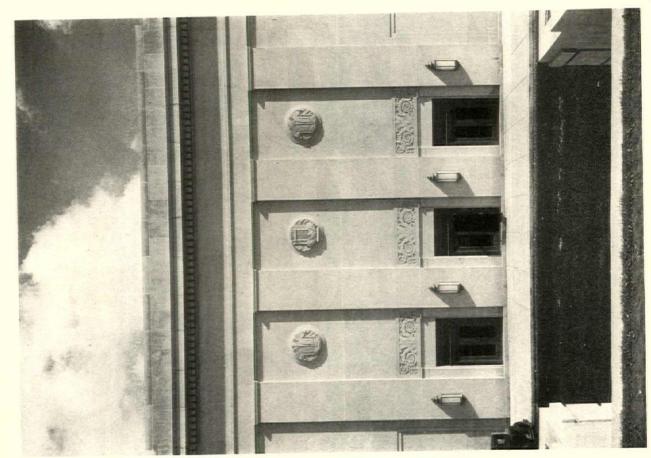
Photographs by Richard Garrison

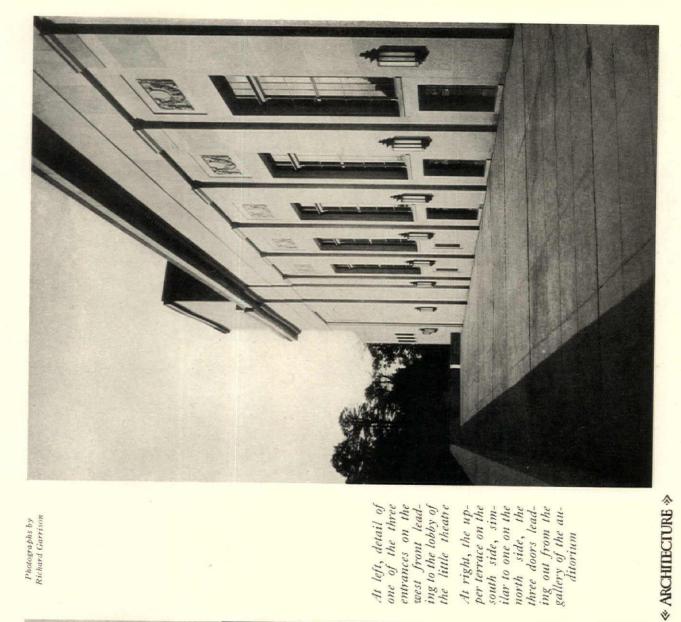
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At left, the en-trance to the little theatre as seen in direct elevation from the Art Mu-

At right, looking across this same west end

seum across the street on the west



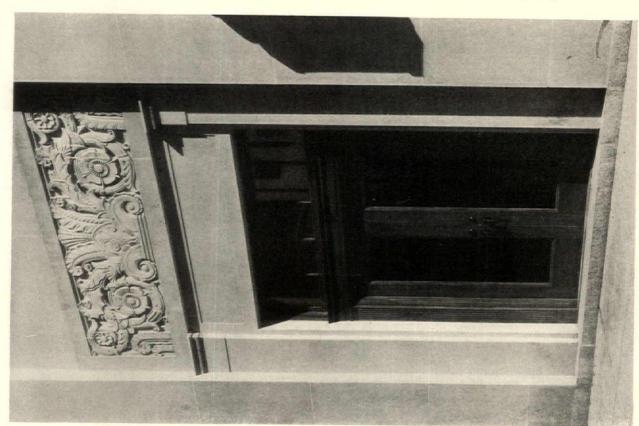


Photographs by Richard Garrison

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

ing out from the gallery of the au-ditorium







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 thirtynine feet by one hundred twenty feet, with a ceiling height of fifty feet



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

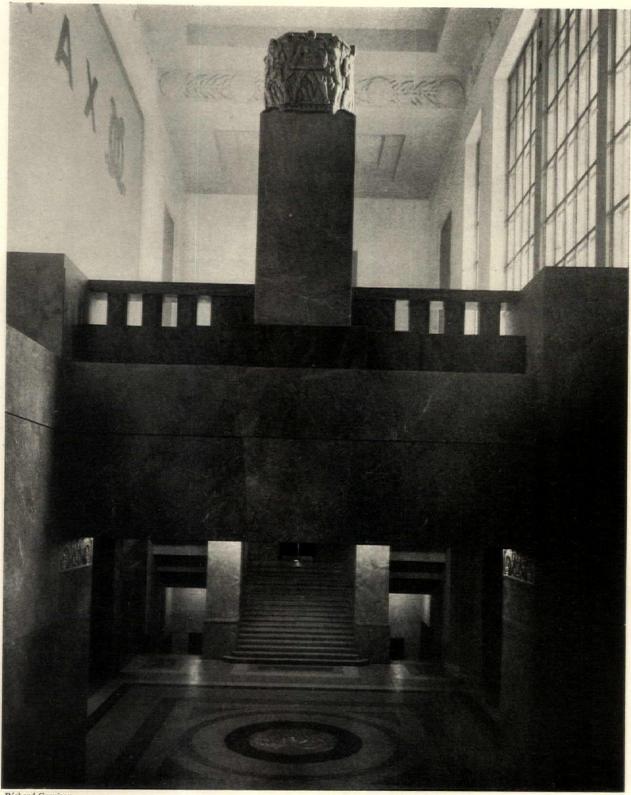


Upon a photograph of the west wall of War Memorial Hall Mr. Hirons has sketched very freely an indication of a possible future mural painting. The three doors under the mural form a particularly interesting feature of this rocm. They are of wrought iron, and, as will be seen in the detail photographs 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.

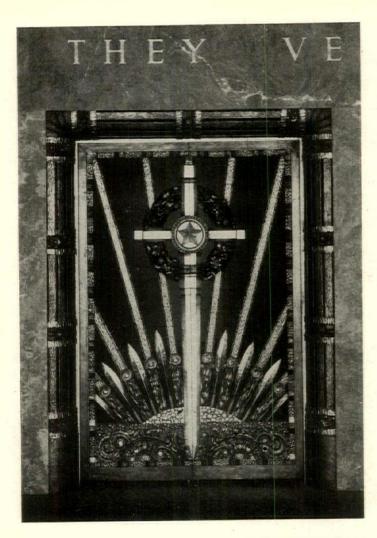
The architects have had little or no interest in what I might say of their work; their concern has been with the fact that a building of this kind is the fruit of many minds and many hands. Without a close and sympathetic collaboration between the architects and the other artists and craftsmen, the Worcester 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.

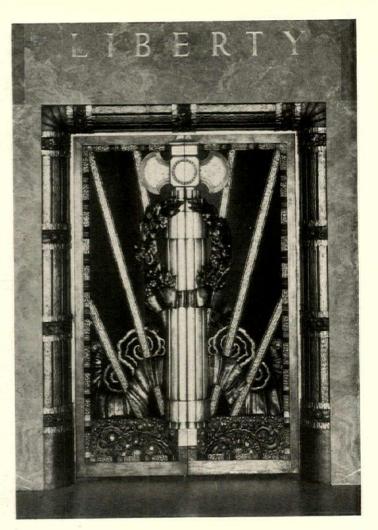


Richard Garrison

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

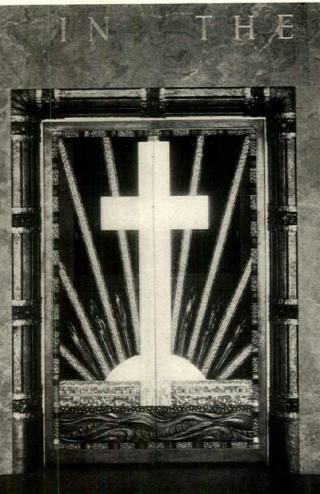
(sound amplification); Scrimgeour Electric Company (electrical work); Cox, Nostrand & Gunnison (electrical lighting fixtures); Marjorie Taylor and Catherine Klock (draperies); Harriton Glass Company (marble and glass carving); Renner & Maras (iron gates and lighting urns in Memorial Hall); McComb, Powers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





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

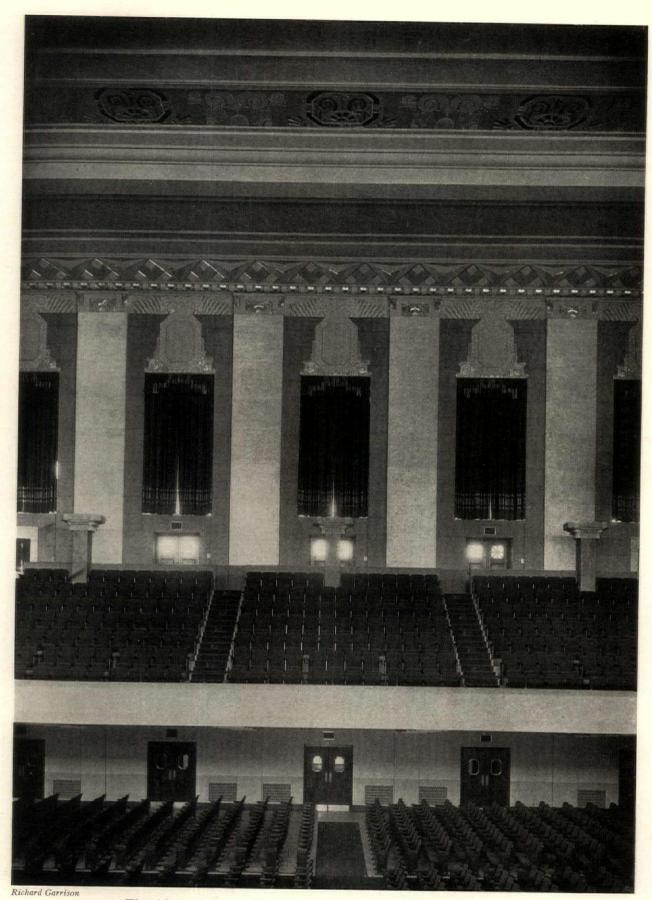








A detail of the proscenium and the organ grille in the main auditorium. The color of the draperies is a soft red trimmed with silver. The walls and ceiling are in soft grays and browns with silver



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

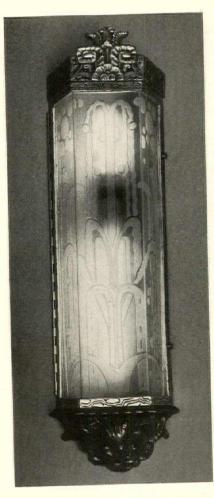


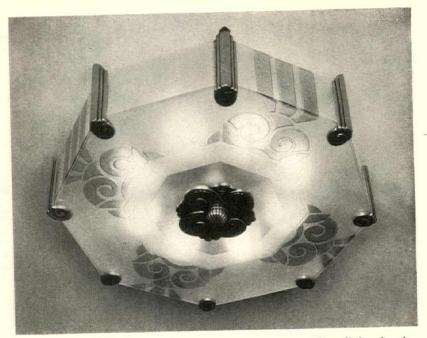
In the main foyer the walls are of Lunel Fonce marble used in conjunction with travertine. The floor is of terrazzo with a central bronze insert showing the seal of Worcester—René Chambellan, sculptor



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

333





One of the ceiling lights in the side lobbies

Photographs by

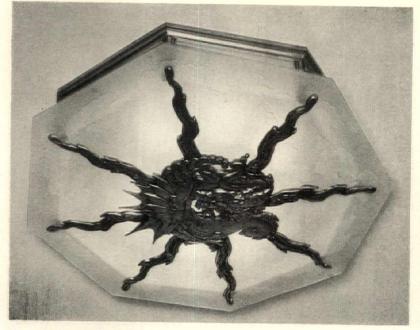
One of the side corridor lights, in bronze and carved glass

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



« ARCHITECTURE »

