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J U L Y

THE ARCHITECTURAL RECORD

ELECTIONS OF THE AMERICAN INSTITUTE OF ARCHITECTS

At the Sixty-seventh Convention of the American Institute of Architects, held May 28-30 in Milwaukee, Stephen F. Voorhees, chairman of the Construction Code Authority, was elected the new president. He is a member of the firm of Voorhees, Gmelin and Walker, of New York, which has designed many notable buildings. He succeeds Ernest J. Russell of St. Louis.

Other officers for 1935-6 are: first vice president, Louis LaBeaume, St. Louis; second vice president, Francis P. Sullivan, Washington, D. C.; treasurer, Edwin Bergstrom, Los Angeles; secretary, Charles T. Ingham, Pittsburgh. The following have been chosen regional directors to serve three years: Great Lakes Division, Walter R. McCornack, Cleveland; Western Mountain Division, William H. Crowell, Portland, Ore.; Middle Atlantic Division, William G. Nolting, Baltimore, Md.

Carl Milles, sculptor and professor of sculpture at Cranbrook Academy of Art, Cranbrook, Mich., and Harold R. Shurtleff of Boston have been elected to honorary membership in the Institute. Mr. Milles relinquished his post as professor of sculpture in the Royal Swedish Academy of Art three years ago to join the Cranbrook colony; he has designed the Indian figure representing peace which is to be executed in Mexican onyx and which will stand thirty-five feet tall in the new city hall at St. Paul. Mr. Shurtleff was designated as an architect to determine the historical background for the restoration of Williamsburg, Va., by John D. Rockefeller, Jr.; he also has assisted Samuel Eliot Morison, professor of history at Harvard, in the writing of a history of that University.

The following fellows of the Institute have been elected: Robert Seeley De Golyer and William Jones Smith, Chicago; Alfred Fellheimer, Frederick Augustus Gold, Philip L. Goodwin and Henry Stuart Waterbury, New York; Walter R. McCornack, Cleveland; Floyd A. Naramore and Harlan Thomas, Seattle; Rudolph Weaver, Gainesville, Fla.

APPRAISING THE A. I. A. CONVENTION

By WILLIAM STANLEY PARKER, F.A.I.A.

What really happened of significance? Is the profession, as expressed in the actions of its national organization, stepping forward with the times, standing still, or, through failure to grasp the significance of present-day tendencies and problems, actually slipping backward under the current of progress?

This Institute Convention, like many in the past, will, to any given eye, probably yield evidence supporting both conservative and progressive tendencies, but different eyes may well differ on the character of the evidence. Judgment is affected by interest, and architects are not all interested in the same things. That, as I presumed to demonstrate a dozen years ago in the pages of the Institute Journal, is why so many architects complain annually about the Convention procedure, each architect finding so much time spent on subjects that do not interest him.

My imaginary conversations around the Secretary's Table were, however, well documented by letters from those who took part in the discussions and these letters clearly established the fact that while the profession, and therefore the Institute, is vitally interested in a wide variety of subjects, each individual architect actually is deeply interested in only a few of the basic elements of the complicated service which he is called upon to render. If, therefore, as generally happens, the Convention deals to some extent with most of the important problems of the profession, each delegate finds himself most of the time listening to discussions on phases of the profession which do not greatly interest him, and quite naturally concludes that the Convention has been badly handled by presenting dull speakers on subjects of no particular importance. Unfortunately, however, for those who administer our Conventions, there is no agreement as to which subjects are unimportant and uninteresting.

With this in mind I approach the problem of the recent Convention with a desire to analyze it from the imaginary point of view of a "composite" architect, one who, like a group of diversified partners, holds a broad and inclusive interest in the varied manifestations of the profession. Having thus scanned the results of the Convention, it may be profitable to look ahead and formulate what should be, what perhaps is, the program of the Institute for the coming year.

The Convention undoubtedly fell under the somewhat ominous spell of By-Law Amendments, as has happened with other Conventions within my memory. In fact this item on the program afforded, to one with a good memory, an example of poetic justice as amusing as it evidently was unconscious to the chief participant.

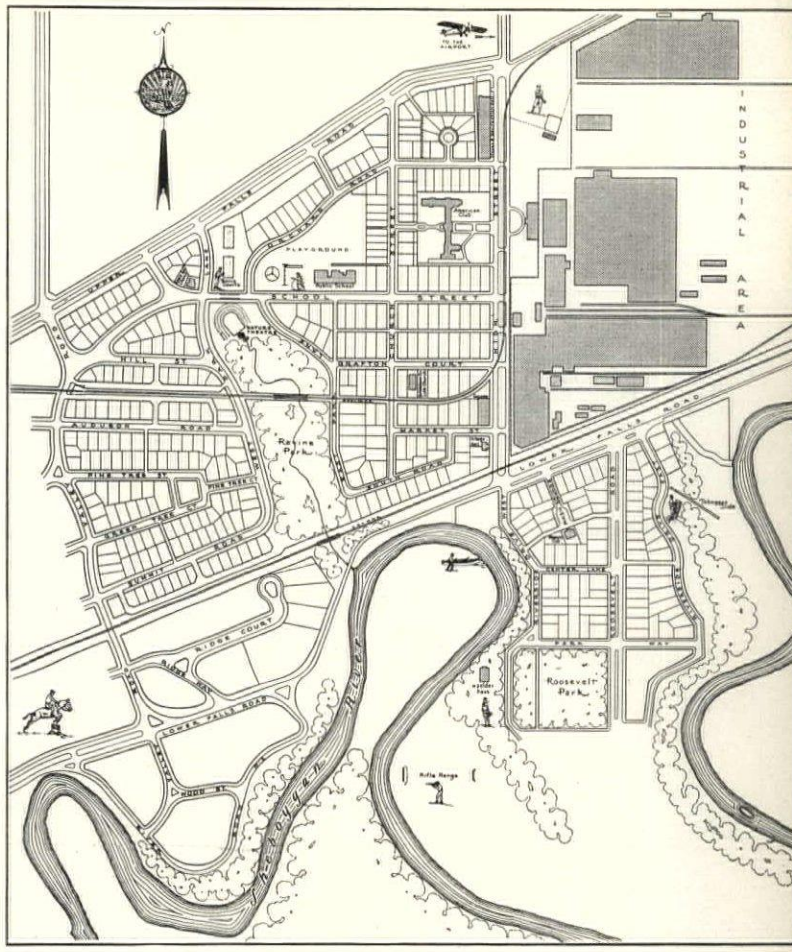
Many years ago a painstaking committee brought before a Convention a thoroughly prepared and also a quite complete revision of the By-Laws, in accordance with general instructions of the previous Convention. It was the result of a long year's work, involving countless hours of study and effort. The delegates in Convention assembled picked it to pieces and the chairman of the committee saw his year's work come to precisely nought, the whole matter being turned over to a new committee for a fresh start.

In Milwaukee the Convention was presented with as carefully and laboriously prepared a document on By-Law Amendments as has ever been presented to any Convention, in accordance with precise instructions of the last Convention. But when the results of these instructions were studied, the Institute indulged in what Vice President Maginnis, from the chair, characterized as a form of self criticism, changed its aggregate mind, and again picked the suggested changes to pieces. After approving the amalgamation of the Constitution and By-Laws into a single set of By-Laws, it slightly amended the existing provisions relating to State Societies and to Junior Members, and handed the remains back to the Board for the complete redrafting made necessary by the rejection of the major membership amendments which had been proposed. All unconscious of the historic parallel in which he was involved, the accepted floor leader of the assault on the proposed amendments was the chairman of the committee who years ago had seen his own handiwork similarly treated.

All this gave to the writer a certain entertainment which normally is absent from the process of amending By-Laws. It's dull work at best, albeit necessary from time to time. A reasonable number of fleas is good for a dog, keeps him from broodin' on bein' a dog. Even so with by-law amendments and a Convention; but enough is enough and the recent Convention suffered from a surfeit.

The program, realizing the importance of these amendments left several sessions open for these and other items, at the expense perhaps of time that might have been spent listening to stimulating papers on present-day tendencies in design or other phases of architectural practice. These certainly would have avoided the irksome roll-calls with which several sessions were afflicted, to an extent not equaled within the memory of the oldest delegate.

One thing, however, must be said for the by-law amendments this year—they did not concern themselves solely with the internal mechanism of the Institute. They involved the entire structure of the profession. They represented an effort to accomplish the mandate of the last Convention and provided a means by which any "State Societies, other unaffiliated architectural organizations and individuals" might affiliate with the Institute in order to effect "the unification of the entire architectural profession in a single strong national organization." Here was a task worthy of the undivided attention of any convention of architects. A lecture on aesthetics, however compelling, would have to yield in



KOHLER VILLAGE IN WISCONSIN — "THE MOST DELIGHTFUL EXPERIENCE OF THE CONVENTION"

importance to an effort involving the future solidarity and effectiveness of the profession.

And in the light of present-day conditions is any other effort of more importance to the profession? Unless a clear affirmative answer to this question is forthcoming, it is a little hard to justify criticism of the Convention on this score. And after all there were other events of interest. The first afternoon session dealing with the relation of the architect to government agencies was certainly of vital interest to the members of the Institute. The official representatives of the government agencies gave clear and forceful statements, and by no means unfriendly ones, and the concluding report by the chairman of the Committee on Public Works was admirable and gives promise of being a firm foundation on which to build a structure of fair workable relationships between the many Federal agencies and the profession in the coming years.

The evening session devoted to the report of the Committee on Education disappointed me only in its failure to develop some discussion that might have further illuminated the problems and procedures of the new mentor system, probably as difficult to develop as it is desirable. But each year, as I listen to the committee's report of progress, I am impressed with the fact that this important department of Institute activity has made amazing strides forward and is accomplishing far-reaching results for the benefit of American architecture and the related arts, not alone through improved processes of education within the profession but in the development of a wider and more intelligent appreciation of the fine arts among the teachers and students of our American colleges. Here is a splendid work made possible by the Carnegie Foundation as well as by special Institute funds, for the initiation and management of which the Institute may well be proud as well as grateful for the many years of constructive service of a devoted group of members who have made a real contribution to the profession through their service on the Committee on Education.

I think for most of the delegates, the trip to Kohler Village remains in their memories as the most delightful experience of the Convention, the most successful excursion of its kind that I can remember. Between two indifferent cloudy and rainy days Wednesday came clear and sparkling. The management of the trip was equally perfect.

At the luncheon we were given a first taste of the quality of the village by the little costumed flower girls and the daughters of the village who, after ministering to us at table, regaled us with some charmingly rendered quartettes. These children and young people seemed to radiate the happiness and contentment that the village in every aspect suggests.

A trip through such a plant as that at Kohler is inevitably impressive. The orderliness and system, the

Photographs © The Milwaukee Journal

ARCHITECTS AT THE MILWAUKEE CONVENTION, FROM LEFT TO RIGHT: RUSSELL S. WALCOTT (CHICAGO), ARTHUR S. COVEY (NEW YORK), ELLIS F. LAWRENCE (OREGON), EMERY STANFORD HALL (CHICAGO).

multiplicity of departments, the varied and fascinating techniques so highly developed, culminating in the glazing process with its Brobdingnagian pincers that picked the glowing fixture out of the furnace, set it neatly on its turntable to be powdered with silica, then back into the furnace for a few moments only to be again retreated, powdered, and again fired.

The village itself is perhaps no more than many another well designed small house development, and there are many in various parts of the country. This one is old enough to have given an impulse to many others. The houses are excellent of their kind and marked with a restraint too often lacking in commercial developments, but their superiority in design is not the chief significance of Kohler Village. This seems to me to lie in the general community atmosphere that has been created, the conjunction of a large well administered industry with the social amenities of a small country village, not just Topsy-growed, but planned so as to provide for the unmarried as well as the family groups and for the joint community activities as well as the quiet privacies of family life.

It is well urged that the success of the current housing projects being developed under PWA will depend upon the character of their management. Kohler Village seems adequate proof of this. Can one escape the conviction that underlying its atmosphere is something imparted by the spirit of its founder who continues to guide the policies of its administrations, something of democratic friendliness and social equality in spite of wide variations of income? Superabundant wealth that permits the scale of hospitality accorded us in Mr. Kohler's house seems able to march hand in hand with equality in voting, sports, and other community affairs.

What, then, in brief, happened at the Convention?

Our relations with government agencies were clarified and a well conceived program for the future was outlined. Its approval may be symbolized by the election of its author as the second Vice President.

The Institute's Education Committee marked another step forward in its admirable program.

We met once more with the Producers' Council which looks ahead to enlarged membership and activity, and saw a sample of what an enlightened producer can develop in the way of by-products.

We didn't listen to impassioned pleas for more recognition of functionalism in design but we saw and felt the human result of straight-forward functionalism in community design and intelligence in community management.

We took another step along the difficult road of unification; shorter than last year's Convention suggested but nevertheless a step in the same direction, and time will prove its wisdom or correct its mistake.

And we called upon the Construction League to recognize its position of leadership and pledged the Institute's support of efforts to effect a real coordination of the construction industry, the responsibility for which, following the Supreme Court decision, again rests with the Construction League. Before this is printed the League will have taken its first step at the meeting of the General Assembly called for June 17.

What should constitute the main features of the Institute's program for the coming year?

With the normal continuance of its regular activities, as expressed in its standing committees, there seem to me to be three major demands upon the Institute in its service of the profession during the coming months:

(1) Develop the utmost possible results of the Convention's action concerning State Societies, and devise the next step towards a desirable unification.

(2) Develop harmoniously with the government agencies the program outlined in the report of the Committee on Public Works.

(3) Marshal the utmost, in counsel and in active support, that the Institute can offer to the Construction League, which faces a most urgent task calling for enlightened and constructive leadership.

Here is challenge enough to the Institute.

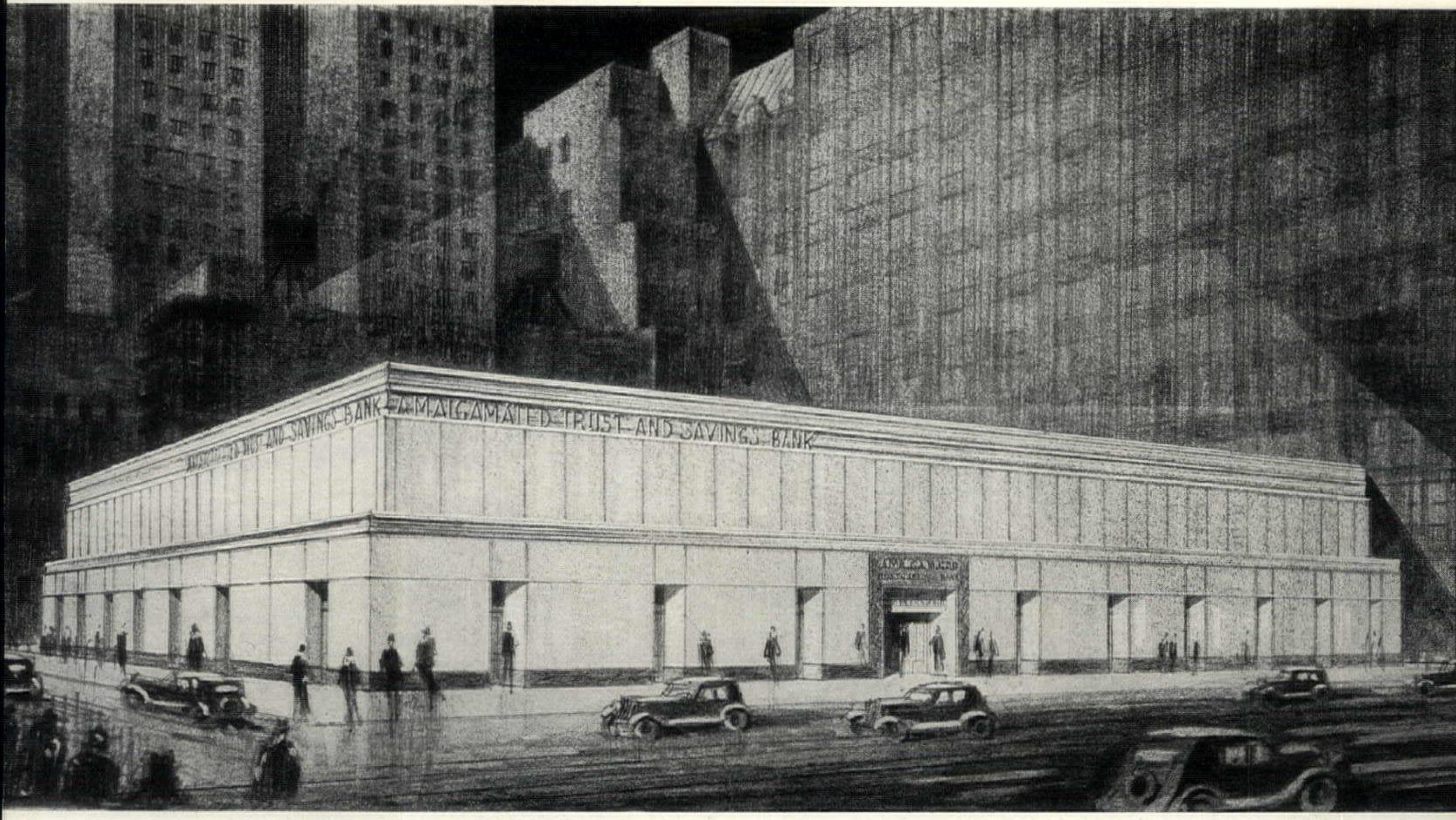
Photograph by Hedrich-Blessing Studio

MAIN ENTRANCE TO FOYER LEADING TO BANK ON SECOND FLOOR

PORTFOLIO

BANK AND SHOPS IN CHICAGO
HOLABIRD AND ROOT, ARCHITECTS

Photographs by Hedrich-Blessing Studio



HOLABIRD AND ROOT, ARCHITECTS

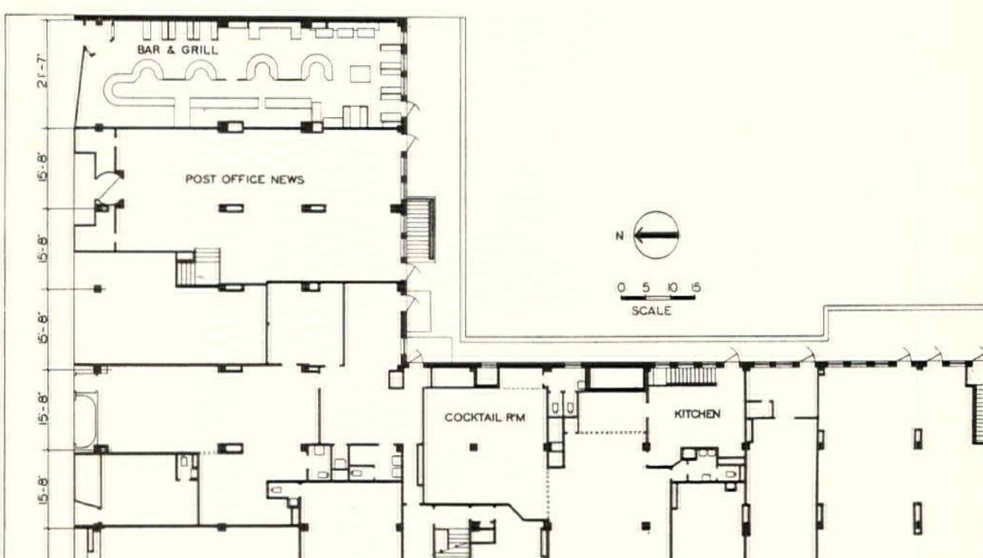
This "taxpayer" replaces the old 7-story Guardian Bank Building and 11-story Adams Express Building on the southeast corner of Monroe and Dearborn Streets, located in the heart of Chicago's business Loop. The new building has two stories and basement for shops, offices, and the bank. It fronts 131½ feet on Monroe Street and 190 feet on Dearborn Street. The first story completely covers the property. The second story is set back from the street line approximately 5 feet and is 65 feet deep in both wings. The first story is 13½ feet in the clear, the second generally 12 feet with a portion 15 feet clear. The materials are glass and stainless steel. The building is air conditioned with individual control, the windows being completely sealed with heads on line with ceilings.

Left:

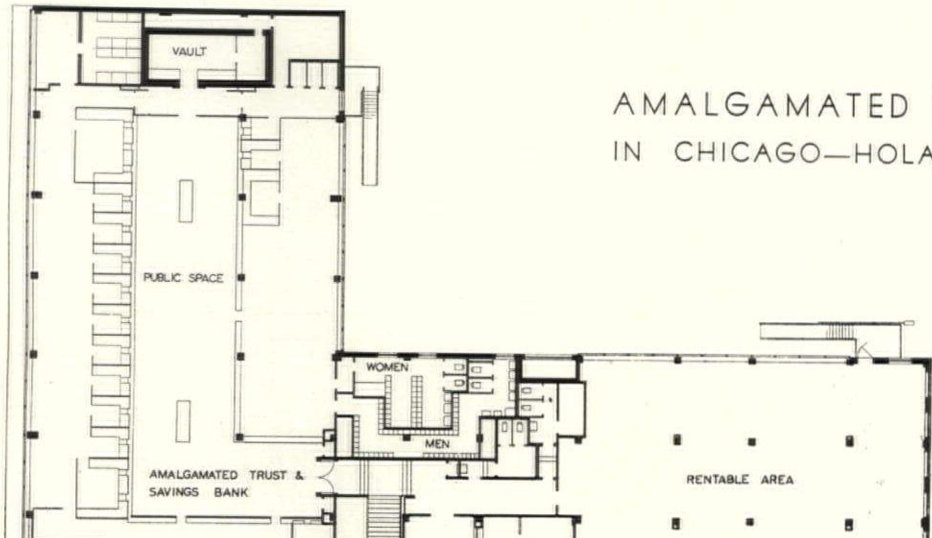
ENTRANCE TO BANK ON SECOND FLOOR

Photographs by Hedrich-Blessing Studio

MAIN BANKING ROOM

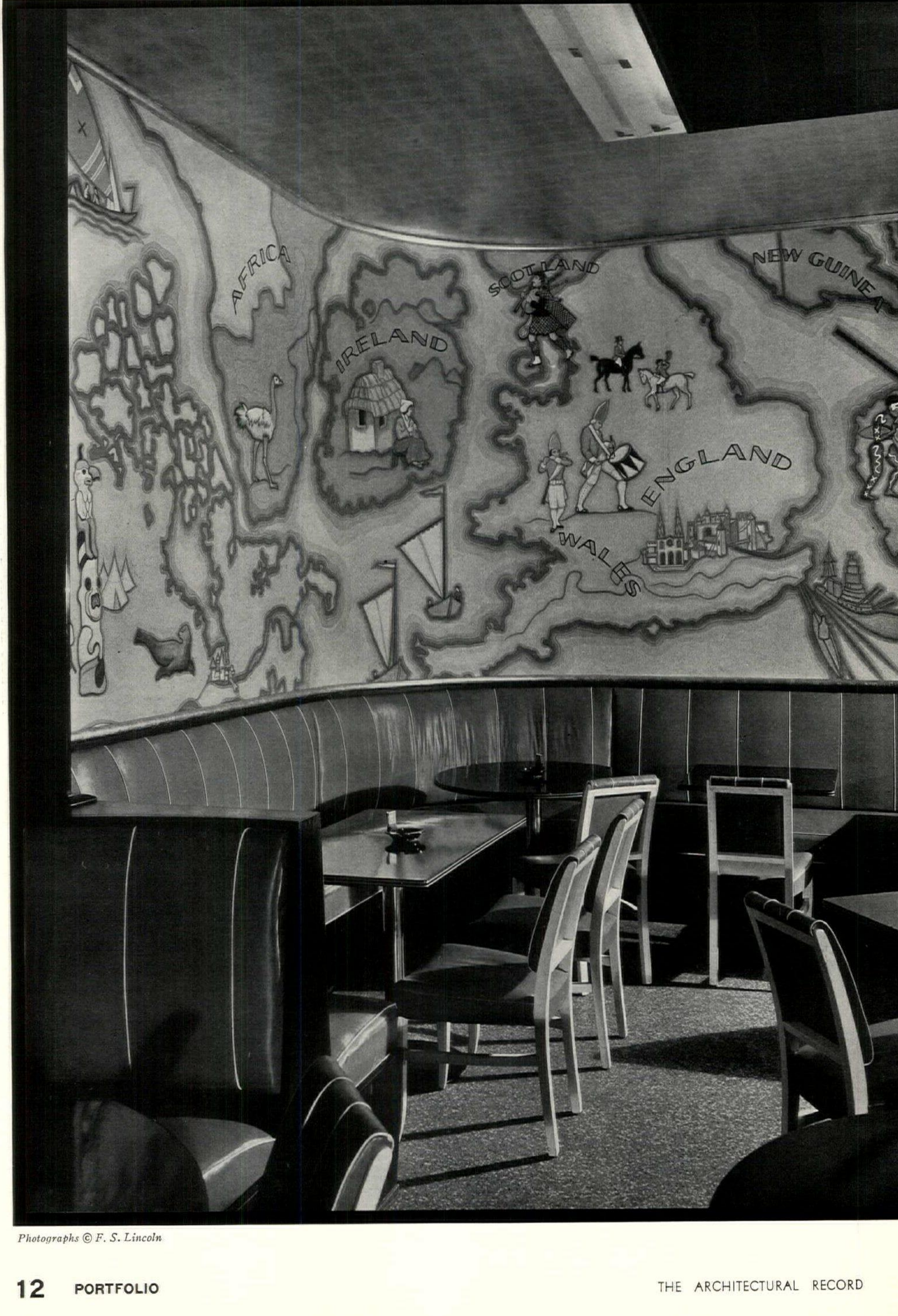


DETAIL OF BANK VAULT



SECOND FLOOR PLAN

AMALGAMATED TRUST & SAVINGS BANK IN CHICAGO—HOLABIRD AND ROOT, ARCHITECTS



Photographs © F. S. Lincoln

MAYFAIR RESTAURANT
CAFE OF ALL NATIONS

WASHINGTON, D. C.

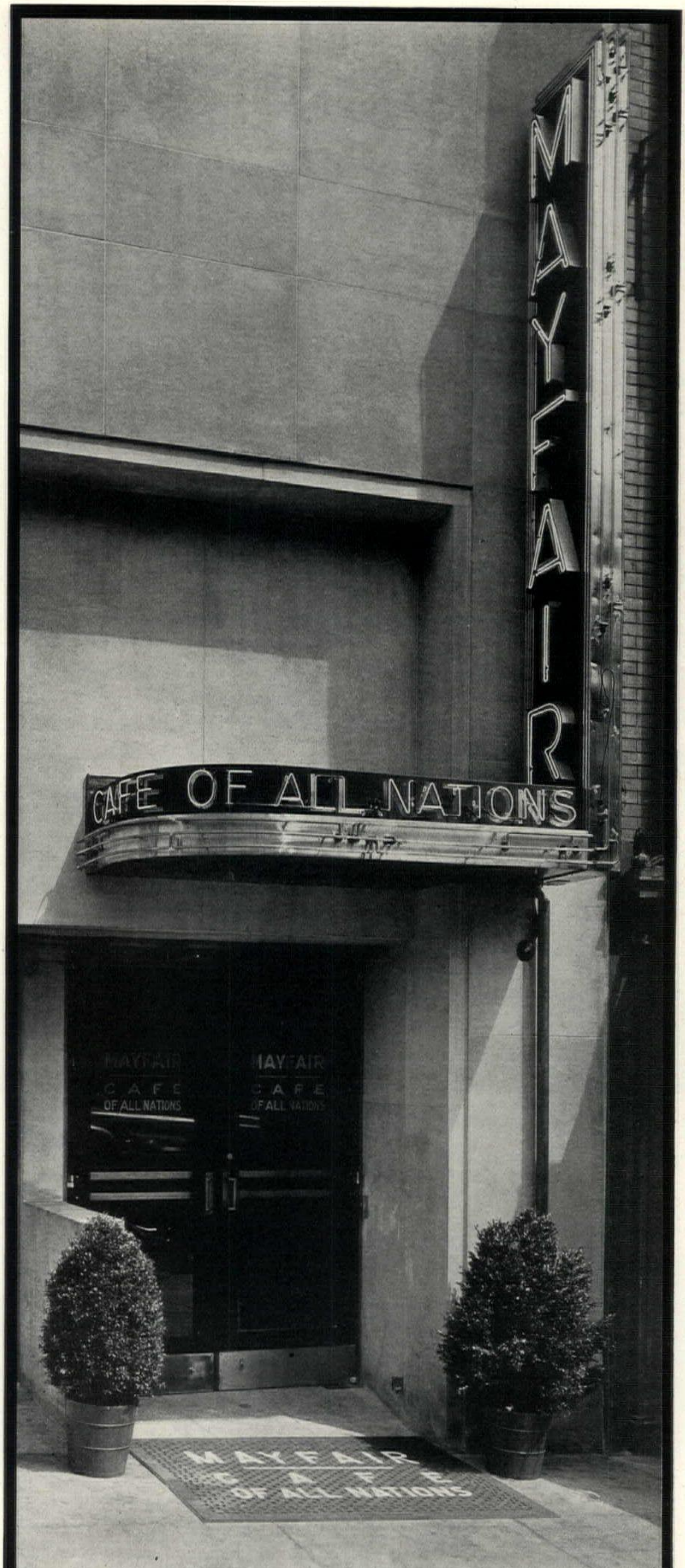
JOSEPH URBAN ASSOCIATES
IRVING L. SCOTT & OTTO TEEGEN
ARCHITECTS

This new café and restaurant occupies the complete basement of the Remington Rand Building and is entered by a vestibule. The check-room, washrooms, an elevator to the upper floors of the building, and the entrance to the main dining space, all lead from this area. (See plan on page 15.)

A novel method of displaying food and serving the patrons has been inaugurated in the Mayfair. The entrance side of the main room contains a display counter on which all foods available on the menu are shown in an attractive manner. The patrons view the food, then take a table where a waiter takes their order. The waiter then goes to the rear of the counter, which contains steam tables and hot plates and brings the food to the table.

The benches along three walls are upholstered in a deep blue-green fabricoid, as are the chairs. The woodwork of the chairs is white, while the tables have black formica tops and chromium-plated pedestals. All wainscoting and bench woodwork are painted in black lacquer. Along one of the long walls an arrangement of circular alcoves provides an intimate grouping for parties of six or eight persons. These alcoves are separated from each other by vertical sheets of black glass, reaching from the top of the benches to the ceiling.

In the main dining room, that part of the ceiling which is suspended is painted black. It is made of acoustic material in 12-inch blocks. The restaurant is air conditioned throughout, the fresh air outlet being contained in the suspended ceiling and the exhaust ducts under the bench seats. The entire source of light comes from the ceiling fixtures. Not only does each free-standing column in the main room terminate in a glass fixture comprising three sheets of projecting frosted glass, but a continuous fringe of two layers of frosted glass follows the perimeter of the suspended ceiling and provides good light for the outer edge of the room and the murals. The fixtures in the other rooms are flush with the ceiling.

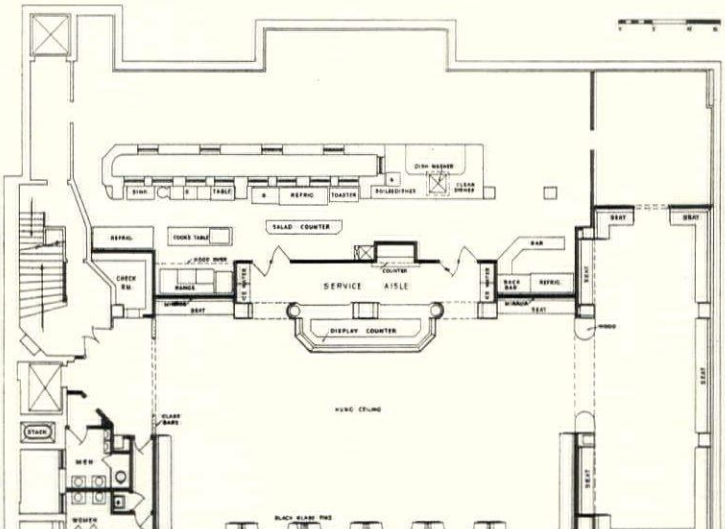


Photographs © F. S. Lincoln

MAYFAIR RESTAURANT—CAFE OF ALL NATIONS
WASHINGTON, D.C. . . . DESIGNED BY JOSEPH URBAN ASSOCIATES

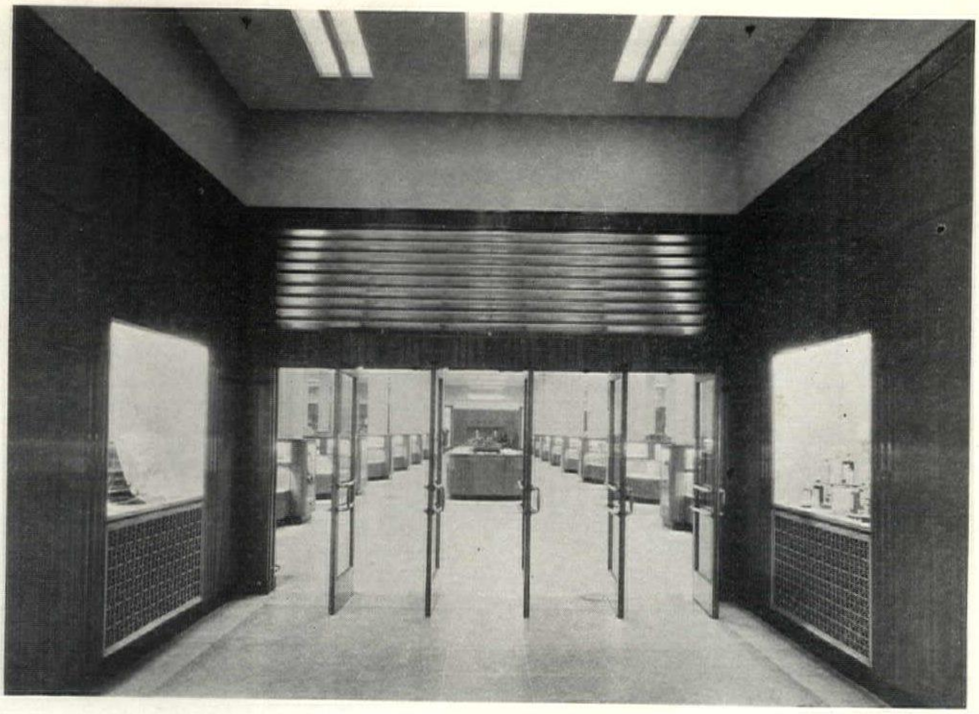
The walls are resplendent with murals depicting the life of various nations—a subject most appropriate for Washington, the residence of ambassadors and important representatives of all foreign countries. Of those countries chosen, a sufficient contour of each serves as a background on which are superimposed scenes and customs pertaining to the various regions of that country. In the mural of France, for example, the outline of the country can be seen with portions of its near neighbors such as Belgium, Germany and Switzerland. The Arc de Triomphe rises out of the spot where Paris would appear on such a map; a palace and an 18th Century cavalier dancing a minuet are placed further south at Versailles. We see the vintage on the west coast near Bordeaux, shepherds with their sheep in the Basque region, the ramparts at Carcassonne, villas along the Riviera, agricultural pursuits in the formerly devastated region of the north, transatlantic steamers sailing from Le Havre and fishermen along the west coast taking off for the Great Banks. Great Britain, Italy, Spain, South America and India are among the countries described in separate murals. Other nations are represented in a long mural, placed directly over the display counter, which shows natives dressed in the costume generally associated with the individual countries, each bearing the flag of his nation.