334

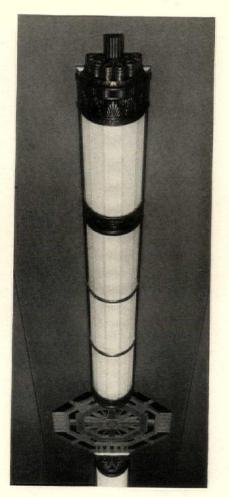


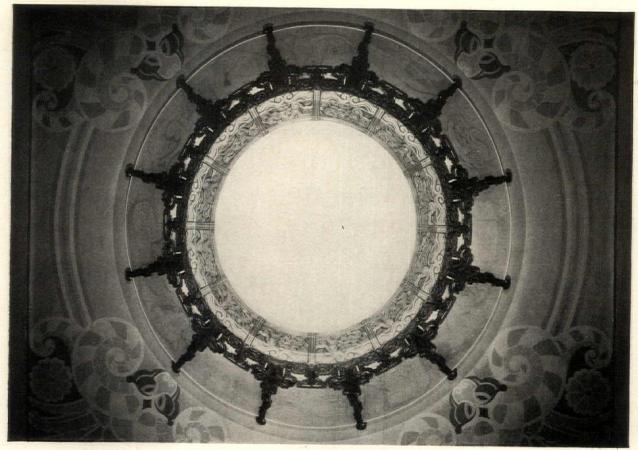
One of the smaller ceiling lights in the main lobby

Richard Garrison

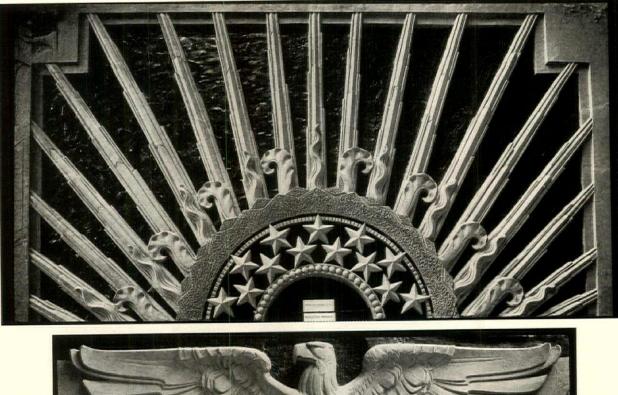
Looking directly up at the main central ceiling light in the foyer, showing the sun amid an abstract representation of clouds, and the signs of the zodiac in the carved glass

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





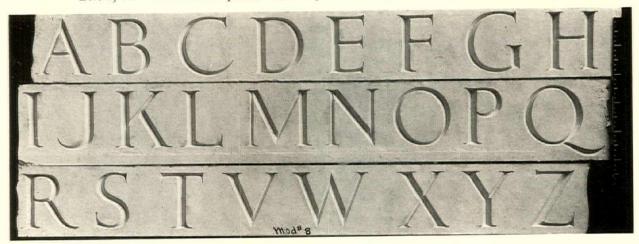
≪ ARCHITECTURE → 335





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



« ARCHITECTURE »

Termites and Buildings PART I: PREVENTIVE MEASURES IN NEW WORK By Jefferson M. Hamilton, A. I. A.

A ings becomes more widespread, the are 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 under. 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, socalled 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

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 freestanding 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, gravish 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, anæmiclooking, 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

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 fullstrength 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 tenper-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-

« ARCHITECTURE »

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 firstfloor 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.

9

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 finemesh 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

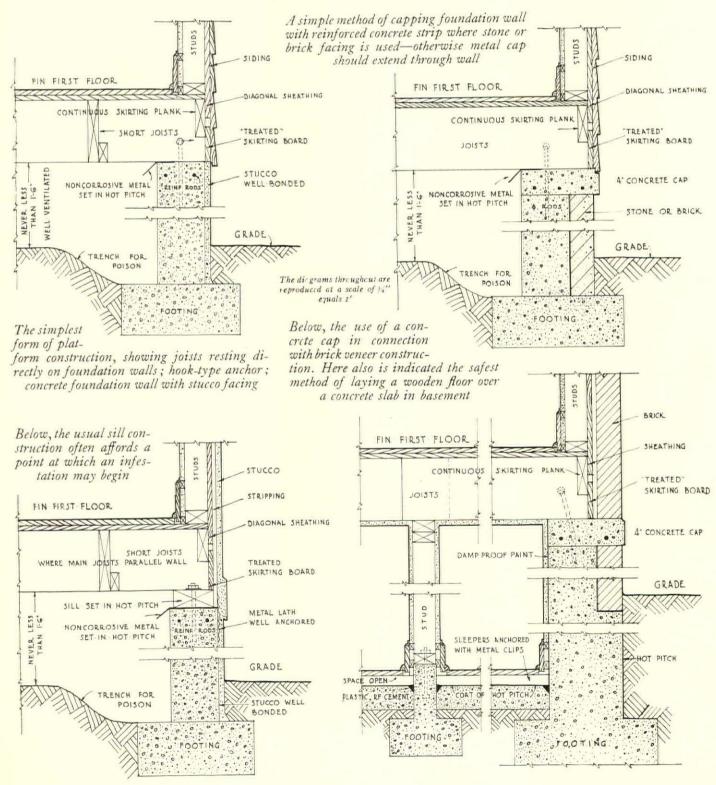
truly solid; too many small voids are left which would serve as passages for termites, even in brickwork. Tile or similar masonry units which contain voids are not recommended for foundation work, unless solidly filled with concrete. Since brick, stone, and similar materials are often desired, however, 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.

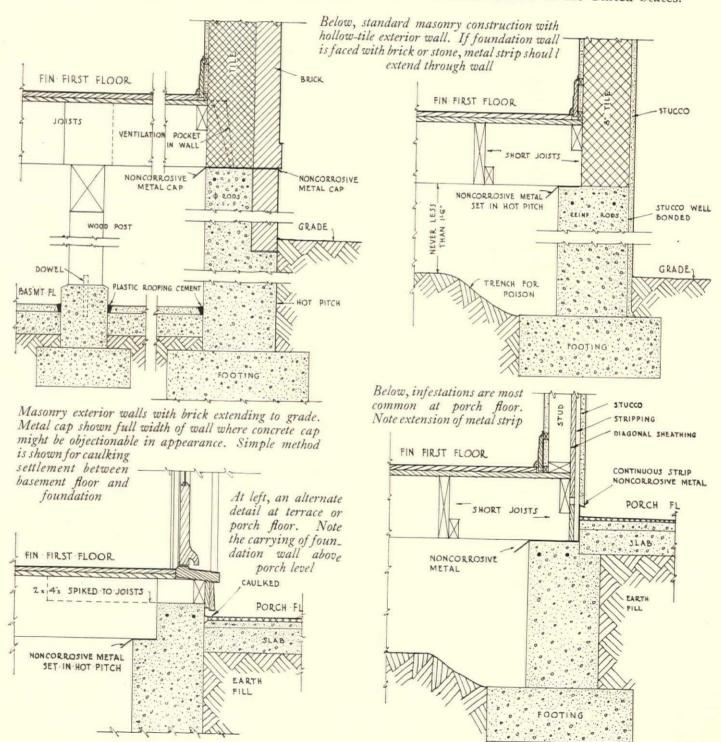
(4) The shield recommended by the U. S. Bureau of Entomology should be a continuous strip of metal, applied under the joists on the inner face of the foundation wall; this would serve as a permanent protection in the many places difficult to reach under a building. The strip of metal should be wide enough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



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 opentank 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.



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,

FIN-FIRST-FLOOR THE FL An attempt to protect wood framing where a tile floor is laid on a slab over earth fill NON CORROSIVE METAL An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill An attempt to protect wood framing where a tile floor is laid on a slab over earth fill 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.

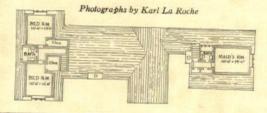
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« ARCHITECTURE »

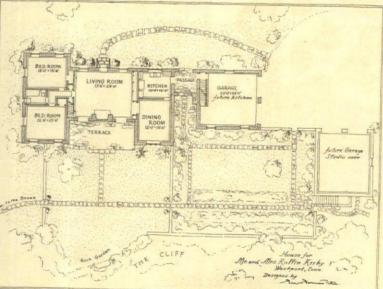


House of Rollin Kirby, Westport, Conn.

DESIGNED BY FRAZIER FORMAN PETERS



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 diningroom 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





A path leads through the whitewashed 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



sible 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



« ARCHITECTURE → 347



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



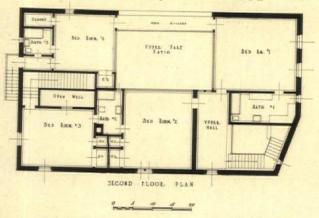
« ARCHITECTURE » 348



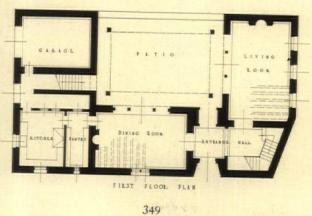
Photograph by Miles Berné

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



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



* ARCHITECTURE *

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,



The Editor's Diary

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

« ARCHITECTURE »

and the second second

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.

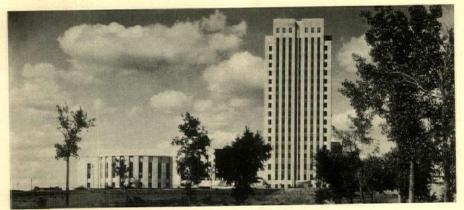
Tuesday, October 10.—This afternoon I went down to the Lower East Side to see ex-Governor Alfred E. Smith swing a sledge upon the old so-called "lung block" to signalize the beginning of its demolition and its replacement by model dwellings. The fact was borne in upon all of us who attended the ceremonies 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 Metro-politan 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)



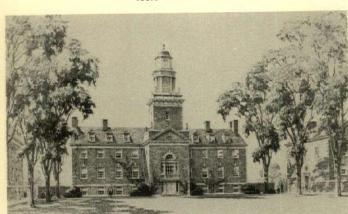


State Capitol of North Dakota at Bismarck, as yet incomplete. Bell de Remer & W. F. Kurke, architects; Holabird & Root, associate architects

Architectural News

Richard Averill Smith

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



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





Providence Journal Photograph by Scheer

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



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



in Photographs

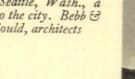
The new Art Museum for Seattle, Wash., a gift to the city. Bebb S Gould, architects



Richard Averill Smith

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





Christian Science Publishing Society Building, in

Boston. Chester Lindsay Churchill, architect; Lockwood Green

Engineers, Inc.

Wurts Brothers



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



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



(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 win-

dows, 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 tailormade 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.

October 20.-According to Friday, October 20.—According to John H. Millar, there is a good deal of discussion these days as to the possibil-ity of our coming to a policy of "plow-ing 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 apart-ments; 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 I 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

« ARCHITECTURE ≫

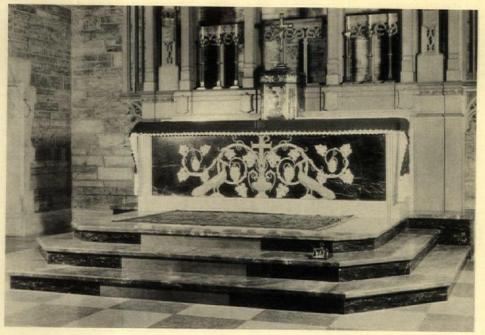
complexity—the three subjects hung are the west front of Notre Dame in Paris, the Arch of Titus in Rome, and the arches of the Palaces of Nero at Rome. Henry Bultitude, who sent in five or six oils, shows himself as much or more—of a painter as he is interior decorator—and that is saying a lot. There 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 blackand-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 Govern-ment 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-ordinat-ing the whole scheme with long-range planning, has not been done, and the wheels turn, if at all, very slowly. The Administration, therefore, has incor-porated 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.

FAVORITE FEATURES





HENRY D. DAGIT & SONS



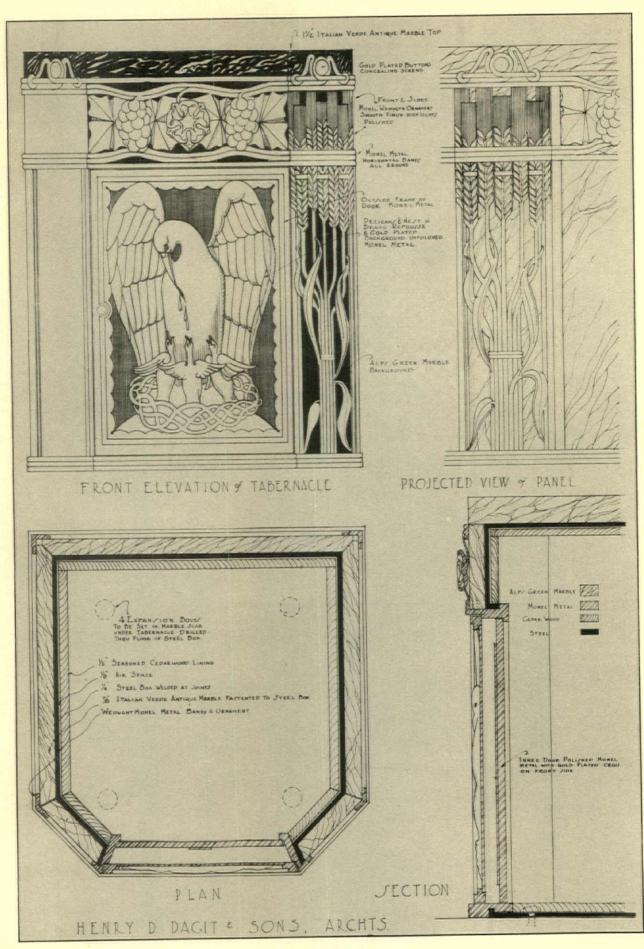
In almost every piece of work that an architect designs there is, when it is finished, something that he would prefer to have otherwise. Once in a long while, however, he rings the bell so clearly that even his sophisticated eye finds it good. The architect tells himself that it worked o ut a s he h a d h o p e d, a n d h e would not change it if that were possible

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 over-

leaf

Here is another in

355



« ARCHITECTURE »



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 $1\frac{1}{4}$ " for a 100° F. rise in tempera-ture 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 hotwater line connected to the ends of all lines or risers so that a constant supply of hot water may be on tap.

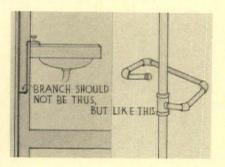
Some systems in the small building, where there are no house tanks, are what are known as down-feed loops or systems (such as A in the diagrams on the next page); that is to say, the hot water is taken by one line, without branches, to the top of the building, and from there is fed down to all fixtures, 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

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.

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 downfeed 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 hotwater systems depends for its circu-



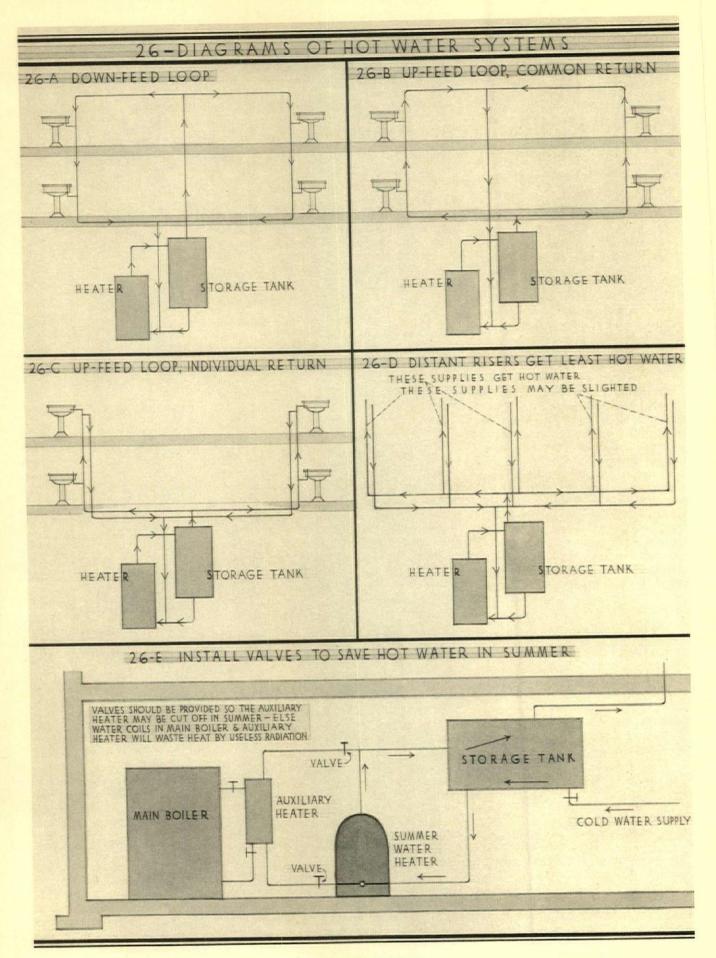
lation upon the fact that hot water rises. If this tendency, which is not very strong at normal temperatures, is restricted by small pipes, tortuous routes, and sections passing through cold places, it is obvious that the system will not work satisfactorily.

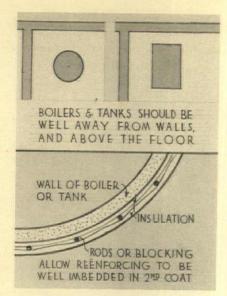
The components of a hot-water system are the pipes, heater, and storage tank. If a steam system is installed, there probably will be a so-called indirect heater attached to the main boiler. This should be of adequate size to supply hot water at all times, with the help of the storage tank. It should 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 hotwater 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 oilburner or gas system is used, a gas heater or small coal stove probably will be desirable for summer hotwater 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





the cellar is flushed down. The hotwater 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

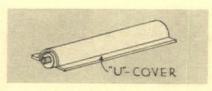
The thickness of pipe covering for hot-water lines should be specified, likewise the method of fastening it. Then the quality and variety should be given attention. The specification should call for the joints to be filled. No half coverings should be permitted if it is possible to avoid it. Where exposed 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 diningrooms 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.

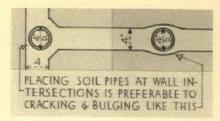
Another item properly coming under pipe covering is the provision of metal forms for the protection of pipe covering. These derive their name from their shape and are called "U" covers. They generally have a lip on the "U" to enable them to be fastened to the floor. These are necessary in cinder fill 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

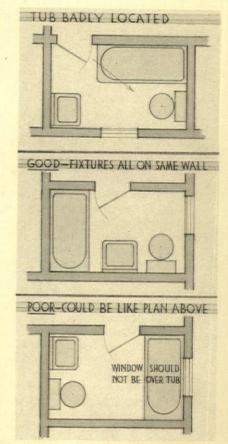
Bathrooms which are far apart, or those not over the kitchen or other plumbing lines, or separate circuitous routes, not only need more maintenance but are obviously more costly to install than where lines carry through vertically. It is an advantage to place the fixtures back to back whenever this is 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 possi-

> « ARCHITECTURE ≫ 359



ble 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

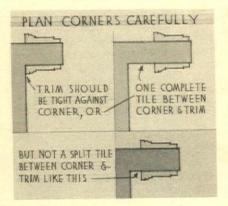


soil lines across the beams is to be avoided, as it will result in the necessity of "platforming" (raising the finished floor level) the bathroom—an undesirable form of construction.

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

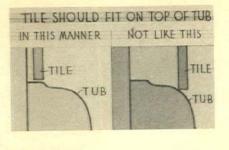
The thoughtful study of bathrooms and kitchens will not only result in a saving on the plumbing work, but will give a sense of pride in their ownership.

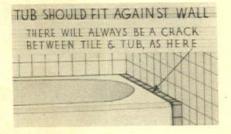
A bathtub set out near the door or entrance may make the person entering the room stumble, or at least create a fear of stumbling. Having three fixtures on the side of the room provides the most economical arrangement. If the window is over the tub there is the disadvantage that the window cannot be 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-

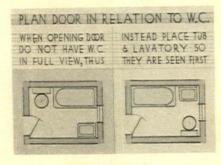




ing a band of split tile to be run between the tub and the wall. The architect should ask for, and get, the roughing size of the tub. This will enable him to do his part in laying out a workmanlike job of the bathroom.

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.

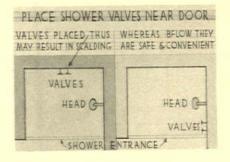
By keeping the dimensions of a bathroom within reason, it is often possible for a very little additional cost to provide an extra bathroom. This of course will not only be a great convenience to the owner, but a valuable asset in making a sale. The residence with one bathroom only will soon be considered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



« ARCHITECTURE »

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 bath-room. 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.

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 $4\frac{1}{2}$ " 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 aver-age 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:

 $T_4 = \frac{4}{\tan 8^\circ}, T_5 = \frac{5}{\tan 16^\circ}, \text{ and so}$

on. The values thus found were never far from the co-ordinates of points assumed from practical test. Further field observation showed

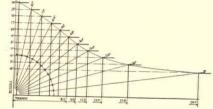
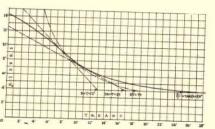
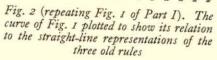


Fig. 1. A graphic representation of the derivation of the curve and the relation of the three elements for risers at 1" intervals





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

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 ris-ers from 4" to 9". As an after-thought 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 be-yond 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 stepladder. At 88° we have reached the true ladder, for vertical or almost vertical use. The curve here inter-sects 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 141/4". 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 mis-guiding and inconsistent for steeprakes. If used for the ladder, allowing I" treads, one rule would space the rungs at 16", one at 12", and the other at six feet or more.

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, 17/2," "5/2, 15," "6, 13/2," "6/2, 12," and so on. In the table shown here the risers are given at 1/4" 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 pro-

portion. 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

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

TABLE OF	STAIR	PROPORTIONS
		R

T =

Т

tan	(R-3)	1

$ \begin{array}{r} 4 \\ 4 \\ 1/4 \\ 4 \\ 1/2 \\ 4 \\ 3/4 \\ 5 \\ 5 \\ 1/4 \\ 5 \\ 5 \\ 4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ 6 \\ 1/4 \\ $	28.3 24.1 21.2 19.1 17.4 16.2 15.1 14.2	0.1405 0.1763 0.2126 0.2493 0.2867 0.3249 0.3640 0.4040	8 10 12 14 16 18 20 22
$ \begin{array}{r} 4\frac{1}{2} \\ 4\frac{3}{4} \\ 5 \\ 5\frac{1}{4} \\ 5\frac{1}{2} \\ 5\frac{3}{4} \\ 6\frac{1}{4} \end{array} $	24.1 21.2 19.1 17.4 16.2 15.1 14.2	0.2126 0.2493 0.2867 0.3249 0.3640	12 14 16 18 20
$ \begin{array}{r} 4\frac{1}{2} \\ 4\frac{3}{4} \\ 5\frac{1}{4} \\ 5\frac{1}{4} \\ 5\frac{1}{2} \\ 5\frac{3}{4} \\ 6\frac{1}{4} \end{array} $	21.2 19.1 17.4 16.2 15.1 14.2	0.2126 0.2493 0.2867 0.3249 0.3640	14 16 18 20
$ \begin{array}{r} 4^{3}_{4} \\ 5 \\ 5^{1}_{4} \\ 5^{1}_{4} \\ 5^{3}_{4} \\ 6^{1}_{4} \end{array} $	19.1 17.4 16.2 15.1 14.2	0.2493 0.2867 0.3249 0.3640	16 18 20
5 ¹ / ₄ 5 ¹ / ₂ 5 ³ / ₄ 6 6 ¹ / ₄	17.4 16.2 15.1 14.2	0.3249	18 20
5 ¹ / ₄ 5 ¹ / ₂ 5 ³ / ₄ 6 6 ¹ / ₄	16.2 15.1 14.2	0.3249	20
5 ¹ /2 5 ³ /4 6 6 ¹ /4	15.I 14.2	0.3640	
5 ³ / ₄ 6 6 ¹ / ₄	14.2	0.4040	22
61/4			
61/4	13.5	0.4452	24
	12.8	0.4877	26
61/2	12.2	0.5317	28
63/4	11.7	0.5774	.30
	11.2	0.6249	32
771/4	10.7	0.6745	34
71/2	10.3	0.7265	36
7 ³ ⁄4	9.9	0.7813	38
	9.5	0.8391	40
81/4	9.2	0.9004	42
81/2	8.8	0.9657	44 46
83/4	8.5 8.1	1.0355	40

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



« ARCHITECTURE »

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size—using as a basis some ratio of the child's average pace to the adult's.