MURALS BY JOSEPH URBAN STUDIOS

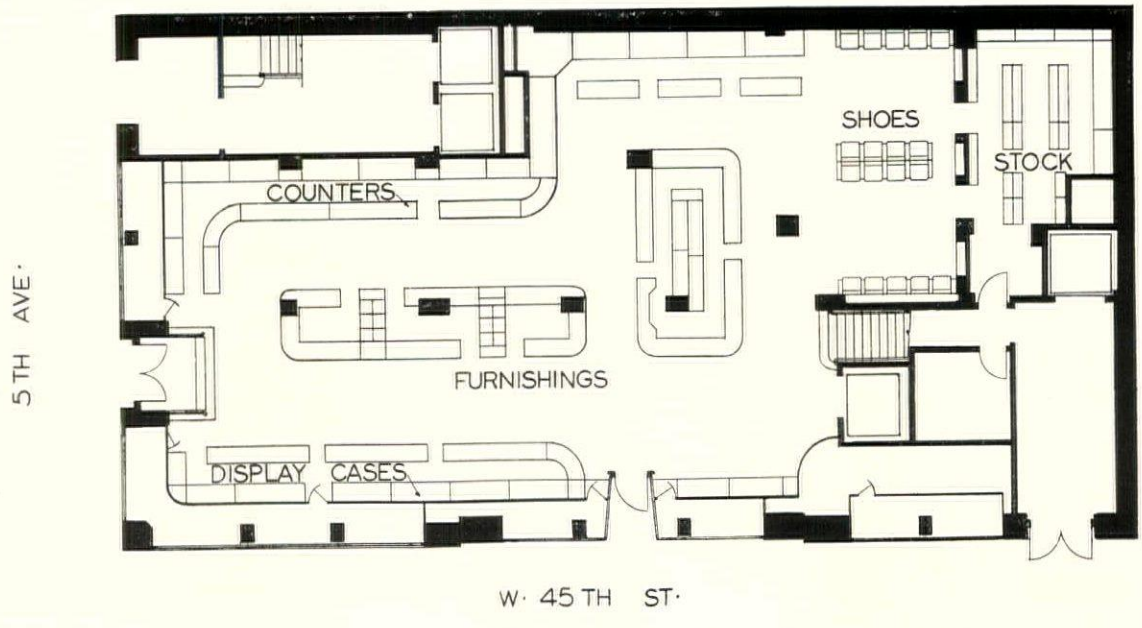


TAYLOR STORE
CLEVELAND

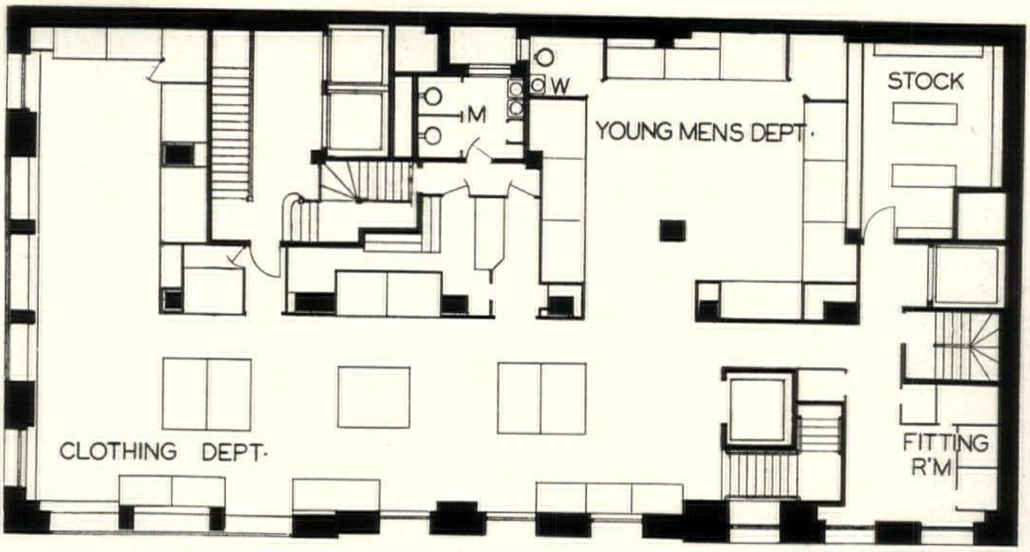
WALKER AND WEEKS
ARCHITECTS



Photograph by Peyser and Patzig

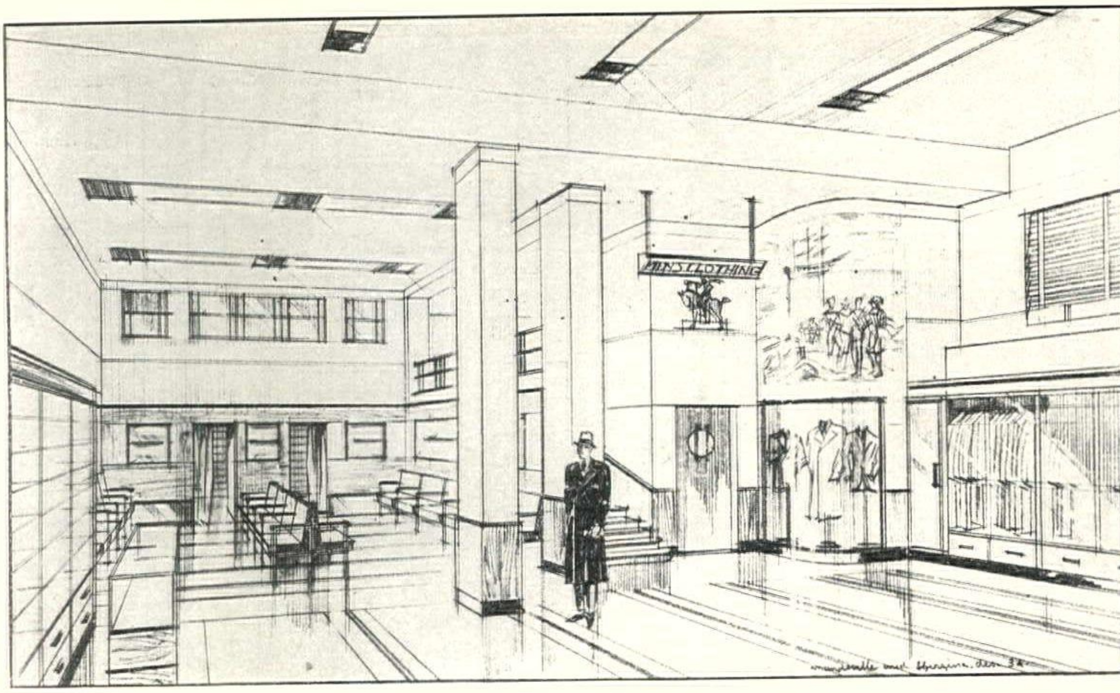


SECOND FLOOR PLAN

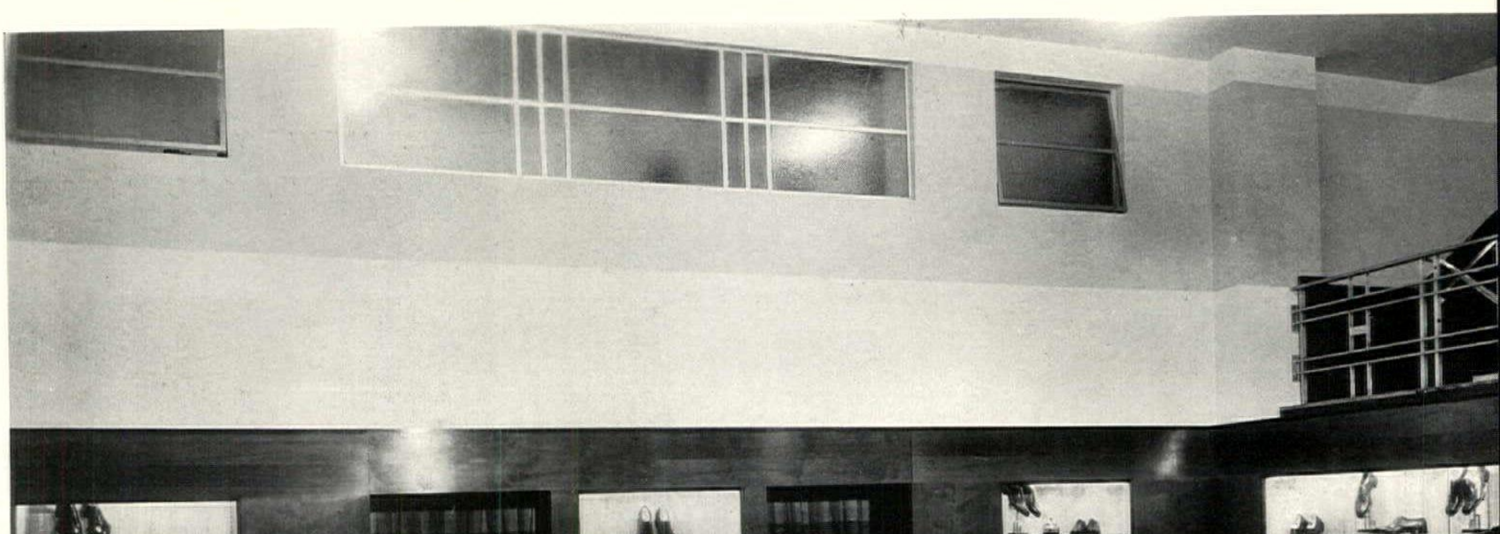


WALLACH'S STORE . . . . . NEW YORK CITY
DESIGNED BY STARRETT AND VAN VLECK, ARCHITECTS

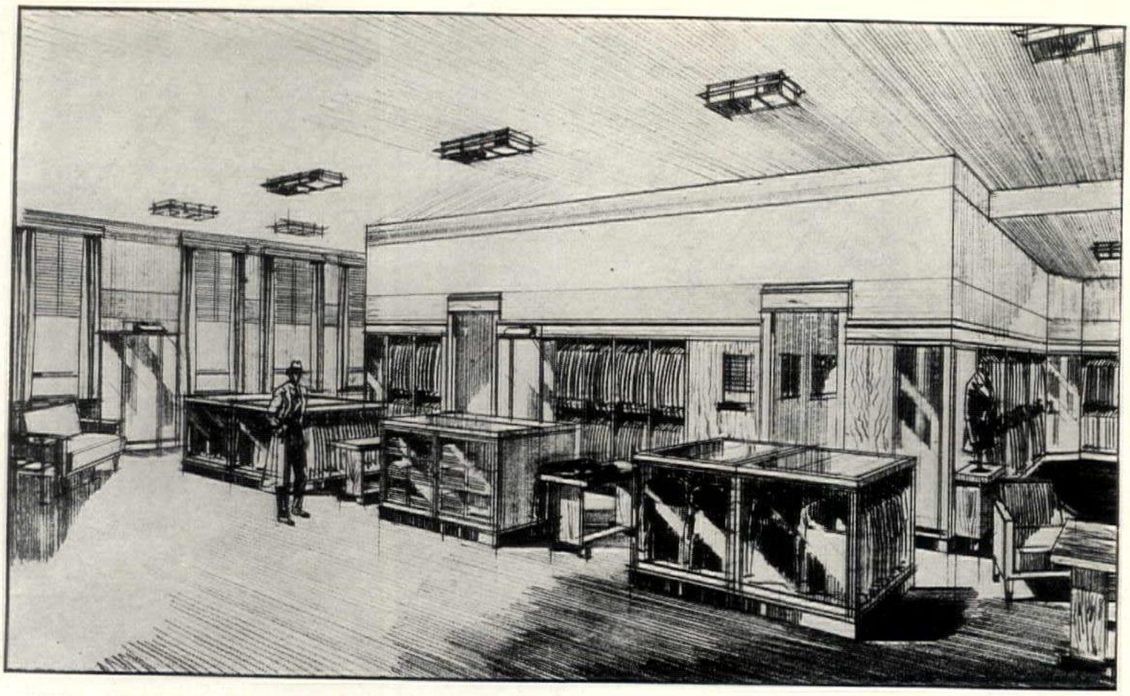
WALLACH'S STORE IN NEW YORK



SHOE DEPARTMENT AT REAR OF STREET FLOOR



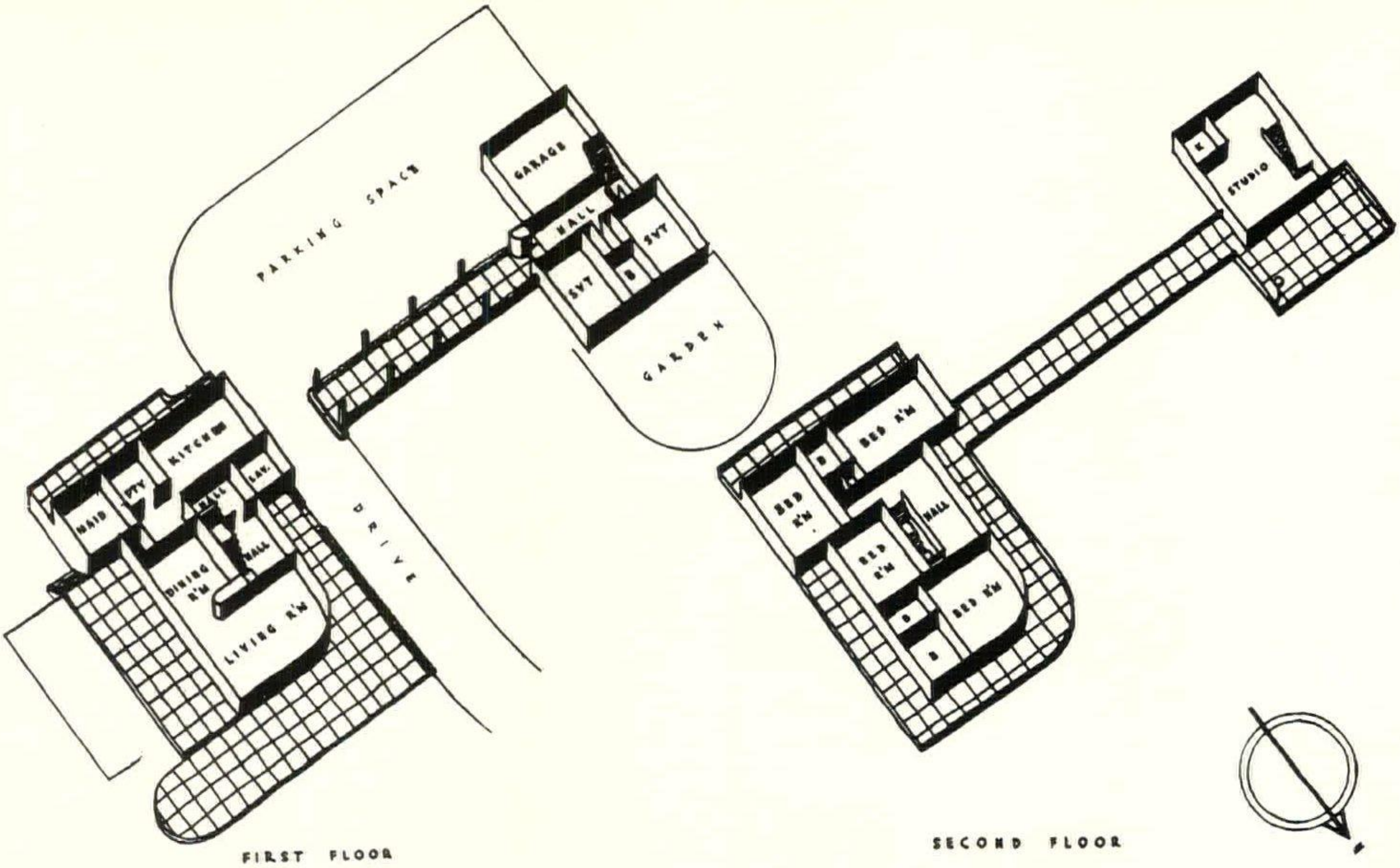
Photographs by Worsinger



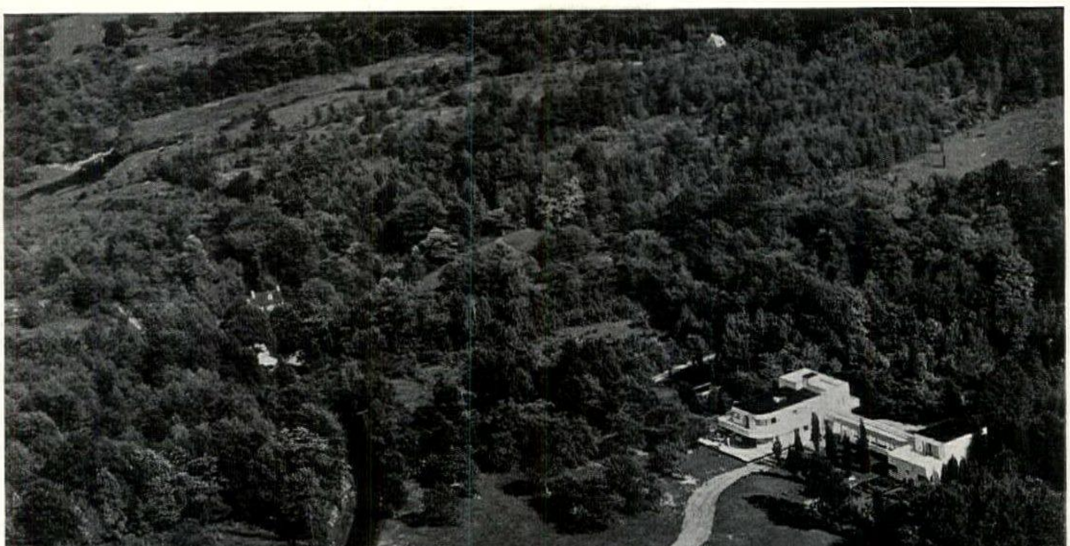
VIEW OF SECOND FLOOR LOOKING TOWARD 5TH AVENUE

MANDEVILLE & SFORZINA DESIGNERS OF INTERIORS

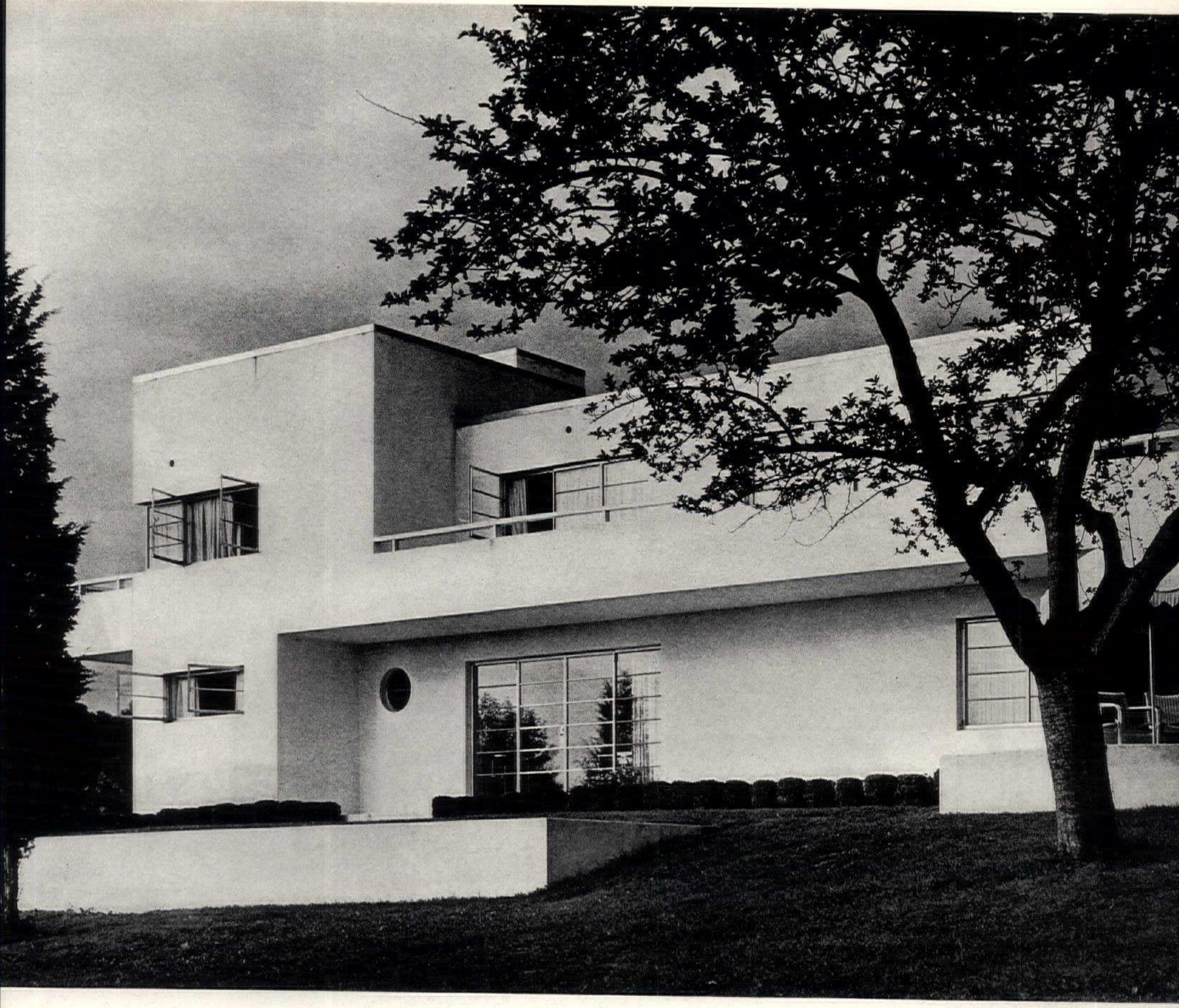
STARRETT & VAN VLECK ARCHITECTS

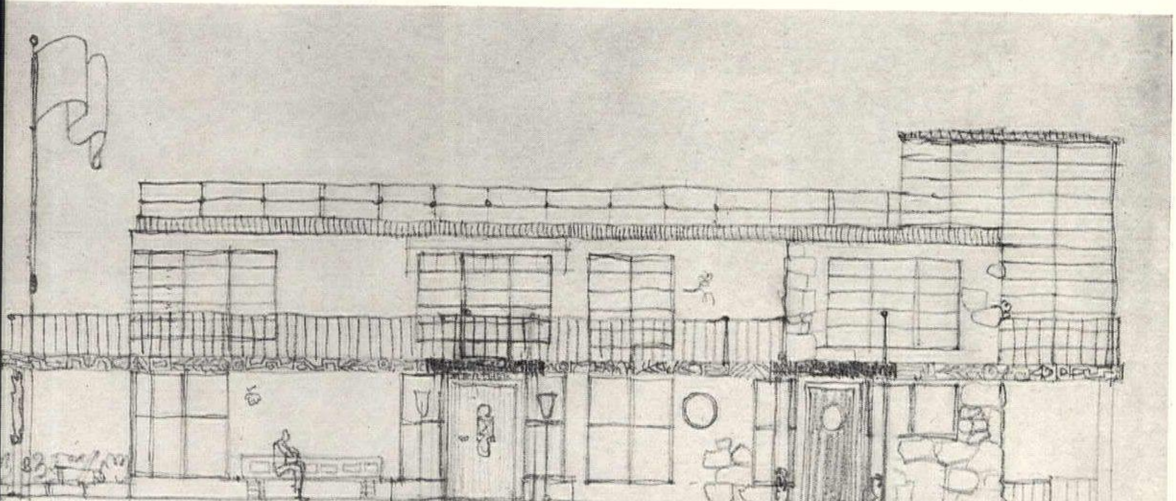


CONTEMPORA HOUSE ROCKLAND COUNTY, NEW YORK
PAUL LESTER WIENER, DESIGNER



Photograph by McLaughlin Aerial Surveys





EAST FACADE, SHOWING DINING TERRACE

DESIGN SKETCH BY JOSEPH HOFFMANN OF VIENNA, WHICH WAS USED BY MR. WIENER AS INSPIRATION FOR A NEW DESIGN FOR NEW CONDITIONS.

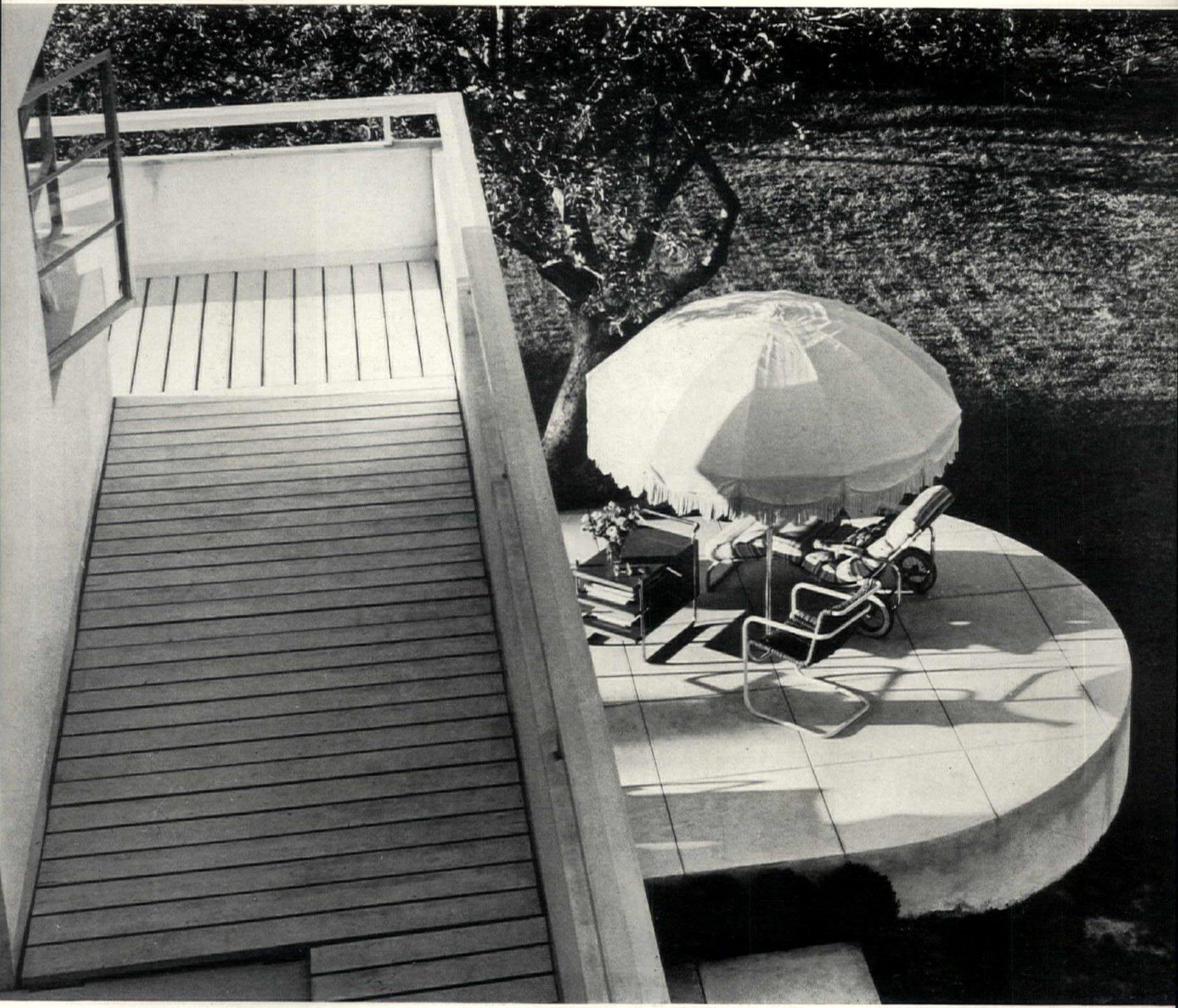
LIVING ROOM TERRACE

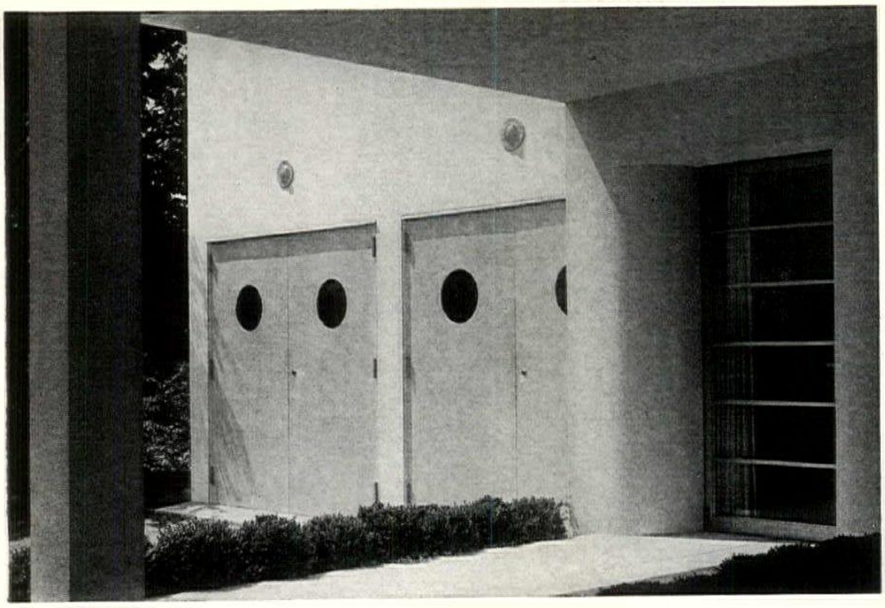
CONTEMPORA HOUSE . . . DESIGNED BY PAUL LESTER WIENER

The exterior is finely grained stucco, in an off white shade, applied over porous cinder blocks. The stucco is highlighted with thin bands of aluminum coping and with aluminum posts supporting the white wood terrace rails. One third of the wall space is broken by window or door casements of specially designed noncorrosive aluminum. The pitch of the almost flat roofs is inverted, and water drainpipes built into the walls in the center of the house. This feature removed the need for leaders on the façade.

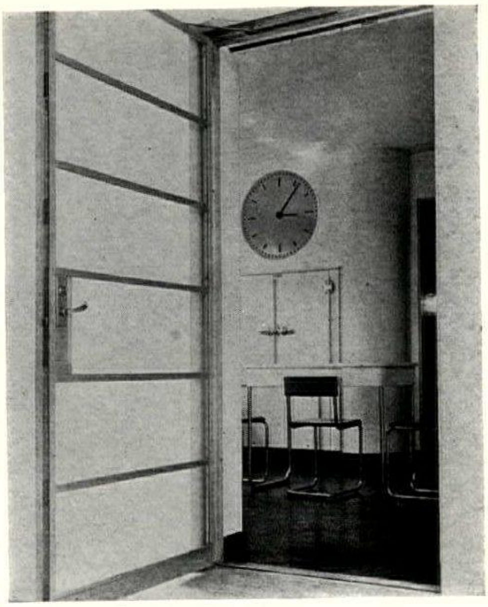
The main section of the house and what is known as the studio building are connected by a terraced passageway. The smaller section can be maintained independently, as it contains a bath, two bedrooms and kitchenette, in addition to the 24′ by 32′ studio; it has a thermostat control connected with the oil burner in the main house. The two buildings contain 14 rooms and 4 baths in all, each room opening on a terrace.

VIEW FROM UPPER TERRACE



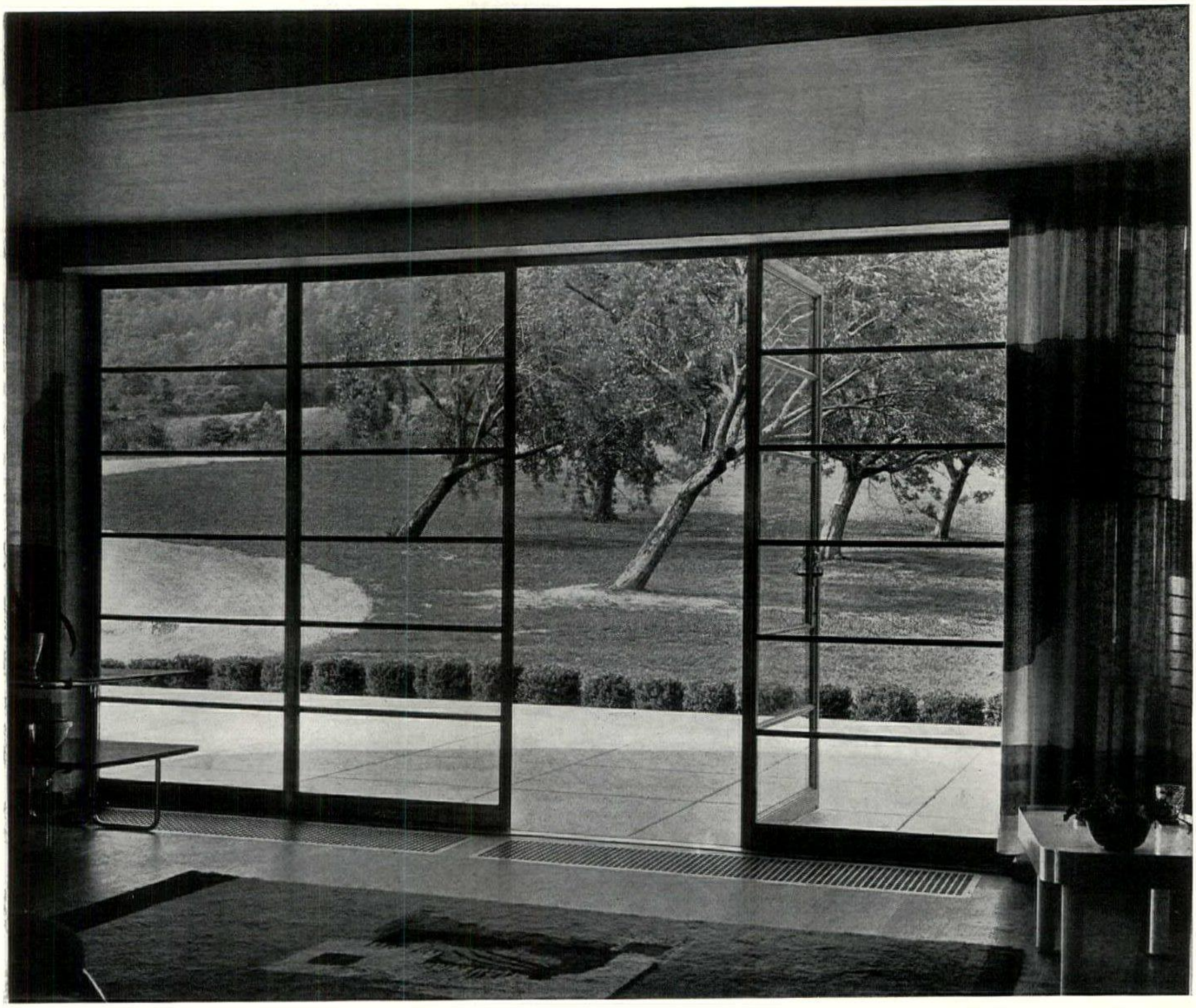


GARAGE DOORS AND STUDIO ENTRANCE



VIEW INTO KITCHEN

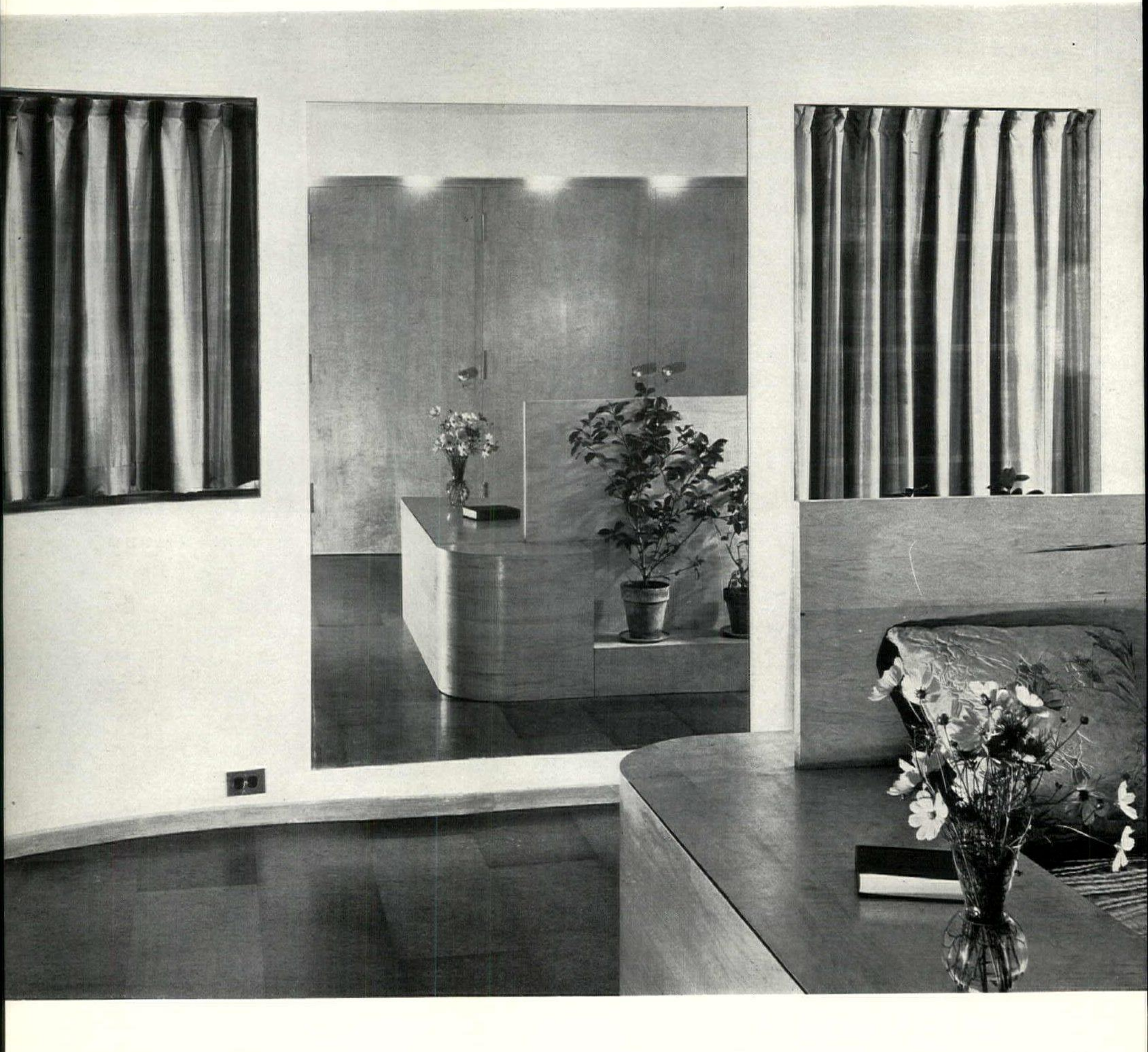
LIVING ROOM: Specially designed aluminum window and door casements, with light cove above.



DINING ROOM

CONTEMPORA HOUSE . . . DESIGNED BY PAUL LESTER WIENER

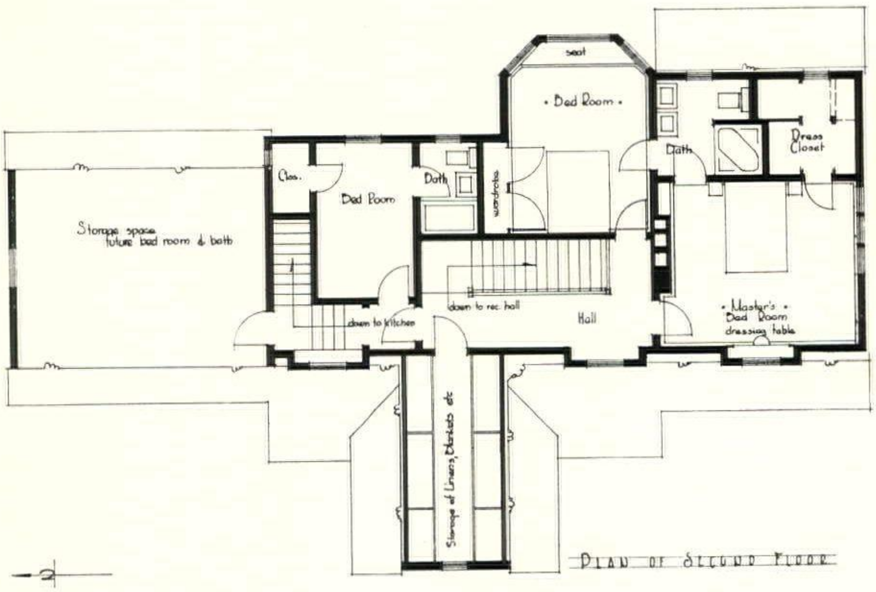
MASTER BEDROOM: High back of bed lacquered Chinese red; window curtains shaded from gray to blue.

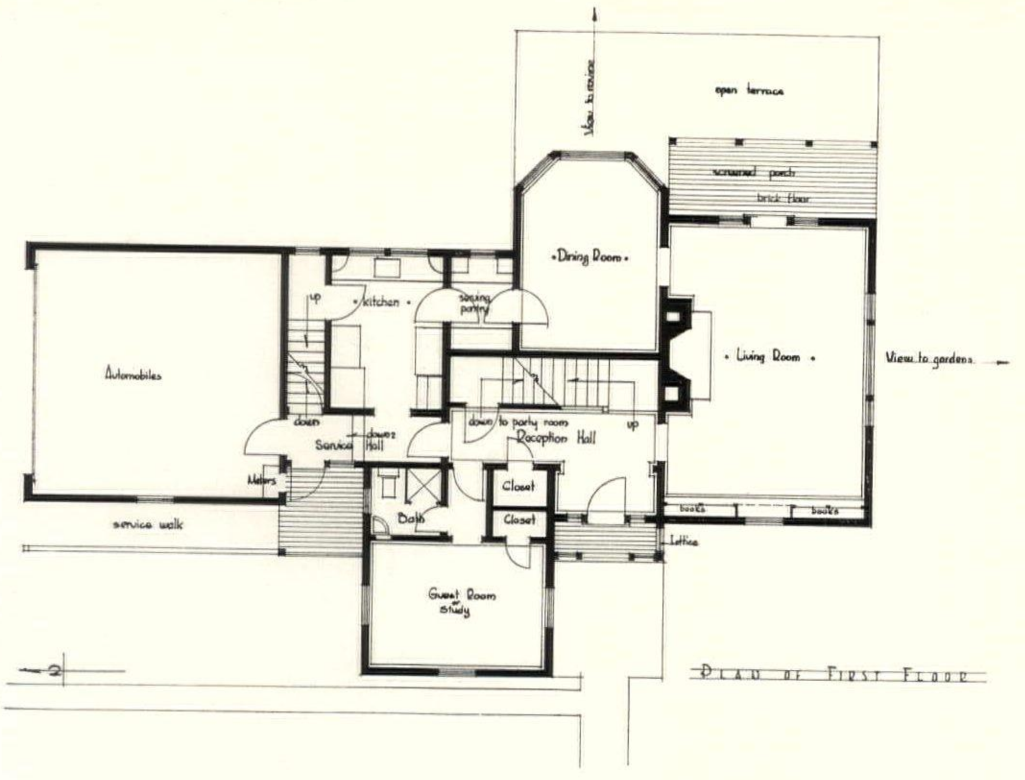


Contempora House is described as "an interlocking unit, with the built-in furniture, and also the mobile pieces, achieving a decorative value because of their functional purposes." The built-in items provide an important feature of the interior architecture of each room, their design being closely allied with the fabrics, closets, door knobs and radiator grilles. Colors for the fabrics, walls, floors and furniture were selected from the viewpoint of room exposure and layout and their relationship to indirect illumination at night. Each room was considered as a space composition in which the odd pieces of furniture could be moved freely without disturbing the essential harmony. Light enters the designer's composition, too, for no lighting fixtures obtrude themselves: the ceilings and walls are utilized to reflect light.

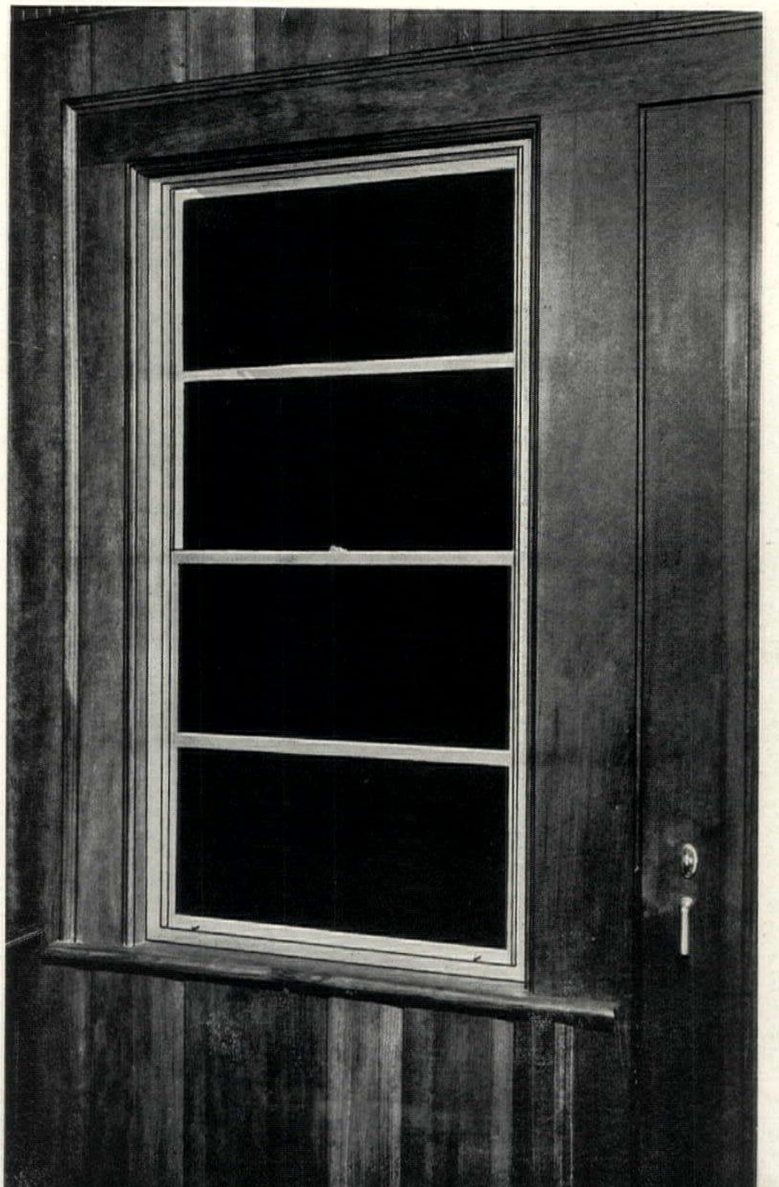
LIVING ROOM: Hand loomed window curtains in white, yellow and tones of gray.

HOUSE OF LAWRENCE J. PLYM
AT NILES, MICHIGAN
WILLIAM P. CRANE, ARCHITECT





This house was designed to provide privacy of gardens and terraces to be developed to the rear. The desired relationship of the various functions of the house dictated the dining room's seclusion from the front door, and a serving pantry gave the best solution of separating the dining room from the noises of the kitchen. The guest room was brought out of the luxury class (as a room useful about one per cent of its days) and placed on the first floor (at once brought to 100% efficiency), giving privacy from the rest of the household to the occasional guest, and offering the same advantages to any member of the family.



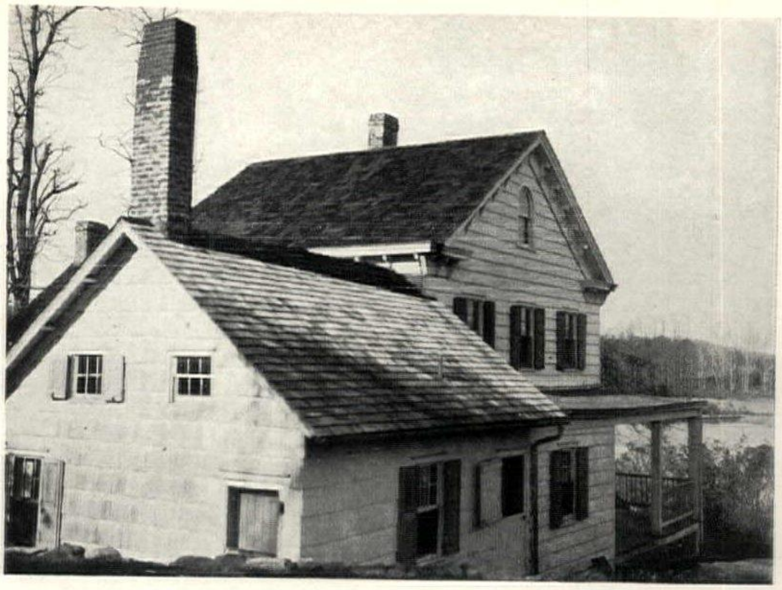
The house is built of wood, with shingled side walls, relieved by boards and battens on the garage wing, and with a wood shingled roof. This construction, aside from its economy, was adopted because of the available services of a master carpenter. The foundations are concrete walls poured in forms built on the job, and the first floor is composed of light steel beams and concrete slabs.

Much study was given to the windows, as an entirely new weight hung aluminum window was used. This new window is fabricated of solid extruded aluminum sections hich reduce the maintenance cost to a minimum and eliminate painting, sticking, swelling, shrinking or warping. The sash are designed so that the members are very small and compact and give ample strength and satisfactory weathering. The low infiltration of the windows and the use of rock wool installation in all walls and roofs produce considerable estimated saving in the annual heating bill. The windows are manufactured by the Kawneer Company, Niles, Michigan, and were used for the first time in this residence. After one year they are still operating satisfactorily.

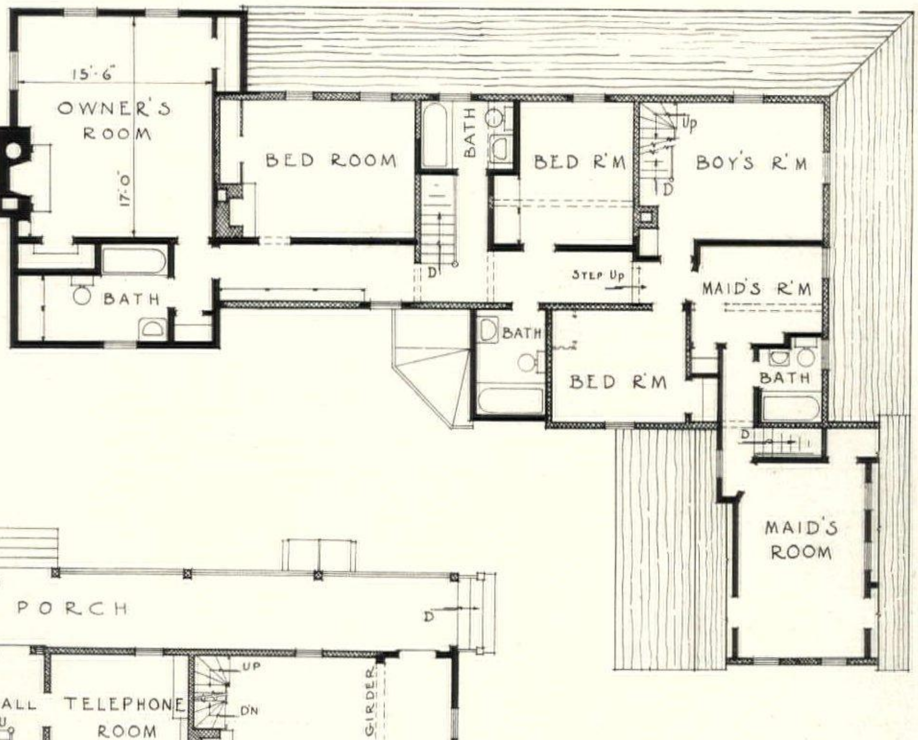
ALTERATION AND ADDITION TO HOUSE OF E. S. BLAGDEN AT LLOYD HARBOR, LONG ISLAND

PHILIP L. GOODWIN, ARCHITECT

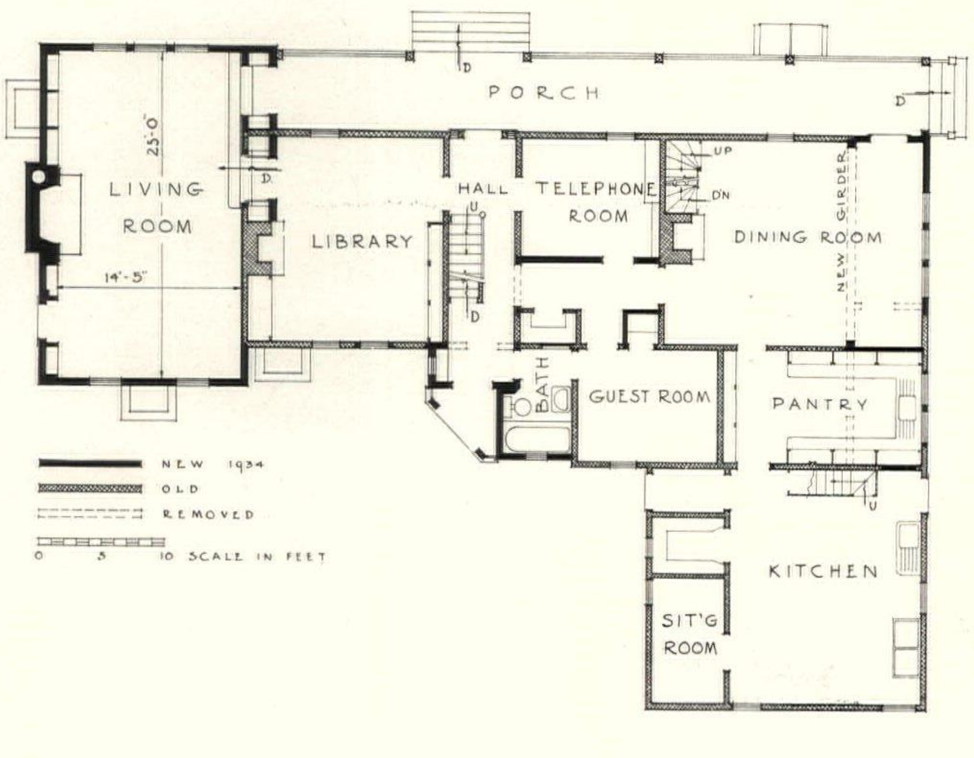
tograph by George H. Van Anda



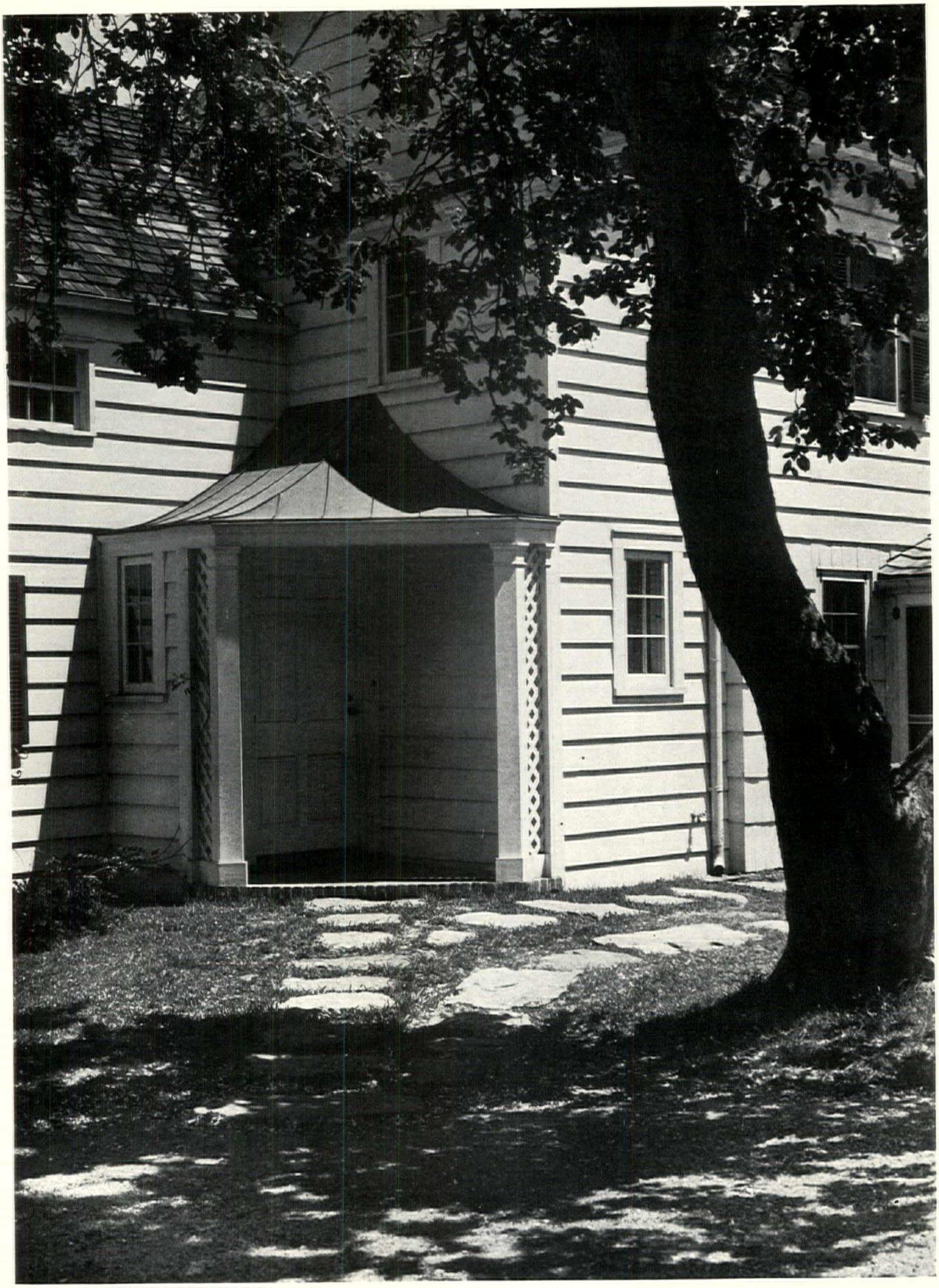
HOUSE BEFORE ALTERATIONS



SECOND FLOOR PLAN



FIRST FLOOR PLAN



Photograph by Van Anda

PHILIP L. GOODWIN, ARCHITECT

ALTERATION AND ADDITION TO HOUSE
OF E. S. BLAGDEN AT LLOYD HARBOR, LONG ISLAND

ANALYSIS OF REAL PROPERTY INVENTORY DATA FOR 65 CITIES & COMMUNITIES IN NEW JERSEY

By A. B. RANDALL
Technical Adviser

The figures of the Real Property Inventory in New Jersey are based upon a wide variety of cities—from Newark, the largest, to some of the smallest suburban communities—thus giving a general gauge of what may be anticipated from the completed inventories which will cover all the principal "non-farm" portions of the State. Returns compiled to date cover 65 cities and communities, with a population of 2,067,442, or 51.3% of the total in the State. An analysis of the returns from these 65 cities and communities reveals several interesting points: (1) the substandard conditions of many of the structures and dwelling units in the State, and hence indications of the possibilities of a reconstruction program; and (2) evidences of a potential and perhaps not distant market for new housing and family accommodations.