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 re-strictions 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 stair-ways 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 indis-

pensable 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.

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

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1933

INDEX

VOLUME LXVII: JANUARY THROUGH JUNE, 1933

The pagination of the volume is divided as follows: Jan., 1-62; Feb., 63-122; Mar., 123-184; Apr., 185-246; May, 247-308; June, 309-370

- Administration Bldg., Veterans' Home, Rocky Hill, Hartford, Conn.; Douglas Orr, archt.: 13
- Adventures of Huckleberry Finn, painted by D. Putnam Brinley: 151
- Air conditioning: Fair Weather, by Carleton B. Ryder: 31
- Aldrich, William T., archt.: Worcester Art Museum, Worcester, Mass.: 155. Proposed Munger Hall, Wellesley College, Welleslev. Mass.: 155
- All Souls Unitarian Church, New York City; Hobart B. Upjohn, archt.: 13
- Allen & Collens, archts.: City Hall, Newton, Mass.: 13 Alsatian House in Fredericksburg, Texas,
- Old, from the pencil drawing by Edward M. Schiwetz: 253
- Alschuler, Alfred S., assoc. archt.; Schmidt, Garden & Erikson, archts .: Mount Sinai Hospital, Chicago: 86
- American Philosophical Society's Bldg., Proposed, Philadelphia; Paul P. Cret, archt .:
- Apartments: Van Tassel, North Tarrytown, N. Y.: Jan. Frontis. Interiors, Public Rooms, Park Plaza, St. Louis, Mo.: 279
- Arch of Constantine, from the pencil drawing by Burton Kenneth Johnstone: 225
- Architectural League Exhibit, The, New York City: 211
- Architectural News in Photographs: 12, 154, 276

Architectural Observer, The: 227

Are We Ready for an American Housing Advance?, by Henry Wright: 309

Balusters, English: 317

- Bank Screens: A Portfolio of: 47 Banks: Proposed Federal Reserve Bldg., Philadelphia: 155. Providence National, Providence, R. I.: 157. Dime Savings
- Bldg., Brooklyn, N. Y.: 277 Bartels, W. F.: Some Pitfalls in Supervision: XXVII. Ornamental Iron and Bronze, Cont.; Hardware: 37. XXVIII. Hardware, Cont.; Roofing and Sheet Metal: 101. XXIX. Roofing and Sheet Metal, Cont.: 165. XXX. Roofing and Sheet Metal, Cont.; Mechanical Appurtenances: 223. XXXI. Mechanical Appurtenances, Cont.: 283. XXXII. Mechanical Appur-
- tenances, Cont.: 351 Basilica Patriarcal, Monterrey, Mexico, from the pencil drawing by Edward M. Schiwetz: 254
- Benjamin Franklin Memorial and Franklin Institute Museum, Philadelphia; John T. Windrim, archt.: 276
- Bercovici, Rion: Selling Architectural Services Today: 228
- Blair, Walter D.; Taylor & Fisher; Peebles

& Ferguson, archts.: Clark Memorial Hall, University of Virginia: 12

- Book Reviews: 42, 106, 156, 216, 278, 332 Boyd, Rutherford: The Ratio-Envelope of Form: 7. Can We Invent New Forms? : 323
- Brein, John David, sculptor: Joslyn Memorial, Omaha, Neb.: 99
- Brinley, D. Putnam, painter: The Adven-tures of Huckleberry Finn: 151 Brown, Lewis H.: A Constructive Policy for
- the Construction Industry: 353
- Can We Invent New Forms?, by Rutherford Boyd: 323
- Carter's Grove, The Renascence of, on the James River, Virginia; W. Duncan Lee, archt.: 185
- Charcoal Drawings: New York Hospital-Savannah, Ga.; Schmidt, Garden & Erikson, archts.: 71
- Century of Progress, Chicago: Proposed Hall of Religion: 155
- Drawing: New York Hospital-Charcoal Cornell Medical College Association Group: March Frontis.
- Chatham Village, Pittsburgh; Ingham & Boyd, archts.; Clarence S. Stein and Henry Wright, consulting archts.: 12
- Chinese Y. W. C. A. Bldg., San Francisco; Julia Morgan, archt.: 195
- Christian Science Publishing Society's Bldg., Boston; Chester Lindsay Churchill, archt .: 276
- Chrystie, E. P .: Drawing in Charcoal, New York Hospital-Cornell Medical College Association Group: March Frontis.
- Churches: All Souls Unitarian, New York City: 13. Stained Glass for Night and Day, St. Paul's, Chestnut Hill, Pa.: 164. Utrecht Cathedral, 1929: May Frontis.
- Churchill, Chester Lindsay, archt.: Christian Science Publishing Society's Bldg., Boston, 276
- City Hall, Newton, Mass.; Allen & Collens, archts.: 13
- Clark Memorial Hall, University of Virginia; Walter D. Blair; Taylor & Fisher; Peebles & Ferguson, archts.: 12
- Clute, Eugene, Lamination in Metal Work: 265
- Coate, Roland E., archt.: House of Herbert Allen, Jr., Los Angeles, Calif.: 167. House of Edward H. Heath, San Marino, Calif .: 343
- Comparative Costs: 45
- Construction Industry, A Constructive Policy for the, by Lewis H. Brown: 353
- Constructive Policy for the Construction Industry, by Lewis H. Brown: 353
- Contacts: 45, 353 Corbett, Harvey Wiley, and D. Everett Waid, archts .: Metropolitan Life Insurance Co.'s

Home Office Bldg., New York City: 12, 276 Cornwell, Dean, painter: Murals for Los An-geles Public Library: 327

- Craftsmanship in Hand-wrought Hardware, Today's, by Gerald K. Geerlings: 15
- Cram & Ferguson and Samuel E. Lunden, assoc. archts.: The Edward L. Doheny, Jr. Memorial Library, University of Southern California: 12
- Cret, Paul P., archt.: Proposed Federal Reserve Bank Bldg., Philadelphia: 155. Pro-posed American Philosophical Society's Bldg., Philadelphia: 277
- D'Ascenzo Studios, The, craftsmen, in conjunction with Zantzinger, Borie & Medary, archts.: Stained Glass for Night and Day, St. Paul's Church, Chestnut Hill, Pa.: 164 Davis, Dunlap & Barney, archts.: House of
- Edward Wright, Moylan, Pa.: 347
- Delano & Aldrich, archts.: Yale Divinity School, New Haven, Conn.: 269
- Delk, Edward Buehler, archt.: House of Dr. Thomas G. Orr, Kansas City, Mo.: 285
- Designer's Notes on Low-cost Multi-family Housing, A, by Thomas C. Stapleton: 1
- Dime Savings Bank Bldg., Brooklyn, N. Y.; Halsey, McCormack & Helmer, Inc., archts.:
- Doheny, Jr. Memorial Library, The Edward L., University of Southern California; Cram & Ferguson and Samuel E. Lunden, assoc. archts.: 12
- Doors, Interior; A Portfolio of: 107
- Drawing as a Basis for Etching, by Gerald K. Geerlings: 261
- Eagle in Sculpture, The, A Portfolio of: 293 Editor's Diary, The: 43, 103, 161, 213, 289, 340
- Ekman, Holm & Co., archts. and engrs.: Proposed Federal House of Detention, Sandstone, Minn.: 154
- Embury II, Aymar, archt.: House of O. F. Miller, Kalamazoo, Mich.: 25
- English Balusters: 317 Erikson, Carl A.: The Hospital, Today and Tomorrow: 63
- Etching, Drawing as a Basis for, by Gerald K. Geerlings: 261
- Etching, soft-ground, "Inland Islands," by Gerald K. Geerlings: June Frontis.
- Etching, Soft-ground-The Architect's Medium, by Gerald K. Geerlings: 333
- Fair Weather, by Carleton B. Ryder: 31

Favorite Features: 339

- Federal House of Detention, proposed, Sandstone, Minn.; Ekman, Holm & Co., archts. and engrs.: 154
- Federal Reserve Bank Bldg., proposed, Philadelphia; Paul P. Cret, archt.: 155

Fenichel, Irving M., archt.: Knickerbocker Laundry Co., Long Island City: 12 Fisher, Ernest M.: The Minimum House: 45

Floating a Sketch, by Fred R. Lorenz: 11 Forms?, Can We Invent New, by Rutherford Boyd: 323

Gables, Eaves Returns on Masonry, A Portfolio of: 355

- Garfield Park Hospital, Chicago; Schmidt, Garden & Erikson, archts.: 69
- Geerlings, Gerald K.: Today's Craftsmanship in Hand-wrought Hardware: 15. Photographs and captions, Parisian and Dutch Shop Fronts: 131. Pencil drawing, Utrecht Cathedral, 1929: May Frontis. Drawing as a Basis for Etching: 261. "Inland Islands," soft-ground etching: June Frontis. Soft-ground Etching—the Architect's Medium: 333
- Gilbert, Cass, archt.: Proposed United States Legation and Consular Bldg., Ottawa, Canada: 155. Sundial, Shakespeare's garden, Stratford-on-Avon: 277 Goldwater, M.D., S. S., consultant with
- Goldwater, M.D., S. S., consultant with Schmidt, Garden & Erikson, archts.: Valley Hospital, Sewickley, Pa.: 74
- Goldwater, M.D., S. S., hospital consultant with Schmidt, Garden & Erikson, archts.; Henry Hornbostel. consulting archt.: Montefiore Hospital, Pittsburgh: 81
- Green & Son, Edward B., archts.: Toledo Museum of Art, Toledo, O.: 154
- Hall & Proetz, archts.: Interiors, Public Rooms of the Park Plaza, St. Louis, Mo.: 279
- Hall of Religion, proposed, Century of Progress Exposition, Chicago; Thielbar & Fugard, archts.: 155
- Halsey, McCormack & Helmer, Inc., archts.: Dime Savings Bank Bldg., Brooklyn, N. Y.: 277
- Hardware, Today's Craftsmanship in Handwrought, by Gerald K. Geerlings.: 15
- Hewitt & Brown, archts.: The Creation of a Telephone Bldg., Minneapolis: 199
- Hewlett, James Monroe, painter: Providence National Bank, Providence, R. J.: 160
- Holey, Dr. Karl, archt.: Ein Landhaus, Hang, South Tirol: 331
- Hornbostel, Henry, consulting archt.; Schmidt, Garden & Erikson, archts.; S. S. Goldwater, M.D., hospital consultant: Montefiore Hospital, Pittsburgh: 81
- Hospital, Today and Tomorrow, The, by Carl A. Erikson: 63
- Hospitals: Michael Reese, Chicago: 64. Garfield Park, Chicago: 69. St. Catharine's, Kenosha, Wis.: 70. Central of Georgia Railway Co., Savannah, Ga.: 71. St. Mary's, Saginaw, Mich.: 72. Valley, Sewickley, Pa.: 74. Ponca City Hospital of the Sisters of St. Joseph, Ponca City, Okla.: 76. Leila Y. Post Montgomery Hospital of the Sisters of Mercy and Werstein Nurses' Home, Battle Creek, Mich.: 78. Montefiore, Pittsburgh: 81. Salvation Army Hospital for Women, Chicago: 85. Mount Sinai, Chicago: 86. Swedish Covenant, Chicago: 88. Washington, Washington, Pa.: 89. New York Hospital-Cornell Medical College Association Group: March Frontis.
- House, The Minimum, by Ernest M. Fisher: 45
- Houses: Of Le Roy Kellogg, Pasadena: 21.
 Of O. F. Miller, Kalamazoo, Mich.: 25.
 Interiors, London: 39. Of Benjamin D.
 Mosser, Mendham (Morristown), N. J.:
 137. Of Herbert Allen, Jr., Los Angeles,