In the first analysis which was made, using the Real Property Inventory figures for Trenton and the non-farm communities surrounding it within Mercer County as a sample, it was deduced that between 10 and 12 per cent of all family accommodations in the State were sufficiently substandard, either by deterioration or obsolescence, to warrant replacement. It is of interest to compare this estimate with facts deduced from the Inventory returns for the first 65 communities tabulated:

A. RESIDENTIAL STRUCTURES	NUMBER	PER CENT
Total number	277,701	100
Number needing major repair (#3 class building)	69,311	25
Number unfit for habitation (#4 class building)	12,965	4.7
Total in bad condition (# 3 and #4 class building)	82,276	29.7
Total fifty years old, or older	35,483	12.8

B. DWELLING UNITS (or family units)	NUMBER	PER CENT
Total number	550,056	100
Number needing major repairs	127,988	23.3
Number unfit for habitation	30,321	5.5
Total number in bad condition	151,378	27.6
Number using heating stoves	192,804	35.1
Number having no running water	4,509	0.8
Number without gas or electric light	12,268	2.2
Number without indoor water closets	22,699	4.1
Number without bath tub or shower	87,560	15.9

In any program of large-scale rehabilitation of slum and blighted districts, many structures and dwelling units which need major repairs would necessarily be demolished along with neighboring units which are unfit for habitation. It may be logically assumed that any #4 class or unfit buildings or family units which might be included in any rehousing program owing to the fact that they lie in areas which are otherwise generally excellent, would be more than offset in number by those buildings in a superior condition but which lie within slum areas for which the only rational treatment would be a comprehensive demolition and replacement program necessitated by the blighted condition of the entire area. Therefore, based upon these findings, a slum-clearance program of about 10 per cent of the dwelling units in these 65 communities seems a reasonable estimate.

The price class or rental range of dwelling units is of considerable interest considering low-cost housing. The following has been developed by the inventories in these 65 communities:

C. DWELLING UNITS IN THE LOW-COST CLASS	NUMBER	PER CENT
Renting for $15 or less a month	36,422	6.6
Valued to $1,500 or under	2,088	0.4
Total low-cost accommodations	38,510	7.0

This shows the existing accommodations available for those families in the lowest income group and likewise, when considered with the following data, demonstrates the need for low-cost housing.

D. CROWDING CONDITIONS	NUMBER	PER CENT
Dwelling units crowded	81,378	14.8
Dwellings units over-crowded	3,577	0.65
Dwelling units greatly over-crowded	329	0.06
Dwelling units crowded or worse	85,284	15.51
Dwelling Units with extra or "doubled-up" families	29,359	5.3

From the foregoing considerations, if 7.0 per cent of available accommodations are in the lowest price class and if 15½ per cent are crowded or worse and if 5.3 per cent of all dwelling units contain "doubled-up" families, there is little or no question that a comprehensive slum-clearance and low-cost housing program would meet an urgent demand.

Another development by the Real Property Inventories merits more than passing note, namely the condition of occupancy and vacancy among the dwelling units unfit for occupancy.

E. UNFIT ACCOMMODATIONS	NUMBER	PER CENT
Total dwelling units	550,056	100
Dwelling units unfit for habitation	30,321	5.5
Vacant dwelling units in structures unfit for habitation	6,931	1.3
Percentage of occupancy in unfit dwelling units	....	77.2

This extraordinary high percentage of occupancy in the unfit dwelling units is an excellent demonstration of the need of proper sanitary and wholesome accommodations which exists among those of the lowest income groups, and likewise demonstrates the need of protecting these more unfortunate citizens against improper surroundings in much the same way that public opinion recognizes their right to protection against spoiled meat and other hazards.

Without considering any of these conditions of overcrowding or extra doubled-up families, or of dwelling units unfit for habitation, the vacancies in dwelling units amount to a gross total of about 9.5 per cent. It should be remembered, however, that this vacancy of almost 10 per cent is *apparent vacancy* and may give only a picture of temporary conditions. A further analysis should be made considering at least three important factors, namely, (1) the number of dwelling or family units which are unfit for habitation, (2) the number of "extra" or doubled-up families, and (3) some allowance for a "normal" vacancy percentage. These three considerations will be studied each in turn.

The total vacant dwelling units, 52,022, or 9.5 per cent of the total, would be reduced to 21,701 or show a percentage of vacancy of only about 4.2 per cent of the total available habitable dwelling units,* if the unfit dwelling units, whether occupied or vacant, were somehow removed from use. It may not be possible to condemn and demolish these structures in the immediate future, but at all events it is reasonable to suppose that, with the return of better business conditions, a large proportion of them will be abandoned by their present occupants if they are not replaced or restored.

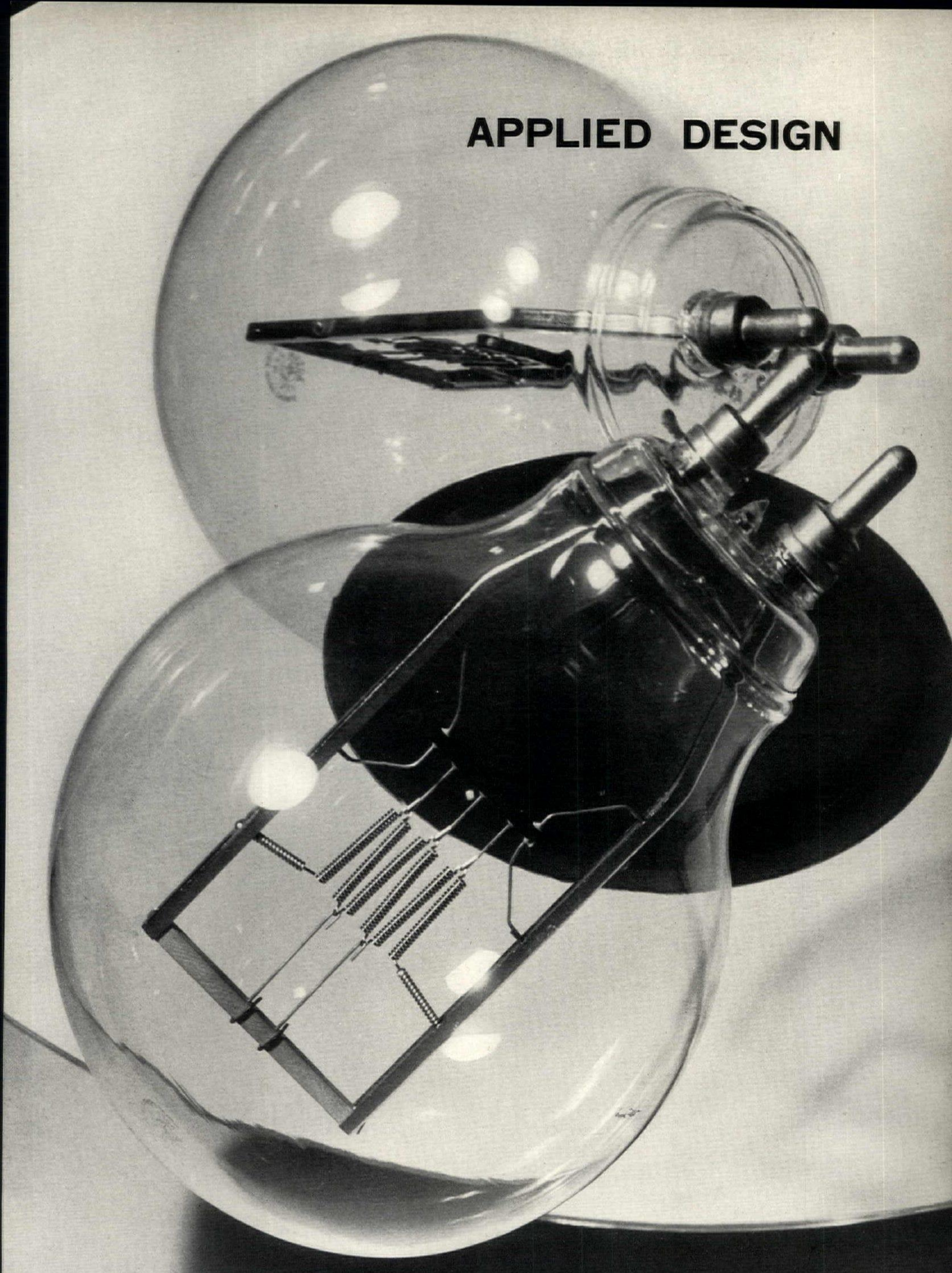
A further reduction in the number of vacant units (over and above that reduction which would be caused by the removal of the unfit dwelling units from the market) will take place when economic conditions become better, permitting a large proportion of the total number of extra or doubled-up families to seek new quarters of their own. Inasmuch as the number of extra families, totaling 29,359, is probably an understatement of doubled-up families owing to the difficulty in fully enumerating all such, it may be considered probable that vacancies will completely disappear because, of these 29,359 known extra families, only 21,701 will be able to find quarters in vacant habitable accommodation, leaving a balance of 7,658 families for whom no habitable dwelling units will be available. For the purpose of comparison this potential shortage of dwelling units or family accommodations of 7,658 would amount to 1.3 per cent of the total 519,735 available dwelling units which are now fit for habitation.

Normal vacancy allowance has been previously mentioned and some recognition should be given to this in any analysis of future condition. Structures and dwelling units are all more or less fixed in location, in their facilities and even in their price class, and can only be modified within reasonable limits. Some allowances must be made for lack of adjustment of existing facilities to the intimate needs and special demands of prospective tenants. For instance, a dwelling unit, whether it be a single-family house or a flat, may be in the desired location and within an appropriate price class, but may have an utterly unadaptable arrangement or number of rooms for an available tenant. Again a vacancy in the $100 rental class does no good to a man earning $20 a week nor will a vacancy in a slum interest a well-to-do family demanding a good neighborhood and all modern improvements. Factors of this sort require some margin of vacancies before tenants can be able to secure reasonable adaptable accommodations. In general, a vacancy of about 3 per cent is usually considered a "landlord's market" and only with vacancies at about 5 per cent does a "tenant's market" begin. It would be therefore reasonable and proper to consider that conditions of a landlord's market could prevail with a 3 per cent vacancy as a minimum. On such an estimate, and with a potential shortage of 1.3 per cent or 7,658 dwelling units, after considering the removal of unfit dwelling units and the expansion of the extra or "doubled-up" families into quarters of their own, the potential shortage would become 4.3 per cent and 22,348 dwelling units with allowance for the minimum of 3 per cent for "normal vacancies."

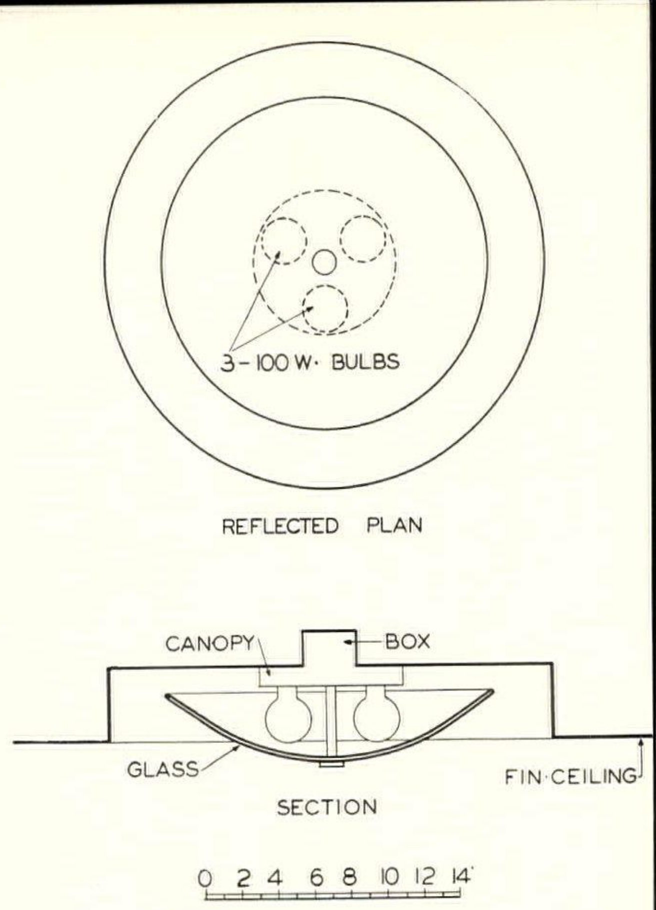
In this analysis no attempt is made to assert that the present apparent vacancy amounting to 9.5 per cent is actually a present shortage of 4.3 per cent in the housing market. However, it is believed that these considerations adequately demonstrate that the present housing market is not in nearly so bad a condition as first analysis might indicate. There are several other considerations to which very serious thought should be given—the natural increase in population in the State since the 1930 census as well as the very large number

(Continued on page 34, Advertising Section)

*Note: 519,735 habitable units or 550,056 less 30,321 units.



hotograph by Zimmerman


3-100 W. BULBS
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CANOPY
BOX
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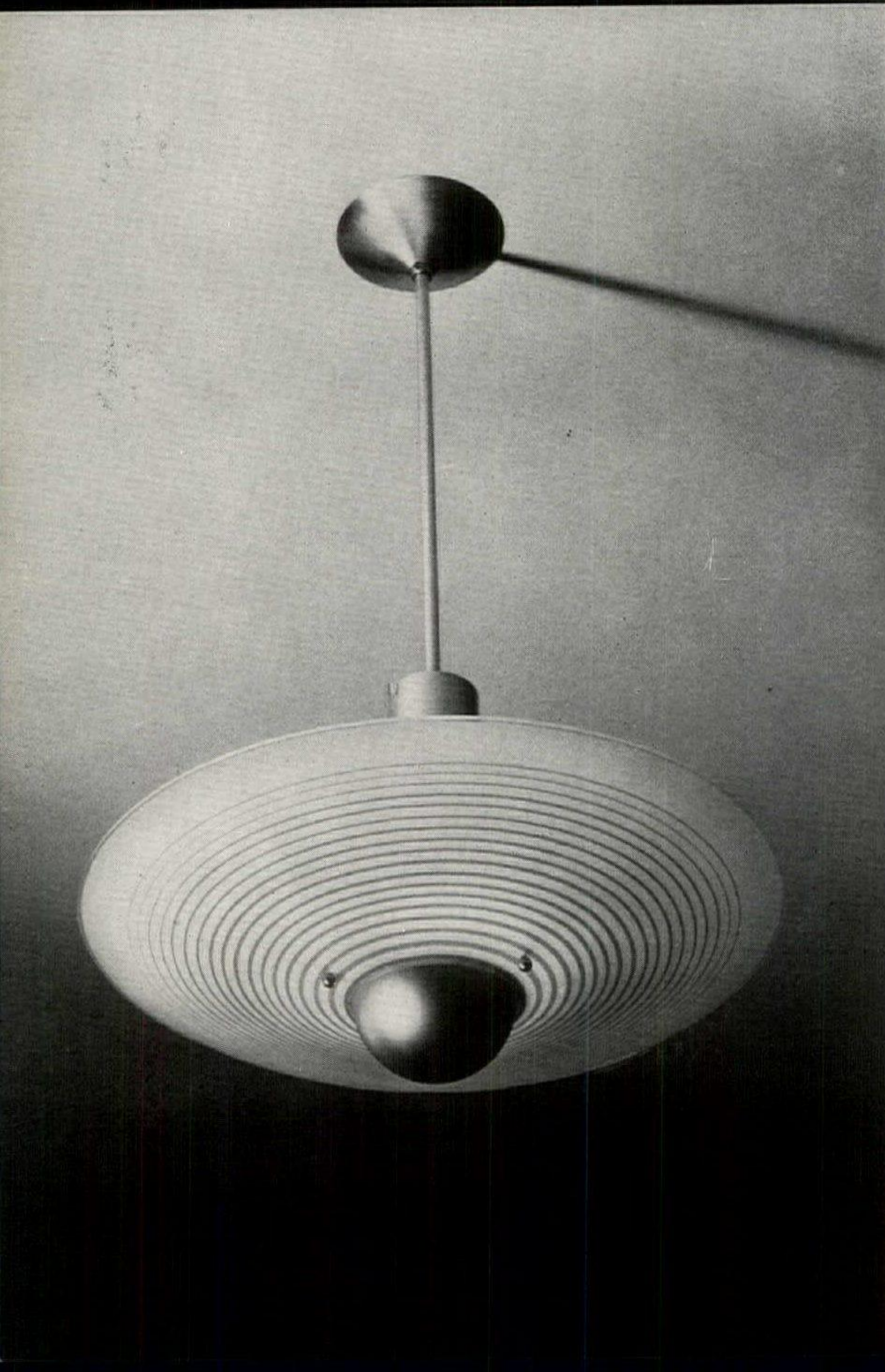
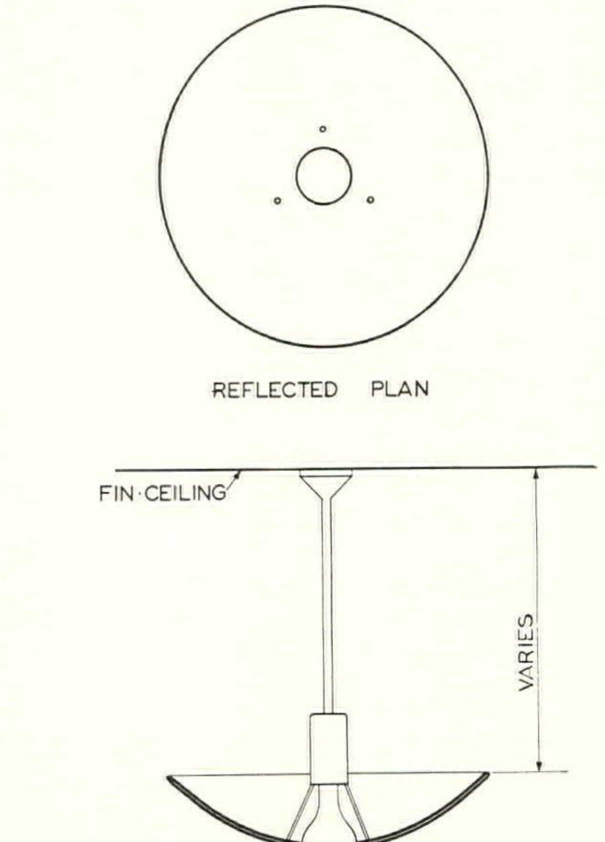
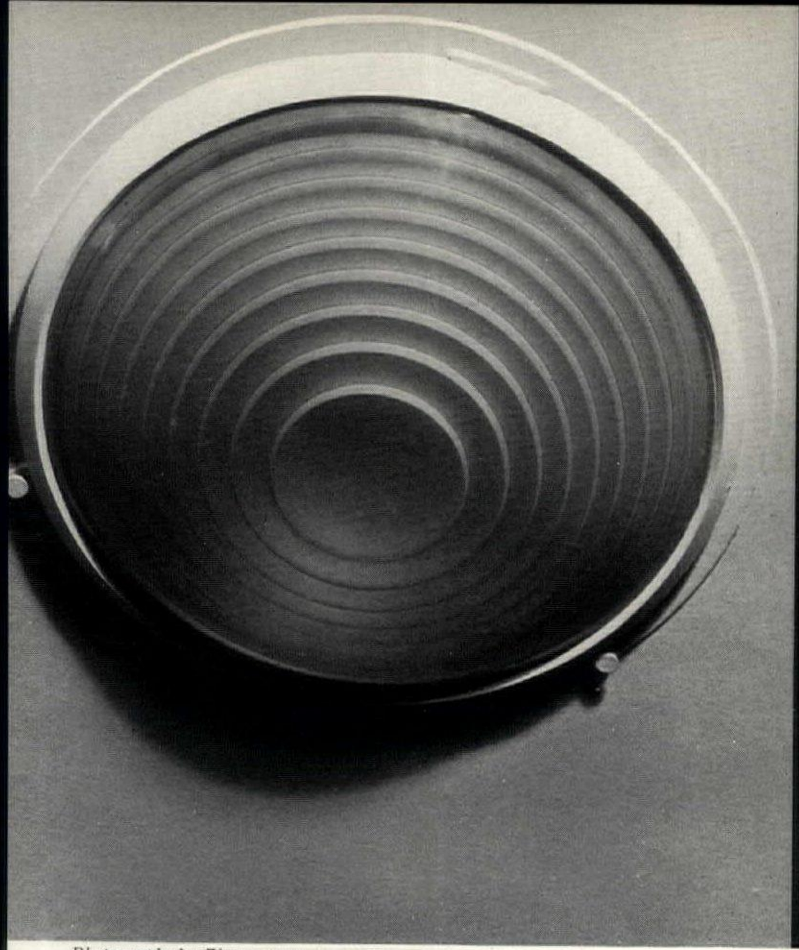
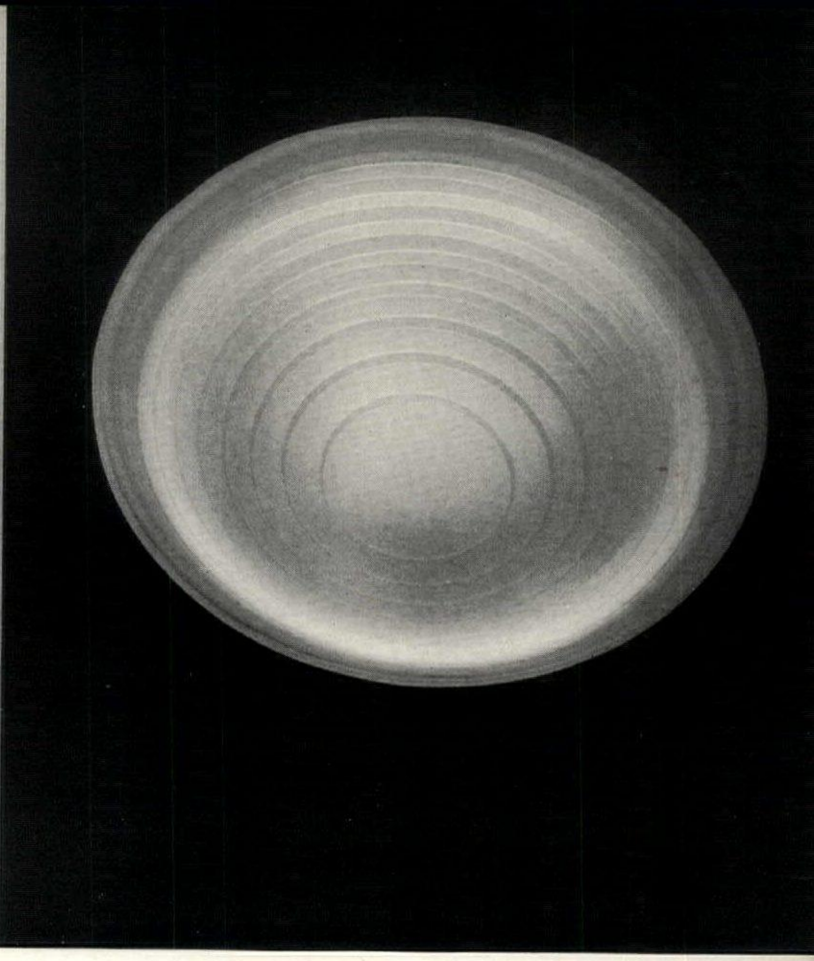



REFLECTED PLAN
FIN. CEILING
VARIES
300W. SILVRAY BULB
BENT & FIRED GLASS
SECTION





Photographs by Zimmerman

ABOVE:

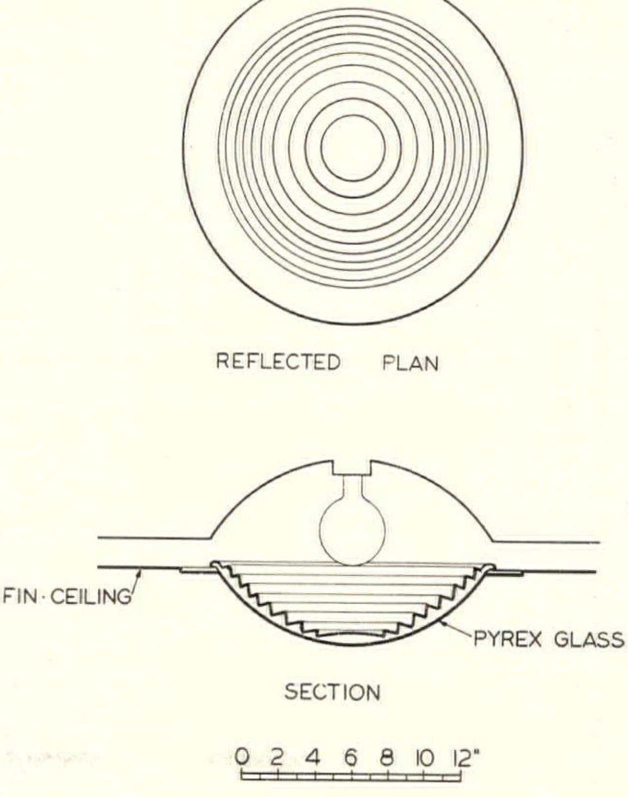
CEILING LENS BY CORNING GLASS WORKS. The pyrex glass bowl is shaped for light diffusion. Originally designed for use as railroad headlights.

UPPER LEFT PAGE:

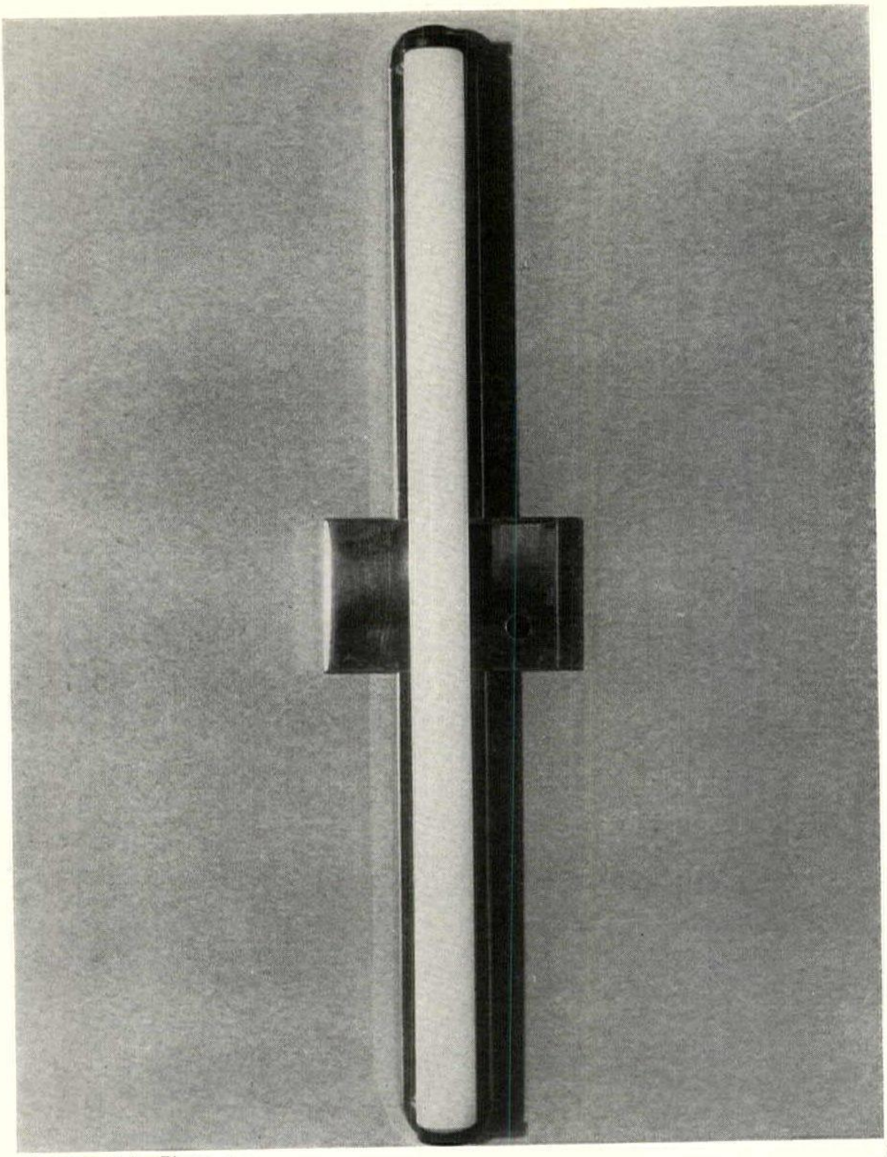
RECESSED CEILING FIXTURE BY MAURICE HEATON. This bowl is obtained from a flat circular piece of transparent glass which is bent at high heat on a cone-shaped mold. Colored rings are obtained by applying a colored glaze (ground glass) on a spinning wheel, and the frosting by spraying a white translucent glaze, heavily where the bulbs show and lightly towards the edges. The glaze is fired on the surface of the glass when it is bent.

LOWER LEFT PAGE:

SUSPENDED CEILING FIXTURE BY MAURICE HEATON. The glass in this case is obtained as above, except that a hole is cut in the center of the original flat piece. In bending, that hole may stretch as much as $1/2''$. The glass is so well annealed that it can touch the bulb without causing breakage.



LUMILINE BRACKET BY JOHN R. WEBER. These brackets may be had in 12″ or 18″-lengths with 1″-diameter bulbs, 30 or 60 watts. The adjustable switchplate allows bracket to be installed above or below the outlet box. The light source may thus be had in the most desirable height, even if the outlet box should be above or below average level. Bracket may also be used horizontally.



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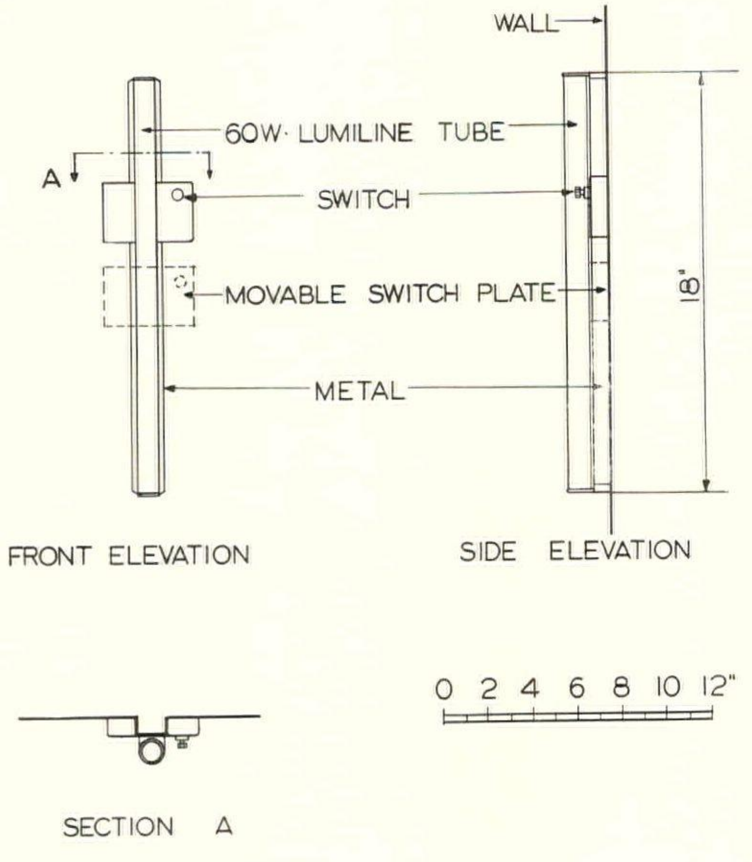
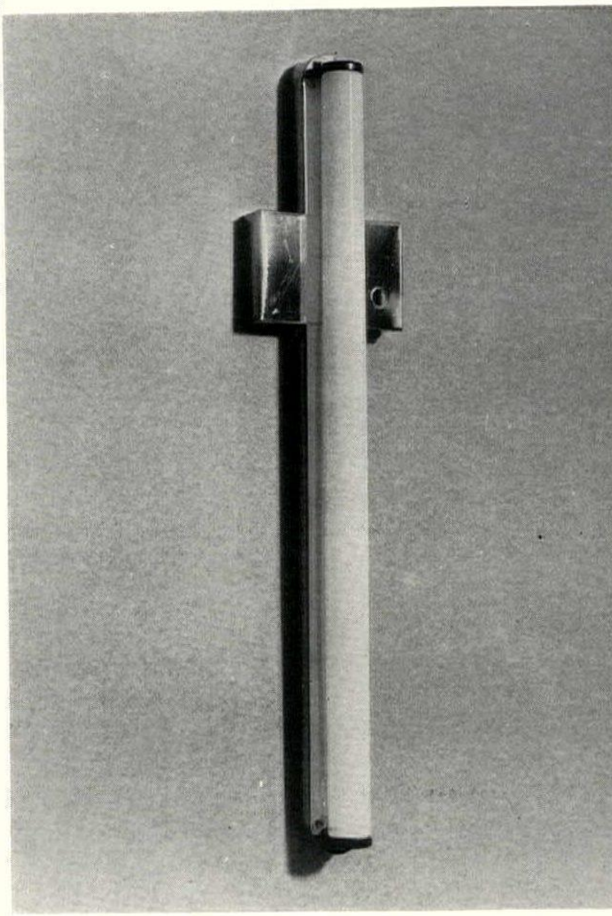
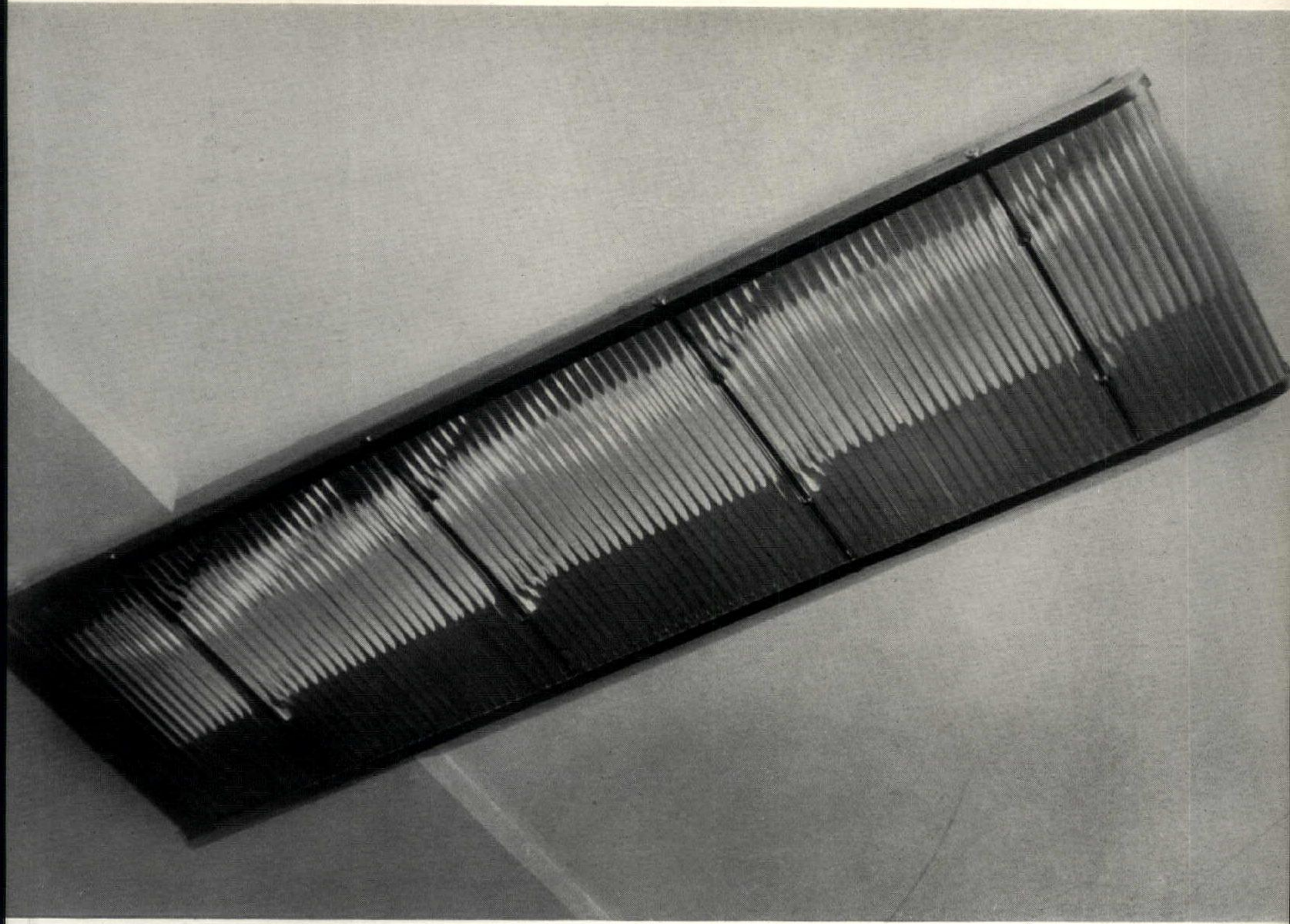
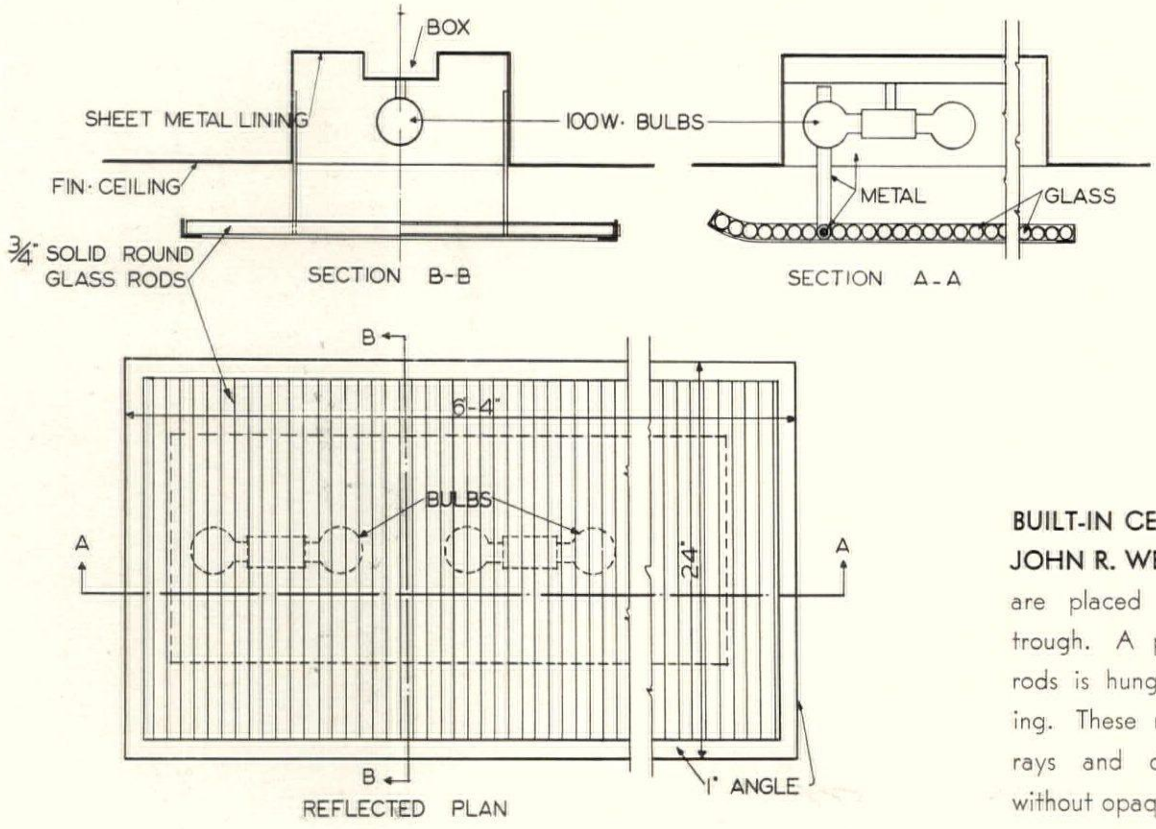
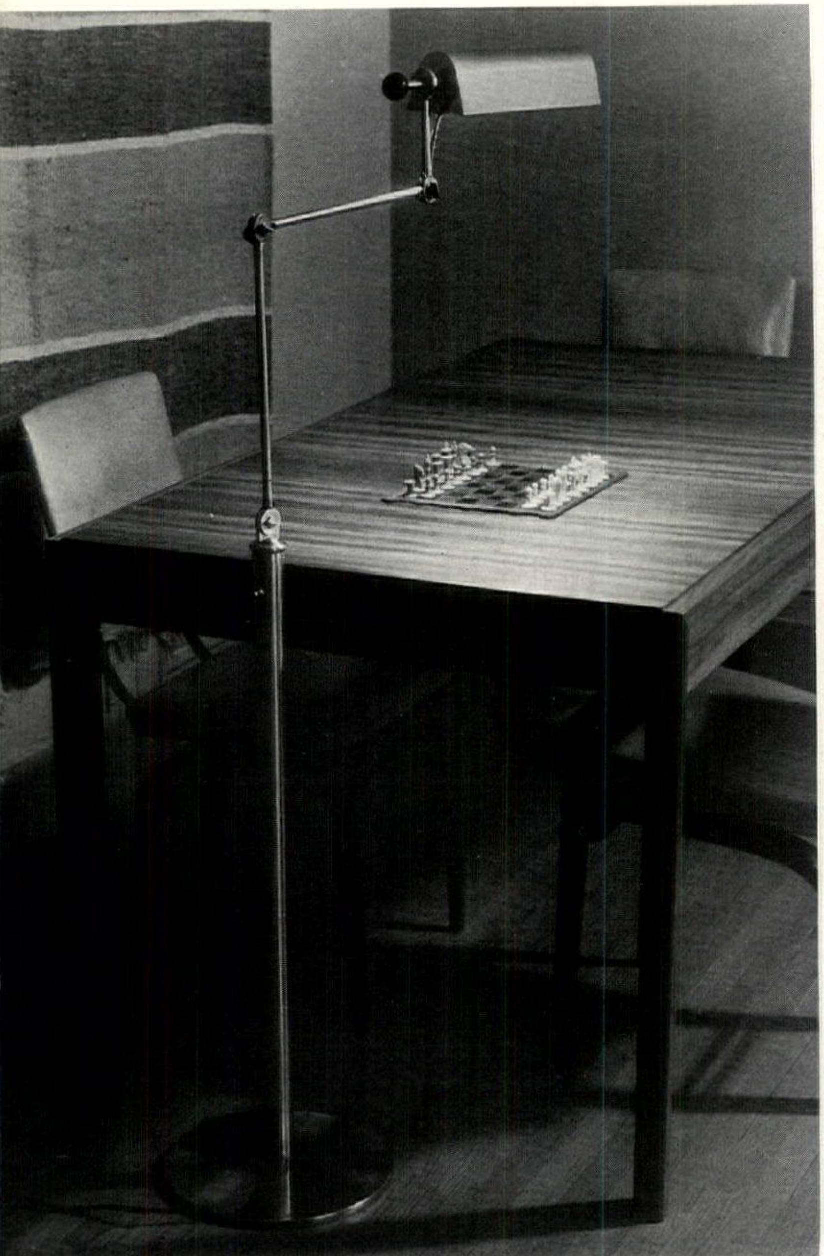




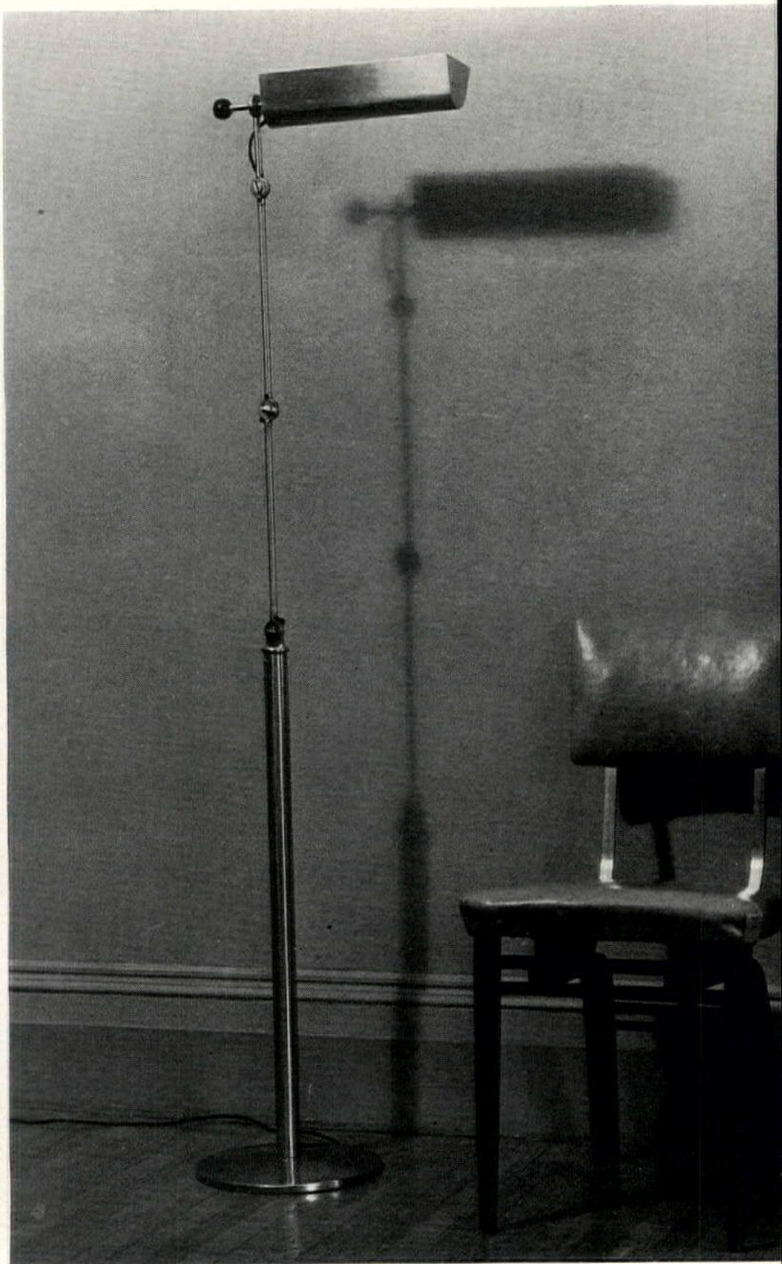




BUILT-IN CEILING FIXTURES BY JOHN R. WEBER. The light bulbs are placed in an open metal trough. A panel of clear glass rods is hung 4" below the ceiling. These rods break the light rays and diffuse their source without opaqueness.



Photograph by Zimmerman



Photograph by Ruth Bernhard

Photographs by Zimmerman

LEFT PAGE:

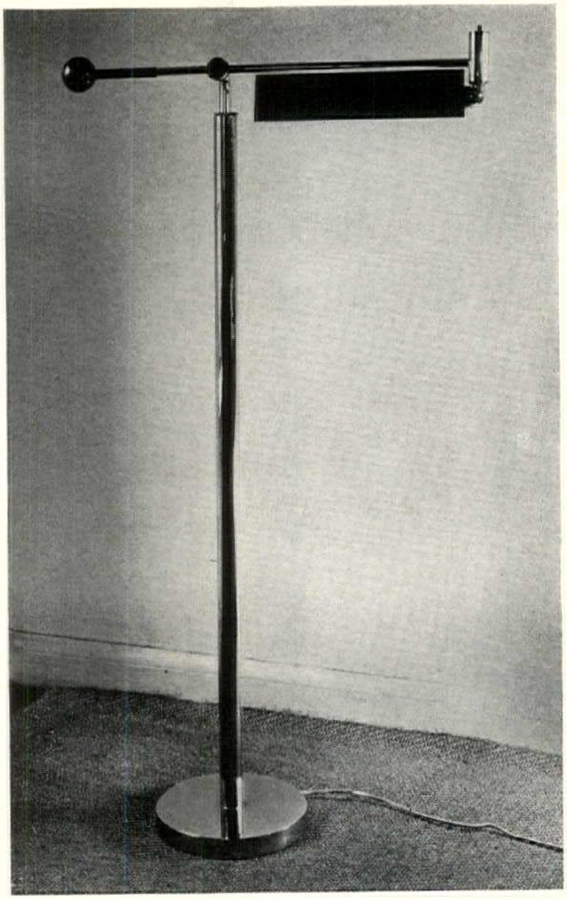
FLOOR - AND - DESK LAMP BY JOHN R. WEBER. The three pivot hinges allow change in position of light trough proper from 5'6" straight above base to 3'0" above floor with 3-foot horizontal lever arm (thus reaching beyond middle of a good-sized drafting table). Trough proper revolves so that it may also be used in horizontal as well as vertical position. Satin chrome finish. Black catalin knob.

ABOVE, THIS PAGE:

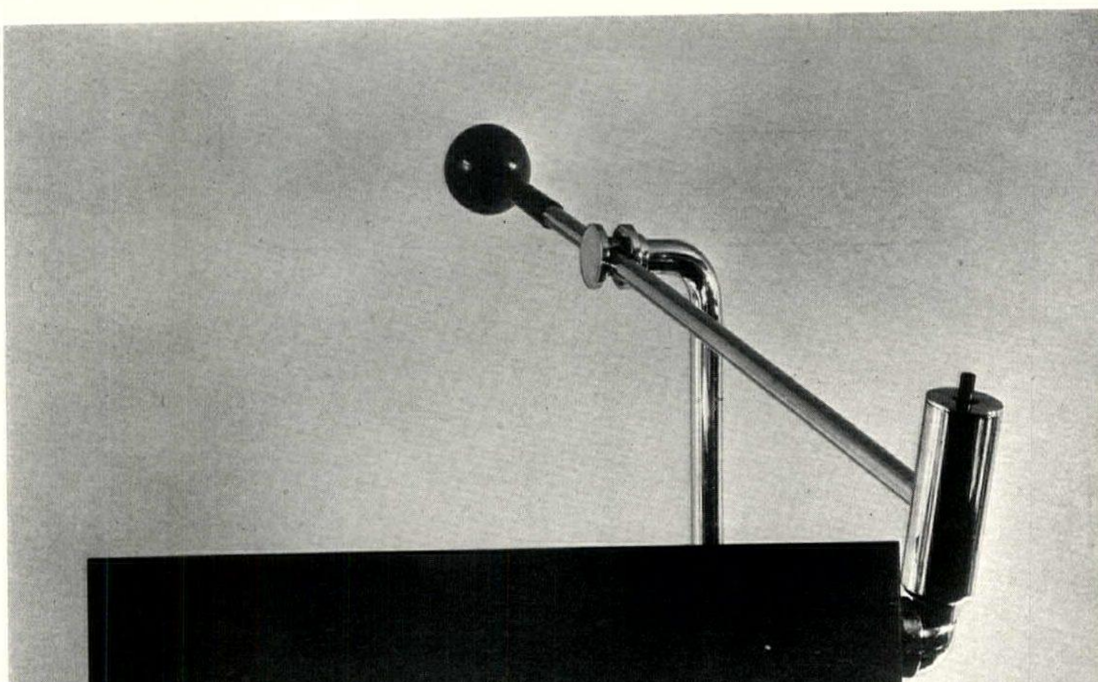
DESK LAMP BY HOWE AND LESCAZE, ARCHITECTS; WALTER BAERMANN, DESIGNER

RIGHT:

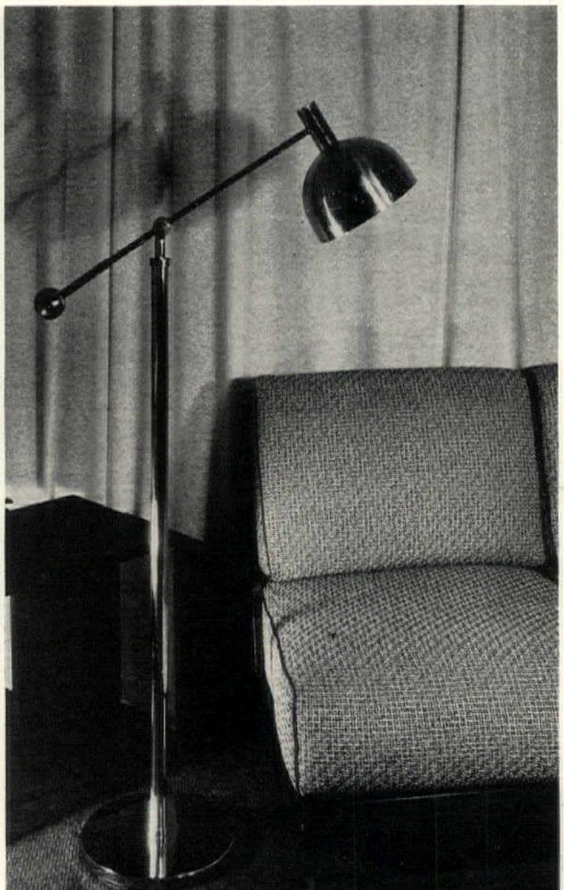
DESK LAMP BY JOHN R. WEBER. Height adjustable, with stem on horizontal pivot. Trough turns also. Base of black grooved bakelite with lead weight insert. Gunmetal plated.



FLOOR LAMPS DESIGNED



BY FREDERICK J. KIESLER



Photograph by Zimmerman

FLOOR LAMP BY JOHN R. WEBER. G-E three-light lamp: 1 bulb, 1 switch, 3 different intensities. Top part revolves. Low intensity filament is used for reading when reflector is turned downward as shown. Turned up, it is used for general indirect illumination. The light may be stepped up 150% if more brightness is desired.

(Left)
NORMAN BEL GEDDES: Eight years' experience in industrial design. He has created radio cabinets, furniture, refrigerators, office, restaurant and airplane interiors, the medal to commemorate the silver anniversary of General Motors, which is part of the permanent exhibit at the Metropolitan Museum of Art, gas stoves, window displays, automobile tires, and gasoline service stations. (Photograph by Maurice Goldberg.)

(Right)
GEORGE HOWE: From 1913 to 1928 in partnership with Walter Mellor and Arthur L. Meigs in Philadelphia; from 1930 to 1934, with William Lescaze. Notable among his architectural works are the Philadelphia Savings Fund Society Building; "Square Shadows," the home of William Stix Wassermann in Whitemarsh, Pa., which was the first completely modern residence to appear in the Philadelphia countryside; the Speiser town house in Philadelphia; the American War Memorial at Bony in France. He has also designed the Oak Lane Country Day School in Philadelphia, the Hessian Hills Schools, Croton-on-Hudson, the project for the Chrystie-Forsyth low-cost housing development, and, among others, the interiors of the Trans-Lux Theatres. (Photograph by Frances R. Waite.)

A NEW AND SIGNIFICANT TYPE OF PARTNERSHIP

has been formed by George Howe, well-known architect, and Norman Bel Geddes, industrial designer. It is the announced purpose of the organization to provide domestic or commercial building owners with a broad survey of mechanical and architectural trends for their consideration and use. With a fresh outside point of view it sets before the industrialist the needs and demands of the public as related to his established technical and business methods in such a way that he can reach decisions as to products and policy affecting not only a particular problem, but often his whole field of activity. The firm offers service in the following categories of design: consumer research; engineering; production; merchandising; architecture—domestic, commercial, industrial; theatrical; landscape; exterior and interior illumination; household and mechanical equipment; decoration; furniture; accessories; merchandising display; railway equipment; ships; yachts; motor cars; airplanes; theatrical production; settings; stage lighting; stage direction.

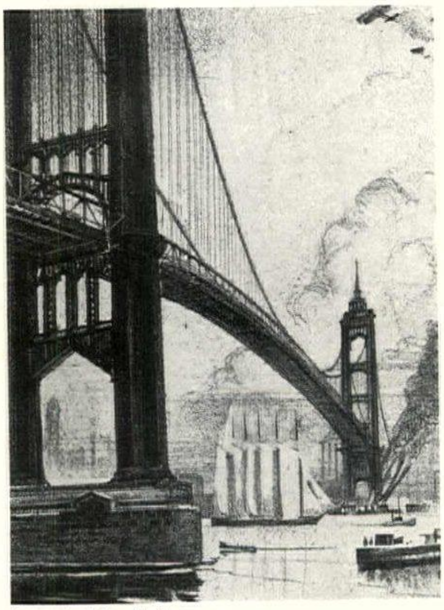
ILLUSTRATED NEWS

FEDERAL RESERVE BOARD BUILDING

The Federal Reserve Board has selected Paul P. Cret of Philadelphia as the architect for its new building on Constitution Avenue in Washington, D. C. Mr. Cret was chosen by a jury on the basis of designs submitted by nine architects who were invited to participate in a competition. The jury's choice was approved by the Federal Reserve Board. It is expected that the architect will begin work immediately on the preparation of final plans and specifications.

The jury which passed upon the designs was composed of three architects and two laymen. The architects who served were John W. Cross, New York City; William Emerson, Dean of the School of Architecture, Massachusetts Institute of Technology, Boston, and John Mead Howells, New York City. The other members of the jury were Frederic A. Delano, Chairman of the National Capital Park and Planning Commission, and Adolph C. Miller, a member of the Federal Reserve Board. The program for the competition was prepared under the direction of Everett V. Meeks, Dean of the School of the Fine Arts in Yale University, who has acted as the Board's professional adviser.

Winning design in competition for a building for the Federal Reserve Board in Washington—Paul P. Cret, architect



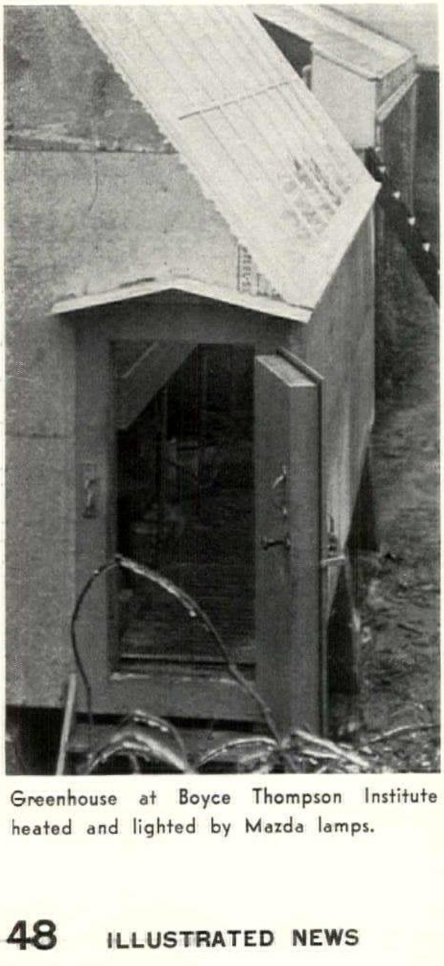
Peter A. Juley & Son

Perspective drawing of the proposed Liberty Bridge to be built between Brooklyn and Staten Island at entrance to New York harbor, the longest bridge span in the world. Robinson & Steinman, engineers.

At the Milwaukee Convention of the American Institute of Architects: Ralph Walker, retiring president of New York Chapter, in foreground, and in the background, Hobart Upjohn, the new president.

NEW TYPE OF INSULATED GREENHOUSE

The Boyce Thompson Institute for Plant Research, Yonkers, New York, has developed an insulated greenhouse heated and lighted by Mazda lamps. Approximately spring-time growth and flowering were produced during the winter months on such varieties of plants as snapdragon, sweet pea, fuchsia, and begonia. Snapdragon plants placed in the house on December 10 when 2 to 3 inches tall had reached the flowering stage and were in flower during the last week of January.



Greenhouse at Boyce Thompson Institute heated and lighted by Mazda lamps.

The only heat supplied during the entire winter was that emitted by 10 ordinary Mazda lamps arranged in 2 rows of five each above the bench where the plants were grown. Each lamp was rated at 500 watts. The lamps were operated by a thermostat and relay which turned them on whenever the air temperature inside the house reached 62° F. As soon as the temperature had reached 68° F. the lamps were turned off again automatically by the thermostat and relay. In practice it was found that the lamps never came on during the day while the sun was shining, even if the outside temperature was at zero. Most of the artificial light was supplied at night. A little additional light was supplied when the plants needed it most.

The house was built similar to a large refrigerator, with double walls of galvanized sheet steel, 16 gauge, nailed to a framework of 2″ x 6″ wooden structural members. The walls, floor, and sheet metal sections of the roof were filled with dry sawdust giving in effect a 6-inch wall of insulating material throughout except for a row of eight 6-foot single-glazed storm sash along the south face of the building. The sash are hinged at the top end so that the bottom end can be propped open for ventilation. All joints inside the house are soldered, and the storm sash are made to fit as tightly as possible. The single door to the house is of the refrigerator type with 6 inches of sawdust between the inner and outer face.

When additional light is supplied, it is important to use additional carbon dioxide. This can be provided by placing approximately a 40-lb. piece of dry ice in a well-insulated double-walled container inside the house. Owing to the slow evaporation of carbon dioxide, this piece will last approximately a week to ten days. The slow diffusion of the gas through the walls and the door makes possible a higher concentration than is found in ordinary air. Since the plant uses this gas in air as a sole source of carbon, it is possible to increase the growth and flowering by increasing the concentration in this way.

LONGEST BRIDGE SPAN

The proposed Liberty Bridge will be built across the Narrows at the entrance to New York Harbor between Brooklyn and Staten Island. A bill has been introduced at Albany to establish a bridge authority for the construction of this project. It is hoped to secure Federal financing.

With a main span length of 4,620 feet, this will be the longest bridge span in the world. The towers will be 800 feet high. The bridge under-clearance will be 235 feet, to clear the greatest mast heights of any existing ships. The total estimated cost, to provide a bridge with eight highway lanes and two 10-foot sidewalks, is \$40,000,000. The design has been prepared by Robinson & Steinman, engineers, and Theodore E. Blake, architect.

RETAIL STORE PLANNING

REQUIREMENTS — GENERAL STORE, APPAREL SHOP, DRUG STORE — STORE LETTERING — STORE LIGHTING

APPAREL SHOPS IN MILWAUKEE . . . . ELMER A. JOHNSON, ARCHITECT

Photograph by Kenneth K. Stowell

Photograph by Gustav Anderson

FURNITURE STORE IN NEW YORK CITY....J. LEWIS SINCLAIR, ARCHITECT

THE RETAIL STORE

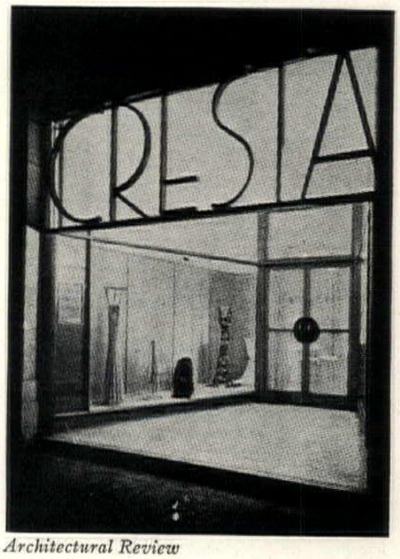
Compiled by FREDERIC ARDEN PAWLEY

STORE planning involves two distinct phases: (1) the general consideration of merchandising principles and (2) the detailed study of structural and service requirements. Merchandise requirements are variable, and types of customers are legion, but a discussion of some fundamental considerations may help to clarify the architectural problem and to emphasize those planning features which are most important in merchandising. Much detailed data obviously must be revised for each new store design problem. This article therefore presents first an outline of merchandising principles and then a listing of specific data in reference form. These data have been compiled from many authoritative sources and represent progressive practice. A brief bibliography is appended for additional reference.

LOCATION

The trading area, volume and type of traffic, parking facilities, day or night business, competition with or advantageous proximity to similar stores, transportation facilities and location of transit stops, rentals, banking facilities, trend of population and trade development of neighborhood are all necessary considerations.

> "The measurement of a retail market resolves itself into a scientific study of a community. . . . Just as the manufacturer and banker have realized the importance of research in their management problems and have proved the advantage of knowledge over guesswork in business, so may the retail merchant benefit by a study of his problems in the light of facts scientifically gathered. Since the purpose of any retail business is to sell merchandise, thereby making sufficient profit to compensate for the energy and capital expended, it seems only logical that the merchant should desire to obtain all the information possible relative to his market."
>
> Retail Store Problems. U. S. Department of Commerce.



Architectural Review

A shop in London designed by Wells Coates, architect. The front is in oak and glass.

Corners are estimated to be 30 per cent more valuable than inside lots. They draw traffic from two streets and offer better natural light and more window area, but crowding minimizes this advantage.

> "A corner store has the choice of an entrance from each street or one at the corner. The corner entrance makes it necessary for customers approaching from one direction to walk the full length of the building before entering the store. Two entrance ways tend to influence customers to go through the store. An entrance on the corner in addition to the other two street entrances might have a tendency to divert traffic, so that many customers would come in through the nearest street door and go out at the corner, and this diversion might materially cut down returns from an otherwise effective display space within the store."
>
> Retail Store Problems.

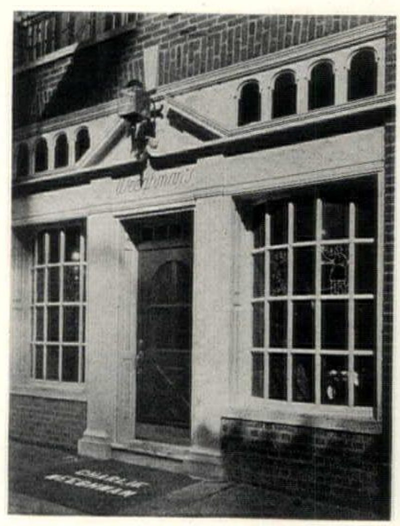
Zimmerman

A 2-story shop front in Times Square, New York City.

The upper side of a street which is not level is the more desirable.

Shade is valuable in summer and better for displays, but winter sales volume may be higher and rents cheaper on the sunny side of the street.

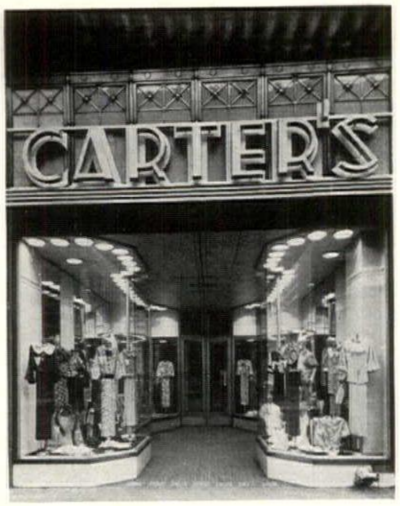
> "One side of a street is usually more popular than the other. There may be several reasons for this. If the street is not level, the upper side is usually more traveled than the lower. This may be accounted for by the fact that the upper side of the street is cleaner, or that 'the human tendency is to get on the upper side of things.' Then, again, there is the question of the shady or sunny side of the street. In the summer the preference for the shady side becomes quite marked, and this is especially true for women, who do much of their shopping the hottest part of the day. Sunlight is always an important factor to be considered in locating a retail store. Shoppers naturally seek the protection of the shady side of the street in the summer, and the sunlight affects the displays that the store makes in its windows. Satisfactory displays are more difficult to make in sunny windows than in those in which the light is controlled or shaded. . . . It is possible, however, that for certain reasons the sunny side of a street may be preferred. An analysis of sales may show that the largest business is done in the winter months, during which time the traffic may prefer the sunny side. The rent is usually cheaper on the sunny side. Another factor in determining the preferable side of the street is the convenience to the street-car stops. When a car stops people usually go to the nearest curb, rather than cross the street."
>
> Retail Store Problems.



A restaurant front in New York City designed by Ross-Frankel, Inc.

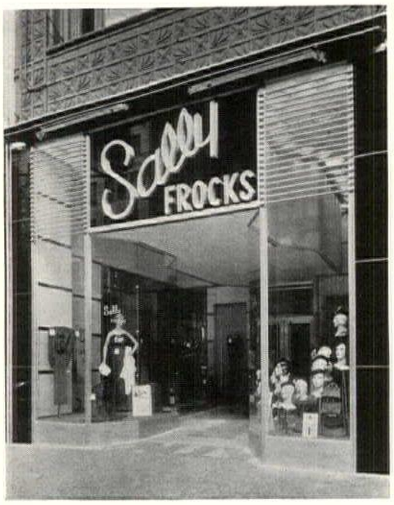
Exclusive specialty shops need not be in a high-rent shopping area but should be easily accessible.

> "Some stores go well in groups. One reason for this grouping is the convenience of the customer, as it affords opportunity for the purchasing of a number of different kinds of articles in one vicinity. Another advantage of locating competing stores close together is the possibility of drawing trade from customers who had planned to go directly to a competitor. The stores thus established are not always competing stores. Very frequently they arrange themselves into complementary groups cooperating with each other in the attraction of custom and in the making of sales. Stores dealing in men's goods are often found on one side of the street, while stores dealing in women's goods are found on the other.
>
> "The logical site is that one which offers the best opportunity to sell goods where people naturally come to trade, either because of convenience or because of habit. If the best site is not obtainable or carries an exorbitantly high rental, and therefore an inferior site is chosen, success depends largely upon the recognition of the economic disadvantages resulting from the location and the cost of special attractions necessary to overcome them."
>
> Retail Store Problems.



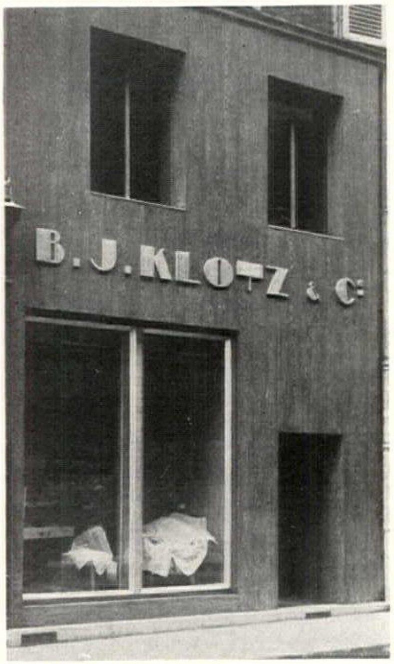
Hedrich-Blessing

A dress shop in the Palmer House, Chicago, designed by Sobel and Drielsma, architects.



Hedrich-Blessing

An apparel shop in Detroit by Sobel and Drielsma, architects. Façade of Carrara glass held in place by aluminum supports.



Bonney

A Paris shop front designed by B. J. Klotz. Façade of oak.

ATTRACTION

The first problem of the merchant is to attract the attention of potential customers and to give them favorable impressions. Uncluttered surfaces, legible signs, good color selections, intelligent window display and lighting are all undeniable attractions for the exterior. Comfort within, based on easy circulation, clarity of plan, accessibility of merchandise; quick service resulting from proper location of stock; effective illumination, good acoustics, and air conditioning—all of these will make customers return.

CIRCULATION

This might be called routing: it is the familiar problem of making the customer see as many varieties of merchandise as possible so as to induce additional sales. In large stores an appearance of activity is desirable; in smaller stores and shops crowding must be avoided.

Aisles and vertical circulation can be planned in such a way as to influence subconsciously the customer's path. The shopper instinctively chooses the wider of two or more aisles or the one to the right. Departments with greater drawing power should be placed so that customers must pass other displays. Service departments, such as the cash desk and wrapping center (if used), should be so located.

Arcades or passages to transportation lines or to other places provide effective spaces for advertising or impulse displays. Self-service or quick service is indicated for such locations.

Special attractions, such as telephone booths, and in large stores, beauty parlors, children's barber shops or playrooms, lunch rooms, are sometimes planned to attract shoppers past impulse displays. These services are often not directly profitable. Location on a main floor balcony or mezzanine is preferred. Even a small book store may work on this basis and have exhibition space for temporary art shows as an attraction.

> "The question of locating the soda fountain and cigar counter is something to be decided by a close study of the individual store. Fountain goods in the majority of cases are of a semi-convenience type. Frequently the fountain can well go to the front of the stores on busy corners and in the rear in stores in small towns and neighborhood locations. The cigar counter almost universally is placed in the front of the store.
>
> "Some proprietors believe that the fountain brings into the store people who would not come otherwise. In such cases, if possible, the fountain should be placed back in the store in order to get as much merchandise as possible before the fountain customers. On the other hand, this often is impractical as this type of customer might not enter if the fountain were removed from the front door.
>
> "A good plan is to check the value of the fountain in profits in comparison to space occupied. Some stores report that the fountain makes a substantial part of the entire store profit; others learn that the space required by the equipment and tables for customers is out of proportion to earnings but justified as a leader to other sales.
>
> "Services, such as telephone and postal station, are placed in the rear of the modern store. The center of the room in a well arranged store is low and the customer has no trouble in finding what is wanted. The man who wants to use a telephone, in passing attractive tables of merchandise, is often reminded of and buys items he needs."
>
> Small Store Arrangement. Domestic Distribution Department, Chamber of Commerce of the U. S.

CLASSIFICATION

Departmentizing helps clarify the store plan, gives good stock control by showing which lines of merchandise are most profitable, facilitates more frequent inventories, tends to develop expert sales help who keep stock in better condition, and to some extent may indicate efficient personnel.

Within each department wares may be divided into three classes—convenience, impulse and demand goods. An entire department may belong to one of these classes or may include all three. As far as possible department or class location should be governed by the characteristic of these classifications.

Convenience goods are usually low-cost items which will be bought hurriedly at the nearest store. Profit is small but good-will is worth cultivation for frequent return. Locate for quick service but not nearest entrance.

Impulse goods are often luxuries sold with high margin of profit. Locate wherever they will best catch the customers' attention or where there is any waiting: near entrance, at service center, at elevator. Displays is most important factor.

Demand goods are staples of a substantial nature which customers come most often to buy. They are items for which a customer will go to a particular store with decision already made for their purchase. Easy accessibility of stock to sales staff is more important than display.

Zimmerman

General store façade.

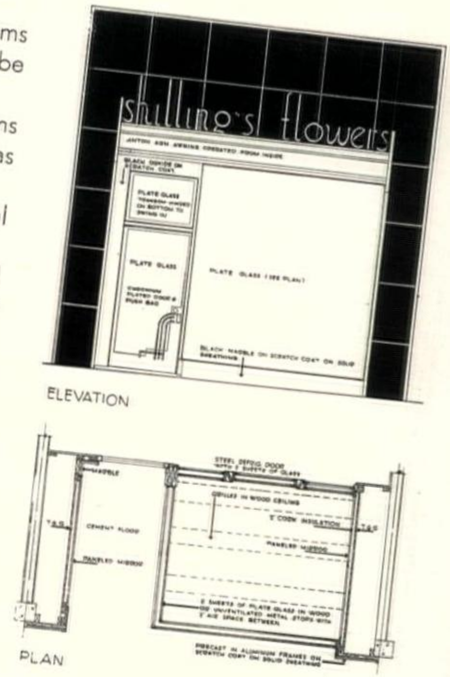
Shopping goods, a fourth classification often made, differ from demand items in their need for accessibility to customer and display so that comparison can be made with competing wares.

All classifications should be made evident. Prominent display of typical items will help more than signs unless goods are of great variety and similar in size as in a drug store.

Related departments should be grouped together not only to suggest additional sales but to make it easier for sales-persons to assist in adjoining departments.

Bargain departments should be isolated since bargain hunters are not good prospective purchasers of other goods. Extensive display of bargains near regular stock tends to lower the character of the store.

The self-service checkout plan used mainly in the grocery line with open display and/or automatic dispensing machines and change-makers may reduce pay roll, shorten customers' waits and handle a larger volume of sales in peak hours. Provide basket racks near entrance, table or counter space for customers and checking counter with wrapping materials at exit. One-way circulation.



Design for a flower shop in Los Angeles by J. R. Davidson.

DISPLAY

Display facilities should be subordinate to the merchandise. A mechanized display may attract brief attention but usually is not sufficiently subordinated: interest is held by the workings of the device, not by the wares.

Similarly, color should be used to focus attention on merchandise. This can be done, where colors are of considerable variety, with neutral backgrounds which will harmonize with any and all of them; or, when goods have one predominant hue, the use of a complimentary scheme will add intensity to the display.

Stores or departments with wares which will not be injured by handling now sell them from open display. Advantages are many: (1) Encouragement of self-service which results in greater volume of sales per clerk. (2) Useful floor space is increased through elimination of counter and bulky show cases. (3) Lower part of walls is made useful for selling-display. (4) No danger of hidden accumulation of non-selling stock. Quick check on wares that do not sell.

Open display tables with tops divided into adjustable compartments are used in island groups, helping to control circulation. Open wall shelving and display fixtures with several levels are recommended. Theft is reported to be negligible, especially when high fixtures obscuring view of tables and racks have been properly eliminated.

Merchants are coming to realize the primary importance of flexibility to meet competition by improvements. Much floor equipment is now made easily movable. Window bulkheads, tables, racks, counters, refrigerators or refrigerated cases, even some shelving are now put on wheels in the modern grocery store. Shelving is adjustable and easily movable. Fruit and vegetable racks are removable and have provision for spraying and/or refrigeration.

Interior show windows built in wall or used between rooms are an effective means of display for wares requiring protection or special lighting.

Locate the cash register so that clerk can do nothing else while making change.

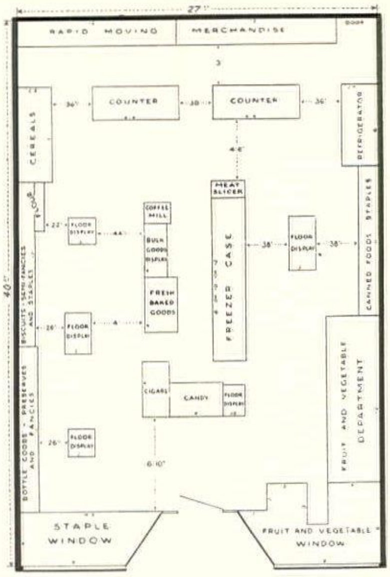
Illustration from LADENBAU

Design for a beauty shop by Joseph Ringel, architect.

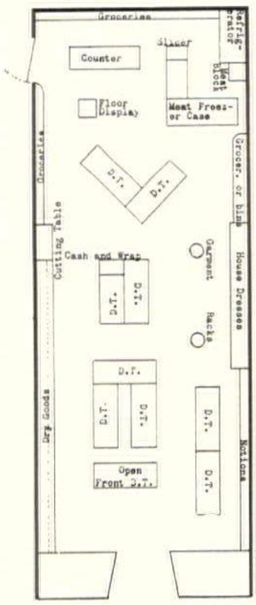
NON-SELLING AREAS

Receiving department for unpacking, checking and marking goods.

Reserve stock room is often a cause of overbuying.

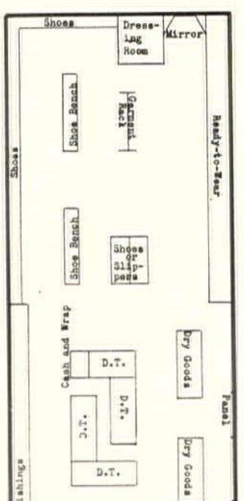


From BETTER GROCERY STORES



Dimensions
Store - 24' x 65'
Display Tables - 32" x 7'

Plan prepared by Wholesale Dry Goods Institute



Dimensions
Store - 24' x 82'
Display Tables - 32" x 7'
Shoe Shelving - 16"
Dressing Room - 5' x 5'

Plan prepared by Wholesale Dry Goods Institute

Seasonal demand makes use of separate warehouse space preferable to using more expensive area in store.

"The small store can handle its delivery orders, as a rule, from the wrapping counter, the orders going out fast enough to prevent cluttering of aisles and delays to either type of customer. When the sales volume reaches a point at which confusion occurs in the retail selling space, it is advisable to provide a separate delivery room. Often as few as 50 orders daily justify an order, assembly and delivery room.

"No selling is done in the order room. It is solely for delivery orders. Experience shows that this plan minimizes mistakes in filling orders, does away with confusion in the sales room and makes for better service all around. Aisles are free of outgoing delivery boxes.

"The order room can be added easily to the floor arrangement of the smaller type store, by removing the rear wall on one side and substituting for it a low 40-inch stock shelf. This throws one-half the back room into an order room. Customers can see into the order room but will not enter. The activity of assembling orders gives a busy aspect to the store without interfering with counter customers' service. Rear doors are used by delivery clerks."

Small Store Arrangement. U. S. Chamber of Commerce.

Delivery department for sorting, checking, loading. In larger stores conveyor systems speed up this process with moving belts or spiral gravity chutes. Loading platform for trucks. Garage usually is separate or eliminated in favor of cooperative delivery service.

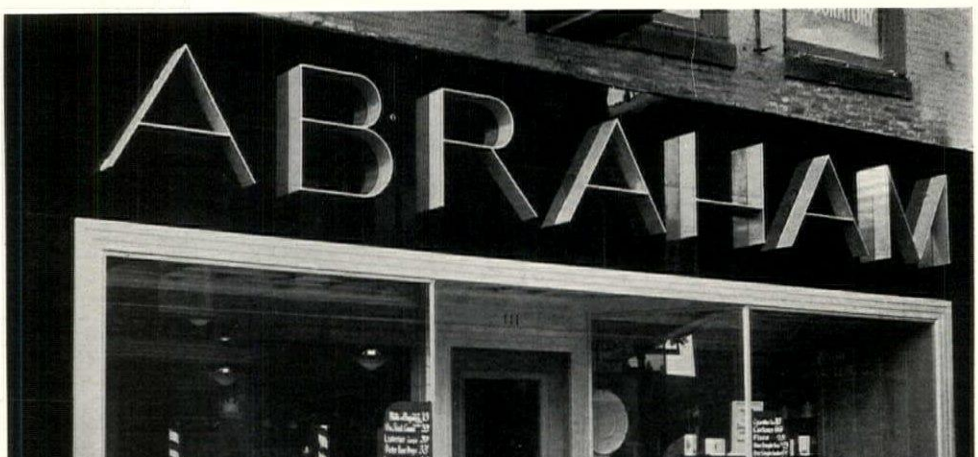
Offices, credit department, 'phone order department and such accessory services as fitting rooms, alteration rooms and millinery workrooms must be provided, all near respective selling departments. Services such as lockers, rest rooms and lavatories for clerks become large elements in department stores. Even in smaller shops conveniences such as water coolers, telephones, lavatories and rest alcoves are offered customers.

MAINTENANCE

Materials should be resistant to wear and easy to clean. Walls should have sanitary cove bases and equipment bases should stand up under wet-mopping or scrubbing. Easy and economical maintenance is assured by keeping surfaces and decoration simple.

Provision should be made for easy collection of trash (chute and bin) and incineration or possible salvage by shredding and baling.

DRUG STORE IN BURLINGTON, VERMONT . . . LOUIS S. NEWTON, ARCHITECT



(2) SPECIFIC DATA

SHOP FRONT

The merchant is interested in distinctiveness, adequate display area and an effective entrance. A good sign or trade symbol against a simple background of material interesting in texture or color is frequently used. Another method is to provide a view of the store interior, thus making the window display doubly effective. In warmer climates it is possible to open the front entirely if the benefits of air conditioning are not sought or necessary.

SIGNS

Maximum legibility for day and night illumination. Graduated in size and located for visibility from across street, from passing cars, and by pedestrians.

Lettering in dark silhouette against lighted background recommended. Projections from building-line and types of illumination are governed by local code and usually require permits.

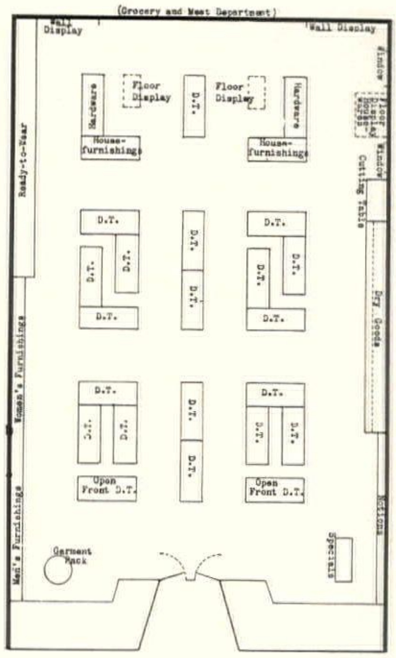
Gaseous tubes for color: Alternating current with small local transformers or converters for direct current—as near sign as possible to shorten heavy copper conductors. Neon (red) uses 6 watts per foot of lettering tube; blue or green each 7 watts; white or yellow, 20 watts. A new type of tubing permits several parallel color channels in small section which makes new combinations practical.

Photo-electric and/or time control for signs.

ENTRANCE

Island windows and irregularly shaped entrances intended to draw window shoppers into store are often wasteful of space and doubtful in effectiveness.

Provide automatic door-opening device with photo-electric control. Doors operate when a ray of light, falling on a photo-electric cell, is interrupted. The door opens long enough for a person to pass through, then closes automatically.

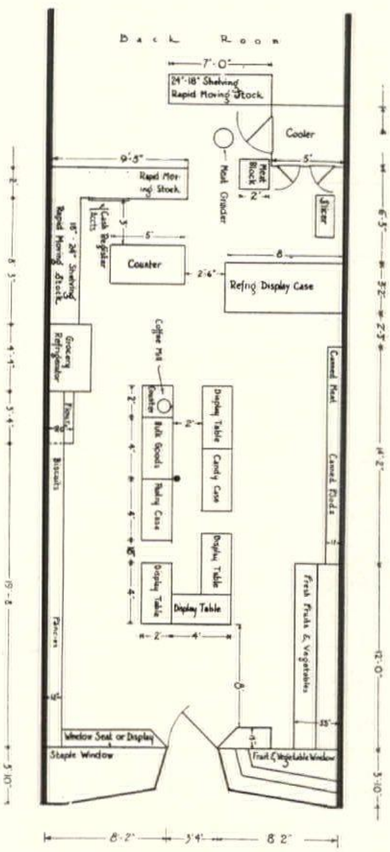


Dimensions
Store - 45' x 73'
Display Tables - 32" x 7'

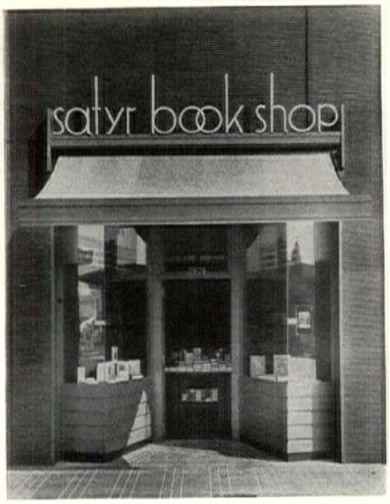
Plan prepared by Wholesale Dry Goods Institute

THEATER FRONT DISPLAYS . . . . . ROCKEFELLER CENTER, NEW YORK CITY

Photograph by Max Zimmerman



Louisville Grocery Survey Model Grocery Store, arranged by Carl Dipman, editor of The Progressive Grocer.



Morgan

A book shop in Los Angeles designed by J. R. Davidson.

WINDOWS

Window areas represent 12 to 40 per cent of total rent and are estimated to earn one-third of profit on all sales.

One-front windows are easiest to dress and light. Island windows are difficult to treat: elevator dressing is expensive, and display and lighting for observation on many sides create problems.

More floor area in window is gained and knee and toe room provided for window shopper if window and its frame can project from shop front.

Depth of window should be twice its width for satisfactory angular view on approach. For general purposes no window need be more than 8 feet high.

A two-level or second-floor display may be advisable for streets traveled by double-deck buses.

Stores selling wares with considerable size range will do well to have at least two separate window types. **Examples:** Women's wear: (1) gowns displayed on standing figures; (2) gloves and hosiery at hand height. Hardware: (1) stoves, lawn mowers, in larger window with low floor; (2) tools at hand height.

Consider access for window dresser, merchandise, cleaning and relamping.

Consider time-switch for window lights.

Hedrich-Blessing

A furniture store façade designed by Howard T. Fisher, architect.

REFLECTIONS

Superlighting (high intensity of illumination in daytime) seems the only solution but is expensive. Sloping windows do not solve problem satisfactorily.

Awnings will cut off most reflections from upper stories of buildings on other side of street but do not take care of bright street scene.

Consider all window floor and background materials to avoid distracting reflections of lighting equipment and window shoppers.

Use matte tile, travertine or similar non-polished materials.

Mirrors may be used on walls to increase apparent size of small displays but care is necessary to avoid distractions. Window dressing may also be made more difficult.

TYPICAL DIMENSIONS FOR SHOW WINDOWS

Type	Depth (feet)	Height above sidewalk (inches)	Type of background	Remarks
Department store:	7-10	12-30	Closed	Interior wall valuable.
Automobile store:	10	Nearly level with sidewalk	Open into store	Disappearing window.
Furniture store:	10	Nearly level with sidewalk	Period	
Jewelry store:	$1\frac{2}{3}$-3	42-48	Low or closed	Miniature stage.
Books or stationery:	2-$3\frac{1}{2}$	30	Low	
Florist shop:	3-5	12	Open or glass	Terraced tile with drainage and insulation.
Drug store:	2-$2\frac{1}{2}$	36	Open	Show interior.
Hardware or paints:	$2\frac{1}{2}$-3 6	30 12	Closed	Two types.
Shoe store:	3-5	12-16 48	Closed or open	Exclusive shops may feature individual models in small windows.
Hat store:	$2\frac{1}{2}$-4	30-48	Closed or open	
Women's wear:	3-5	12 30	Screns, Venetian blinds or open	Two types.
Haberdashery or Tailor:	3-5	30 18	Closed	Two types.
Grocery store:	3-6	20-28	Low	Terraced tile with drainage and insulation.
Bakery or confectionery:	2-3	30	Closed, Glass	Insulation. Two levels.

VENTILATION AND CONDENSATION

Awnings or marquees (naturally more expensive) are preferable to curtains or Venetian blinds for protection of merchandise since heat is dissipated outside of window. Venetian blinds are difficult to clean. Curtains will be required for closed days or during window dressing.

VENTILATION AND CONDENSATION

Low velocity (non-fluttering) mechanical ventilation is desirable for show windows because of the extreme heat originating from lighting units.

Refrigeration may be necessary for foods or flowers.

Condensation may be prevented in winter by closed display with outdoor atmospheric conditions maintained within window. Various schemes such as dry air stream across window have been suggested.