Calif.: 167. Carter's Grove, on the James River, Virginia: 185. Of Vincent Astor, New York City: 217. Old Alsatian House in Fredericksburg, Texas: 253. Of Dr. Thomas G. Orr, Kansas City, Mo.: 285. Ein Landhaus, Hang, South Tirol: 331. Chimney corner, house of Constantine Hutchins, Needham, Mass.: 339. Of Edward H. Heath, San Marino, Calif.: 343. Of Edward Wright, Moylan, Pa.: 347

- Housing, A Designer's Notes on Low-cost Multi-family, by Thomas C. Stapleton: r Housing, The Sad Story of American, by
- Housing, The Sad Story of American, by Henry Wright: 123 Housing Advance?, Are We Ready for an
- American, by Henry Wright: 309
- Howe & Church, archts.: Providence National Bank, Providence, R. I.: 157

Hutzler Brothers Store, Baltimore; Joseph Evans Sperry, archt.: 13

- Indiana World War Memorial, Indianapolis, Ind.; Walker & Weeks, archts.: 13
- Infirmary Bldg., Veterans' Home, Rocky Hill, Hartford, Conn.; Douglas Orr, archt.; Carl J. Malmfeldt, consulting archt.: 13

Ingham & Boyd, archts.; Clarence S. Stein and Henry Wright, consulting archts.: Chatham Village, Pittsburgh: 12 "Inland Islands," soft-ground etching, by

- Gerald K. Geerlings: June Frontis.
- Insurance Co. of North America Bldg., proposed New York City; Shreve, Lamb & Harmon, archts.: 154
- Interior Doors, A Portfolio of: 107
- Interiors-Public Rooms of the Park Plaza, St. Louis, Mo.; Hall & Proetz, archts.: 279
- Johnstone, Burton Kenneth: Pencil drawing, Arch of Constantine: 225. Pencil drawing, Market Square, Nuremburg: 226
- Jones, Thomas Hudson, sculptor: Tomb of the Unknown Soldier, Arlington, Va.: 255
- Keefe, Charles S., archt.: A chimney corner, house of Constantine Hutchins, Needham, Mass.: 339
- Klauder, Charles Z., archt.: Tower of Learning, University of Pittsburgh: 12
- Knickerbocker Laundry Co., Long Island City; Irving M. Fenichel, archt.: 12
- Lee, W. Duncan, archt.: The Renascence of Carter's Grove, on the James River, Virginia: 185
- Leila Y. Post Montgomery Hospital of the Sisters of Mercy and Werstein Nurses' Home, Battle Creek, Mich.; Schmidt, Garden & Erikson, archts.: 78

Libraries: The Edward L. Doheny, Jr. Memorial, University of Southern California: 12. Murals for Los Angeles Public, Los Angeles: 327

- Light and Optics: Material Vision, by Carleton B. Ryder: 93
- Lighting fixtures, Rockefeller Center, New York City: 153
- Lorenz, Fred R.: Floating a Sketch: 11 Loven, Carl: Pencil drawing, Wash Sheds on
- the River Eure, Chartres: Feb. Frontis. Lunden, Samuel E., and Cram & Ferguson,
- assoc. archts.: The Edward L. Doheny, Jr. Memorial Library, University of Southern California: 12
- Luwens. Robert, and Robert W. Symonds, designers: Interiors of a London House: 39

Malmfeldt, Carl J., consultant with Douglas Orr, archt.: Infirmary Bldg., Veterans' Home, Rocky Hill, Hartford, Conn.: 13

Material Vision, by Carleton B. Ryder: 93

McDonald, John and Alan, archts.: Joslyn Memorial, Omaha, Neb.: 99 McKim, Mead & White, archts.: Proposed

- Annex to Post Office, New York City: 276 Memorials: The Edward L. Doheny, Jr. Mem. Library, University of Southern California: 12. Clark Mem. Hall, University of Virginia: 12. Indiana World War Mem., Indianapolis, Ind.: 13. Joslyn Mem., Omaha, Neb.: 99. Benjamin Franklin Mem., Philadelphia: 276
- Metal Work, Lamination in, by Eugene Clute, 265
- Metropolitan Life Insurance Co.'s Home Office Bldg., New York City; D. Everett Waid and Harvey Wiley Corbett, archts.: 12, 276
- Michael Reese Hospital, Chicago; Schmidt, Garden & Erikson, archts.: 64
- Minimum House, The, by Ernest M. Fisher: 45
- Montefiore Hospital, Pittsburgh; Schmidt, Garden & Erikson, archts.; Henry Hornbostel, consulting archt.; S. S. Goldwater, M.D., hospital consultant: 81
- Morgan, Julia, archt.: Chinese Y. W. C. A. Bldg., San Francisco: 195
- Mount Sinai Hospital, Chicago; Schmidt, Garden & Erikson, archts.; Alfred S. Alschuler, assoc. archt.: 86
- Munger Hall, proposed, Wellesley College, Wellesley, Mass.; William T. Aldrich, archt.: 155
- Mural Paintings: The Adventures of Huckleberry Finn: 151. Providence National Bank, Providence, R. I.: 160. Los Angeles Public Library, Los Angeles: 327
- Museums: Worcester Art, Worcester, Mass.: 155. Franklin Institute, Philadelphia: 276
- New York Hospital-Cornell Medical College Association Group, from the drawing in charcoal by E. P. Chrystie: March Frontis. Nuremburg, Market Square, from the pencil drawing by Burton Kenneth Johnstone: 226
- Office Buildings: Metropolitan Life Insurance Co.'s Home Office Bldg., New York City: 12. Parliament Bldgs., Northern Ireland: 154. Proposed United States Customs House and Appraisers Stores Bldg., Philadelphia: 154. Proposed Insurance Co. of North America Bldg., New York City: 154. Telephone Bldg., Minneapolis: 199. Christian Science Publishing Society's Bldg.: 276. Metropolitan Life Insurance Co.'s Home Office Bldg., New York City: 276
- Oliver, Marshal Leslie: The Way Out: 247
- Organic Structure, by Carleton B. Ryder: 145 Orr, Douglas, archt.: Administration Bldg., Veterans' Home, Rocky Hill, Hartford, Conn.: 13
- Orr, Douglas, archt.; Carl J. Malmfeldt, consulting archt.: Infirmary Bldg., Veterans' Home, Rocky Hill, Hartford, Conn.: 13
- Parisian and Dutch Shop Fronts; Photographs and captions by Gerald K. Geerlings: 131 Parliament Bldgs., Northern Ireland; Sir
- Arnold Thornely, archt.: 154 Peebles & Ferguson; Walter D. Blair; Taylor & Fisher, archts.: Clark Memorial Hall,
- University of Virginia: 12 Pencil Drawings: Wash Sheds on the River Eure, Chartres: February Frontis. Arch of Constantine: 225. Market Square, Nuremburg: 226. Utrecht Cathedral, 1929: May Frontis. Old Alsatian House in Fredericksburg, Texas: 253. Basilica Patriarcal, Monterrey, Mexico: 254

- Glasgow: 275
- Ponca City Hospital of the Sisters of St. Joseph, Ponca City, Okla.; Schmidt, Garden & Erikson, archts.: 76 Portfolios: Bank Screens: 47. Interior Doors:
- 107. Stair Railings: 169. Verandas: 231. The Eagle in Sculpture: 293. Eaves Returns on Masonry Gables: 355
- Post Office, Annex to, Proposed, New York City; McKim, Mead & White, archts.: 276 Providence National Bank, Providence, R. I.;
- Howe & Church, archts.: 157 Public-works program, The Way Out, by Marshal Leslie Oliver: 247
- Rasmussen & Wayland, archts.: School bldg., Florham Park, Madison, N. J .: 27
- Ratio-Envelope of Form, The, by Rutherford Boyd: 7
- Restaurant, "Eat in the Hat," Los Angeles: 277
- Rich, Lorimer, archt .: Tomb of the Unknown Soldier, Arlington, Va.: 255
- Rickard, Greville, archt .: House of Benjamin D. Mosser, Mendham (Morristown), N. J .: 137
- Ritter & Shay, archts .: Proposed United States Customs House and Appraisers Stores Bldg., Philadelphia: 154
- Rockefeller Center, New York City: Lighting fixtures: 153
- Ryder, Carleton B.: Fair Weather: 31. Material Vision: 93. Organic Structure: 145
- Sad Story of American Housing, The, by Henry Wright: 123
- Catharine's Hospital, Kenosha, Wis.; St. Schmidt, Garden & Erikson, archts.: 70
- St. Mary's Hospital, Saginaw, Mich.; Schmidt, Garden & Erikson, archts.: 72
- St. Paul's Church, Chestnut Hill, Pa., Stained Glass for Night and Day; Zantzinger, Borie & Medary, archts.; D'Ascenzo Studios,
- designers: 164 Salvation Army Hospital for Women, Chicago; Schmidt, Garden & Erikson, archts .: 80
- Scheide, Inc., Lester Beach, archts.: Model of Old State House Square, Hartford, Conn., made by Elizabeth Judd Scheide: 276
- Schiwetz, Edward M .: Pencil drawing, Old Alsatian House in Fredericksburg, Texas: 253. Pencil drawing, Basilica Patriarcal,
- Monterrey, Mexico: 254 Schmidt, Mott B., archt.: House of Vincent Astor, New York City: 217
- Schmidt, Garden & Erikson, archts.: Michael Reese Hospital, Chicago: 64. Garfield Park Hospital, Chicago: 69. St. Catharine's Hospital, Kenosha, Wis.: 70. Central of Georgia Railway Co. Hospital, Savannah, Ga.: 71. St. Mary's Hospital, Saginaw, Mich .: 72. Ponca City Hospital of the Sisters of St. Joseph, Ponca City, Okla.: 76. Leila Y. Post Montgomery Hospital of the Sisters of Mercy and Werstein Nurses' Home, Battle Creek, Mich.: 78. Salvation Army Hospital for Women, Chicago: 85. Swedish Covenant Hospital, Chicago: 88. Washington Hospital, Washington, Pa.: 89
- Schmidt, Garden & Erikson, archts.; Alfred S. Alschuler, assoc. archt.: Mount Sinai Hospital, Chicago: 86
- Schmidt, Garden & Erikson, archts.; S. S. Goldwater, M.D., consultant: Valley Hospital, Sewickley, Pa.: 74
- Schmidt, Garden & Erikson, archts.; Henry Hornbostel, consulting archt.; S. S. Goldwater, M. D., hospital consultant: Montefiore Hospital, Pittsburgh: 81