Insulated platform will keep out basement heat. Radiators should be kept away from window backgrounds. No unfiltered air should enter window through vents in window frames or elsewhere.

Lighting units should be placed above window proper, behind glass panels, and ventilated to prevent excessive radiation of heat into display.

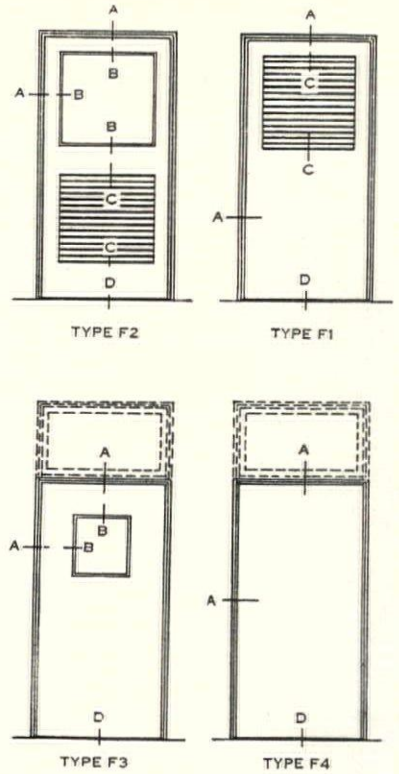
MATERIALS AND CONSTRUCTION

Use only polished plate glass in non-corrodible metal frames as narrow as is commensurate with strength required. Frames should permit expansion and contraction of glass. One-quarter inch Glazing Quality is standard. Practical maximum area for one sheet is 250 square feet. Second Silvering Quality, the next better grade, is used in areas under 20 square feet, where such expense is justified.

Clips and plastic cement are preferable to wide corner posts where strength is not needed.

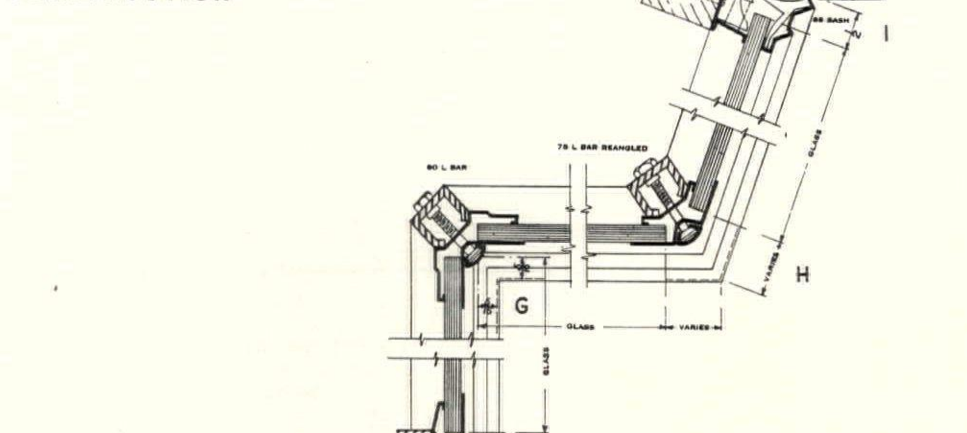
Consider method of concealing wiring which will permit easy inspection.

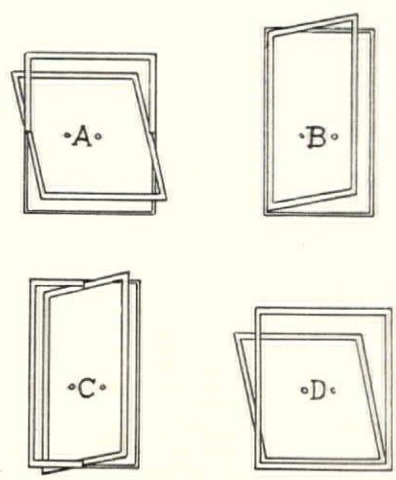
Also consider rolling grilles in front of window as protection against theft, damage during riots, or earthquakes.



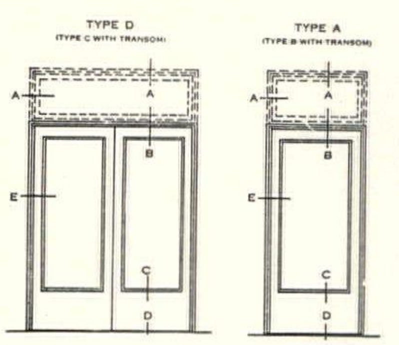
Kawneer flush-type doors fabricated of cold-rolled and extruded members.

HORIZONTAL SECTION DETAIL OF KAWNEER PATENTED STORE FRONT CONSTRUCTION





Kawneer pivoted ventilators. Maximum width of Types A, C and D, 30 inches; for Type B, 24 inches.



Kawneer welded tubular doors fabricated from stainless tubes of solid bronze or aluminum alloy.

INTERIOR PLAN AND EQUIPMENT

Standards	Width	Length	Height
Ceilings:			
Basement			12-14 feet clear
Main floor			12-14 feet clear
Main floor with mezzanine			18-20 feet clear
Shop with mezzanine			15 feet clear
Minimum aisle	4 feet		
General show cases and counters	22-24 inches	4, 6, 8, 10, 12 feet	34-40 inches
Grocery wrapping counter	3 feet	4 or 6 feet	34-36 inches
Display Tables:			
Grocery	3 feet	4 or 6 feet	28-30 inches
Dry Goods	30-32 inches	7 feet	34 inches
Hardware	31-34 inches	5 feet 4 inches and 7 feet	32-35 inches
Drug	24-32 inches	Up to 7 feet	32-34 inches

Shelving:	Depth	Clear Height Between Shelves	Other Features
Grocery:			
General	12-18 inches	10-18 inches	Not over 6 feet high including 6-inch base. Shelves preferably adjustable.
Staples	18-24 inches	Lower shelf 20 inches Others 14 inches	
Hardware wall case with ledge and cabinet	30-36 inches		8 feet long 32 inches to ledge 7 feet 6 inches high
Cabinet	20 inches		
Books	8-9 and 12 inches	10 and 14 inches	8 books/foot
Shoes	14 inches	9 inches (double row)	Boxes 6 inches wide
Millinery	14 inches	18 inches	Deep drawer under shelf
Dry Goods:			
Piece goods	26-28 inches	Shelves under ledge 30-34 inches to ledge	
Men's and women's furnishings	10-18 inches		
Shelves under ledge, add	12-14 inches		

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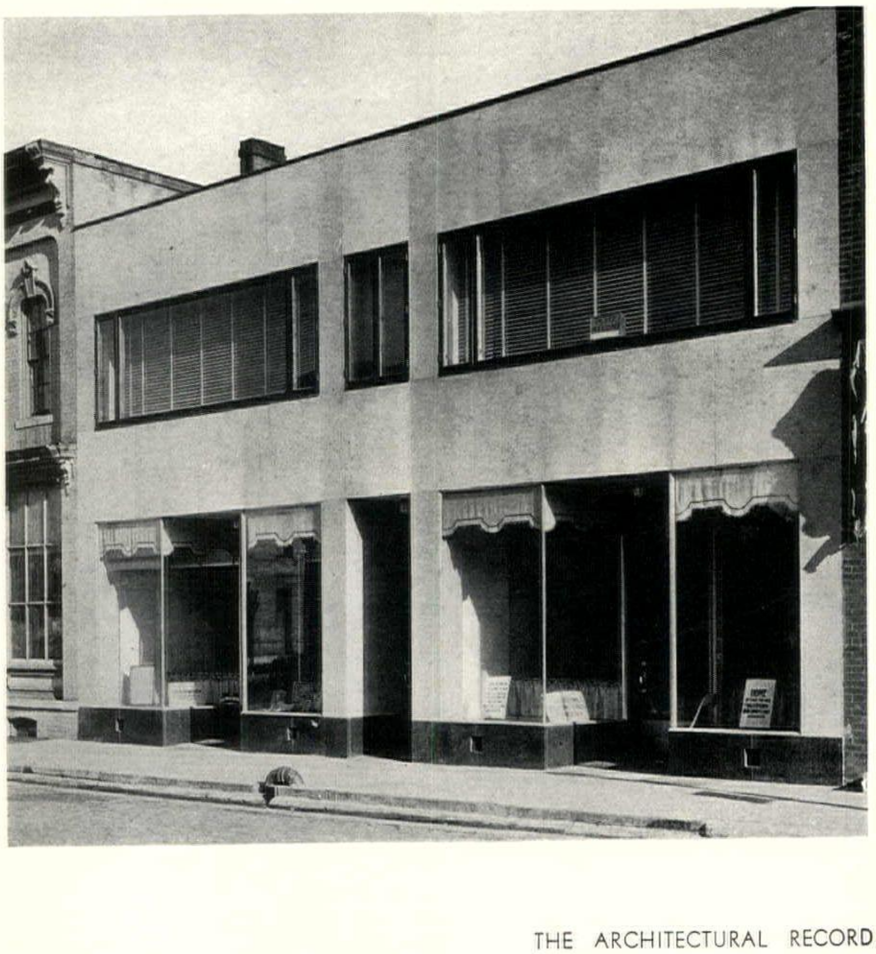
Photograph by Hedrich-Blessing Studio

SHOE STORE IN CHICAGO
KOENIGSBERG AND WEISFELT, ARCHITECTS

SMALL SHOPS

Photograph by Hedrich-Blessing Studio

BERLAND'S SHOP, CHICAGO
ARCHITECTURAL DEPARTMENT
UNIVERSITY OF CHICAGO



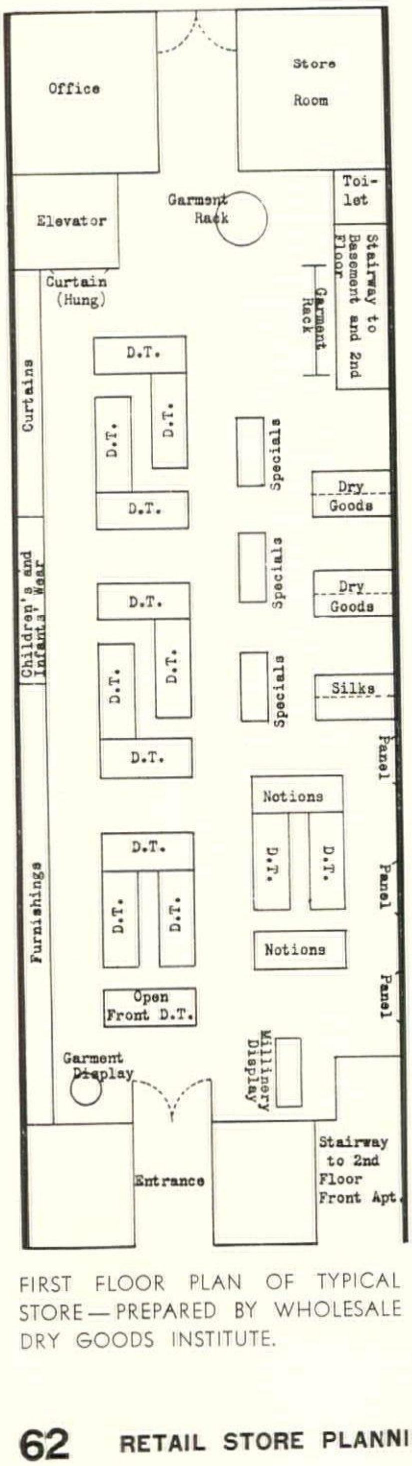
HAFERMEISTER STORE BUILDING
IN WATERTOWN, WISCONSIN
GEORGE FRED KECK, ARCHITECT

Photographs by Hedrich-Blessing Studio

BARNETT'S STORE IN HAMMOND, ILLINOIS . . . . . . GORDON GUNDLING, DESIGNER

THE APPAREL STORE

By KENNETH C. WELCH, Grand Rapids Store Equipment Company



FIRST FLOOR PLAN OF TYPICAL STORE — PREPARED BY WHOLESALE DRY GOODS INSTITUTE.

AISLES

Clerks' aisles should be a minimum of 20 inches with about 2'2" to 2'3" as the ideal. Sometimes they are made slightly wider, up to 30 inches, but this depends somewhat on the degree of activity and whether customers have to go behind the counters to reach mirrors for fitting hats or to examine merchandise.

Customers' aisles may vary from a minimum of 4'6" to as great a width as the traffic determines, possibly up to 10 or even 12 feet in width.

COUNTERS AND CASES

The counters should be 1'10" deep and 38 inches high for stand-up selling, and 34 inches, preferably with an overhang, for seating welling.

Drawers for storage vary a great deal with the type of merchandise. A small drawer about 4 inches high and 15 inches wide, fitting into a cabinet 1'10" deep, handles such items as women's hosiery, gloves, and other small wares.

Other important considerations in apparel stores are the size of the hangrod cases. In women's ready-to-wear the rods should be adjustable from the floor to the center of the rods: 60 inches for coats and the like, and up to 70 inches for evening dresses.

Men's clothing is carried double deck in a cabinet 7 feet high under the cornice, the one rod being removable and the top rod adjustable to take men's overcoats and top coats in season.

When open cabinets are used they can be as shallow as 2'4", but if disappearing doors are used they should be about 2'9" deep, and at least 2'6" or 2'7" deep with sliding doors.

STORAGE

Stock rooms are planned to allow a 2-foot width for the hanging garments and a 2-foot aisle.

As a rule today apparel stores carry very little reserve stock, practically none in outer apparel although possibly some in small wares, such as hosiery and other standardized items.

SERVICE SPACE

A combination locker is suggested for the storing of employees' garments. Two or four persons hang their coats and hats in a common locker, which provides small lockers with individual keys for purses and personal belongings. This arrangement not only saves floor space but also acts as a control against thefts.

Offices vary greatly with the type of the store and the individual type of business, depending on how much credit, how much cash, and how much clerical work is necessary.

Provisions should be made for such service departments as receiving and marking, delivery, workrooms for alterations for both men's and women's wear, ample fitting rooms.

SHOW WINDOWS

The tendency today is to keep a rather low bulkhead for women's wear, possibly 14 to 18 inches, but in men's stores it is made higher, preferably 20 to 26 inches. The window height is not important in women's stores and can be governed entirely by the exterior design. However, most men's stores prefer a comparatively low window, preferably not over 7 feet of glass with a 24-inch bulkhead. Sometimes it is made even lower by use of a valance.

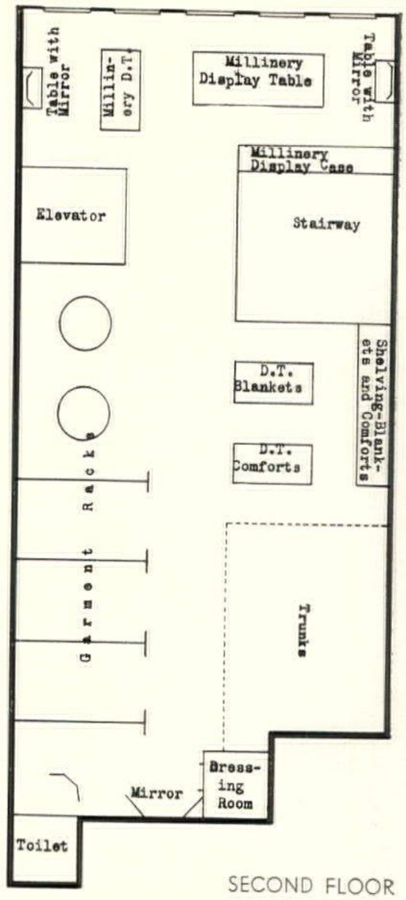
The tendency is to make the windows shallower for strictly apparel stores. Of course, department stores that may introduce furniture and carpets have to have deeper windows, at least 8 to 9 feet. However, in women's apparel stores, the depth can be from as shallow as 3½ or 4 feet up to 6 feet, depending on the width. Windows should not be too deep as compared to their width; the shallower window is more effective as the merchandise is naturally more visible from the street. Even shallower windows coming in front of columns are desirable today for small wares, such as hosiery, gloves and toilet articles, and if possible these should not be shallower than 10 or 12 inches, although if necessary an effective small wares display can be made in 7 or 8 inches.

In men's clothing stores a depth of 4 to 5 feet is customary and the windows should be separated by dividers or smaller windows with widths of 5 to 6 feet to obtain a number of unit displays featuring various color combinations.

A good position for the lights is directly above the window at the front. The illumination, however, should be concealed. If the window is in an arcade or visible from the side, some means should be used to prevent glare.

The windows should have ample easy access, particularly in smaller shops where large stocks are not carried and many times a day things must be taken out of the window to be sold.

The character of the background is, of course, a debatable subject. A light-colored background is desirable, either painted or in light-colored woods, and preferably dull rather than polished to prevent reflection of the lighting. One advantage of a light background is that it does introduce more light into the window and consequently reduces the reflection on the glass; a dark-colored background nearly always aggravates this reflection condition. Naturally, backgrounds should not be too ornate: the important function of any window is to display the merchandise properly and not to be too much of a feature in itself.



SECOND FLOOR

<u>Dimensions</u>

Store - 28½' x 90' 1st Floor
28½' x 60' 2nd Floor

Tables in island arrangement - 32" x 7'

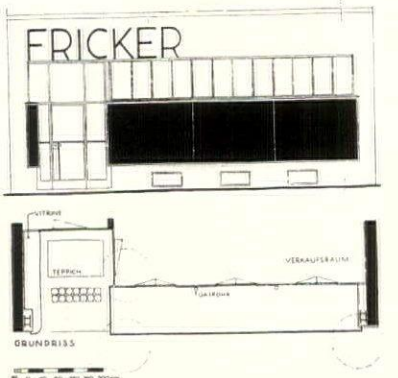
BRILL BROTHERS STORE, NEW YORK CITY... SHREVE, LAMB AND HARMON, ARCHITECTS

Photograph by F. S. Lincoln

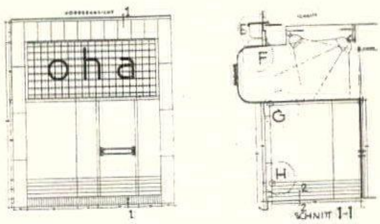
THE DRUG STORE

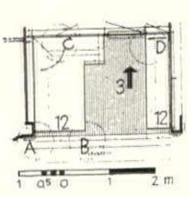
C. W. A. WOODBURNE, Grand Rapids Store Equipment Co.

Perfume shop in Berlin, designed by O. R. Salvisberg, Architect.



A store in Basel, Switzerland, designed by Brauning, Leu & Durig, Architects.





Store in Dusseldorf, Germany, by Bernard Pfau, Architect.

Illustrations from LADENBAU

AISLES

Clerks' aisles are usually 22 to 26 inches, depending on the roominess of the store. Customers' aisles vary usually from 4 to 5 feet in width, and are wider near the entrance or at converging traffic points. They should run as wide as 6 or 7 feet where the traffic is heavy.

COUNTERS AND CASES

Standard sizes of show cases are 42 inches high and 24 inches wide. For narrow stores they may be 20 and 22 inches wide.

Counters are made 34 inches high and 24 inches wide. The lengths of both counters and show cases are 6 feet and 8 feet as a rule.

A display counter is made with a display section in front full height and about 8 inches deep; the total height of this counter is 42 inches over the display and 34 inches high over the wrapping ledge at the rear. The wrapping ledge is usually covered with linoleum and is made about 16 inches wide.

The slatted deck is usually placed about 18 inches below the top glass. From that point down to the base paneled woodwork is furnished, behind which there is storage space for cigar stock.

CANDY CASES

These are made the same width as the other cases, but are usually 50 inches high and have sloping fronts. The tops are about 14 inches wide.

DISPLAY TABLES

These are 33¾ inches high over the rim edge which projects up above the top; the top itself is 32 inches above the floor. The most popular sizes are 20 by 40 inches, 24 by 24 inches, 24 by 48 inches, 24 by 60 inches and 24 by 72 inches.

CASHIERS' STATIONS

The body is made 42 inches high, with a plate glass screen above containing a hand pass, and with total height over-all of 58 inches. A cash drawer and two other drawers are placed in the rear above cupboards.

DRUG WALL CASES

The upper sections are usually furnished with side sliding doors although some sections, particularly for patent medicines, are made without doors. The lower sections are made with wood-paneled doors or drawers or combinations of both. The ledge height of the lower section is 42 inches; total height over-all is 8 feet. The depth of the upper section is 12½ inches, depth of the lower section 19½ inches, lengths 6 feet and 8 feet. Some sections used for candy, toilet articles, gifts and the like, have a buffet recess above the ledge 14 inches high and glass doors above.

TOBACCO WALL CASE SECTIONS

Open cigarette bins or compartments are furnished above the ledge with storage space behind. Glass doors are used above the ledge, and wood-paneled doors below.

PRESCRIPTION WALL CASES

Quite frequently a regular type of wall case is used with glass doors above and below the ledge, although there has been a tendency recently to use fixtures which will allow customers to view the prescription room. Such fixtures are made from 60 to 63 inches high; they have plate glass doors in the upper part and either wood-paneled doors or drawers in the lower. The depth of the upper and lower section is 12½ inches.

SODA FOUNTAINS

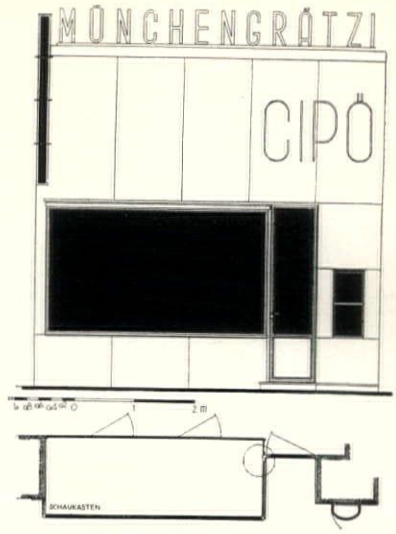
Soda and lunch booths are made 42 inches high, 42 inches from front to back and from 4'8" to 5' long.

Fountain backbars are made with a variety of upper sections comprising diagonally veneered wood panels, mirror panels, cabinets for display and some panels which are located to give indirect lighting. These panels are made also for lights on the face. The indirect lighting effect, however, is more attractive if the lights are so placed as to throw the light over the area immediately in front of the mirrors. The lower sections comprise wood-paneled hinged doors, wood-paneled hinged doors and drawers, refrigerated sections, open sections for dishes, also sections for cutlery and urns. The measurements are quite similar to those given for wall cases except for the lengths. All fountain backbar sections are made in sections to permit assembling according to practically any backbar requirements.

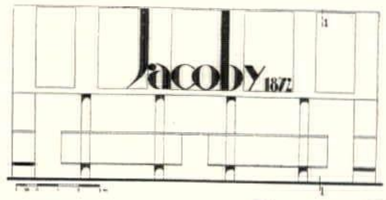
In large stores serving lunches it is often desirable to place the kitchen in the basement under the fountain and obtain service through a dumb-waiter. In stores of this type it is frequently a great advantage to have separate stock rooms for the main lines of merchandise such as tobacco, toilet articles, fountain supplies.

PRESCRIPTION WORKBOARDS

The lower section is 39 inches high and 24 inches wide, comprising drawers and cupboards. Oak is used for workboard ledges as it will withstand the destructive agencies of acids better than any other wood. Pull-out shelves are covered with Vitrolite for the mixing of pills and the like. Label drawers are also included. The depth of the upper shelving sections is 5¾ inches. Poison cabinets are inclosed by glass doors and furnished with locks. Drawer sections with narrow upright drawers for tinctures and other compounding material allow a large stock of small bottles to be carried in a small space.



A store in Budapest, designed by Ludwig Kozma, Architect.

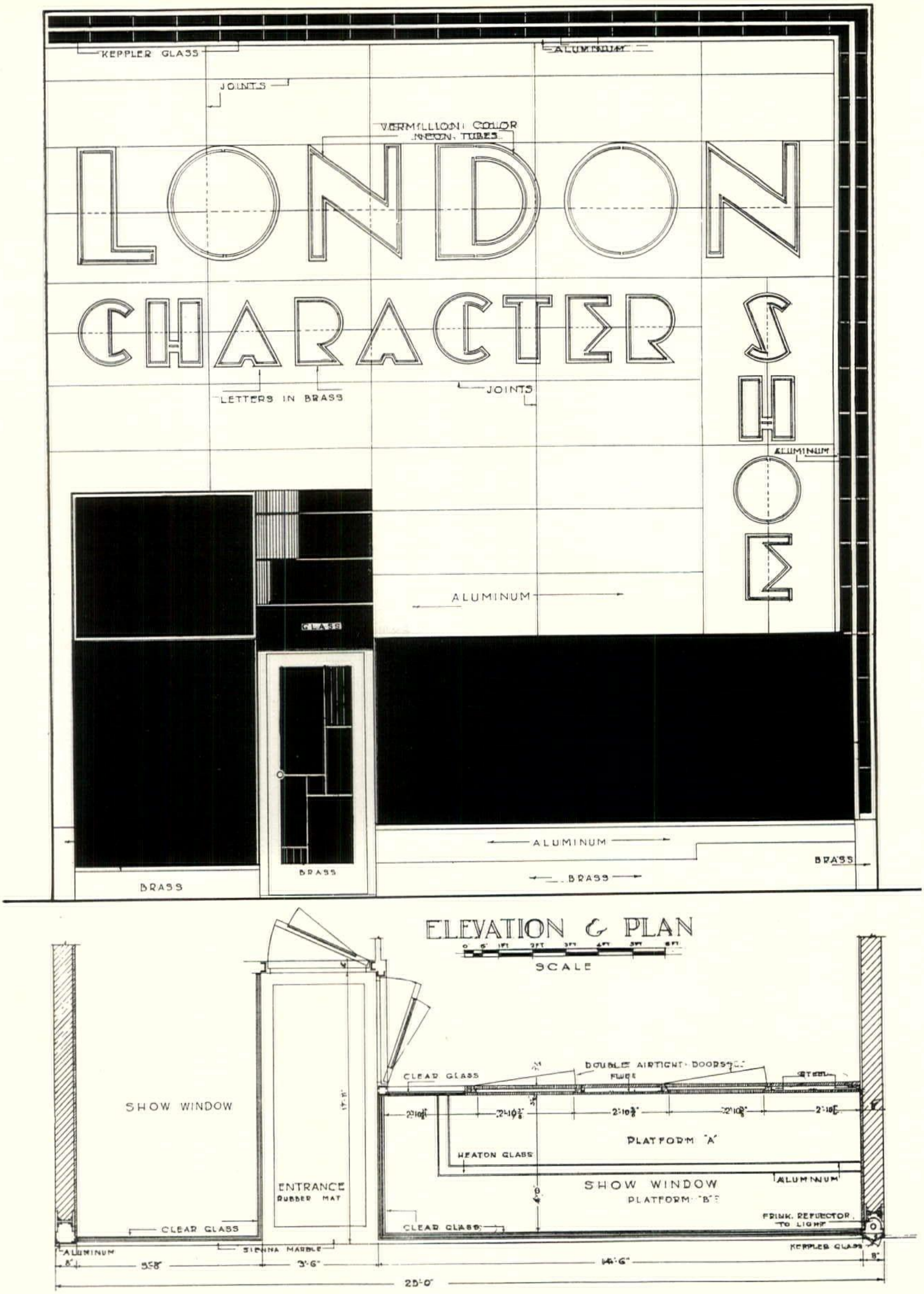


Store in Frankfort by H. Zweigenthal, Architect.

Illustrations from LADENBAU

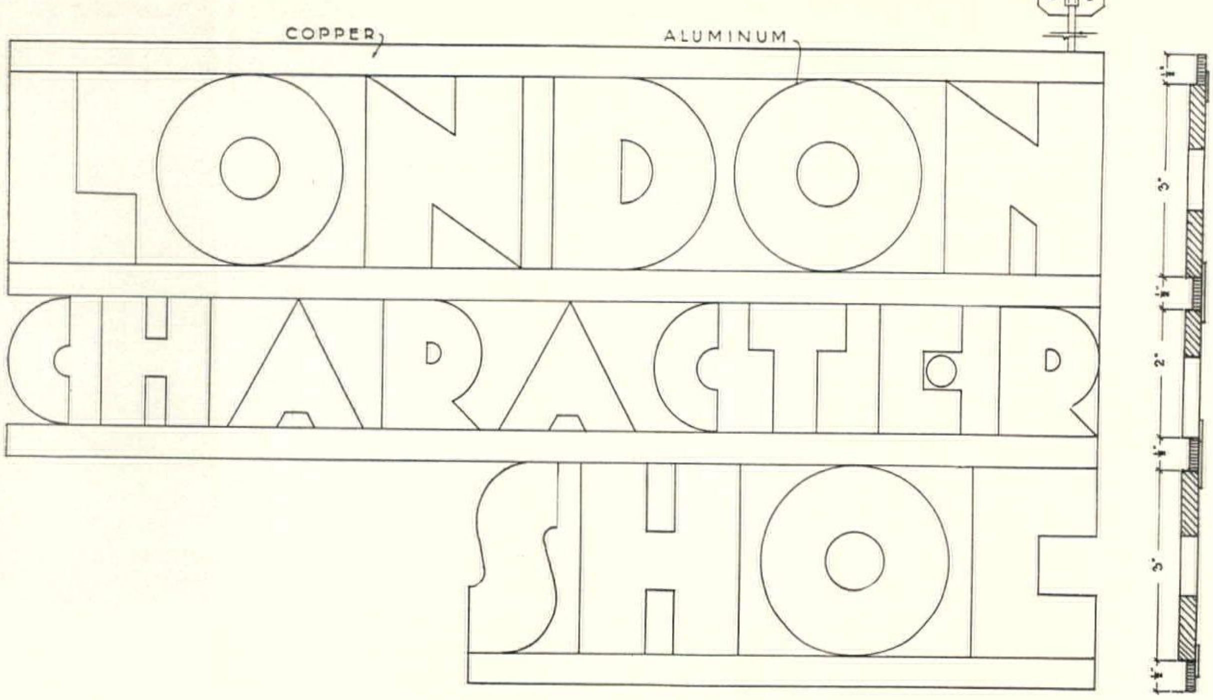
DRUG STORE IN HOTEL ASTOR, NEW YORK CITY . . . ALLMON FORDYCE, DESIGNER

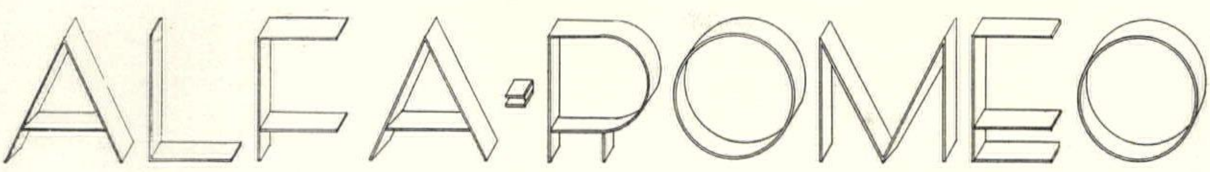
Photograph by Richard Garrison



SHOP FRONT AND LETTERING DESIGNED BY VAHAN HAGOPIAN

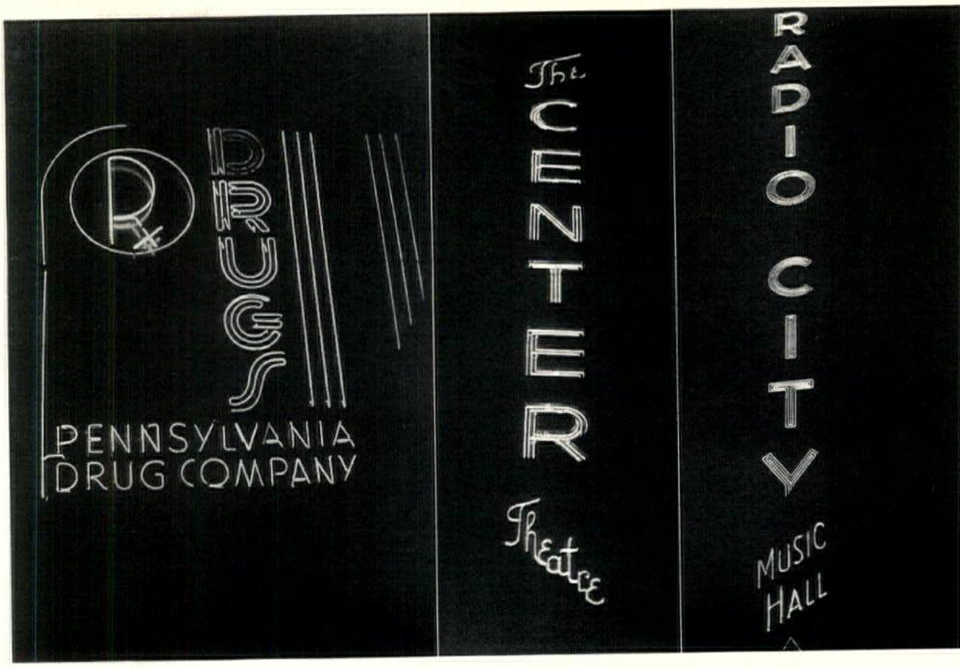
STORE LETTERING





LETTERING (BELOW) BY WALTER DORWIN TEAGUE

Photograph by John Wallace Gillies, Inc.



STORE LETTERING

Photographs by Max Zimmerman

Courtesy, Holophane Co.

FOX STORE IN HARTFORD, CONNECTICUT—DESIGNED BY TAUSSIG AND FLESCH, ARCHITECTS

STORE INTERIOR

The brightness of the show windows determines the minimum desirable level of illumination in the store. Stimulating windows will fail to entice customers into the store if the latter is dim by comparison. The store should therefore be lighted to at least 10 per cent of the show window level. For example, if the show windows are lighted to 250 foot-candles, the store intensity interior should be set at not less than 25 foot-candles. In no case should a store interior have less than 10 foot-candles.

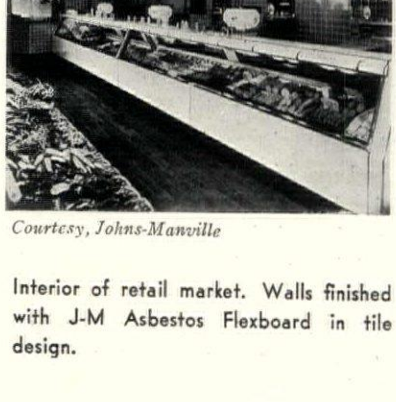
MINIMUM DESIRABLE LIGHTING LEVELS FOR SOME STORE INTERIORS

TYPE OF STORE	Foot-Candles on Merchandise	Foot-Candles in Self-Lighted Show Cases	Foot-Candles in Aisles and Traffic Areas
Apparel Stores	30	60	10
Drug Stores	20	40	5
Food Stores	20	40	5
Gas Stations			
(Show Rooms)	20	40	5
(Sales Rooms)			
Around Pumps	5		
General Outside Area	1		

Courtesy, Holophane Co.

Illumination in Allen's Jewelry Store in Syracuse, N. Y.

High lighting levels are expensive for small stores during intervals between customers. A method of using a minimum level of general illumination in combination with a high level held in reserve, to be turned on only when the customer is present, has recently been developed. Concentrating lens or louver units are installed flush in the ceiling over each show case, and adjacent to wall display cases, controlled by noiseless mercury switches, concealed on the salesman's side of the aisle. When a customer approaches a case the salesman flips the inaudible switch and floods the display with a high intensity, turning it into a temporary attraction zone. This form of inexpensive high intensity lighting can also be controlled by photo-electric switches so that the light will operate when a customer approaches the merchandise, and go out again when he moves away, or by "capacity" switches operating in like manner.



Courtesy, Johns-Manville

Interior of retail market. Walls finished with J-M Asbestos Flexboard in tile design.

FEDERAL HOUSING ADMINISTRATION

Washington

Stewart McDonald
Acting Administrator

June 1, 1935

Mr. John D. Biggers, President,
Libbey-Owens-Ford Glass Company,
Toledo, Ohio.

Dear Mr. Biggers:

Your new "Modernize Main Street" Architectural Competition is a most constructive and timely development in the growing interest in modernization and reviving construction.

Your plan will stimulate the interest of many architects and builders and will encourage the specific action of business property owners throughout the country.

Widespread examples have already come to our attention of increased income resulting from modernization of business properties. The broadening of the National Housing Act to permit insured modernization loans on business property up to $50,000 greatly increases the scope of the cooperation of the Federal Housing Administration.

Under the National Housing Act approved lenders, by complying with the regulations, may be insured up to 20% of the total loans made for improving business property and may be insured also against mortgage loans.

You may be assured of our fullest cooperation and our appreciation of the contribution you are making.

With every wish for the success of your program, I am

Sincerely,

(Signed) STEWART McDONALD

MODERNIZE MAIN STREET

The Modernize Main Street competition sponsored by Libbey-Owens-Ford Glass Company is creating widespread interest among architectural designers, among manufacturers supplying materials and equipment used in store design, and among Administration executives conducting the campaign for modernizing business and other property under loans insured up to $50,000.

The competition was timed to coincide with the enactment of the bill amending the National Housing Act to permit insurance of modernization loans up to $50,000. The amendment, approved May 28, authorizes loans for the purpose of (1) repair, alteration or improvement of real property already improved by, or to be converted into, apartment or multiple-family houses, hotels, office, business or other commercial buildings, hospitals, orphanages, colleges, schools or manufacturing or industrial plants, or (2) the purchase and installation, in connection with the foregoing types of property, of such equipment and machinery, with or without any structural changes in the buildings, as are peculiarly adapted to the business conducted therein or necessary to the operation thereof.

The amendment covers practically every type of structure not including private dwellings, which have been eligible for insurance of loans up to $2,000 since last August. As of June 8 the Federal Housing Administration had, through community campaigns and other promotional activities, obtained pledges from home owners to spend $428,541,779 for modernization and repair work, most of which has been or will be paid for without resort to insured loans. This total, made up of small jobs, is impressive enough to warrant the belief that the extension of modernization loan insurance authorized by the amendment to the National Housing Act will inaugurate a general revival in architectural practice. The Federal Housing Administration has plans for getting in touch with every property owner in the United States to acquaint him with the possibilities of modernizing for profit under the revised loan insurance plan.

There is reason to expect that modernization of stores will bulk large in the general rehabilitation of income-producing property. The Federal Housing Administration estimates that about 65 per cent of the retail stores of the country are in need of improvement. The Record shares the view that stores will figure largely in the modernization work encouraged by the enlarged loan insurance plan and began a research study of store check lists as soon as the bill was introduced in Congress. We take pleasure in being able to publish this study along with the full text of the timely Libbey-Owens-Ford Glass Company's Modernize Main Street Competition.

NEXT MONTH:

SCHOOLS AND SPECIAL BUILDING TYPES

GEORGE WASHINGTON BRIDGE OVER HUDSON RIVER . . . . PHOTOGRAPH BY MARGARET BOURKE-WHITE

VOL · 78 NUMBER 2

1 9 8 3 5

AUGUST

THE ARCHITECTURAL RECORD

MODERATE-COST PRIVATE HOUSES

This issue of The Record is devoted to moderate-cost private houses. It gives a survey of current practice and trends in private house architecture with reference to principles, methods, materials and equipment, incorporating new developments in their several technical relationships.

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Evidence of professional attention to a field heretofore neglected, namely low-cost residence architecture, is seen in a competition by the New York Chapter of the A. I. A., the conditions and results of which merit special study. The competition permitted ample freedom of invention in planning, constructing and equipping a house for a family of four with income and resources warranting a construction cost of $4,000 or less. This study-competition, limited to chapter members and participated in by well-known architects, is believed to be the first of its kind. It is hoped that similar competitions will be held by other chapters. There are probably few chapter activities so promising of practical benefit to the profession and to the public as critical study of low-cost private house architecture.

The survey further discloses a remarkable variety of construction methods experimented with partly on the initiative of architects and partly on the initiative of manufacturers. A dozen such methods worth recording are used in houses newly completed or sufficiently far advanced to be photographed for this issue.

Two prefabricated house systems recently placed upon the market have achieved wide popular interest. The list of prefabricated house systems now marketed under trade names is impressive until one begins to analyze the term "prefabricated." An automobile is prefabricated in the sense that it is assembled in a factory from factory-made parts. This mode of assembly is out of the question as regards houses of any size intended for fixed locations. The prefabricated house is merely a new name for the old stock house.

There is no difference in construction principle between prefabricated or stock houses and houses designed by architects for individual clients. They are all assembled with more or less hand labor on the site from manufactured parts. If an architect specifies a brick wall he is using manufactured materials as against the more highly integrated manufactured wall panels of the stock house.

Every essential item which goes into a stock house can be bought in the open market. Even the most recent mechanical core, which combines the lighting and air conditioning plant, the fabricated bathroom, the fabricated kitchen, and the plumbing into a compact structural unit, can be so bought. There is no doubt a price differential on parts in favor of the wholesale buyer. On the other hand, the wholesale buyer who assembles the parts has to pay a heavy commission on the sale of the house. The stock house is essentially an installment selling device and it has yet to be demonstrated which is the more economical investment for a home buyer—a stock house on the installment plan or an architect-designed house on an amortized mortgage.

The survey offers no direct evidence on comparative costs. However, the specialists whom the editors have consulted are agreed that a more livable moderate-cost house can be designed today for, say, $5,000 to $10,000, than could have been designed before the depression began. To obtain the improved livability it will probably be found as a rule to be less expensive to design a new house than to redesign an old one.

EIGHT MONTHS' CONTINUOUS RISE IN PRIVATE HOUSE CONSTRUCTION

Beginning with October of last year, when the number of new residential projects built for owner's occupancy showed an increase over the total for the corresponding month of the preceding year, there has occurred a consistent and almost spectacular increase in this type of construction. Each month since then has shown a greater gain over the corresponding month of the preceding year than prevailed during the previous month. The October gain amounted to 9 per cent and by the end of the quarter the cumulative increase had risen to 18 per cent.

During the first five months of 1935 this improvement continued uninterruptedly with the result that the total number of single-family structures started during this period showed an increase of 74 per cent over the number started during the corresponding five months of 1934. The current rate of activity has now risen to the level which prevailed during the first half of 1931.

The average contract price of the houses for the five months of 1935 in the accompanying table supplied by Dodge Statistical Research Service is $6,050. The June figures, incomplete at this writing, continue the trend of the preceding eight months.

The significance of this table is to be interpreted in the light of such factors as (1) available mortgage money, (2) construction cost in comparison with the general price level, (3) purchasing power or effective demand, (4) supply.

The home mortgage market collapsed during the depression. It has now been completely reorganized on principles briefly set forth in this issue under the heading, "Standards for Mortgage Insurance." In the last several months enough mortgage money has become available to supply any effective demand for moderate-cost private house building.

The cost of construction relative to the general price level is usually measured by the price index for structural materials and the wage index for union labor. These indexes are used because no general index of the cost of construction exists. However, each building project is a separate cost problem, covering finance, site and equipment as well as structural materials and labor. Financing is undoubtedly less expensive than it has ever been, $10 a month being sufficient to pay both the interest and the entire principal of a $1,000 loan in ten to fifteen years. Equipment has been lowered in price, largely by introduction of mechanical units designed especially for moderate-cost houses. There is reason to believe that the aggregate cost of building a home is less both in comparison with the past and in comparison with the general price level than one is led to infer when consulting only the price index for structural materials and the wage index for union labor.

Purchasing power of the income groups that supply effective demand for moderate-cost private houses is a matter of opinion in the absence of statistical measurement. It is the outcome of employment and profits.

The condition of supply may be judged from the survey of residential property in 64 cities made by the Federal Government in January and February of 1934. The cities represent every State, range in population from 10,000 to more than 1,000,000 and their combined population exceeds 10,000,000.

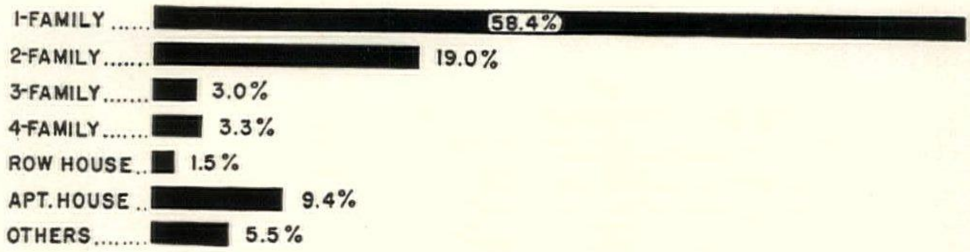
The findings are analyzed in an article entitled "Dwelling Conditions in Sixty-Four Cities" in the June 1935 issue of the Federal Home Loan Bank Review.

The article contains a series of charts which illustrate at a glance the principal aspects of the supply of dwelling units as revealed by the property survey. Six of the charts are reproduced on opposite page.