- Photographic Study, A; Robert MacLean Schools and Colleges: Tower of Learning, University of Pittsburgh: 12. Clark Memorial Hall, University of Virginia: 12. The Edward L. Doheny, Jr. Memorial Library, University of Southern California: 12. Pro-posed Munger Hall, Wellesley College, Wellesley, Mass.: 155. Yale Divinity, New Haven, Conn.: 269. Florham Park, Madison, N. J.: 277
 - Sculpture on Joslyn Memorial, Omaha, Neb.; John David Brcin, sculptor; John and Alan McDonald, archts.: 99
 - Selling Architectural Services Today, by Rion Bercovici: 228
 - Shoe repairing bldg., Portland, Ore.: 27
 - Shop Fronts, Parisian and Dutch; Photographs and captions by Gerald K. Geerlings: 131
 - Shops: Hutzler Brothers, Baltimore: Shreve, Lamb & Harmon, archts .: Proposed
 - Insurance Co. of North America Bldg., New York City: 154
 - Soft-ground Etching-the Architect's Medium, by Gerald K. Geerlings: 333
 - Some Pitfalls in Supervision, by W. F. Bartels: XXVII. Ornamental Iron and Bronze, Cont.; Hardware: 37. XXVIII. Hardware, Cont.; Roofing and Sheet Metal: 101. XXIX. Roofing and Sheet Metal, Cont.: 165. XXX. Roofing and Sheet Metal, Cont.; Mechanical Appurtenances: 223. XXXI. Mechanical Appurtenances, Cont.: 283. XXXII. Mechanical Appurtenances, Cont.: 351
 - Sperry, Joseph Evans, archt.: Hutzler Brothers Store, Baltimore: 13
 - Stained Glass for Night and Day, St. Paul's Church, Chestnut Hill, Pa.; The D'Ascenzo Studios, craftsmen; Zantzinger, Borie & Medary, archts.: 164
 - Stair Railings, Metal; A Portfolio of: 169 Stapleton, Thomas C.: A Designer's Notes on
 - Low-cost Multi-family Housing: 1
 - State House Square, Old, Model of, Hartford, Conn.; Lester Beach Scheide, Inc., archts.; made by Elizabeth Judd Scheide: 276
 - Stein, Clarence S. and Henry Wright, consulting archts.; Ingham & Boyd, archts .:
 - Chatham Village, Pittsburgh: 12 Stewart, Jack G.: Working Drawings: XXXII. Casement and D. H. Window in Frame Wall: 41. XXXIII. Various Swimming Wall: 41. XXXIII. Pool Sections: 104. XXXIV. Various Skylight Construction Details: 162. XXXV. Various Residential Eave Details: 215. XXXVI. Various Residential Watertables: 290. XXXVII. Detail of Bar Construction: 342
 - Sundial, Shakespeare's garden, Stratford-on-Avon; Cass Gilbert, designer: 27
 - Supervision, Some Pitfalls in, by W. F. Bartels: XXVII. Ornamental Iron and Bronze, tels: XXVII. Ornamental Itoli and Blotz Cont.; Hardware: 37. XXVIII. Hard-ware, Cont.; Roofing and Sheet Metal: IoI. XXIX. Roofing and Sheet Metal, Cont.: 165. XXX. Roofing and Sheet Metal, Cont.; Mechanical Appurtenances: 223. XXXI. Mechanical Appurtenances, Cont.: 283. XXXII. Mechanical Appurtenances, Cont.: 351
 - Swedish Covenant Hospital, Chicago; Schmidt, Garden & Erikson, archts.: 88
 - Symonds, Robert W., and Robert Lutyens, de signers: Interiors of a London House: 39
 - Taylor & Fisher; Peebles & Ferguson; Walter D. Blair, archts .: Clark Memorial Hall, University of Virginia: 12
 - Telephone Bldg., The Creation of a, Minneapolis; Hewitt & Brown, archts.: 199
 - Terra-cotta, The Making of: 207

- Thielbar & Fugard, archts .: Proposed Hall of Religion, Century of Progress, Chicago: 155
- Thomas, Andrew J., archt.: Van Tassel Apts., North Tarrytown, N. Y .: Jan. Frontis.
- Thornely, Sir Arnold, archt.: Parliament Bldgs., Northern Ireland: 154
- Today's Craftsmanship in Hand-wrought Hardware, by Gerald K. Geerlings: 15 Toledo Museum of Art, Toledo, O.; Edward
- B. Green & Son, archts.: 154 Tomb of the Unknown Soldier and Approaches, Arlington, Va.: Lorimer Rich, archt .: Thomas Hudson Jones, sculptor: 255
- Tower of Learning, University of Pittsburgh; Charles Z. Klauder, archt.: 12
- United States Customs House and Appraisers Stores Bldg., proposed, Philadelphia; Ritter & Shay, archts.: 154
- United States Legation and Consular Bldg., proposed, Ottawa, Canada; Cass Gilbert, archt.: 155
- Upjohn, Hobart B., archt.: All Souls Unitarian Church, New York City: 13 Utretch Catherdral, 1929, from the pencil drawing by Gerald K. Geerlings: May Frontis.
- Valley Hospital, Sewickley, Pa.; Schmidt, Garden & Erikson, archts.; S. S. Goldwater, M. D., consultant: 74
- Van Pelt. Jr., Garrett, archt.: House of Le-Roy Kellogg, Pasadena: 21
- Van Tassel Apts., North Tarrytown, N. Y.; Andrew J. Thomas, archt.: Jan. Frontis.
- Verandas, A Portfolio of: 231
- Waid, D. Everett, and Harvey Wiley Corbett, archts.: Metropolitan Life Insurance Co.'s Home Office Bldg., New York City: 12, 276
- Walker & Weeks, archts .: Indiana World War Memorial, Indianapolis, Ind.: 13
- Wash Sheds on the River Eure, Chartres, from the pencil drawing by Carl Loven: Feb. Frontis.
- Washington Hospital, Washington, Pa.; Schmidt, Garden & Erikson, archts.: 89
- Way Out, The, by Marshal Leslie Oliver: 247 Windrim, John T., archt.: Benjamin Franklin Memorial and Franklin Institute Museum, Philadelphia: 276
- Worcester Art Museum, Worcester, Mass.; William T. Aldrich, archt.: 155
- Working Drawings, by Jack G. Stewart: XXXII. Casement and D. H. Window in Frame Wall: 41. XXXIII. Various Swimming Pool Sections: 104. XXXIV. Various Skylight Construction Details: 162. XXXV. Various Residential Eave Details: 215. XXXVI. Various Residential Watertables: 290. XXXVII. Detail of Bar Construction: 342
- Wright, Henry: The Sad Story of American Housing: 123. Are We Ready for an American Housing Advance? : 309
- Wright, Henry and Clarence S. Stein, consulting archts.; Ingham & Boyd, archts.: Chatham Village, Pittsburgh: 12
- Yale Divinity School, New Haven, Conn.; Delano & Aldrich, archts.: 269
- Y. W. C. A. Bldg., Chinese, San Francisco; Julia Morgan, archt.: 195
- Zantzinger, Borie & Medary, archts. in conjunction with The D'Ascenzo Studios, craftsmen: Stained Glass for Night and Dav, St. Paul's Church, Chestnut Hill, Pa .: 164

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INDEX

VOLUME LXVIII: JULY THROUGH DECEMBER, 1933

The pagination of the volume is divided as follows: July, 1-62; Aug., 63-126; Sept., 127-188; Oct., 189-252; Nov., 253-316; Dec., 317-378

- Airplane view of Washington, D. C.: 192, 196, 197, 200
- Allied Archts. of Washington: House Office Bldg., Washington, D. C.: 193, 194
- Anonymous Lament, An: These Houses We Live In: 213
- Apartments: Sunnyside Gardens, Long Island: July Frontis.
- Architectural Education, A Letter from a Friend, by Harry F. Cunningham: 147
- Architectural News in Photographs: 40, 154, 352

Architectural Observer, The, 269

- Arlington Memorial Bridge, Washington, D. C.; McKim, Mead & White, archts.; 189. C. Paul Jennewein, sculptor: 212 Art Museum, Seattle, Wash.; Bebb & Gould,
- archts.: 353
- Auditorium, The Worcester Memorial, Worcester, Mass.; L. W. Briggs Co., Frederic C. Hirons, assoc. archts.: Dec. Frontis., 317
- Ayres, Atlee B. & Robert M., archts. for restoration: proposed restoration of Mission Espiritu Santo, Goliad, Tex.: 352
- Bankers Trust Co. Bldg., The, by Richmond H. Shreve: 127
- Bankers Trust Co. Bldg., New York City; Shreve, Lamb & Harmon, archts.: Sept. Frontis., 127
- Banks: Bankers Trust Co. Bldg., New York City: 127. Springfield Safe Deposit & Trust Co., Springfield, Mass.: 154. First National, Amherst, Mass.: 259
- Bartels, W. F .: Some Pitfalls in Supervision: XXXIII. Insulation and Acoustics; Elevators: 37. XXXIV. Elevators, Cont.: 71. XXXV. Ductwork: 169. Better Practice:
- 219, 285, 357 Bartlett, Paul Wayland, sculptor: Statue of Lafayette, Hartford, Conn.: 40
- Bauer, Jacob L., State Highway Engr.: High Level Viaduct over the Jersey meadows: 40
- Bebb & Gould, archts.: Art Museum, Seattle, Wash.: 353
- Bell & Howell Camera Corp., Hollywood, Calif.; Marshall P. Wilkinson, archt.: 155 Bennett, Parsons & Frost, archts.; David
- Lynn, Archt. of the Capitol: Capitol, Washington, D. C.: 196, 197
- Better Practice, by W. F. Bartels: 219, 285, 357
- Blouke, Pierre, archt .: House of steel frame and copper exterior, Rome, N. Y .: 353 Book Reviews: 70, 272
- Borie, C. L., Jr., Horace Trumbauer, C. C. Zantzinger, archts .: North wing, Pennsyl-
- vania Museum of Art, Philadelphia: 40 Brazer, Clarence Wilson, archt.: Court house, Media, Pa.: 41
- Brickwork, Current Dutch, by Gerald K. Geerlings: 161
- Briggs Co., L. W., Frederic C. Hirons, assoc. archts.: The Worcester Memorial Audi-torium, Worcester, Mass.: Dec. Frontis., 317
- Brooks, W. F., archt .: A Children's Library, New Britain, Conn.: 45 Brown, Arthur, Jr., archt.: Supervising Archt. of the Treasury: Department of La-
- bor and Independent Establishments Bldg., Washington, D. C .: 202

Byers, John, archt.: House of Lewis Bradbury, Santa Monica Canyon, Calif .: 349

- Capitol, Bismarck, N. Dak.; Bell de Remer & W. F. Kurke, archts.; Holabird & Root, assoc. archts.: 352
- Capitol, Washington, D. C.; David Lynn, Archt. of the Capitol; Bennett, Parsons & Frost, archts.: 196, 197
- Cemetery Bldgs., proposed Minnesota Aca-cia Park; William M. Ingemann, archt.: 353
- Central Heating Station, Washington, D. C., Paul P. Cret, archt.; United Engineers &
- Contractors, Inc.: 207 Century of Progress Exposition, The, by Henry H. Saylor: 63
- Children's Library, A, New Britain, Conn.; W. F. Brooks, archt.: 45 Christian Science Publishing Society Bldg.,
- Boston; Chester Lindsay Churchill, archt.; Lockwood Green Engineers, Inc.: 353 Churches: Proposed restoration of Mission
- Espiritu Santo, Goliad, Tex.: 352. Tabernacle, Church of Saints Simon and Jude, Bethlehem, Pa.: 355
- Churchill, Chester Lindsay, archt.; Lockwood Green Engineers, Inc.: Christian Science Publishing Society Bldg., Boston: 353
- City Hall and Court House, St. Paul, Minn.; Ellerbe & Co., Holabird & Root, assoc. archts.: 154
- Cleveland Museum of Art, The, Cleveland; Hubbell & Benes, archts.; Olmsted Bros., landscape archts.: 261
- Clubs: Union, New York City: 155
- Condict, Mrs. Mason M., landscape archt .: House of Richard Lennihan, Southbridge, Mass.: 157
- Contacts: 171, 299
- Contribution of Engineering to Progress, The, by Edward J. Mehren: 299
- Conway, James N., and Draver Wilson, designers: El Saquero, Westwood Village, Los Angeles, Calif.: 223
- Corbels: A Portfolio of: 17
- Corbett, Harrison & MacMurray; Hood & Fouilhoux; Reinhard & Hofmeister, archts .: R. C. A. Bldg., Rockefeller Center, New York City: 353
- Cortissoz, Royal: An appreciation, Charles Adams Platt, 271
- Court House, Media, Pa.; Clarence Wilson Brazer, archt.: 41
- Court House, Providence County, Providence, R. I.; Jackson, Robertson & Adams, archts.: 352
- Cox, Laura M., archt.: House of Richard Lennihan, Southbridge, Mass.: 157
- Cram & Ferguson, assoc. archts.: James A. Wetmore, Acting Supervising Archt. of the Treasury: Federal Bldg., Boston: 352
- Cret, Paul P., archt.; United Engineers & Contractors, Inc.: Central Heating Station, Washington, D. C.: 207
- Cret, Paul P., archt.; Alexander B. Trowbridge, consulting archt.: Folger Shakespeare Library, Washington, D. C.: 210, 211
- Cunningham, Harry F.: Architectural Education, A Letter from a Friend: 147

ii

Current Dutch Brickwork, by Gerald K. Geerlings: 161

- Curtain Treatment at Windows: A Portfolio of: 363
- Dagit & Sons, Henry D., archts .: Tabernacle, Church of Saints Simon and Jude, Bethle-
- hem, Pa.: 355 Dean, A. W., and G. E. Harkness, engrs.: French King Bridge over Connecticut River: 41
- Delano & Aldrich, archts .: Union Club, New York City: 155. Post Office Department, Washington, D. C.: 203, 204
- Department of Agriculture Extensible Bldg., Washington, D. C.; Supervising Archt. of the Treasury: 208
- Department of Commerce, Washington, D.
- C.; York & Sawyer, archts.: 200, 201 Department of Justice Bldg., Washington, D. C.; Zantzinger, Borie & Medary, archts.: 206
- Department of Labor and Independent Establishments Bldg., Washington, D. C.; Arthur Brown, Jr., archt.; Supervising Archt. of the Treasury: 202
- de Remer, Bell, and W. F. Kurcke, archts .: Holabird & Root, assoc. archts.: Capitol, Bismarck, N. Dak.: 352 de Sibour, J. H., archt.: U. S. Public Health
- Service Bldg., Washington, D. C .: 209
- Dilemma of the Painter, The, by Harold W. Rambusch: 171
- Doyle and Associates, A. E., archts.: Portland Art Assocation, Portland, Ore.: 155 Draw Trees, When You: 229
- Duhring, H. Louis, archt.: Group Houses, Chestnut Hill, Pa.: 223
- Editor's Diary, The: 42, 77, 153, 227, 293, 351
- Education, Architectural, A Letter from a Friend, by Harry F. Cunningham: 147
- Ellerbe & Co., Holabird & Root, assoc. archts .: City Hall and Court House, St. Paul, Minn.: 154
- El Saquero, Westwood Village, Los Angeles, Calif.; designed by James N. Conway and Draver Wilson: 233
- Embury II, Aymar, archt.: House of Richard F. Hoyt, New York City: 151
- Engineering to Progress, The Contribution of, by Edward J. Mehren: 299
- Entrance Driveways: A Portfolio of: 111
- Exposition, The Century of Progress, by Henry H. Saylor: 63
- Eye Institute, Columbia Presbyterian Medical Center, New York City; James Gamble Rogers, archt.: 155

Favorite Features: 355

- Federal Bldg., Boston; James A. Wetmore, Acting Supervising Archt. of the Treasury; Cram & Ferguson, assoc. archts.: 352
- Fellheimer, Alfred, Steward Wagner, archts. and engrs.: Union Terminal, Cincinnati, O.: 40, 41
- Ferris, Hugh: Rendering of Bankers Trust Co. Bldg., New York City: Sept. Frontis.
- First National Bank, Amherst, Mass.; Lester Kintzing, archt.: 259

- Folger Shakespeare Library, Washington, D. C.; Paul P. Cret, archt.; Alexander B. Trowbridge, consulting archt.; John Gregory, sculptor; Brenda Putnam, sculptor: 210, 211
- French King Bridge over Connecticut River; A. W. Dean and G. E. Harkness, engrs.: 41
- Geerlings, Gerald K .: Current Dutch Brickwork: 161
- Gibbons, James Cardinal, bronze of, Church of the Sacred Heart, Washington, D. C.; Leo Lentelli, sculptor: 353 Gilbert, Cass, archt.: U. S. Supreme Court,
- Washington, D. C .: 198, 199
- Gothic Niches: A Portfolio of: 301 Gregory, John, sculptor: Folger Shakespeare
- Library, Washington, D. C .: 211
- Hamilton, Jefferson M .: Termites and Buildings: 337 Harkness, G. E., and A. W. Dean, engrs.:
- French King Bridge over Connecticut River: 41
- Heilborn, Carl W .: Study in sanguine, Olvera Street, Los Angeles-Mexican Shops: Aug. Frontis. Study in sanguine, Midday in a California Valley: Oct. Frontis. Drawing in pen-and-ink and wash, Old Houses, Spain: Dec. Frontis.
- High Level Viaduct over the Jersey meadows; Jacob L. Bauer, State Highway Engr.: 40
- Hirons, Frederic C., L. W. Briggs Co., assoc. archts .: The Worcester Memorial Auditorium, Worcester, Mass.: Dec. Frontis., 317
- Holabird & Root, Ellerbe & Co., assoc. archts .: City Hall and Court House, St. Paul, Minn.: 154
- Holabird & Root, assoc. archts.; Bell de Remer and W. F. Kurke, archts .: Capitol, Bismarck, N. Dak.: 352
- Hood & Fouilhoux; Reinhard & Hofmeister; Corbett, Harrison & MacMurray, archts .: R. C. A. Bldg., Rockefeller Center, New
- York City: 353 Hopkins, Alfred, archt.: House of Alfred Hopkins, Princeton, N. J.: 273 Hospitals: Eye Institute, Columbia Presby-
- terian Medical Center, New York City: 155
- House Office Bldg., Washington, D. C.; Allied Archts. of Washington: 193, 194
- Houses: Of Richard F. Hoyt, New York City: 151. Of Richard Lennihan, Southbridge, Mass.: 157. Group, Chestnut Hill, Pa.: 223. Of Alfred Hopkins, Princeton, N. J.: 273. Of Rollin Kirby, Westport, Conn.: 345. Of Lewis Bradbury, Santa Monica Canyon, Calif .: 349. Of steel frame and copper exterior, Rome, N. Y .: 353
- Houses We Live In, These; An Anonymous Lament: 213
- Housing-Where, When and How? by Henry Wright: I. I. The Blight of Our Cities: 2. II. Where Shall We House? : 10. III. Blight Rehabilitation: 15. IV. Visualizing the Possibilities of Rehabilitation of Blighted Areas: 30. V. The Case for Group Housing: 79. VI. Enter the Group Dwelling: 104
- Hubbell & Benes, archts.: The Cleveland Museum of Art, Cleveland: 261
- Hunter College of the City of New York, Bird's-eye view of; Thompson, Holmes & Converse; Charles B. Meyers, archts.: 40 Hutaff, John H.: An Achievement in Model
- Making: 39 Ingemann, William M., archt.: Proposed
- Cemetery Bldgs., Minnesota Acacia Park: 353
- Institute of Health Bldg., Washington, D.

C.; Supervising Archt. of the Treasury: 209

- Insurance Co. of North America, New York City; Shreve, Lamb & Harmon, archts .: 154
- Internal Revenue Bldg., Bureau of Washington, D. C.; Supervising Archt. of the Treasury: 205
- Jackson, Robertson & Adams, archts .: Providence County Court House, Providence, R. I.: 352
- James Co., Thomas M., archts. and engrs.: Springfield Safe Deposit & Trust Co., Springfield, Mass.: 154
- Jennewein, C. Paul, sculptor: North wing, Pennsylvania Museum of Art, Philadel-phia: 40. Arlington Memorial Bridge, Washington, D. C .: 212
- Kahn, Inc., Albert, archts. and engrs.: Proposed Providence Journal Bldg., Providence, R. I.: 352
- Kintzing, Lester, archt.: First National Bank, Amherst, Mass.: 259
- Lafayette, Statue of, Hartford, Conn.; Paul Wayland Bartlett, sculptor: 40
- Lentelli, Leo, sculptor: Bronze of James Cardinal Gibbons, Church of the Sacred Heart, Washington, D. C.: 353 Lettering, Exterior: A Portfolio of: 47
- Libraries: A Children's, New Britain, Conn .: Addition to Library of Congress, Washington, D. C .: 195. Folger Shakespeare, Washington, D. C.: 210, 211
- Library of Congress, Addition to, Washington, D. C.; David Lynn, Archt. of the Capitol; Pierson & Wilson, consulting archts.; Alexander B. Trowbridge, consultant: 195
- Limestone, Quarrying and Fabricating: 73 Lockwood Green Engineers, Inc.; Chester Lindsay Churchill, archt.: Christian Science Publishing Society Bldg., Boston: 353
- Lower Merion School District, Administration Bldg., Ardmore, Pa.; Savery & Scheetz, archts.: 33
- Lynn, David, Archt. of the Capitol; Bennett, Parsons & Frost, archts .: Capitol, Washington, D. C.: 196, 197
- Lynn, David, Archt. of the Capitol; Pierson & Wilson, consulting archts.; Alexander B. Trowbridge, consultant: Addition to Library of Congress, Washington, D. C.: 195
- Lynn, David, Archt. of the Capitol; Wyeth & Sullivan, consulting archts .: U. S. Senate Office Bldg., Washington, D. C.: 193
- Marshall P. Wilkinson, archt.: Bell & Howell
- Camera Corp., Hollywood, Calif.: 155 McKenzie, R. Tait, sculptor: "The Spirit of Nursing," American Red Cross Bldg., Washington, D. C.: 41
- McKim, Mead & White, archts.: Arlington Memorial Bridge, Washington, D. C .: 189, 212
- Mehren, Edward J.: The Contribution of Engineering to Progress: 299
- Memorials: Statue of Lafayette, Hartford, Conn.: 40. "The Spirit of Nursing," American Red Cross Bldg., Washington, D. C.: 41. A Children's Library, New Britain, Conn.: 45. Arlington Memorial Bridge, Washington, D. C .: 189, 212. The Worcester Memorial Auditorium, Worcester, Mass.: Dec. Frontis., 317
- Meyers, Charles B.; Thompson, Holmes & Converse, archts.: Hunter College of the City of New York: 40
- Midday in a California Valley, from the Study in sanguine Conté crayon by Carl W. Heilborn: Oct. Frontis.