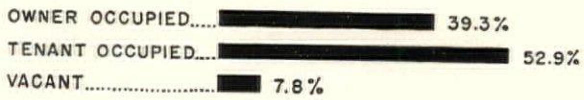
TOTAL NEW SINGLE-FAMILY HOUSES BUILT FOR OWNER'S OCCUPANCY: 37 EASTERN STATES (ALTERATIONS NOT INCLUDED)

	1933		1934		1935	
JANUARY	720	$4,347,600	482	$3,840,000	830	$5,185,100
FEBRUARY	765	4,060,300	599	4,438,300	923	5,328,300
MARCH	1,218	6,253,600	927	6,728,600	1,715	10,212,300
APRIL	1,612	8,543,300	1,322	8,543,900	2,408	14,312,200
MAY	2,272	11,953,500	1,560	9,333,700	2,786	17,338,700
JUNE	2,325	13,029,100	1,247	8,143,800		
JULY	2,288	12,907,300	1,192	7,619,400		
AUGUST	1,996	11,934,300	1,199	6,981,100		
SEPTEMBER	1,606	9,754,600	1,264	7,777,300		
OCTOBER	1,321	7,686,700	1,441	8,840,800		
NOVEMBER	965	6,160,100	1,097	6,854,500		
DECEMBER	571	4,062,700	824	5,206,500		
TOTALS	17,659	$100,693,100	13,154	$84,307,900	8,662	$52,376,600

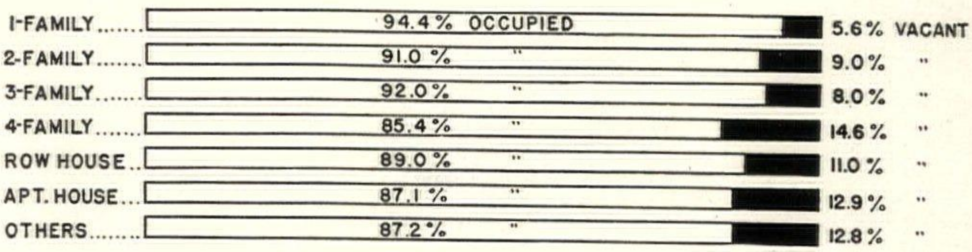
PERCENTAGE DISTRIBUTION OF 2,633,135 DWELLING UNITS IN 64 CITIES, BY TYPE OF STRUCTURE



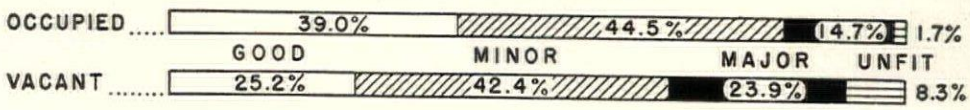
DISTRIBUTION OF 2,633,135 DWELLING UNITS IN 64 CITIES BY OCCUPANCY



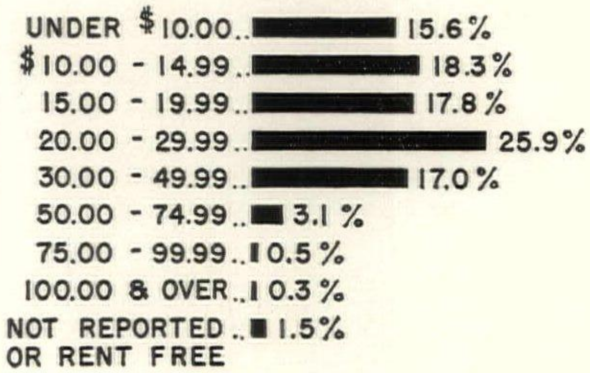
DISTRIBUTION OF OCCUPANCY AND VACANCY BY TYPE OF STRUCTURE



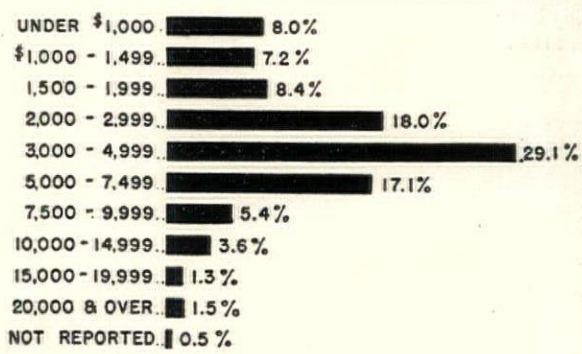
OCCUPIED AND VACANT DWELLING UNITS IN 64 CITIES CLASSIFIED AS TO CONDITION OF STRUCTURE



DISTRIBUTION OF OCCUPIED RENTAL UNITS BY MONTHLY RENTAL



DISTRIBUTION OF OWNER-OCCUPIED SINGLE-FAMILY DWELLINGS BY VALUE, JANUARY 1, 1934



STANDARDS FOR MORTGAGE INSURANCE

The Federal Home Loan Bank Act and the National Housing Act with supplementary legislation have created a Federal system of mortgage banking in the field of home finance. The system was in full operation in the closing month of last year, lacking only conforming State legislation to be completely effective.

The system permits building loans up to 80 per cent on houses for not more than four families and not exceeding with the land $20,000 in value, this high coverage being coupled with a low interest rate because the mortgages are (1) amortized, (2) discountable and (3) eligible for insurance by the Federal Mutual Mortgage Insurance Corporation.

The high-coverage insurable mortgage is designed to supersede the home finance method in common use before the depression. By this method a thrift institution accepted a short-term first mortgage while a junior mortgage was taken by a concern financing sales by operative builders. The great majority of thrift institutions—building and loan associations, life insurance companies, savings banks and the like—operate under State charters and are subject to State laws. As a rule such laws prevented thrift institutions from lending more than 50 per cent of appraised value.

Up to January 21 of this year only two States had revised their laws to enable thrift institutions to make high-coverage loans on mortgages insured by the Federal Mutual Mortgage Insurance Corporation. By June 15 the list of States had grown to 42. The timing of the conforming State legislation corresponds suggestively with the rise in the monthly construction figures for the current year in the table on page 76.

Of the mortgages accepted for insurance up to June 29 thirty-six per cent in dollar volume represented new construction, not including limited dividend housing. In June mortgages for refinancing and for new construction were accepted for insurance at the rate of $2,800,000 a week as against a total of $24,100 for the period of operation before December 29, 1934.

The total of insured mortgages, not including mortgages on limited dividend housing, as of June 29 was $37,637,068.

The demand for insurance is now so well established that the former variable premium has been reduced to a flat rate of one-half of one per cent per annum of the original face value of all classes of mortgages. The former variable maximum interest rate allowed has also been reduced to a flat rate, namely, 5 per cent per annum on the amount outstanding.

Mortgages were accepted for appraisal in June at the rate of 7,100,000 a week. Of the mortgages accepted throughout the entire period of operation 16.9 per cent have been rejected for insurance. The high percentage of rejections suggests that the standards of eligibility are exacting and that they are being enforced.

The National Housing Act, which authorized the Federal Housing Administrator to establish the Federal Mutual Mortgage Insurance Corporation, is general in its terms. It obligated the Administrator to build an organization and to adopt standards of eligibility for insurance. Problems related to valuation, risk rating and property management were intrusted by the Administrator to James B. Dusenberry, who organized the Underwriting and Realty Division and formulated its rules and regulations.

The Division is organized into several sections, including the Underwriting Section, which has charge of matters pertaining to the eligibility of mortgages for insurance; the Placement Section, which has charge of the selection of technical personnel; the Realty Section, which has jurisdiction over the management and resale of acquired real estate, and several other sections.

Last Fall arrangements were made for the selection of qualified men to serve on the underwriting staffs of the field insuring offices. A picked group of 280 men were brought to Washington in November to attend a school of instruction. Of these, fifty-seven were qualified architects; the rest were qualified appraisers and mortgage men.

There are sixty-three insuring offices. Each has a salaried staff, supplemented by fee architectural inspectors and fee valuators. The risk rating of the mortgage, based on examinations by specialists reporting on separate categories of risk, is determined by the chief underwriter in the insuring office.

Five principal categories of risk are analyzed. These are: (1) property, (2) neighborhood, (3) relation of property to neighborhood, (4) the borrower and (5) the mortgage pattern.

The duties assigned to architectural inspectors fall into two parts: (1) the rendering of the Report of Architectural Inspector and (2) the making of reports on inspections during construction.

The Report of Architectural Inspector calls for two major conclusions, the first of which is the Rating of Property, and the second the Estimate of Cost Required to Replace Improvements in New Condition.

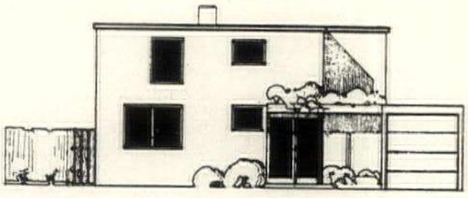
In rating the property the architectural inspector gives consideration to the risks introduced by varying degrees of quality displayed by eleven factors in a form questionnaire or grid. This grid rating, when combined with four other ratings made by the valuator and mortgage risk examiner, enters into the final grade rating of the mortgage.

The valuator uses a similar grid to make a Rating of Neighborhood and still another to make the Rating of Relation of Property to Neighborhood. The mortgage risk examiner makes two ratings: the Rating of Borrower and the Rating of Mortgage Pattern.

The purpose of the foregoing paragraphs has been to indicate the importance of the insured amortized mortgage to private house construction and the relationship of the standards of eligibility for mortgage insurance to private house architecture. To attempt to give a working knowledge of the standards would be impracticable in a limited space. The required information is contained in the *Underwriting Manual* and other documents issued by the Underwriting and Realty Division, Federal Housing Administration, Washington, D. C. Nearer and better sources for specific problems are the district insuring offices, of which a list is given on page 88.

LOW-COST HOUSES . . . .

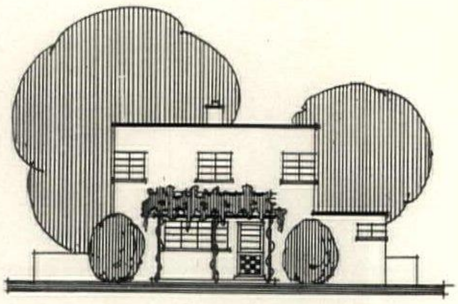
A STUDY COMPETITION CONDUCTED BY THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS



NORTH

FIRST PRIZE

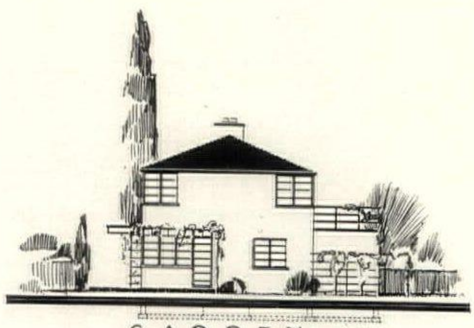
J. ANDRE FOUILHOUX, ARCHITECT



• GARDEN •

SECOND PRIZE

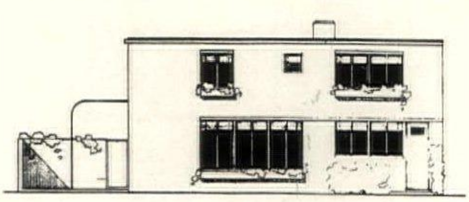
JOHN THEODORE HANEMAN, ARCHITECT



GARDEN

THIRD PRIZE

FREDERICK G. FROST, ARCHITECT



EAST

FOURTH PRIZE

J. ANDRE FOUILHOUX, ARCHITECT

Can decent and adequate individual houses be designed by architects for the lower income groups? This question was met by the New York Chapter by conducting a competition among its membership.

(1) No inherent problem confronts the architect in the design and construction of six-room houses costing $5,000 or more.

(2) On the other hand, the problem of individual houses of proper standards for the lowest income groups, namely, for families having a combined annual income of $1,200 or less, presents difficulties which are more than technical. This class, estimated by the National Housing Administration as representing one-third of the population of the United States, must receive Federal or other subsidy; and it is probable that much of the housing for this group will be multi-family or row houses.

(3) Housing is urgently needed by 9,968,000 families in the United States, as indicated by the last census.

Population of U. S., 1930	122,775,046
Estimated number of families	29,904,663
Average size of family (persons)	4.1055

(4) The type of house needed is one that supplies accommodations for four persons, namely, two adults and two children, and the total cost, including land, should not exceed $4,000. The competition program invited proposals for new construction methods and use of new materials where economy and improvement could be demonstrated. Four winning designs were submitted to reputable contractors in order to demonstrate the low-cost claim of the competitors.

The problem:

House for 4 persons (two adults and two children).
Cost not to exceed $3,200 exclusive of land cost.
Interior site, lot 50 feet wide by 100 feet deep, fronting on a street or road.
Orientation left to competitors.

First prize — design by J. Andre Fouilhoux:

This house is planned around a modulus unit adaptable to the use of prefabricated units when costs will have been brought down through economy in fabrication and quantity production. Outside wall studs with stucco on paper backed lath. Space between studs filled with rockwool bats, giving heat insulation as well as making the wall almost fireproof. Inside wall and ceiling surfaces plywood. Bathroom and kitchen asbestos board. Stairs built as outside unit to save expense of special framing. Economy in heating plant by having furnace centrally located with short duct runs and small horizontal propeller fan insuring positive circulation. Oil burner fed from bottle refilled from outside tank.

Second prize — design by John Theodore Haneman:

Possible construction systems: (1) Stucco on metal lath with terra cotta coping and plastic slate roof. (2) Brick veneer. (3) Stucco on terra cotta block with Truscon beams and Gypsteel planks. (4) Same with brick veneer instead of stucco. Estimated cost at 28¢ a cubic foot: $3,252.27.

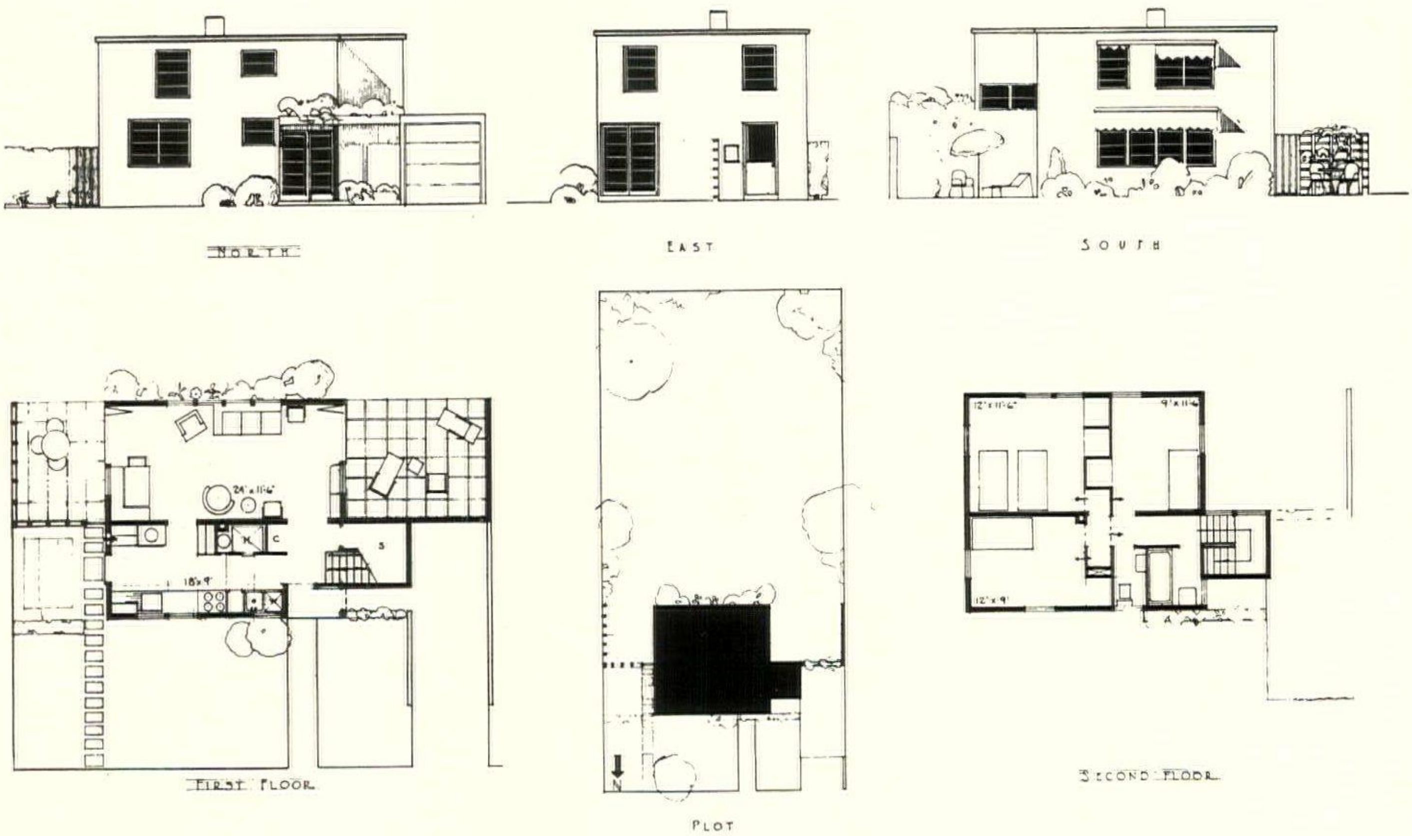
Third prize — design by Frederick G. Frost:

Wood frame with stucco on metal lath. Rockwool insulation. Plaster on metal lath. Asbestos shingle roof. Concrete block foundation. Total cubage: 11,990 cubic feet.

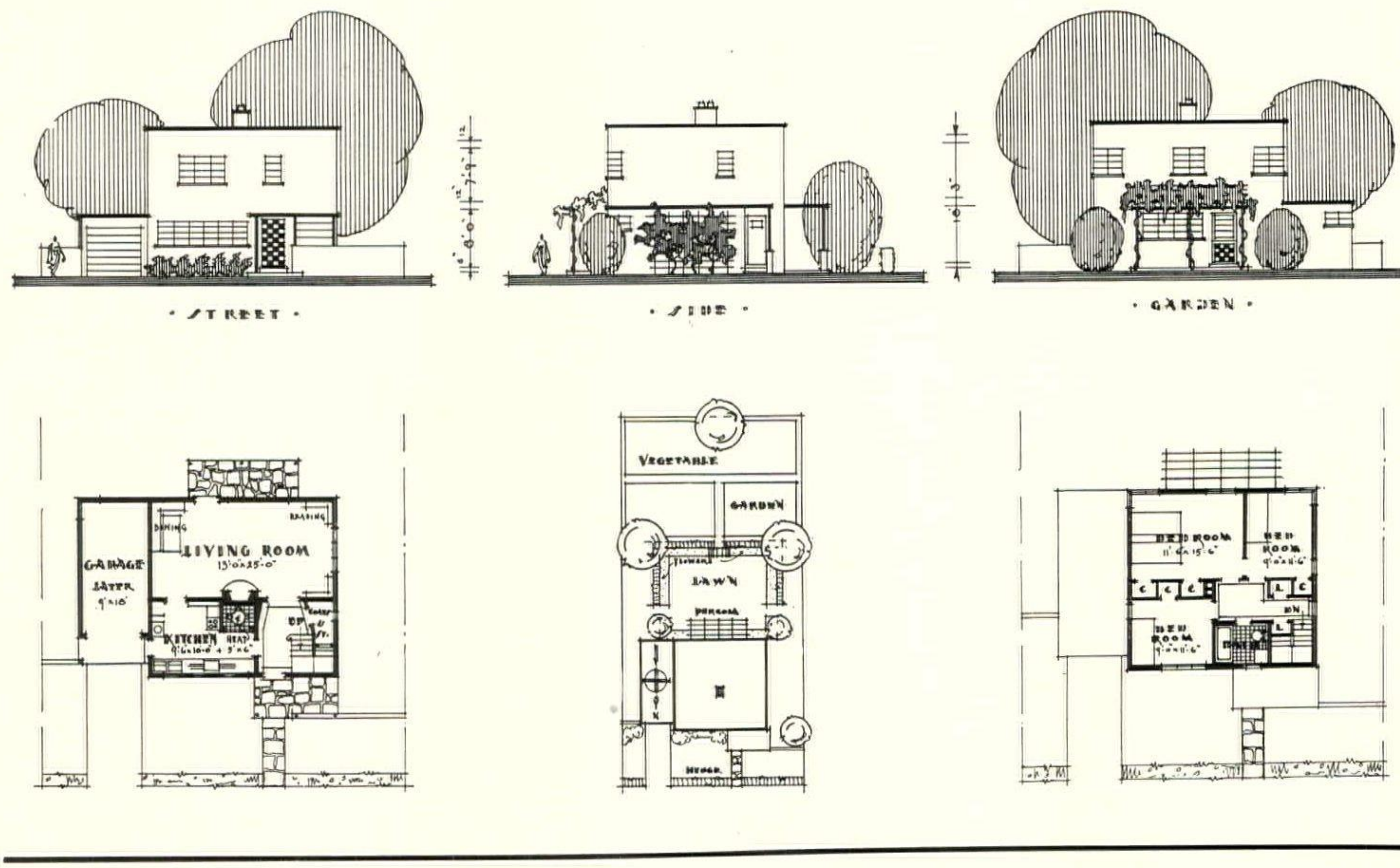
Fourth prize — design by J. Andre Fouilhoux:

Solid brick or tile wall along lot line. Other walls of studs with stucco on paper backed lath with rockwool insulation. Cellular steel floor framing. Inside wall surfaces of plywood; bath and kitchen, asbestos board.

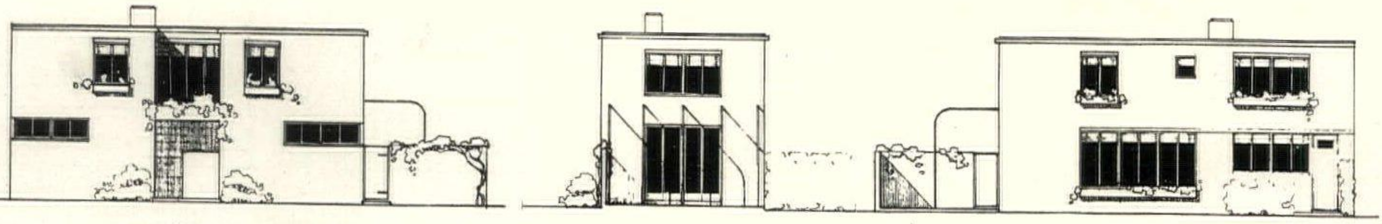
FIRST PRIZE: J. ANDRE FOUILHOUX, ARCHITECT



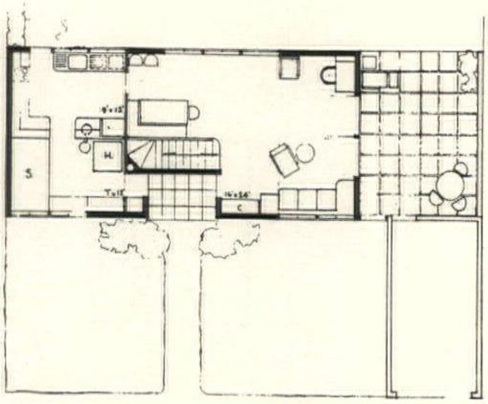
SECOND PRIZE: JOHN THEODORE HANEMAN, ARCHITECT

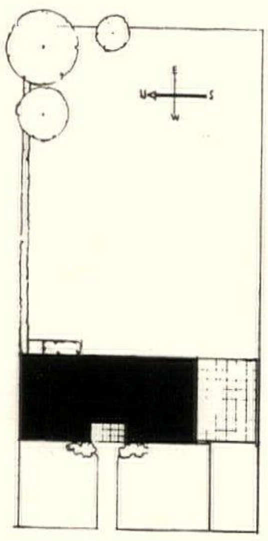


FOURTH PRIZE: J. ANDRE FOUILHOUX, ARCHITECT

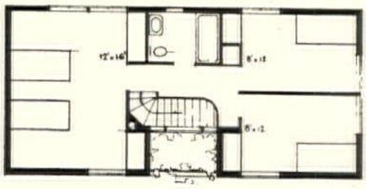


WEST SOUTH EAST



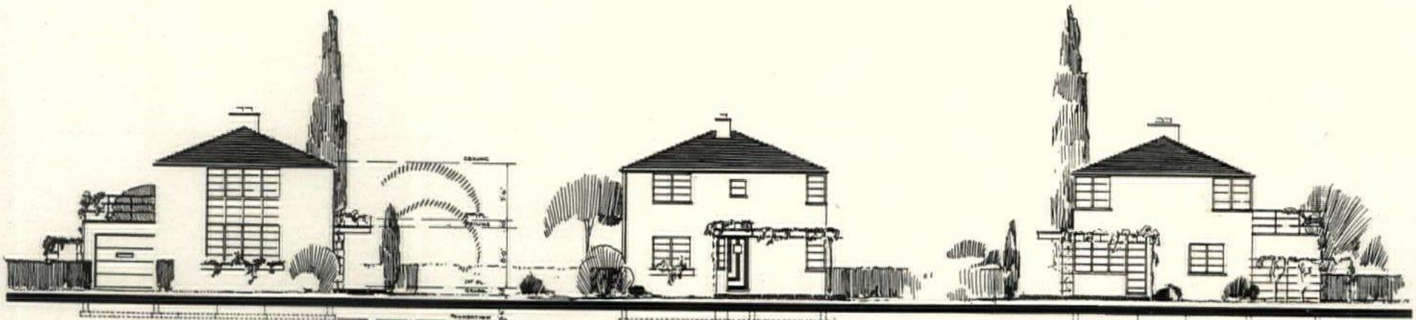


PLOT PLAN

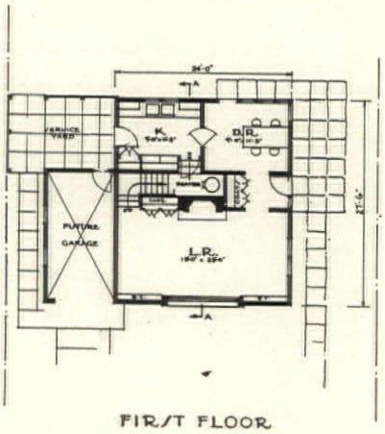


SECOND FLOOR

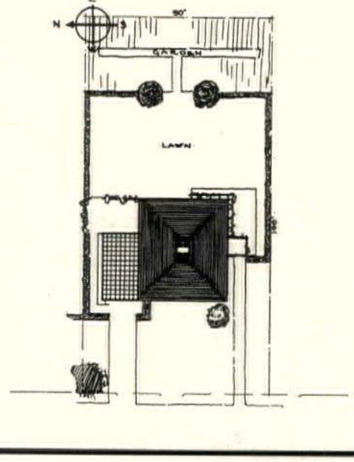
THIRD PRIZE: FREDERICK G. FROST, ARCHITECT

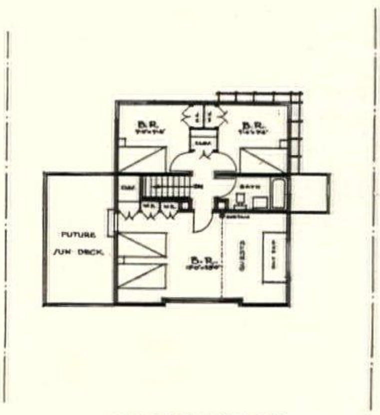


STREET SIDE GARDEN



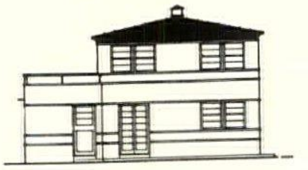
FIRST FLOOR





SECOND FLOOR

DESIGN BY PHILIP L. GOODWIN ARCHITECT

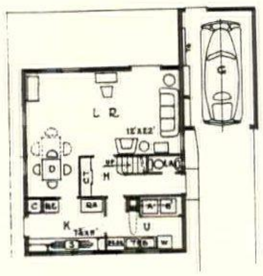


GARDEN FRONT

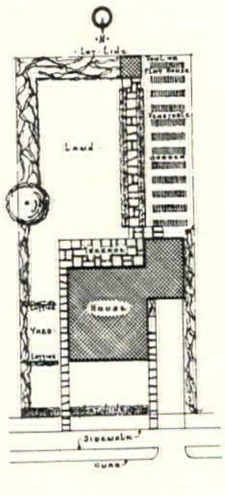
STREET FRONT

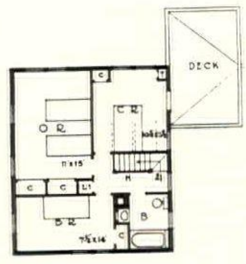
ENTRANCE SIDE

Foundations: concrete or cinder blocks. Studs: wood or metal. Sheathing: ½" Transite or similar materials. Roofing: painted tin or lead covered copper of standing seams. Windows: stock aluminum. Doors: wood painted (not stock). Interior floor beams: wood or metal. Floors: pine linoleum covered. Insulation: aluminum insulating paper. Heating: oil or gas burner; humidified air with summer circulation. This house can be built for $3,200 unless entirely fireproof, when it might exceed this cost slightly.



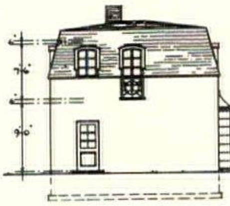
FIRST FLOOR PLAN





SECOND FLOOR PLAN

DESIGN BY FRANK J. FORSTER ARCHITECT

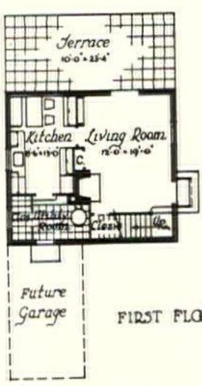


STREET ELEVATION

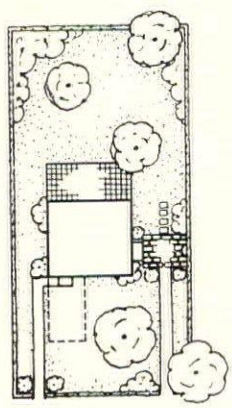
SIDE ELEVATION

GARDEN ELEVATION

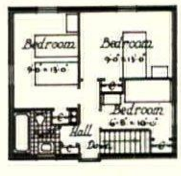
Foundation walls: concrete block. Exterior walls: painted 8" cinder block and double core furring. Floor framing: precast concrete joists and cinder slab filling with finish wood floors set in cement mastic. Roof: "corkanstele" construction with 3/16" slate finish. Interior partitions: double core steel studs with plaster board. Windows: stock steel casements. Air conditioning by means of a self-contained steam boiler, oil burner, fan, filter, and humidifier, controlled by hygrothermostats. Total cubage: 8,705 cubic feet.



FIRST FLOOR PLAN



PLOT PLAN.

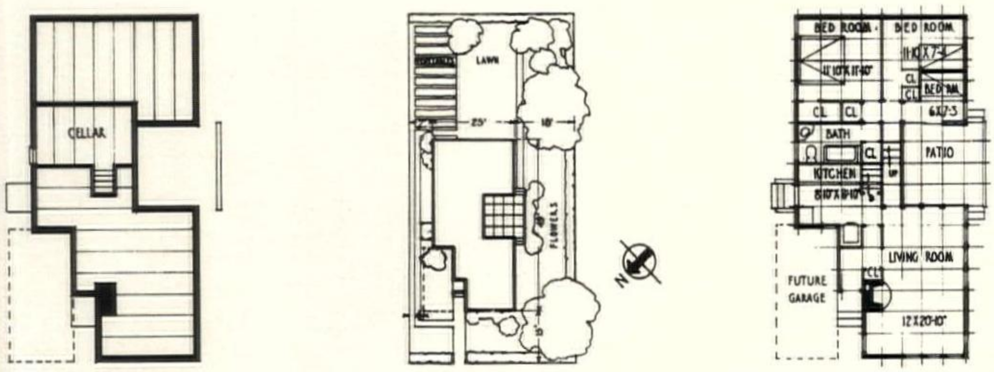


SECOND FLOOR PLAN

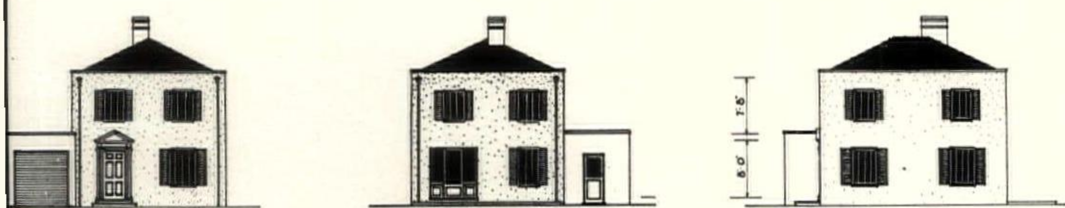
NORTH EAST ELEVATION — NORTH WEST ELEVATION — SOUTH WEST ELEVATION

DESIGN BY
J. H. PHILLIPS
ARCHITECT

Foundation: poured concrete or concrete blocks. Exterior walls: steel channel studs, thermax or other gypsum manufactured panels. Partitions: precast reinforced 3-foot stock panels. Joists: trussed steel. Floors and roof: fine wire mesh and concrete slab. No forms necessary. Composition or wood floors. Composition roof floors and roof insulated. Interior walls and ceilings: covered with plaster paint. Total cubage: 10,216 cubic feet.



CELLAR PLAN — PLOT PLAN — FIRST FLOOR PLAN



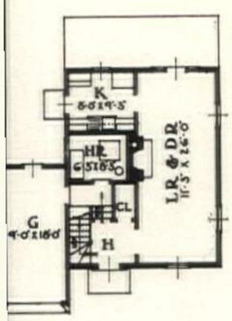
·WEST ELEVATION·
Scale 1/8-1'-0"

·EAST ELEV·

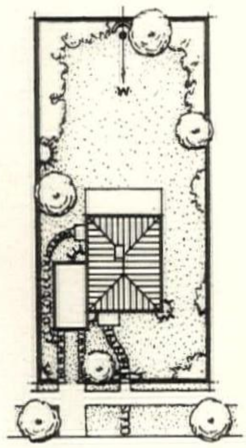
·SOUTH ELEV·

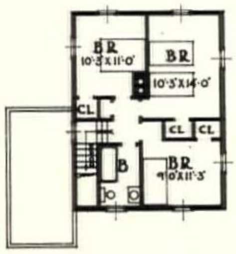
DESIGN BY
DWIGHT JAMES BAUM
ARCHITECT

Exterior walls: stucco on frame construction. Roof: copper left to weather. Stock window frames, blinds and entrance doorway. Overhead garage doors. Exterior walls and second floor ceiling insulated. Floors: oak strip. Walls and ceilings: plastered. Bath floor and wainscot: linoleum. Kitchen floor: linoleum. Warm air heating system. Total cubage: 12,055 cubic feet.



·FIRST FLOOR PLAN·

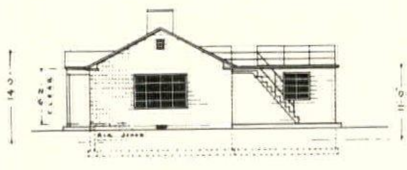




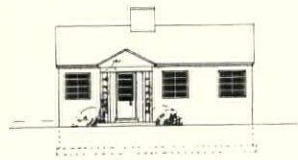
·SECOND FLOOR PLAN·

Exterior walls: cinder block, insulating lath and plaster. Partitions: 2″ metal and plaster. Ceiling: insulating board. First floor: poured concrete or precast joists. Finished floors: asphalt tile or linoleum. Steel windows. Wood doors. Heating: forced hot air, with Vecto heater, fan and recirculating ducts. Oil burner (stove type) in Vecto heater. System can be used for summer cooling. Steel stairs to roof terrace. Total cubage: 13,740 cubic feet.

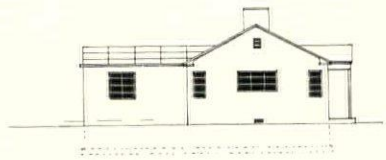
W. STUART THOMPSON, ARCHITECT



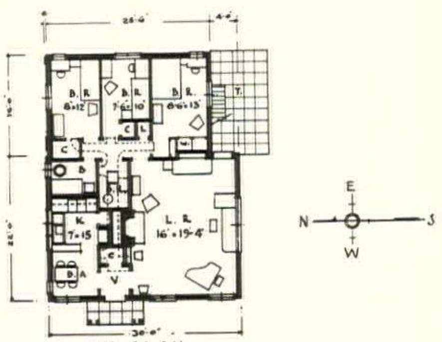
SOUTH E.



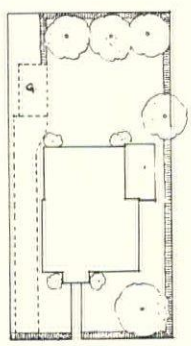
WEST E.



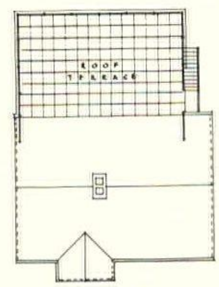
NORTH E.



FLOOR PLAN



PLOT PLAN

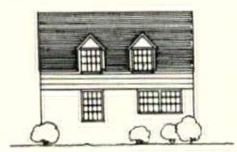


ROOF PLAN

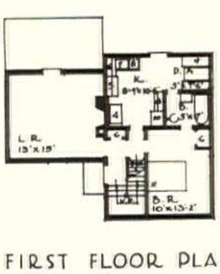
LEWIS E. WELSH, ARCHITECT

EAST ELEVATION

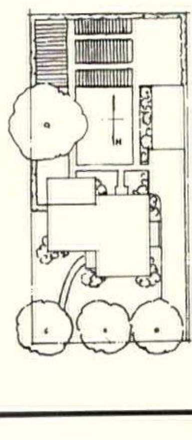
NORTH ELEVATION

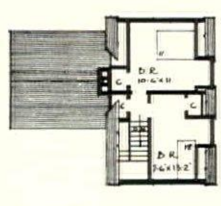


WEST ELEVATION



FIRST FLOOR PLAN





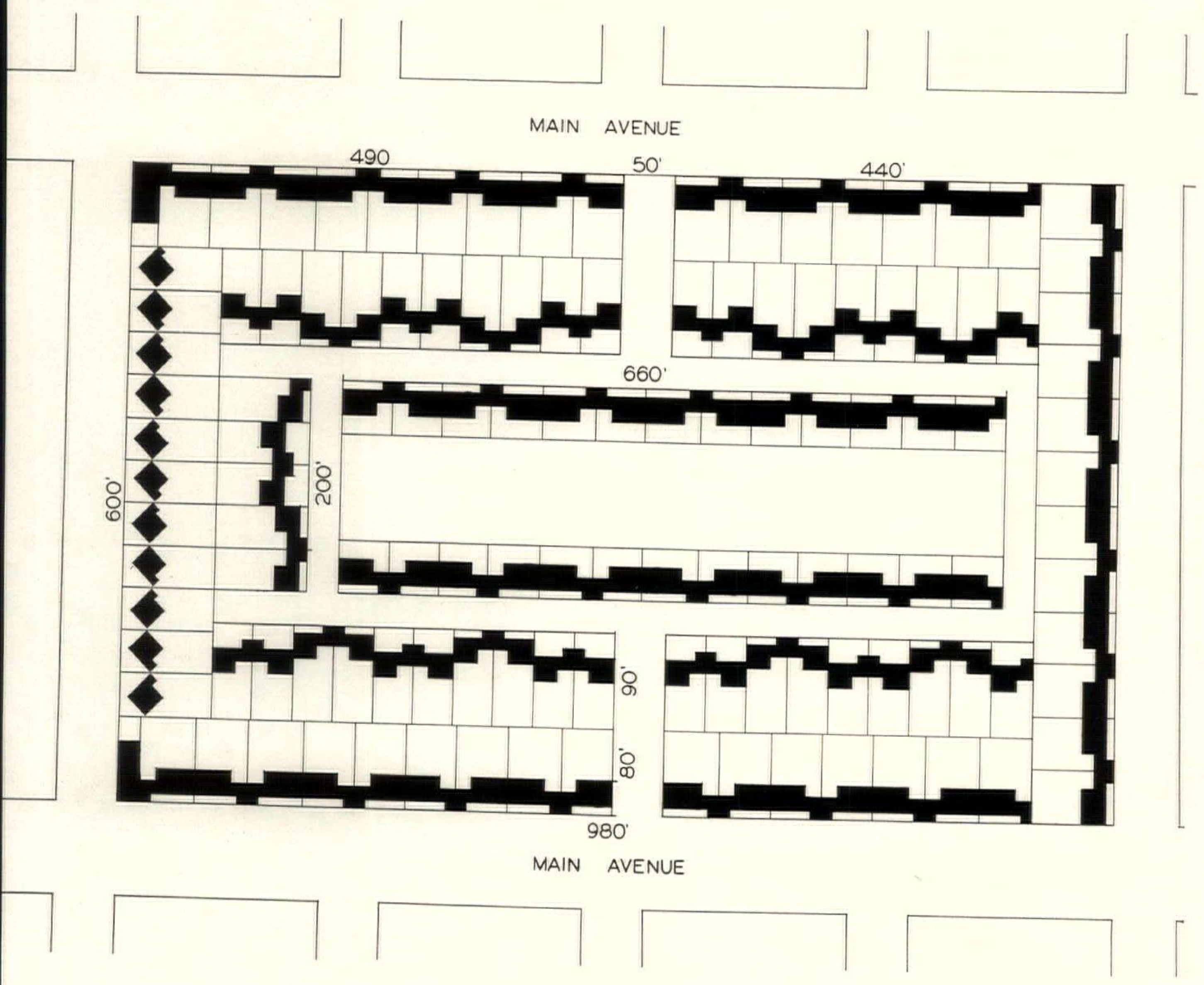
SECOND FLOOR PLAN

REPORT OF SUB-COMMITTEE ON SITE PLANNING AND GROUPING
(CONSISTING OF COMPETITION PRIZE - WINNERS AND HENRY WRIGHT)

"The small house field can be reached and improved only to a limited extent, if our efforts are confined merely to the reduction of the cost of plans and the improvement of design. This field will continue to be served mainly by the mass builder who has obvious advantages for economies and methods of large scale financing. His failure in the past to produce a more creditable output has been because of his limitations in planning ability. It is therefore believed that one of the most important opportunities for the architectural profession lies in making studies and suggesting the possibilities of better community organization open to the mass producer. We have therefore made studies individually and collectively of such better grouping, utilizing the plans which were submitted in the competition and have been able to realize the following results:

"It is considered desirable to include with even such inexpensive houses more land than is customarily offered by the large builder. A 50-foot lot of from 5,000 to 6,500 square feet, depending on depth, is somewhat over-generous and out of proportion to the proposed house cost, however. Lots with completely developed improvements will average not less than $30 a foot with the normal street plan and without speculative profit, though lower costs may at times be available. A 50-foot lot is essential to a good standard of spacing on the basis of a uniform setback. We have, however, suggested certain simple departures from such setback which would add to the appearance of the neighborhood and reduce the average frontage to 40 feet or $1,200 for the lot with complete public and basic lot improvements.

(BELOW) A SITE PLAN BY J. ANDRE FOUILHOUX, SHOWING BLOCK GROUPING OF HOUSE DESIGNS AWARDED FIRST AND FOURTH PRIZES IN COMPETITION.



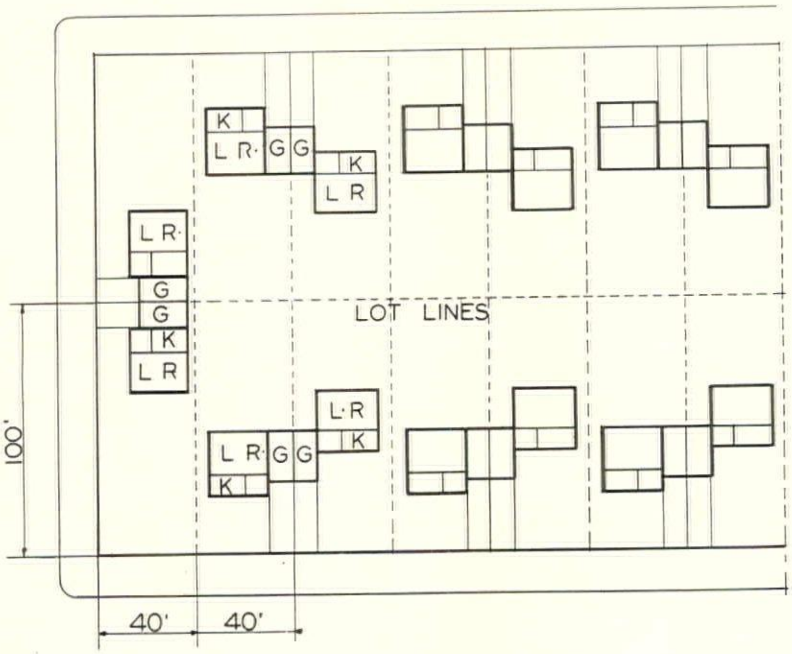
A further saving of perhaps $200 might be had through the use of narrow roadways and less expensive pavements in minor streets and cul-de-sacs.

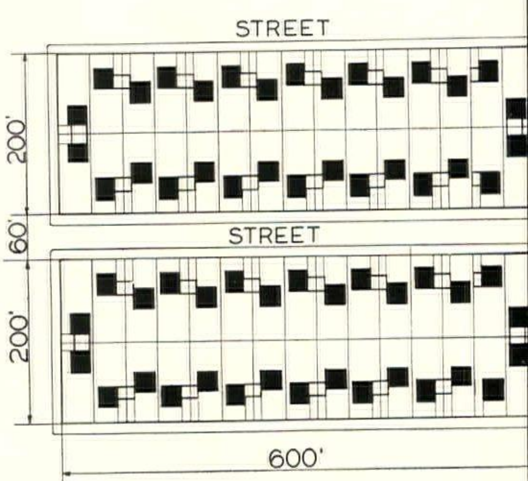
"By the simplest means the mass production of small houses can be relieved of monotony while preserving the inherent economies. A staggered frontage is possible in group building but not attainable through individual procedure. The private lane or cul-de-sac has further advantages in both economy and living quality but is less appropriate for a gradual building procedure than where it can be built up completely at one time.

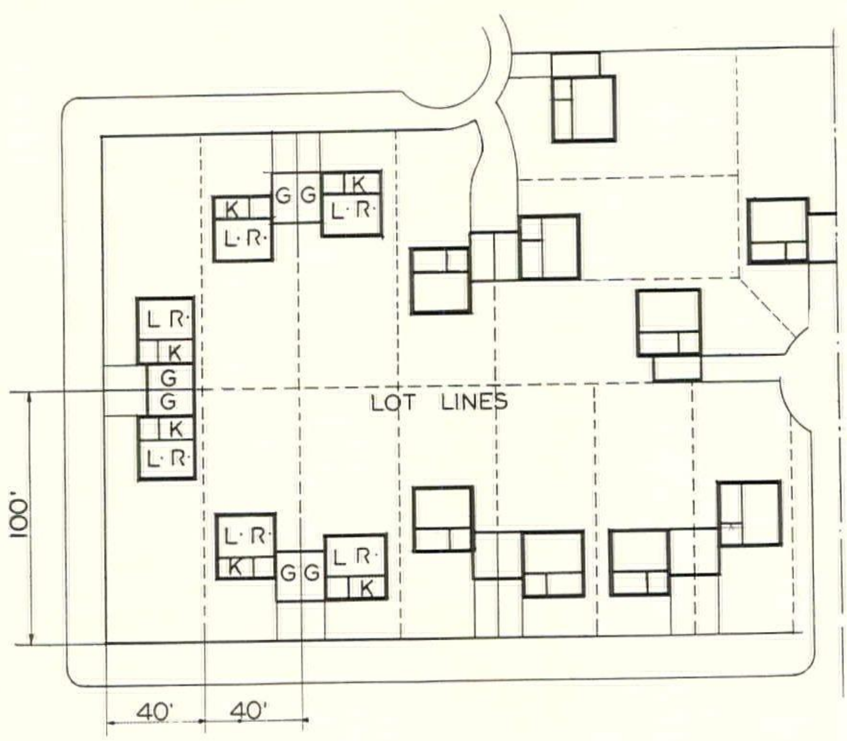
"Variety is obtained by grouping rather than by trite changes in a uniform elevation. A considerable degree of good orientation may be obtained by merely turning a simple plan. This also produces an effective group relationship. A better relation of garden to living area in the house is likewise obtained.