- Mission Espiritu Santo, proposed restoration of, Goliad, Tex.; Atlee B. and Robert M. Ayres, archts. for restoration: 352
- Model Making, An Achievement in; John H. Hutaff: 39 Modernism—Yesterday, Today, and Tomor-
- row, by Rexford Newcomb: 253
- Morgan, Sherley Warner, archt.: Proposed Westminster Choir School Group, Princeton, N. J.: 352
- Morison, Samuel Eliot; Perry, Shaw & Hepburn, archts.: Conjectural restoration of "Old College," Cambridge, Mass.: 154
- Morris, Edwin Bateman: The City of Washington Today: 189
- Morris & O'Connor, archts.: Westchester County Office Bldg., White Plains, N. Y .: 155
- Museums: North Wing, Pennsylvania Museum of Art, Philadelphia: 40. Portland Art Association, Portland, Ore.: 155. The Cleveland Museum of Art, Cleveland: 261. Art Museum, Seattle, Wash .: 353
- National Archives Bldg., Washington, D. C.; Office of John Russell Pope, archt.: 207
- National Institute of Pharmacy, proposed, Washington, D. C.; Office of John Russell Pope, archt.: 155
- Newcomb, Rexford: Modernism-Yesterday, Today, and Tomorrow: 253
- Office Buildings: Insurance Co. of North America, New York City: 154. City Hall and Court House, St. Paul, Minn.: 154. Westchester County Office Bldg., White Plains, N. Y.: 155. Bell & Howell Camera Corp. Bldg., Hollywood, Calif .: 155. U. S. Senate Office Bldg., Washington, D. C .: 193. House Office Bldg., Washington, D. C.: 193, 194. Department of Commerce, Washington, D. C.: 200, 201. Department of Labor and Independent Establishments, Washington, D. C.: 202. Bureau of Internal Revenue, Washington, D. C.: 205. Department of Justice, Washington, D. C.: 206. Department of Agriculture Extensible Bldg., Washington, D. C .: 208. El Saquero, Westwood Village, Los Angeles, Calif.: 223. Federal Bldg., Boston: 352. Capitol, Bismarck, N. Dak .: 352. Providence County Court House, Providence, R. I.: 352. Proposed Providence Journal Bldg., Providence, R. I.: 352. R. C. A. Bldg., Rockefeller Center, New York City: 353. Christian Science Publishing Society Bldg., Boston: 353.
- "Old College," Cambridge, Mass., Conjectural restoration of; Samuel Eliot Morison; Perry, Shaw & Hepburn, archts.: 154
- Old Houses, Spain, from the drawing in penand-ink and wash by Carl W. Heilborn: Dec. Frontis.
- Olmsted Bros., landscape archts.: The Cleveland Museum of Art, Cleveland: 261
- Olvera Street, Los Angeles-Mexican Shops, from the study in sanguine crayon on charcoal paper by Carl W. Heilborn: Aug. Frontis
- Painter, The Dilemma of the, by Harold W. Rambusch: 171
- Parker, Jamieson: Rake, Riser, and Tread: I: 283. II: 361
- Pennsylvania Museum of Art, North Wing, Philadelphia; Horace Trumbauer, C. C. Zantzinger, C. L. Borie, Jr., archts. C. Paul Jennewein, sculptor; Leon V. Solon, colorist: 40
- Perry, Shaw & Hepburn; Samuel Eliot Morison, archts.: Conjectural restoration of "Old College," Cambridge, Mass.: 154

- Peters, Frazier Forman, designer: House of Rollin Kirby, Westport, Conn.: 345 Pew Ends: A Portfolio of: 237
- Pierson & Wilson, consulting archts.; Alexander B. Trowbridge, consultant; David Lynn, Archt. of the Capitol: Addition to Library of Congress, Washington, D. C .: 195
- Platt, Charles Adams, An Appreciation by Roval Cortissoz: 271
- Plumbing: Better Practice, by W. F. Bartels: 285, 357
- Pope, Office of John Russell, archt.: Proposed National Institute of Pharmacy Bldg., Washington, D. C.: 155. National Archives Bldg., Washington, D. C .: 207
- Portfolios: Exterior Lettering: 47. Entrance Driveways: 111. Corbels: 173. Pew Ends: 237. Gothic Niches: 301. Curtain Treatment at Windows: 363
- Portland Art Association, Portland, Ore.; A. E. Doyle and Associates, archts.: 155
- Post Office, Hempstead, L. I.; Tooker & Marsh, archts.; James A. Wetmore, Acting Supervising Archt, of the Treasury: 295
- Post Office, proposed, Milton, Pa.; Harry Sternfeld, archt.: 155
- Post Office Department, Washington, D. C.; Delano & Aldrich, archts.: 203, 204
- Providence County Court House, Providence, R. I.; Jackson, Robertson & Adams, archts .: 352
- Providence Journal Bldg., proposed, Providence, R. I.; Albert Kahn, Inc., archts. and engrs.: 352
- Publishing House, Christian Science Publishing Society, Boston; Chester Lindsay Churchill, archt.; Lockwood Green Engineers, Inc.: 353
- Publishing House, proposed, The Providence Journal, Providence, R. I.; Albert Kahn, Inc., archts, and engrs.: 352
- Putnam, Brenda, sculptor: Folger Shakespeare Library, Washington, D. C .: 211
- Rake, Riser, and Tread: I, by Jamieson Parker: 283. II: 361
- Rambusch, Harold W .: The Dilemma of the Painter: 171
- R. C. A. Bldg., Rockefeller Center, New York City; Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Fouilhoux, archts.: 353
- Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Fouilhoux, archts .: R. C. A. Bldg., Rockefeller Center, New York City: 353
- Rogers, James Gamble, archt.: Eye Institute, Columbia Presbyterian Medical Center, New York City: 155
- Savery & Scheetz, archts.: Administration Bldg., Lower Merion School District, Ardmore, Pa.: 33
- Saylor, Henry H .: The Century of Progress Exposition: 63. The Worcester Memorial Auditorium: 317
- Schools and Colleges: Administration Bldg., Lower Merion School District, Ardmore, Pa.: 33. Hunter College of the City of New York: 40. Conjectural restoration of "Old College," Cambridge, Mass.: 154. Proposed Westminster Choir Group, Princeton, N. J.: 352
- Schweizer, Otto Ernst, archt.: Stadium, Vienna: 154
- Shipman, Ellen, landscape archt.: House of Alfred Hopkins, Princeton, N. J.: 273
- Shreve, Lamb & Harmon, archts.: Bankers Trust Co. Bldg., New York City: Sept.

Frontis .: 127. Insurance Co. of North America Bldg., New York City: 154 Shreve, Richmond H.: The Bankers Trust

- Co. Bldg.: 127 Solon, Leon V., colorist: north wing, Pennsylvania Museum of Art, Philadelphia: 40
- Some Pitfalls in Supervision, by W. F. Bar-
- tels: XXXIII. Insulation and Acoustics; Elevators: 37. XXXIV. Elevators, Cont.: 71. XXXV. Ductwork: 169.
- Southwest, Spanish Architecture of the: 289 Spanish Architecture of the Southwest: 289
- "Spirit of Nursing, The," American Red Cross Bldg., Washington, D. C.; R. Tait McKenzie, sculptor: 41
- Springfield Safe Deposit & Trust Co., Springfield, Mass.; Thomas M. James Co., archts. and engrs.: 154
- Stadium, Vienna; Otto Ernst Schweizer,
- archt.: 154 Stairs: Rake, Riser, and Tread: I, by Jamie-son Parker, 283. II: 361. Self-supporting; Tilden, Register & Pepper, archts.: 362
- Stein, Clarence S., archt.; Henry Wright, assoc.: Sunnyside Gardens, Long Island: July Frontis.
- Sternfeld, Harry, archt.: Proposed Post Office, Milton, Pa.: 155
- ewart, Jack G.: Working Drawings: XXXVIII. Tennis Court Details: 69. Stewart, XXXIX. Squash Racquets and Squash Tennis Courts: 150
- Sunnyside Gardens, Long Island; Clarence S. Stein, archt.; Henry Wright, assoc.: July Frontis.
- Supervising Archt. of the Treasury; Bureau of Internal Revenue Bldg., Washington, D. C.: 205. Department of Agriculture Extensible Bldg.: 208. Institute of Health Bldg., Washington, D. C .: 209
- Supervising Archt. of the Treasury; Arthur Brown, Jr., archt.: Department of Labor Independent Establishments Bldg., and Washington, D. C.: 202
- Supervision, Some Pitfalls in, by W. F. Bartels: XXXIII. Insulation and Acoustics; Elevators: 37. XXXIV. Elevators, Cont.: 71. XXXV. Ductwork: 169
- Tabernacle, Church of Saints Simon and Jude, Bethlehem, Pa.; Henry D. Dagit & Sons, archts.: 355
- Termites and Buildings, by Jefferson M. Hamilton: 337
- These Houses We Live In; An Anonymous Lament: 213
- Thomas & Baker; Thompson, Holmes & Converse, Inc., assoc. archts.: Proposed Vocational Institute for New York State, Coxsackie, N. Y.: 41
- Thompson, Holmes & Converse; Charles B. Meyers, archts.: Hunter College of the City of New York: 40
- Thompson, Holmes & Converse, Inc.; Thomas & Baker, assoc. archts .: Proposed Vocational Institute for New York State, Coxsackie, N. Y.: 41
- Tilden, Register & Pepper, archts.: Selfsupporting stairway: 362
- Tooker & Marsh, archts.; James A. Wetmore, Acting Supervising Archt. of the Treasury: Post Office, Hempstead, L. I .: 295

Trees, When You Draw: 229

- Trowbridge, Alexander B., consulting archt.; Paul P. Cret, archt.: Folger Shakespeare Library, Washington, D. C .: 210, 211
- Trowbridge, Alexander B., consultant; David Lynn, Archt. of the Capitol; Pierson & Wilson, consulting archts.: Addition to Library of Congress, Washington, D. C .: 195

- Trumbauer, Horace, C. C. Zantzinger, C. L. Borie, Jr., archts.: North wing, Pennsyl-vania Museum of Art, Philadelphia: 40
- Union Club, New York City; Delano & Aldrich, archts.: 155 Union Terminal, Cincinnati, O.; Alfred
- Fellheimer, Steward Wagner, archts. and engrs.: 40, 41
- United Engineers & Contractors, Inc.; Paul P. Cret, archt.: Central Heating Station, Washington, D. C .: 207
- U. S. Public Health Service Bldg., Washington, D. C.; J. H. de Sibour, archt.: 209
- U. S. Senate Office Bldg., Washington, D. C.; David Lynn, Archt. of the Capitol; Wyeth
- & Sullivan, consulting archts.: 193 S. Supreme Court, Washington, D. C.: U. Cass Gilbert, archt.: 198, 199
- Vocational Institute for New York State, Proposed, Coxsackie, N. Y.; Thomas & Baker; Thompson, Holmes & Converse, Inc., assoc. archts.: 41
- Wagner, Steward, Alfred Fellheimer, archts. and engrs.: Union Terminal, Cincinnati, O.: 40, 41
- Washington Today, The City of, by Edwin Bateman Morris: 189 Westchester County Office Bldg., White
- Plains, N. Y.; Morris & O'Connor, archts .: 155
- Westminster Choir School Group, proposed, Princeton, N. J.; Sherley Warner Morgan, archt.: 352
- Jetmore, James A., Acting Supervising Archt. of the Treasury; Cram & Ferguson, Wetmore, assoc. archts.: Federal Bldg., Boston: 352
- Wetmore, James A., Acting Supervising Archt. of the Treasury; Tooker & Marsh,
- archts.: Post Office, Hempstead, L. I.: 295 Wilkinson, Marshall P., archt.: Bell & Howell Camera Corp. Bldg., Hollywood, Calif .: 155
- Wilson, Draver, and James N. Conway, designers: El Saquero, Westwood Village, Los Angeles, Calif .: 223
- Windows, A Portfolio of Curtain Treatment at: 363
- Worcester Memorial Auditorium, The, by Henry H. Saylor: 317 Worcester Memorial Auditorium, The, Worces-
- ter, Mass.; L. W. Briggs Co., Frederic C. Hirons, assoc. archts .: Dec. Frontis., 317
- Working Drawings, by Jack G. Stewart: XXXVIII. Tennis Court Details: 69. XXXIX. Squash Racquets and Squash Tennis Court: 150
- Wright, Henry: Housing-Where, When, and How?: 1. I. The Blight of Our Cities: 2. II. Where Shall We House?: 10. III. Blight Rehabilitation: 15. IV. Visualizing Rehabilitation of the Possibilities of Blighted Areas: 30. V. The Case for Group Housing: 79. VI. Enter the Group Dwelling: 104
- Wright, Henry, assoc.; Clarence S. Stein, archt.: Sunnyside Gardens, Long Island: July Frontis.
- Wyeth & Sullivan, consulting archts.; David Lynn, Archt. of the Capitol: U. S. Senate Office Bldg., Washington, D. C .: 193
- York & Sawyer, archts.: Department of Commerce, Washington, D. C .: 200, 201
- Zantzinger, Borie & Medary, archts.: Department of Justice Bldg., Washington, D. C .: 206
- Zantzinger, C. C., C. L. Borie, Jr., Horace Trumbauer, archts .: North wing, Pennsylvania Museum of Art, Philadelphia: 40