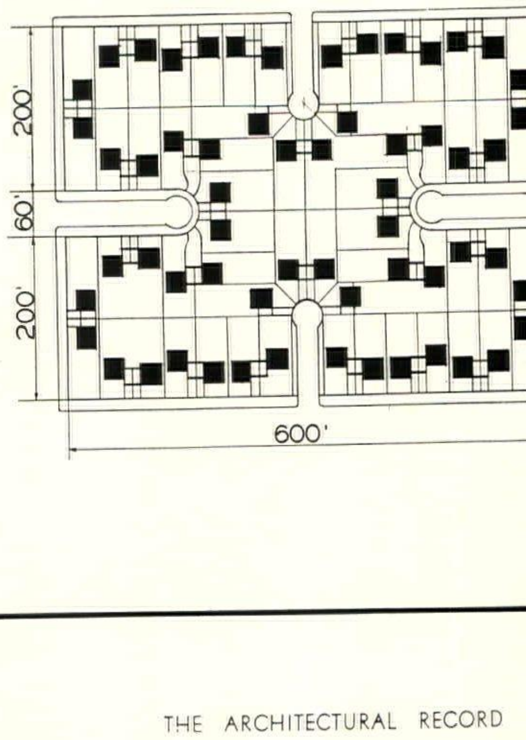
"More subtle and interesting effects can be secured where the plans are carefully worked out for the use of two or more standard base plans, with uniform kitchen, bath and stair features. The Committee has not as yet had time to try this more complex problem.

BELOW: SITE PLANS BY JOHN THEODORE HANEMAN, ARCHITECT, SHOWING GROUPING OF HOUSE DESIGN AWARDED SECOND PRIZE.





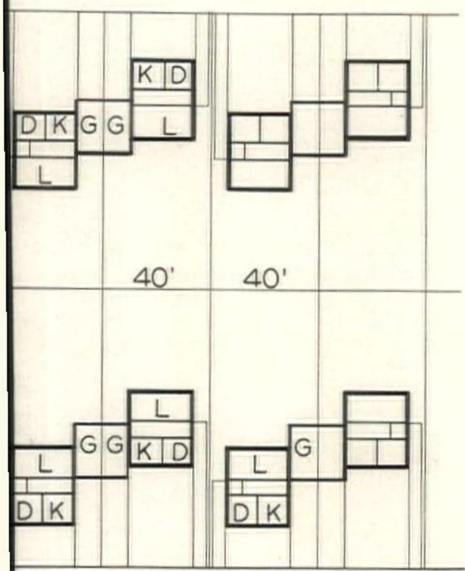


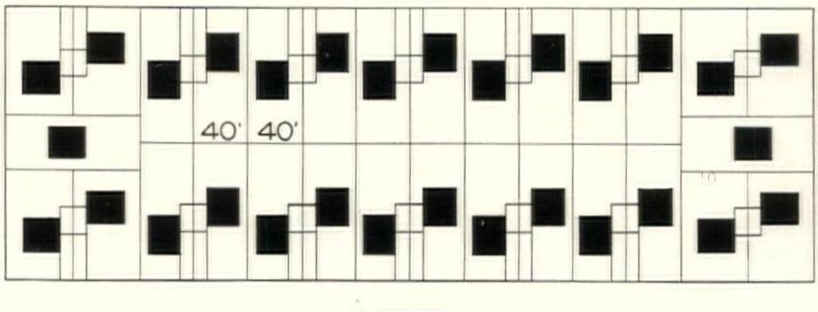


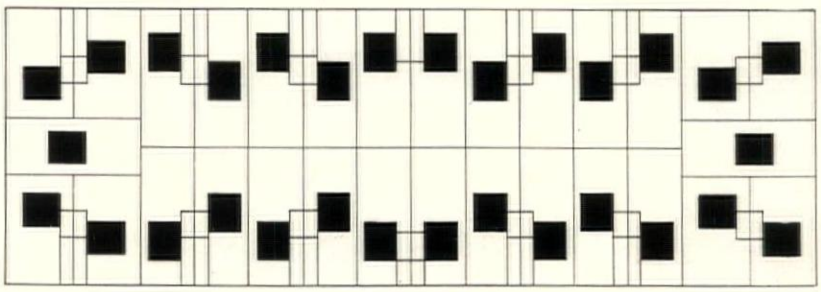
"In any event it is considered imperative that all such proposals be of a simple nature so as to be readily understood by the average type of builder and sales agency in this field. Lot lines should not become too complicated, and spaces requiring common maintenance should be avoided or left optional with the builder. On the other hand, builders must be convinced that they have a valuable selling advantage in featuring permanent qualities and livability in place of possible easy turnover and quick profit.

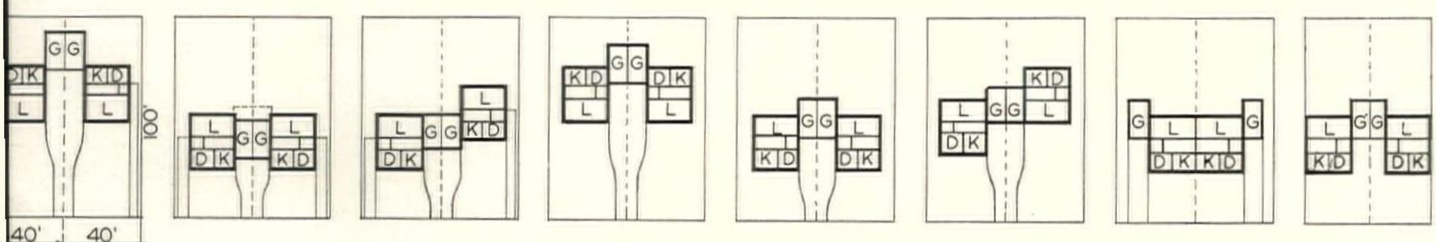
"The A. I. A. can aid morally as well as technically in leading the needed reforms in building laws and city planning so as to encourage such desirable departures from the ordinary cut-and-dried but extravagant processes of suburban land expansion and in curtailing some of the existing wastefulness by altering street patterns, and introducing safety and quiet into residential neighborhoods. At the outset such studies may very well be made jointly and sponsored by the A. I. A. As a better understanding is developed on the part of both the architect and the builder, the latter will naturally bring his problems to individual architects for solution."

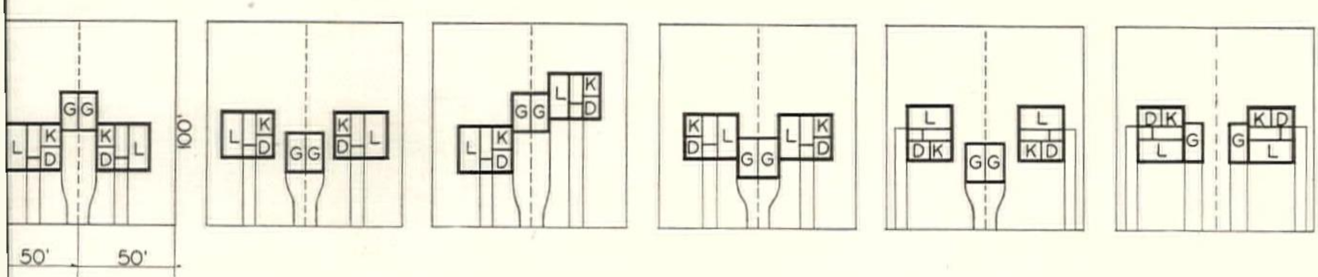
BELOW: SITE PLANS BY FREDERICK G. FROST, SHOWING GROUPING OF HOUSE DESIGN AWARDED THIRD PRIZE.











STATE AND DISTRICT OFFICES OF THE FEDERAL HOUSING ADMINISTRATION

ALABAMA (6):
2105 Third Avenue North,
Birmingham.

ARIZONA (12):
704 Heard Building,
Phoenix.

ARKANSAS (8):
408 Donaghey Building,
Little Rock.

CALIFORNIA (12):
Northern District:
1722 Russ Building,
San Francisco.
Southern District:
Room 609, 756 South Spring Street,
Los Angeles.

COLORADO (10):
512 United States National Bank Bldg.,
Denver.

CONNECTICUT (2):
Room 301, 125 Trumbull Street,
Hartford.

DELAWARE (3):
518 Industrial Trust Building,
Tenth and Shipley Streets,
Wilmington.

FLORIDA (6):
1512 Lynch Building,
Jacksonville.

GEORGIA (6):
505 First National Bank Building,
Atlanta.

IDAHO (12):
401 Idaho Building,
Boise.

ILLINOIS (7):
Northern District:
Room 1800, 134 N. La Salle Street,
Chicago.
Southern District:
620 Illinois Building,
Springfield.

INDIANA (7):
809 Continental Building,
17 North Meridian Street,
Indianapolis.

IOWA (7):
418 Old Federal Building,
Des Moines.

KANSAS (10):
309 Federal Building,
Topeka.

KENTUCKY (8):
Martin Brown Building,
Louisville.

LOUISIANA (6):
1106 Hibernia Bank Building,
New Orleans.

MAINE (2):
477 Congress Street,
Portland.

MARYLAND (5):
919 Fidelity Building,
Baltimore.

MASSACHUSETTS (2):
Room 305, Park Square Building,
Boston.

MICHIGAN (4):
1174 First National Bank Building,
Detroit.

MINNESOTA (9):
200 Roanoke Building,
Minneapolis.

MISSISSIPPI (6):
211 Lamar Life Building,
Jackson.

MISSOURI (8):
710 R. A. Long Building,
Kansas City.
913 Ambassador Building,
St. Louis.

MONTANA (9):
United States Assay Building,
Helena.

NEBRASKA (10):
670 Saunders-Kennedy Building,
Omaha.

NEVADA (12):
Old Federal Building,
Reno.

NEW HAMPSHIRE (2):
9 Capitol Street,
Concord.

NEW JERSEY (3):
505 Industrial Office Building,
Newark.

NEW MEXICO (11):
301 Lensic Building,
Santa Fe.

NEW YORK (1):
Room 1280, 11 W. Forty-second Street,
New York City.
Room 305, 74 Chapel Street,
Albany.
728 Marine Trust Building,
Buffalo.

NORTH CAROLINA (5):
304 Haywood Bldg., 46 Haywood Street,
Asheville.

NORTH DAKOTA (9):
3 Eltinge Building,
Bismarck.

OHIO (4):
708 Hartman Building,
Columbus.
808 Bulkley Building,
Cleveland.

OKLAHOMA (11):
433 Key Building,
Oklahoma City.
822 Tulsa National Bank Building,
Tulsa.

Note: Numerals in parentheses indicate region.

OREGON (12):
420 Park Building,
Portland.

PENNSYLVANIA (3):
Western District:
934 New Federal Building,
Seventh Avenue and Grant Street,
Pittsburgh.
Eastern District:
1607 Fidelity-Philadelphia Trust Building,
Philadelphia.

RHODE ISLAND (2):
17 Exchange Place,
Providence.

SOUTH CAROLINA (5):
712 Peoples Office Building,
Charleston.

SOUTH DAKOTA (9):
Citizens Bank Building,
Sioux Falls.

TENNESSEE (8):
210 Federal Building,
Memphis.

TEXAS (11):
Northeastern District:
817 First National Bank Building,
Dallas.
Northwestern District:
9th Floor, First National Bank Building,
Fort Worth.
Southeastern District:
1627 Shell Building,
Houston.
Southwestern District:
19th Floor, Nilam Building,
San Antonio.

UTAH (10):
1109 First National Bank Building,
Salt Lake City.

VERMONT (2):
206 Bank Street,
Burlington.

VIRGINIA (5):
1430 Central National Bank Building,
Richmond.

WASHINGTON (12):
1813 Exchange Building,
Seattle.

WEST VIRGINIA (4):
405 Union Trust Building,
Parkersburg.

WISCONSIN (7):
18th Floor, Mariner Tower,
Milwaukee.

WYOMING (10):
Post Office Building,
Cheyenne.

DISTRICT OF COLUMBIA:
102 New Federal Housing Administra tion Building,
Vermont Avenue at K Street,
Washington.

ALASKA:
Juneau.

PORTFOLIO OF HOUSES

Photograph by R. Tebbs

HOUSE OF H. O. VOORHIS AT PLAINFIELD, NEW JERSEY—DESIGNED BY A. DEHART, ARCHITECT

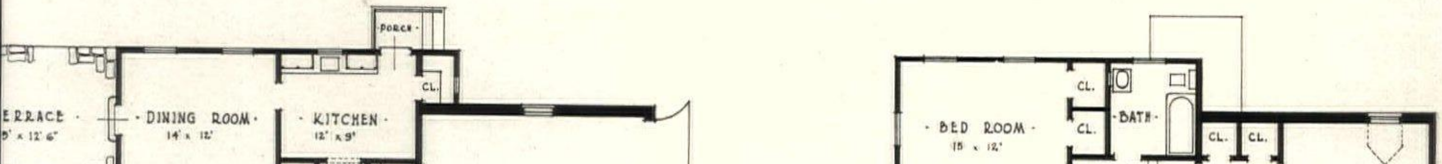
HOUSE OF H. O. VOORHIS
PLAINFIELD, NEW JERSEY
A. DEHART, ARCHITECT

Photographs by R. Tebbs

Photograph by Murray M. Peters

HOUSE OF FREDERIC H. RYDER AT ROCKVILLE CENTRE, NEW YORK

DESIGNED BY FRANK R. CREIGHTON, ARCHITECT

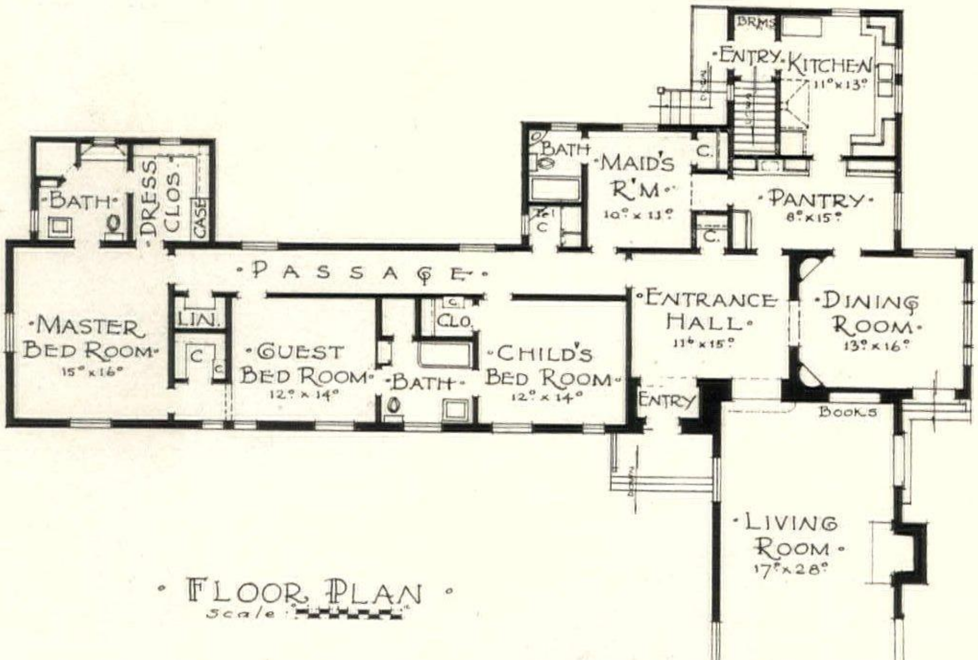


· FIRST FLOOR PLAN · SCALE IN FEET 5 0 5 10 15 · SECOND FLOOR PLAN ·

HOUSE OF ARNOLD R. WHITE AT ALTADENA, CALIFORNIA

MARSTON AND MAYBURY, ARCHITECTS

Photographs by Hiller Studio



FLOOR PLAN
scale

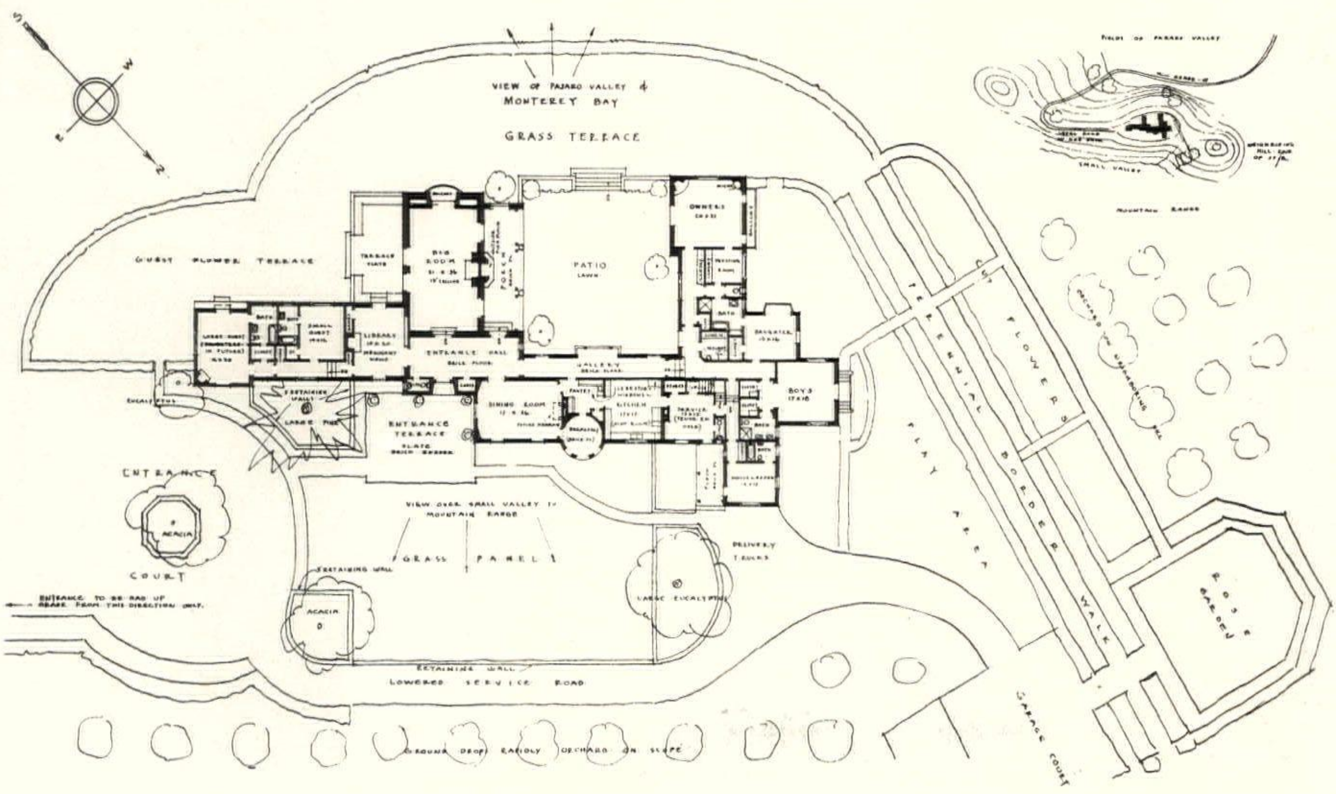
Photographs by Roger Sturtevant

HOUSE OF W. N. CUMMING NEAR WATSONVILLE, CALIFORNIA

WILLIAM WILSON WURSTER, ARCHITECT

THOMAS D. CHURCH
LANDSCAPE ARCHITECT

ARMSTRONG, CARTER & KENYON
INTERIOR DECORATORS



S
W
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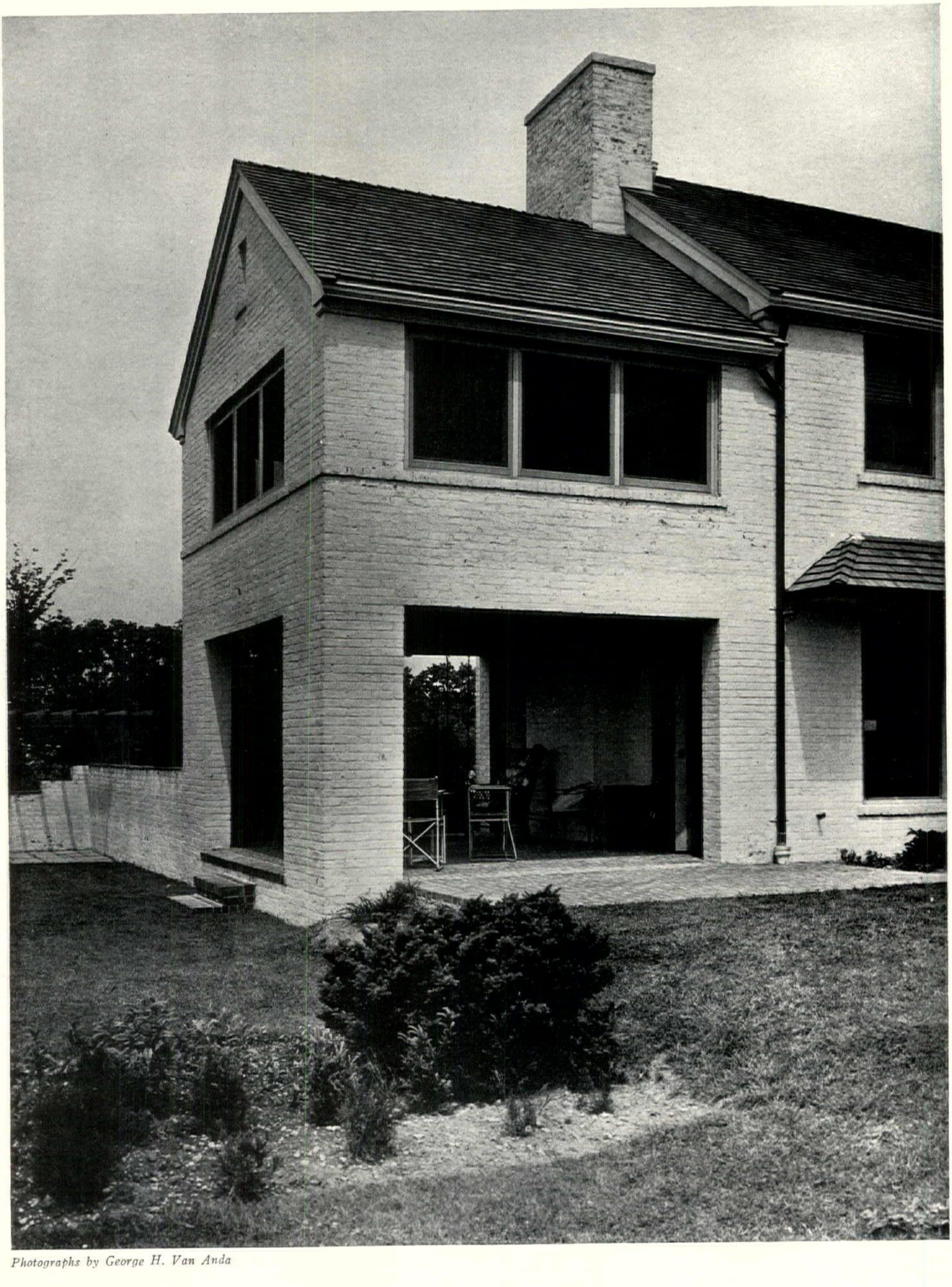
VIEW OF PAJARO VALLEY &
MONTEREY BAY
GRASS TERRACE
GUEST FLOWER TERRACE
TERRACE
BIG ROOM
PORCH
PATIO
LAWN
OWNERS
BATH
DAUGHTER
LIBRARY
ENTRANCE HALL
BRICK FLOOR
GALLERY
BOY'S 17 X 18
DINING ROOM
KITCHEN
ENTRANCE TERRACE
LARGE PINE
EUCALYPTUS
ENTRANCE
ACACIA
COURT
VIEW OVER SMALL VALLEY TO
MOUNTAIN RANGE
GRASS PANEL
RETAINING WALL
DELIVERY TRUCKS
LARGE EUCALYPTUS
ACACIA
RETAINING WALL
LOWERED SERVICE ROAD
GROUND DROPS RAPIDLY ORCHARD ON SLOPE
CUT FLOWERS
PERENNIAL BORDER
PLAY AREA
WALK
ROSE GARDEN
GARAGE COURT
SMALL VALLEY
MOUNTAIN RANGE

HOUSE OF H. LOCKWOOD DE FOREST AT COLD SPRING HARBOR, LONG ISLAND

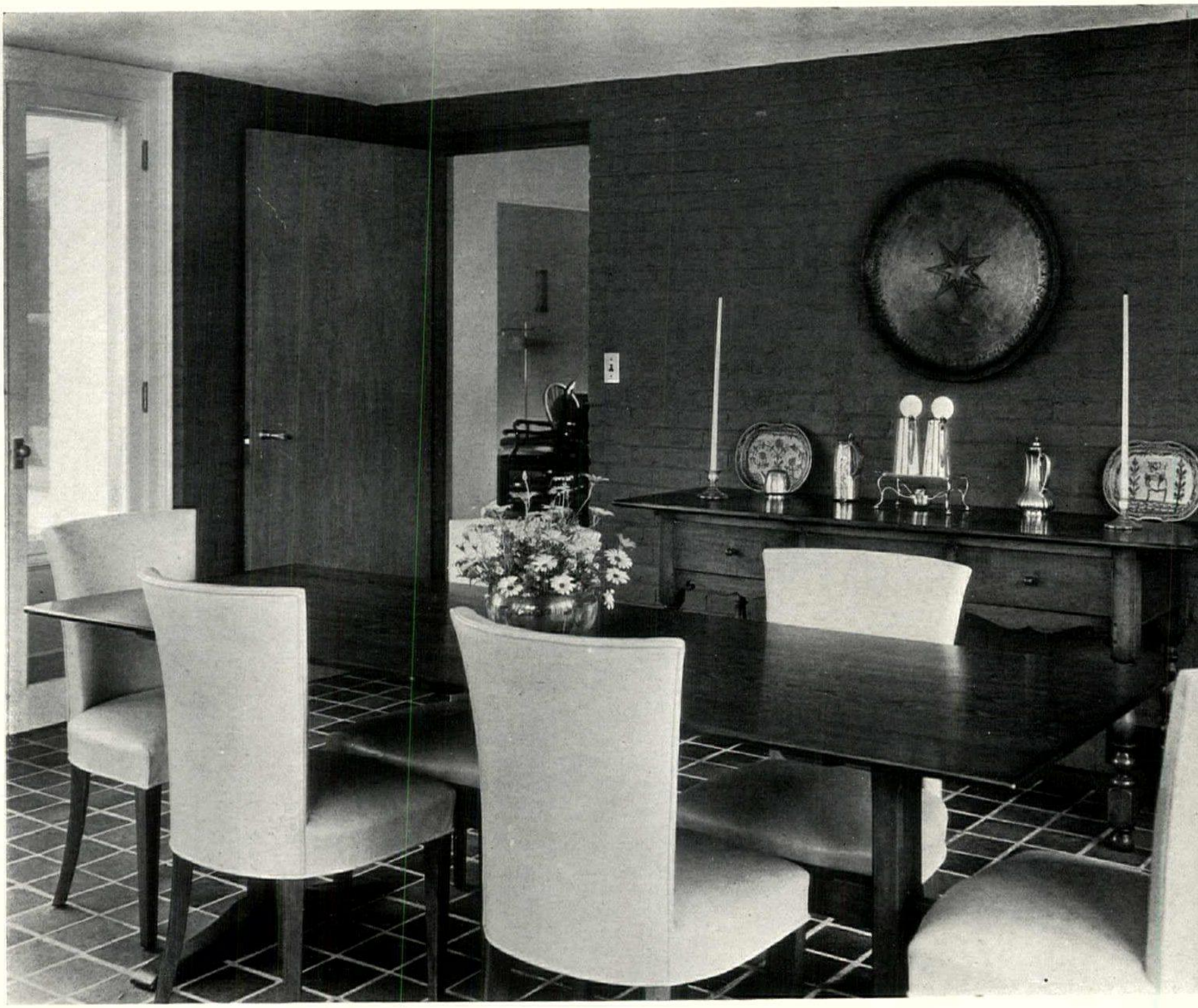
W. STUART THOMPSON, ARCHITECT



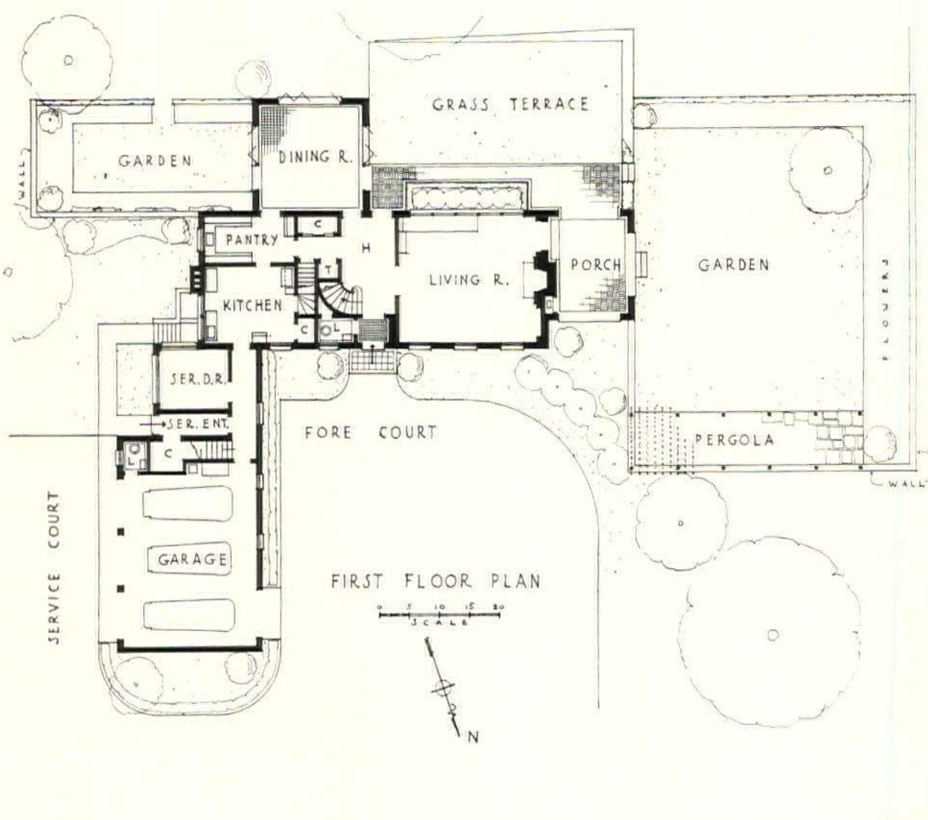
Photographs by George H. Van Anda

The house was built in a treeless meadow. The large trees were all transplanted, and the garden and landscape work designed with the house.

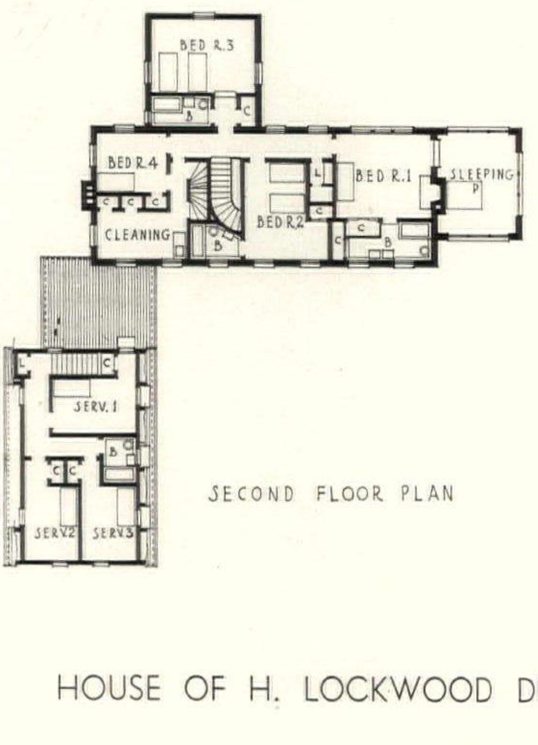
The exterior of building is common brick, painted white. The roof is shingle, stained gray. Exterior trim is white with olive green doors and windows. All floors of living rooms and halls and bedrooms are oak; dining room, tile; baths and lavatories, rubber tile; pantry and kitchen, linoleum. Walls have color integral in plaster; smooth float finish. Walls of dining room are brick, painted soft blue with white trim. Bathrooms are finished with waterproof paper and paint. Living room has oak trim and oak built-in desk, bookshelves and window seat. The facing and hearth are Kasota stone. The house is equipped with modern plumbing with brass pipe. A gas fired air-conditioned system has been installed. Cost of house (1933) was $34\frac{1}{2}$¢ a cubic foot.



Photographs by George H. Van Anda



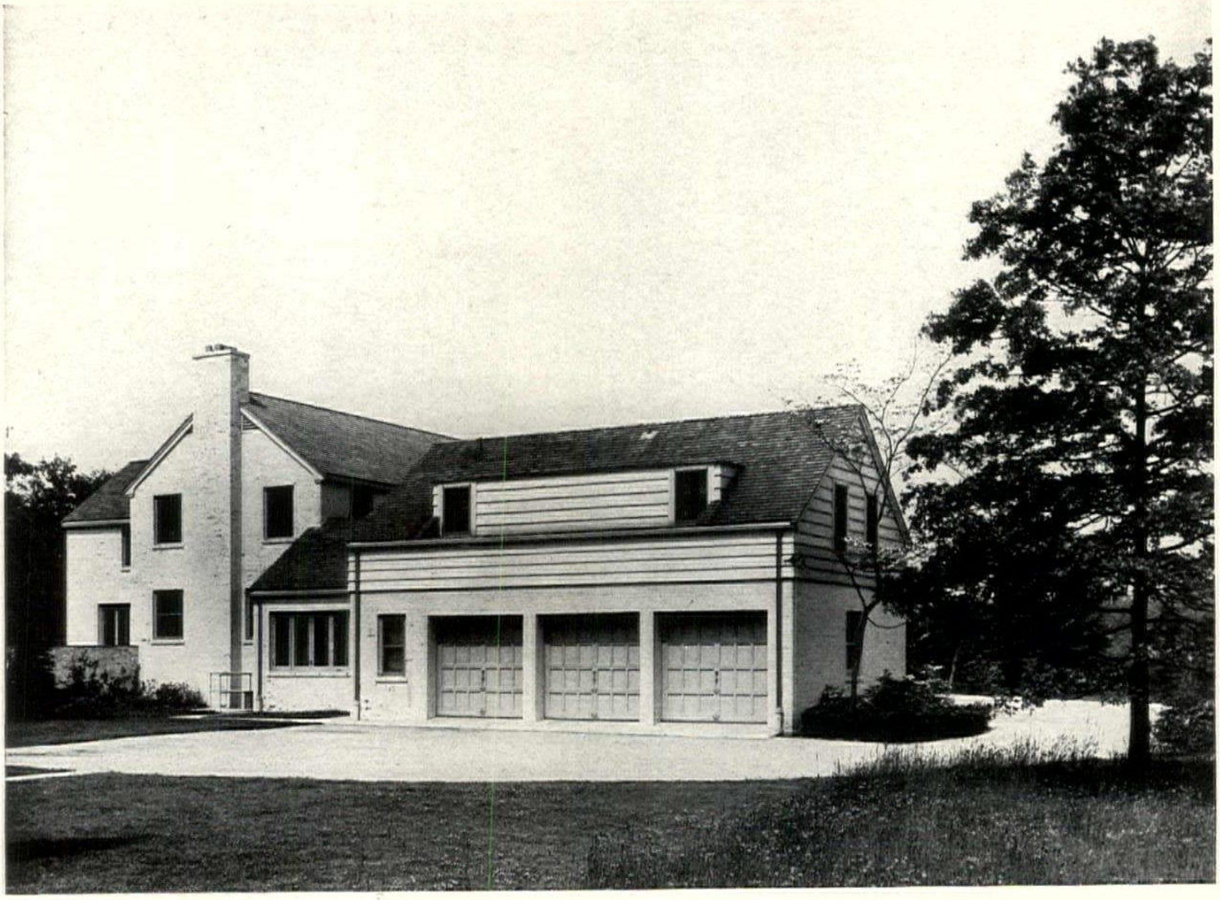
INTERIOR VIEWS OF THE DINING ROOM



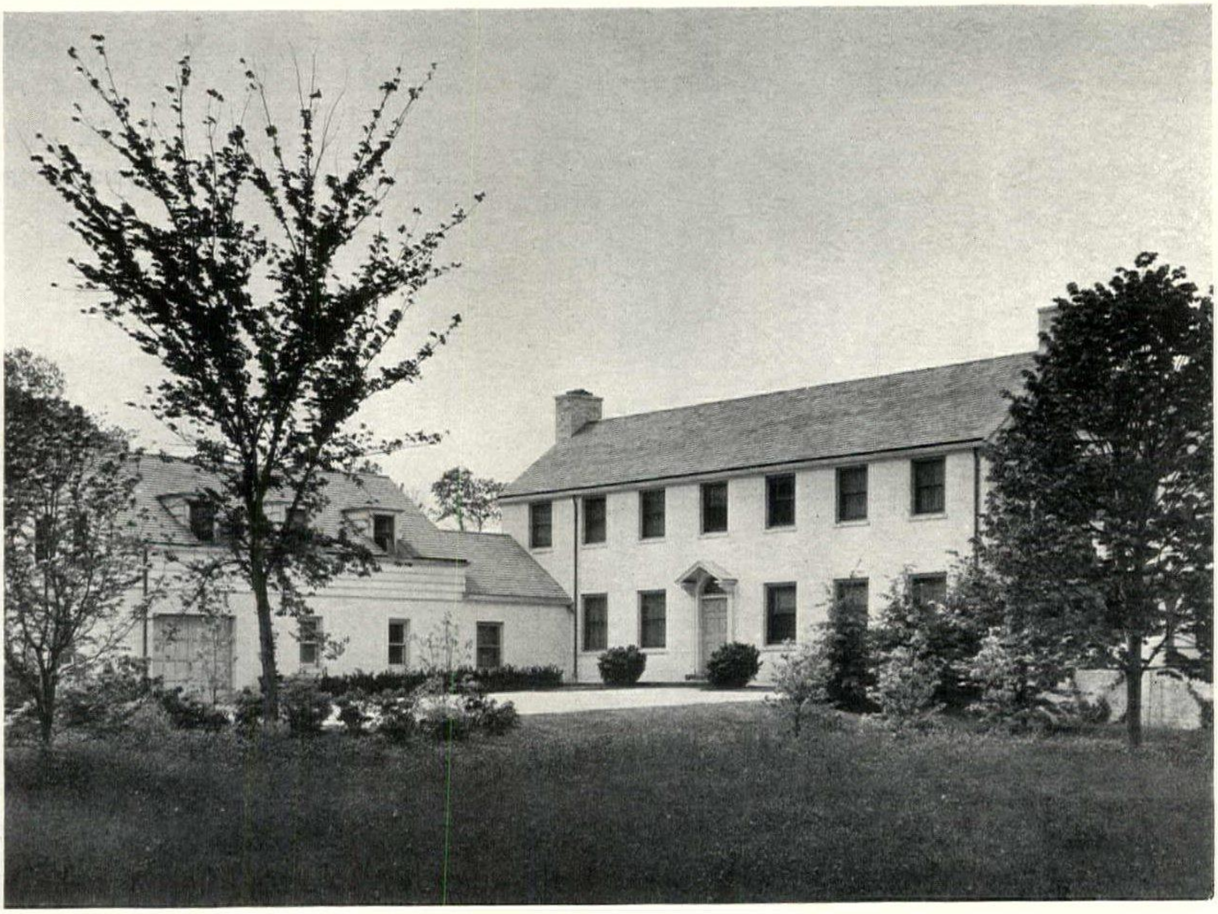
SECOND FLOOR PLAN

W. STUART THOMPSON, ARCHITECT

HOUSE OF H. LOCKWOOD DE FOREST AT COLD SPRING HARBOR, LONG ISLAND

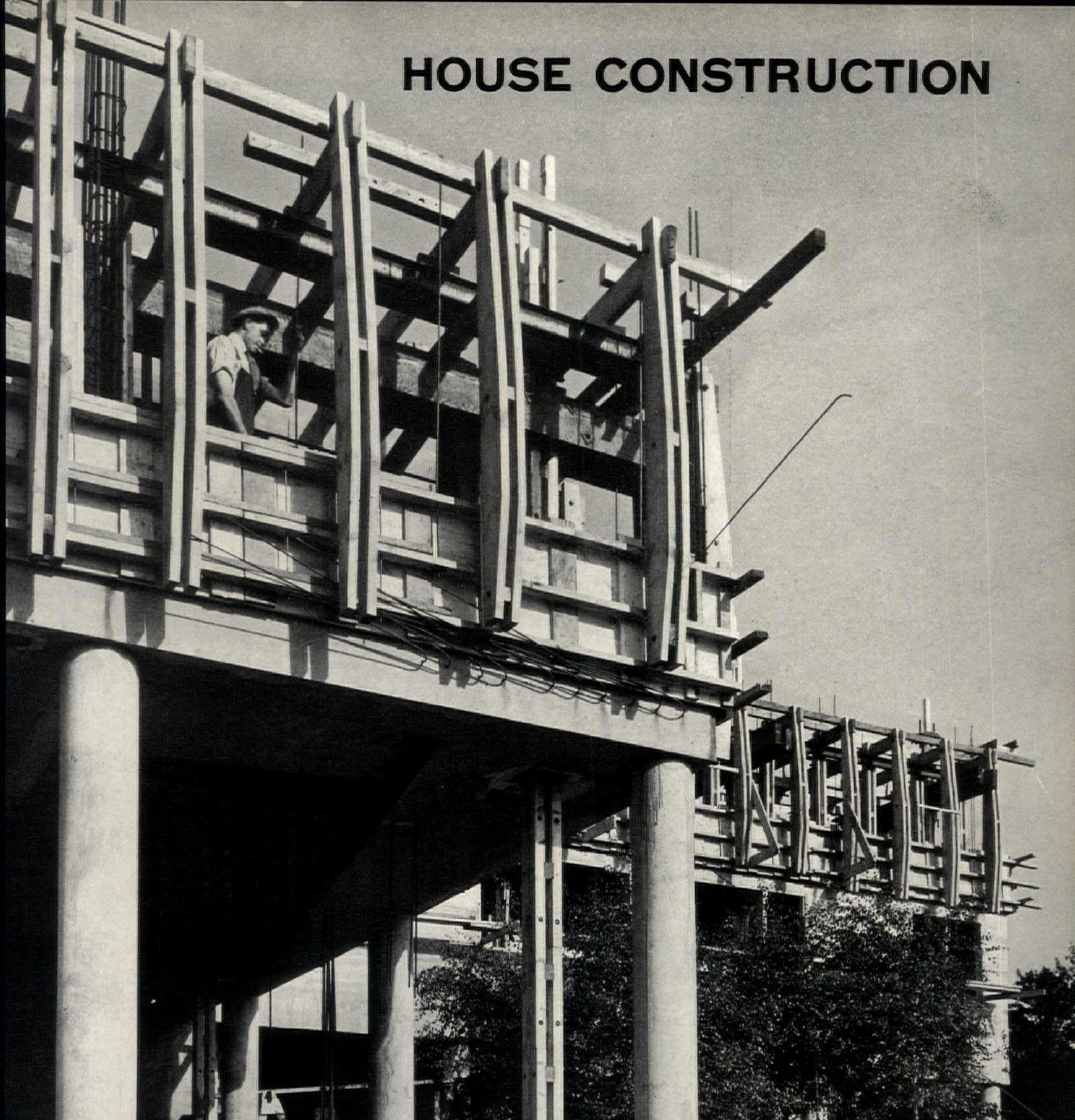


HOUSE OF H. LOCKWOOD DE FOREST AT COLD SPRING HARBOR, L. I.
W. STUART THOMPSON, ARCHITECT



Photographs by George H. Van Anda

HOUSE CONSTRUCTION



Photograph by F. S. Lincoln

CONCRETE HOUSES AT GENESTA ROAD, PLUMSTEAD, ENGLAND—PILICHOWSKI AND LUBETKIN, ARCHITECTS

A house being built at Euclid, Ohio, by the Euclid Housing Corporation with the aid of a PWA loan.

TRADITIONAL CONSTRUCTION

PREFABRICATION WITH WOOD

The full scale model house built at the Forest Products Laboratory is indicative of the completely new rôle which wood will play when it finally submits to industrialization.

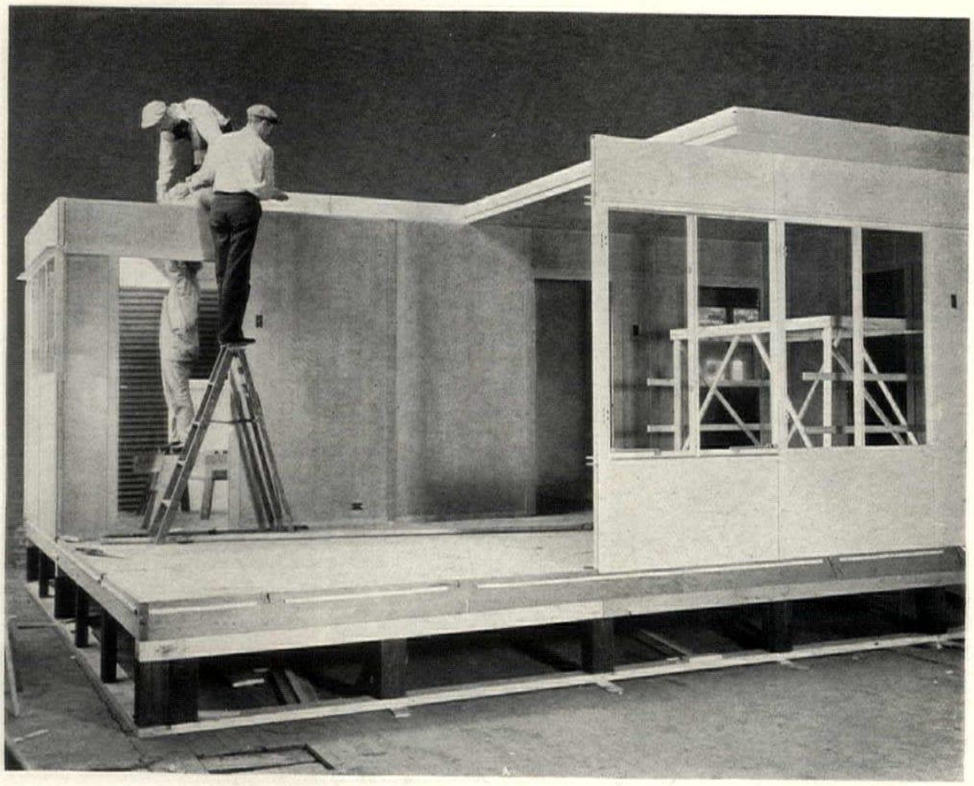
The structural system embodied in the demonstration house is an application of the "stressed covering" principle. Shortly after the World War the then current practice of covering the framework of airplane wings and fuselage with fabric was largely abandoned for a more efficient system in which the covering became an integral member which aided in resisting stresses, both bending and torsional. More effective performance and the elimination of much dead weight have made this system universal aircraft practice today.

Tests made at the Forest Products Laboratory on various methods of sheathing wood structures produced some very interesting data. It was discovered that the resistance of a frame wall to a static load applied in the plane of the wall when sheathed with 1/4" plywood well nailed to the studs is about the same as when diagonal 1" sheathing is used. When 1/4" plywood is glued to the studs, rigidity far in excess of any ordinary requirement is produced.

In the latter case, the construction lacks only a second sheet of plywood glued to the opposite face of the studs to produce a stressed-covering condition in which the faces of the panel act as the flanges of a box girder. So promising structurally was the stressed-covering idea that tests were undertaken to determine the design factors and predictable performance of panels built on that principle.

The specimens actually built and tested for this purpose were a series of floor panels with glued upper and lower faces of plywood, and results clearly demonstrated the high efficiency of the construction. It was found that in such a panel having a span of 13 1/2 feet, a joist 5 3/8 inches in depth is the practical equivalent of the 10-inch joist required by conventional carpentry, so that a substantial reduction is gained in both cost of material and in bulk of the floor system. It was also discovered that the stiffness of all such panels could be calculated with reasonable accuracy by neglecting the plies of the coverings which run at right angles to the joists and using 5/6 of the modulus of elasticity for the species of which the plywood is made, due account being taken of moisture content values.

These tests added sufficient engineering data to warrant application of the system to a specific method of prefabrication of wall, floor, and roof units of a house. And every indication seemed to point to prefabrication as the only reasonable basis for applying such a structural thesis. The new principle, promising high performance, economy of material, easy handling, and low transportation cost, could be realized in practice only through precision machine work, since sufficiently accurate dimensioning and gluing of the panels could



Prefabricated wood panels being assembled in model house built by Forest Products Laboratory.

NEW WOOD CONSTRUCTION

BY GEORGE W. TRAYER AND HAMILTON BEATTY

Forest Products Laboratory*, Forest Service U. S. Department of Agriculture

not be expected under the diverse and sundry conditions encountered on the typical contract job.

Actual design of wall, floor, and roof panels was a matter of calculation based on the data which the tests provided and the acceptance of a module of 4 feet, chosen because it represented the width of commercially available plywood. The model house was planned with no spans in excess of 13′ 6″; hence the depth of the structural members in floor and roof panels was kept down to 5⅜″, with top coverings of ⅝″ plywood and lower coverings of ⅜″ plywood. Contiguous edges of adjacent floor and roof panels were splined to distribute concentrated loads.

Using this panel system the Laboratory designed its demonstration house with a floor space of 21 by 29 feet. Into that area were built four rooms, including kitchen, living room, two bedrooms, a bath and a utility room.

A standard wall panel consists of two sheets of ¼″ plywood, each 4 feet wide and 8 feet long, which are glued to a central framework of light structural members. The thickness of wall panel framing was arbitrarily set at 1⅜″ because it corresponded with the thickness of cheap stock doors.

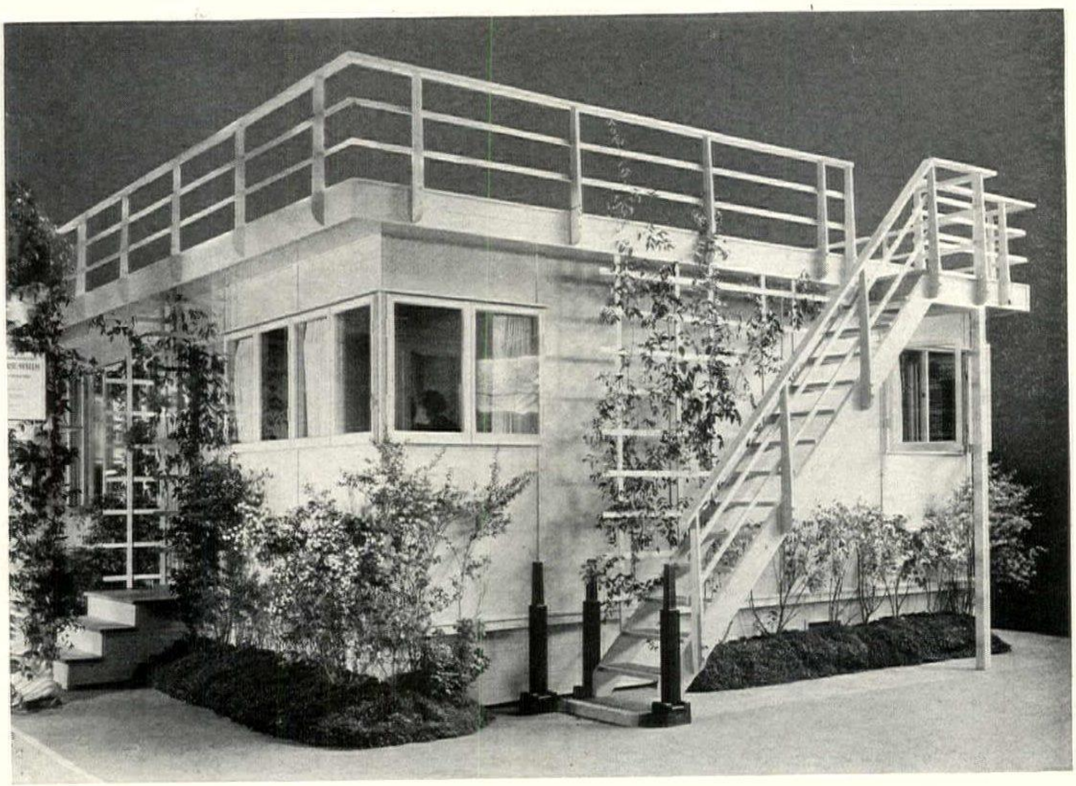
Joining the wall panels together was a problem, since both structural and protection considerations had to be faced. Its solution was the use of a vertical mullion member grooved on its two edges to receive the plywood facings of the wall panels, which were allowed to project ¾″ beyond the internal framework. Filling these grooves with a mastic before the adjacent wall panels are shoved home provides an excellent seal and assures protection to the most vulnerable points in the whole system. Modifications of the vertical mullion were designed for the corners, for the junction of partitions with outside walls, for window sills, and for door and window heads and jambs.

A vertical section of the house shows the unusual window treatment in which the sash are hung completely outside the plane of the wall. This overcame an exceedingly difficult weatherproofing problem created by the built-up sill members and the thinness of the walls. The aperture between the sash and exterior casing members was sealed with a spring bronze weather strip, the most efficient gasket that could be readily procured.

Electrical needs are provided by building the necessary wiring and outlets into the panels in the process of manufacture. In assembly, an encircling conduit placed beneath the water table of the house connects the panel network. Wiring in interior panels is handled in the same way and connects with a conduit running below the floor.

Plumbing for the demonstration house represents nothing more than an economical handling of current equipment achieved through careful planning of a

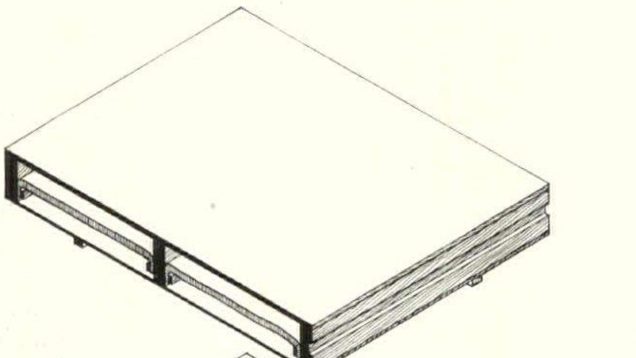
*Maintained at Madison, Wisconsin, in cooperation with the University of Wisconsin.



(Left) Complete house, as exhibited at Madison, Wisconsin, House Show, was erected in 21 hours by 7 men.

(Right) Small wood dowels are used to join window panels in walls, or at corners where one upright mullion serves as jamb for two windows. . . . Joining prefitted window panels: in a series of windows, only the first panel comes fitted with both upright mullions.

U. S. FOREST PRODUCTS LABORATORY



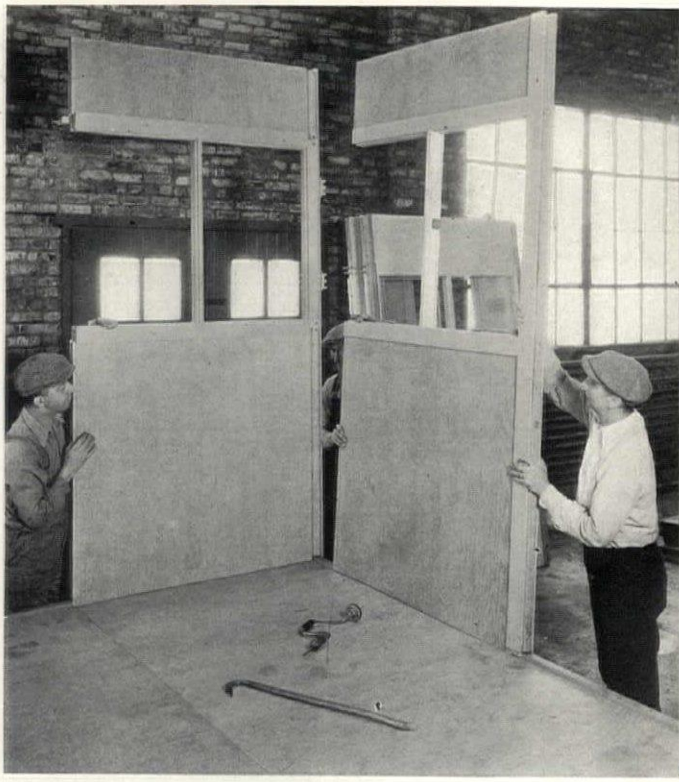
INTERLOCKING WALL, FLOOR AND ROOF PANEL ASSEMBLY

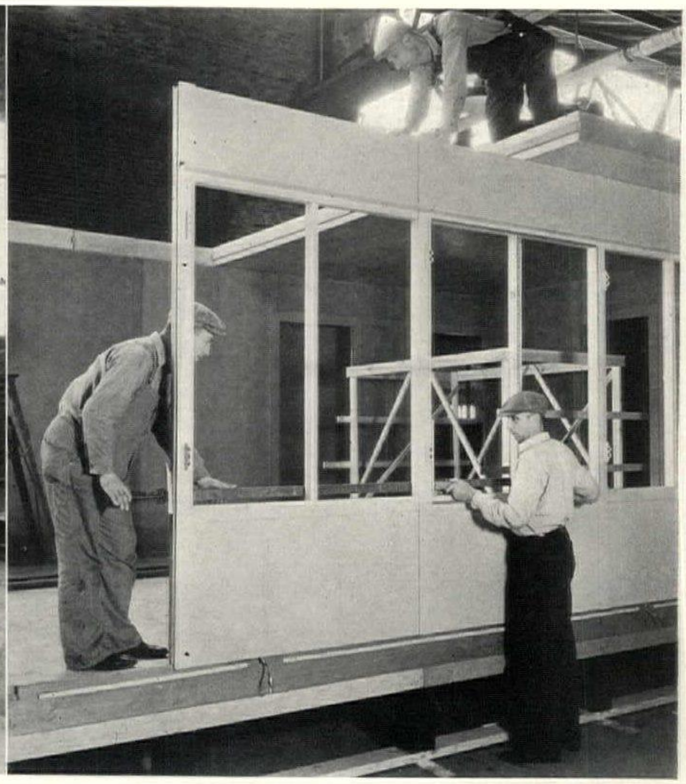
utility room which is adjoined by both bath and kitchen. Heating is provided by a hot-air circulator placed in the living room. In panels through which plumbing pipes and chimney had to pass, reinforcing blocks were placed at the critical points during fabrication.

Careful consideration of the roof led to the selection of the flat deck type as the only logical solution. Not only did the deck lend itself in simple fashion to the system of prefabrication, but it added logical validity to the whole model as a complete departure from its traditional but more costly forebears.

A built-up roofing sheet, unbroken except for chimney and central roof drain, was carried over a cant strip and low curb at the roof edge and sealed by a narrow wood strip nailed to the face board. A substantial wood railing permits safe use of the deck space by occupants. It is supported by posts lag-screwed to sides and ends of the roof panels, an attachment which avoids puncturing the roof membrane.

Even the finished flooring of the house is prefabricated. The small pieces which go to make it up are factory-produced, and assembled on 4-foot squares of plywood so that there is a 3/8″ projection of plywood on all sides. On the site the squares are laid in place and secured to the floor panels by means of T-shaped parting strips. White oak strips were used with both the red gum of the bedroom and the red oak of the living-room floors.



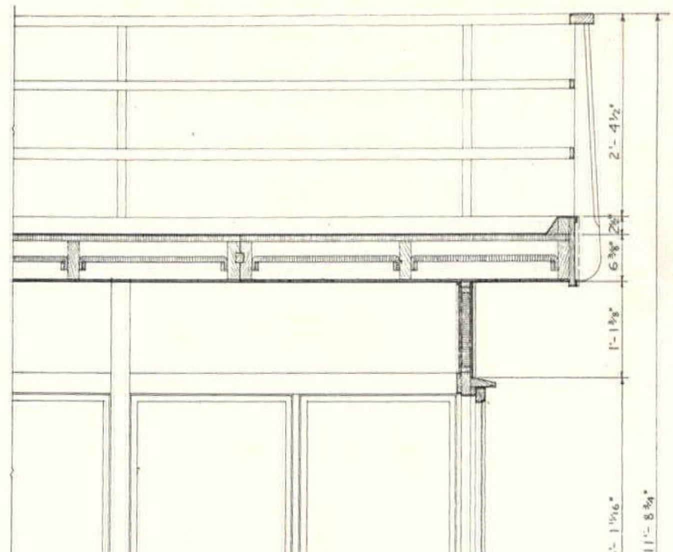


PREFABRICATED ALL - WOOD HOUSE

The bathroom floor represents a special development in wood utilization. Hardwood sawdust, chemically treated, is molded under pressure to form a dense, black, impervious plastic. Because only experimental equipment was available, the largest sheet of this plastic which could be made for this floor was a 4½″ disc. The discs were machined into hexagons and squares to form the main body of the floor and its border. In production the whole floor with an integral cove base would undoubtedly be molded from this plastic in a single unit.

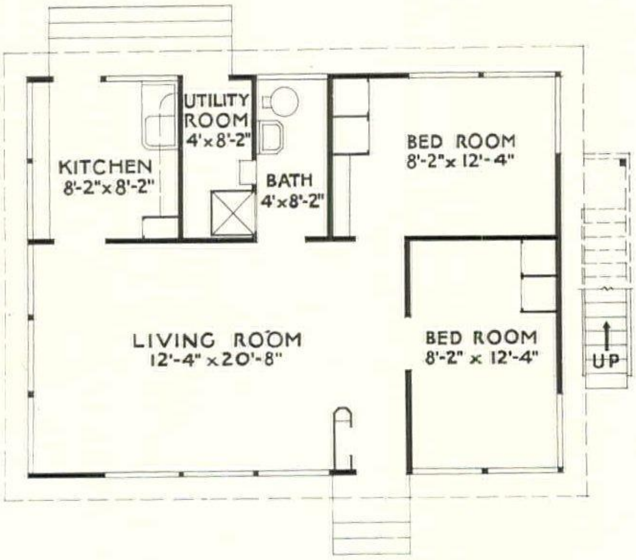
Since the success of this structural system must depend on the preservation of the plywood and the glue lines between plywood and structural framework, adequate weather protection is a prime requisite. The exterior finish, therefore, was chosen for its protective and lasting qualities. An aluminum priming coat was followed by a second coat of aluminum and a lead-and-oil undercoat. A lead-and-oil finish coat completed the four-coat process.

The bedroom interiors received one coat of shellac followed by a coat of wax. The living room was given a coat of shellac and then a warm russet glaze consisting of linseed oil, flat varnish, and pigment. Bathroom and kitchen walls and ceilings first received a prime coat of aluminum followed by a coat of enamel undercoat which was stippled to eliminate any suggestion of grain. Another undercoat was then applied before putting on the finish coat of enamel.

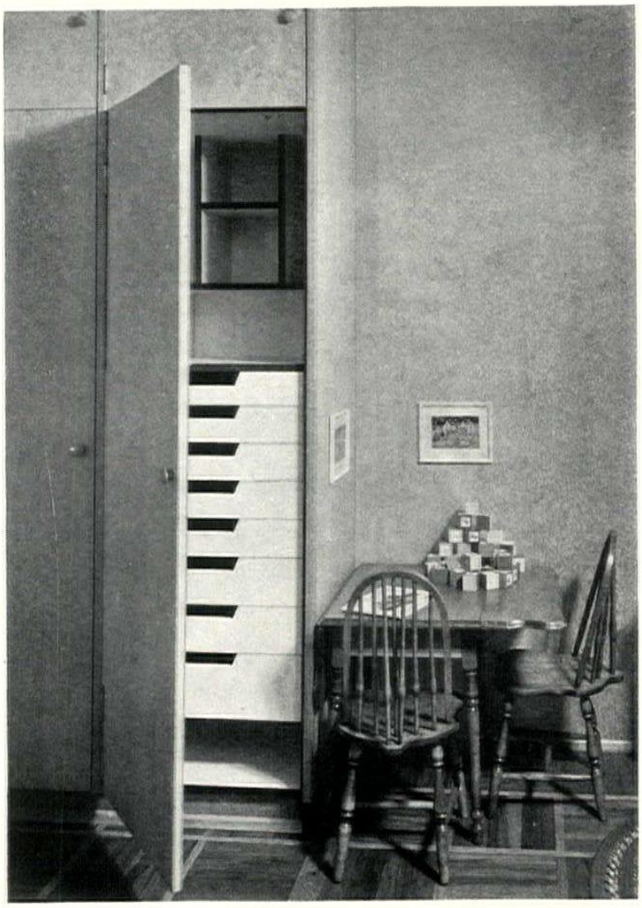


VERTICAL SECTION THROUGH TYPICAL WINDOW PANEL

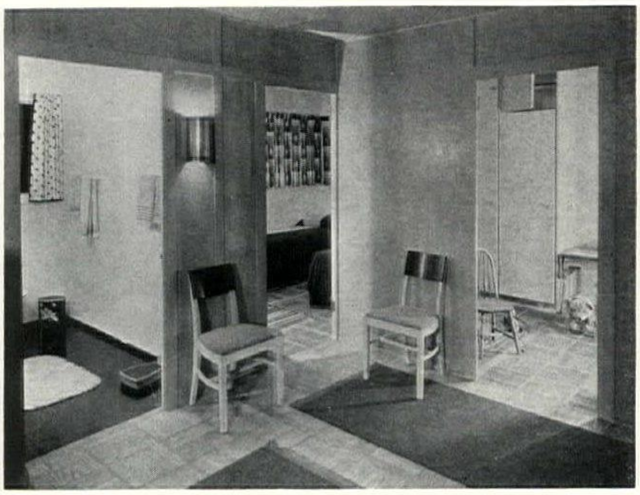
U. S. FOREST PRODUCTS LABORATORY PREFABRICATED ALL-WOOD HOUSE



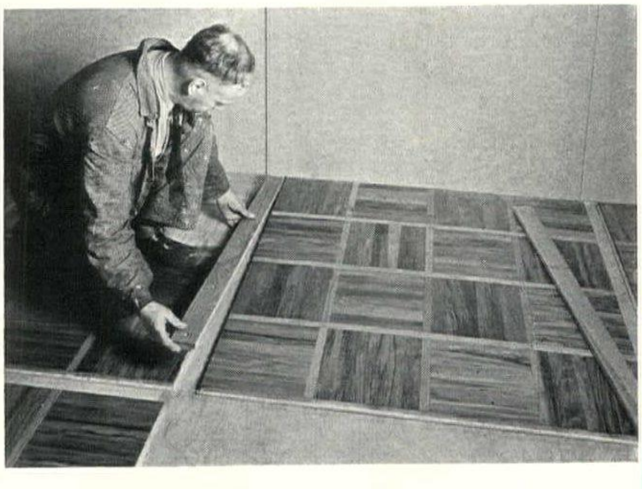
FLOOR PLAN OF DEMONSTRATION HOUSE



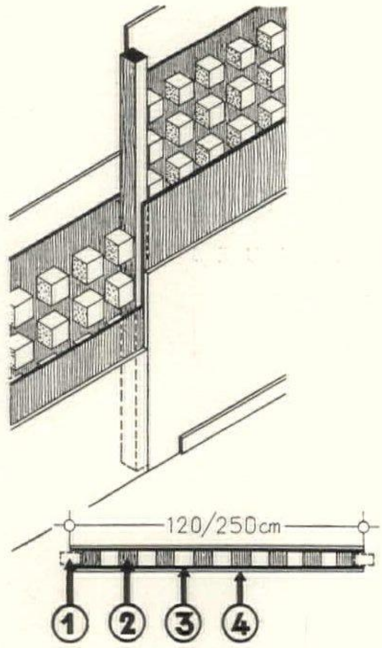
Interior of nursery, showing built-in cabinet.



View of living room, showing entrances to bathroom, master bedroom, and nursery.



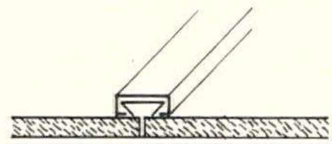
Laying the hardwood floor: T-shaped hardwood strips hold the prefabricated squares solidly to the panel subfloor.



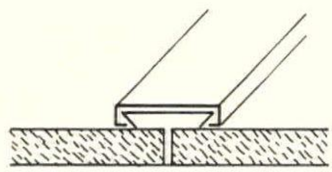
STANDARDIZED PREFABRICATED WALL UNIT

Made of sheets of plywood glued to square wood blocks. Width: 4 feet. Height: 8 to 10 feet. Qualities: light weight, structural rigidity, dry assembly, good thermal and sound insulation, concealed installation of pipe conduits and easy fastening of fixtures.

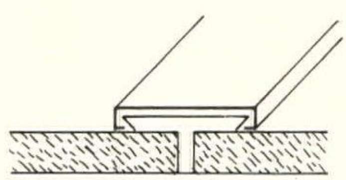
(1) STRUCTURAL FRAME.
(2) WOOD BLOCK SPACERS.
(3) PLYWOOD.
(4) INSULATION BOARD, VENEER OR CANVAS.



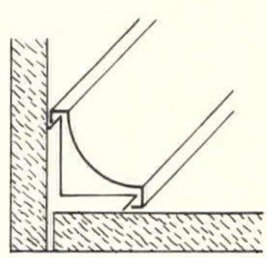
FLAT TOP
3/8" x 1/8"



FLAT TOP
3/4" x 1/8"



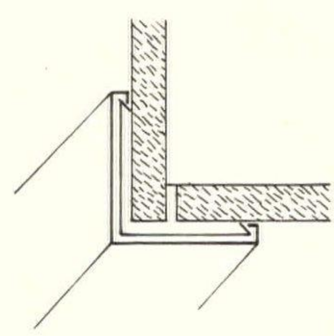
FLAT TOP
1" x 1/8"



INSIDE CORNER
1/2" x 1/2"

SNAP - ON STAINLESS STEEL MOULDINGS

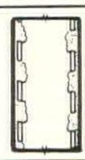
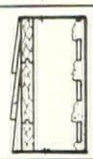
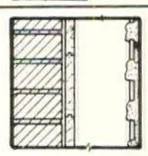
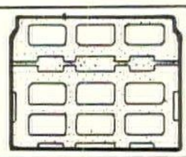
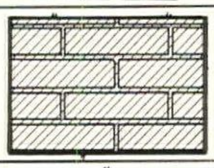
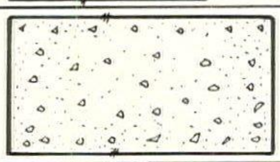
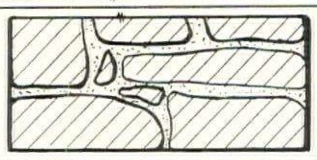
Joint cover strips for plywood, insulation board, flexboard, masonite, and similar products. No visible nails or screws. A dove-tail shaped track is nailed or screwed on first and then the cover strip is snapped into place. Mouldings may be had in bright or satin finish. Curved or other special shapes are also obtainable.



OUTSIDE CORNER
3/4" x 3/4"

COMPARISON OF VARIOUS WALL CONSTRUCTIONS

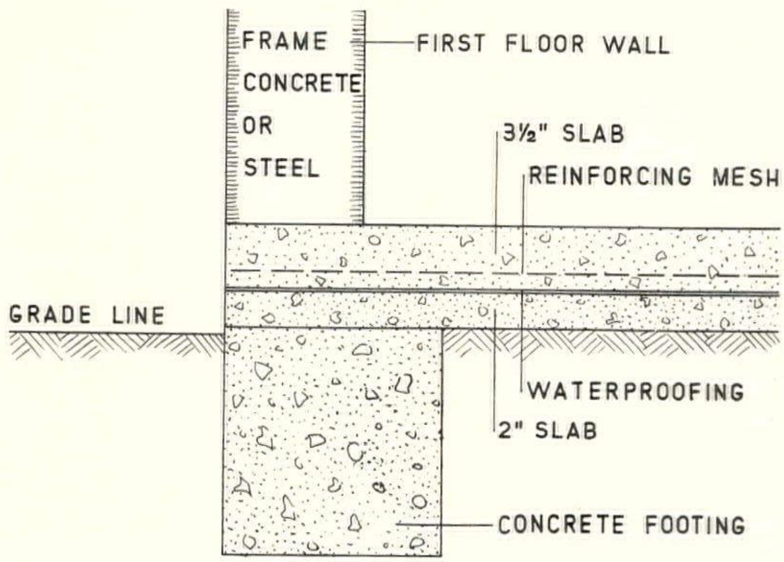
SHOWING OVERALL HEAT TRANSMISSION VALUES

TYPE OF WALL CONSTRUCTION	VERTICAL SECTION THRU WALL	WALL THICKNESS IN INCHES	OVERALL CONDUCTANCE IN B.T.Us.	WEIGHT IN LBS. PER SQ. FOOT THICKNESS AS NOTED
TRUSCON FERROCLAD INSULATION		1	.250	3.5
WOOD SHEATHING BOTH SIDES OF STUDS		5¼	.288	7.0
PLASTER AND WOOD LATH BOTH SIDES OF STUDS		5¼	.344	10.0
WOOD SIDING, WOOD SHEATHING LATH AND PLASTER STUD CONSTR		6	.262	11.0
BRICK VENEER, WOOD SHEATHING LATH AND PLASTER STUD CONSTR.		10	.247	50.0
HOLLOW TILE		12	.250	125.0
BRICK		15	.250	165.0
CONCRETE		25	.250	285.0
STONE		30	.250	330.0

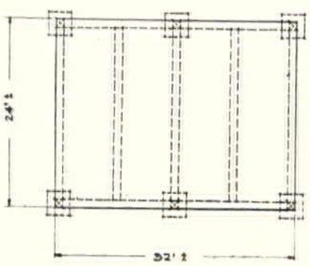
Conductivity values from A. S. H. V. E. Guide. Weights per square foot computed from established densities. Conductivity is the measure of heat flow—B.t.u. per hour per square foot per degree Fahrenheit. Chart by Truscon Steel Company.

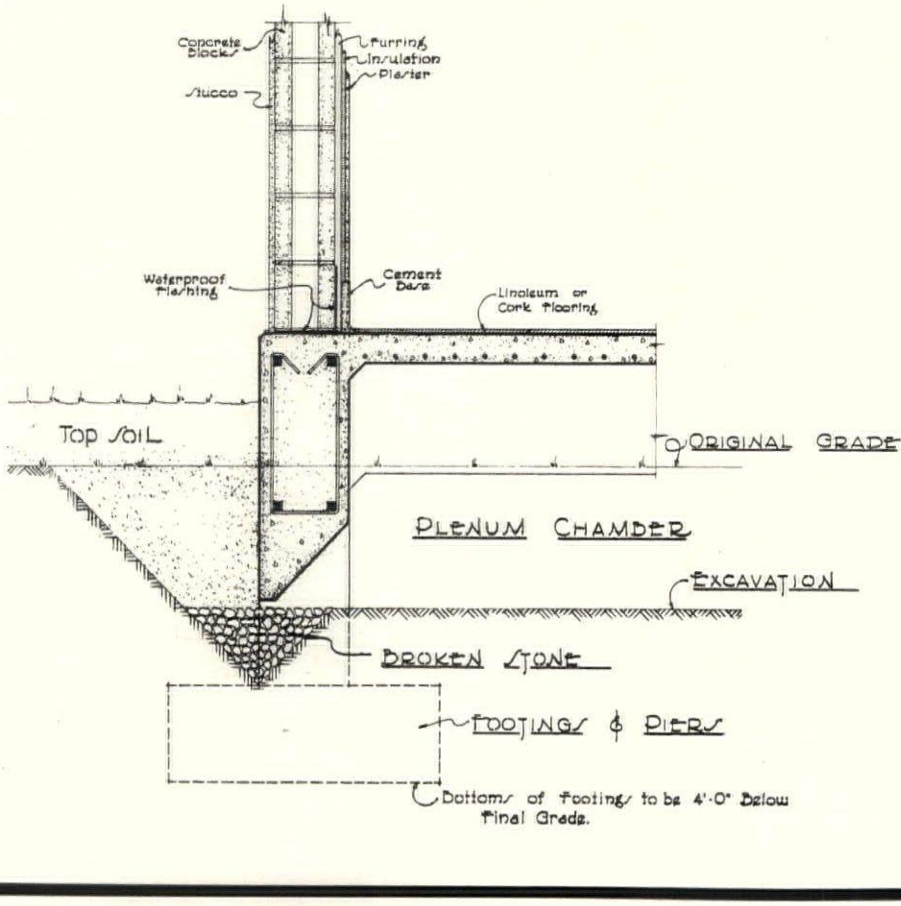
FOUNDATIONS

Concrete footing and floor slab detail. Location in South or on West Coast where frost does not penetrate ground location. The earth on which slab is laid should be thoroughly tamped and wetted. Provision is made for waterproofing the floor slab. The top slab is reinforced with steel mesh. Bolts are set in top slab at time of pouring the 3½" concrete surface slab. These bolts are used to attach the frame of the house.



METHOD OF WATERPROOFING FIRST FLOOR CONCRETE SLAB





Concrete foundation, designed by Arthur J. Barzaghi, civil engineer, for a house in location where frost conditions require deep footings. There are six piers supporting the floor slab and six reinforced beams encircling the house. Three intermediate beams support the slab. Broken stone provides drainage beneath the outside beams. The wall indicated is of concrete blocks, stuccoed on the outside and furred, insulated and plastered on the inside. This house wall can also be of poured or precast concrete, tile, brick, steel or wood.

CONCRETE HOUSE CONSTRUCTION

A large number of concrete house construction systems have been developed during the past few years. A report of a survey by the Portland Cement Association in which many systems are illustrated and described is now available to architects. Copies can be obtained at 30 cents each from the Association's offices in Chicago (33 West Grand Avenue).

The following conclusions were reached by this survey:

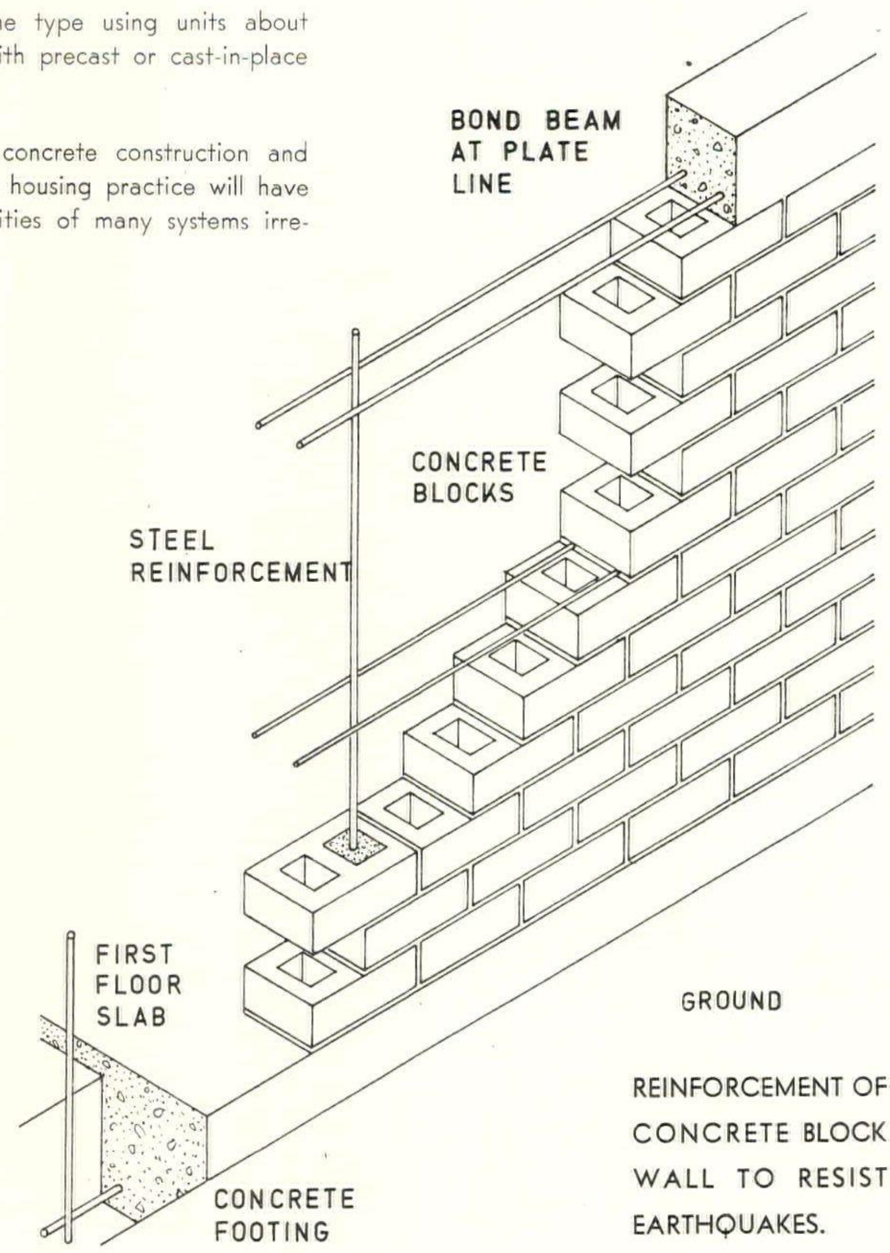
"Monolithic concrete probably represents the ultimate in permanent dwelling construction.

"The precast unit and stucco-structural frame methods are regarded as being well suited for home building and capable of further development.

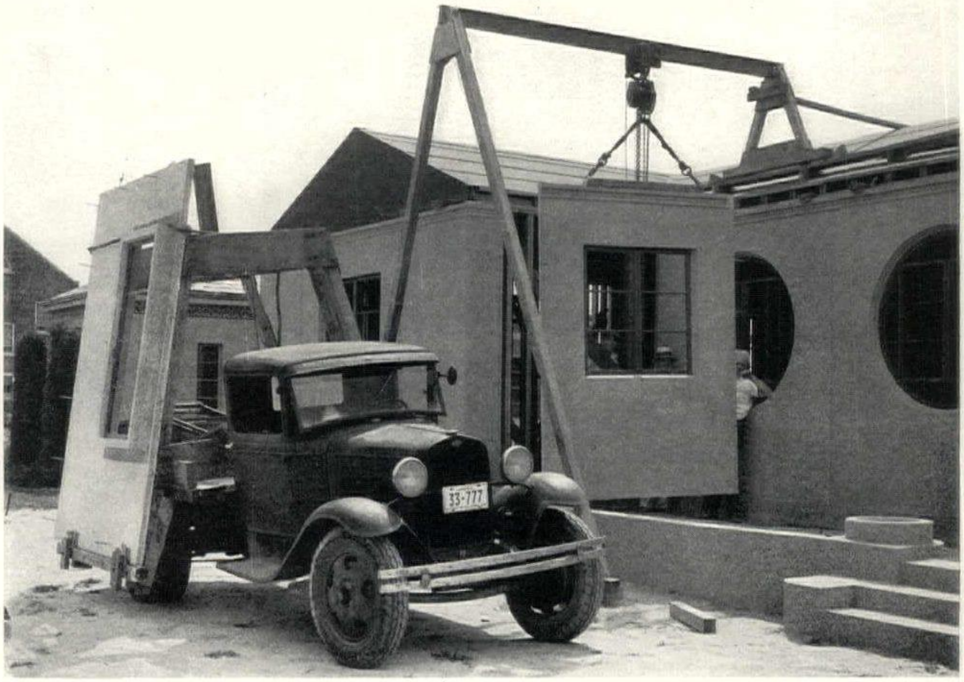
"There is need for greater simplicity in the design and erection of forms for monolithic walls.

"Of the precast unit wall systems, the type using units about 12" high by 36" long in conjunction with precast or cast-in-place studs appears most promising.

"The important technical progress in concrete construction and equipment and the possible changes in housing practice will have considerable influence on the potentialities of many systems irrespective of their past experience."



REINFORCEMENT OF CONCRETE BLOCK WALL TO RESIST EARTHQUAKES.

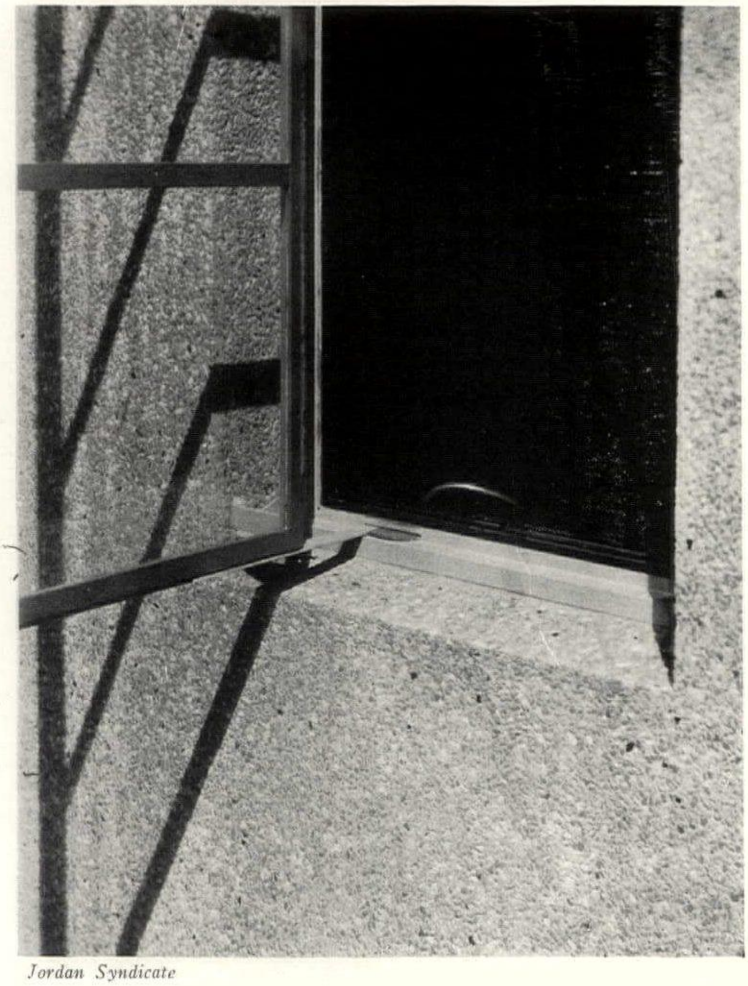


A precast panel being put into place on the building site.

Reni Photographers

EARLEY PROCESS PRECAST MOSAIC CONCRETE PANELS

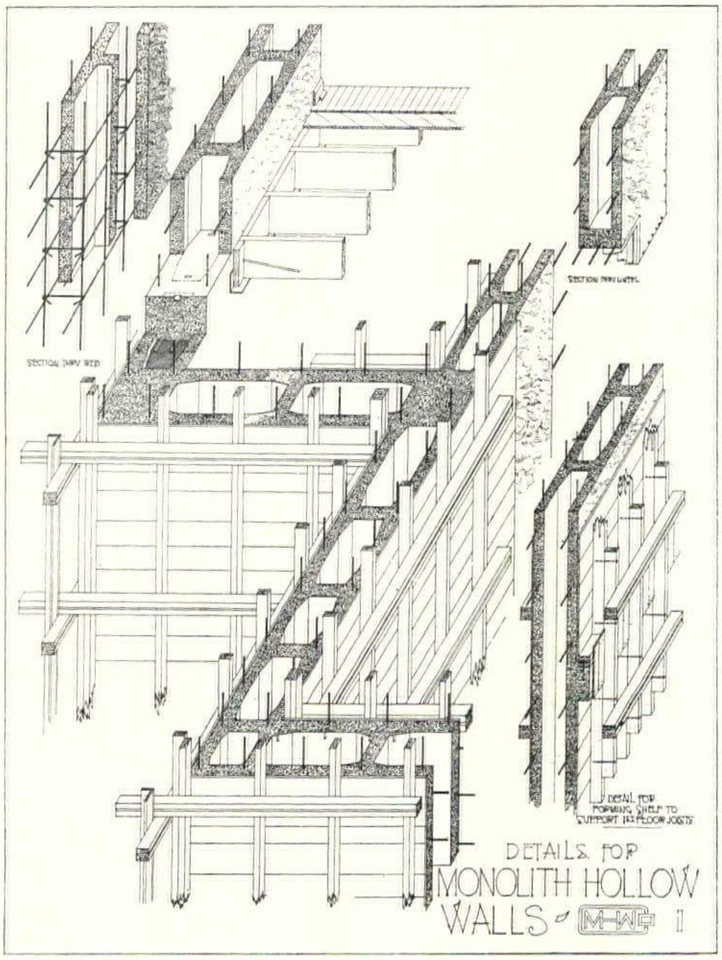
DEVELOPED BY EARLEY PROCESS CORP., WASHINGTON, D. C.



Jordan Syndicate

Mosaic concrete is made of crushed quartz, quartz sand and portland cement by a patented process. The aggregates are selected for their hardness and for their fadeless color. The "sand" used in making mosaic concrete is crushed from the same stone and graded to size as exactly as the larger aggregates. The concrete is cast in moulds from which it takes its form. Color and texture are determined by the color and the size of the aggregates. The moulds are removed just before the final hardening of the concrete. The surface cement is then wire-brushed and the panel washed with a weak solution of muriatic acid to produce a surface of "exposed aggregates."

The panels are 2 inches thick, approximately 9 feet high, from 4 to 10 feet wide and heavily reinforced with electrically welded steel mesh. They are cured for fourteen days in a humidity chamber until they have a crushing strength of about 5,000 pounds to the square inch. The panels are so made that they can be easily assembled upon a concrete foundation on which a skeleton of studding—wood or steel—is set. Light reinforced concrete columns are then cast behind the joints between the panels. The latter are attached to these columns by a process which combines them but leaves them free to move with the expansion and contraction of the concrete. The window casements are cast solidly into the panels themselves in the course of their prefabrication in the studio. The assembled walls completely enclose the building, thus enabling workers to proceed with the interior finish independent of external weather conditions.



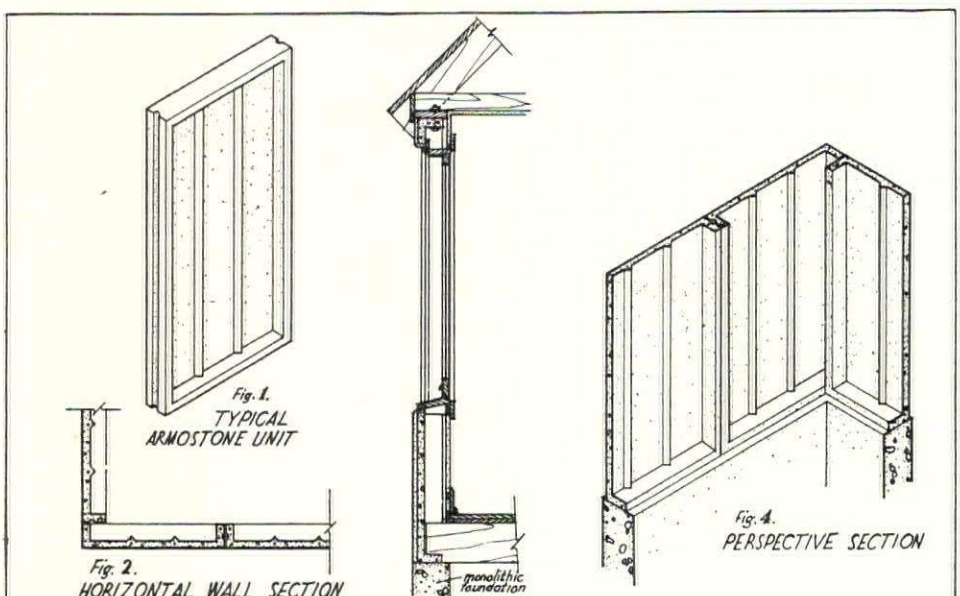
MONOLITH HOLLOW WALLS . . .

MONOLITH HOLLOW WALL COMPANY, LOS ANGELES

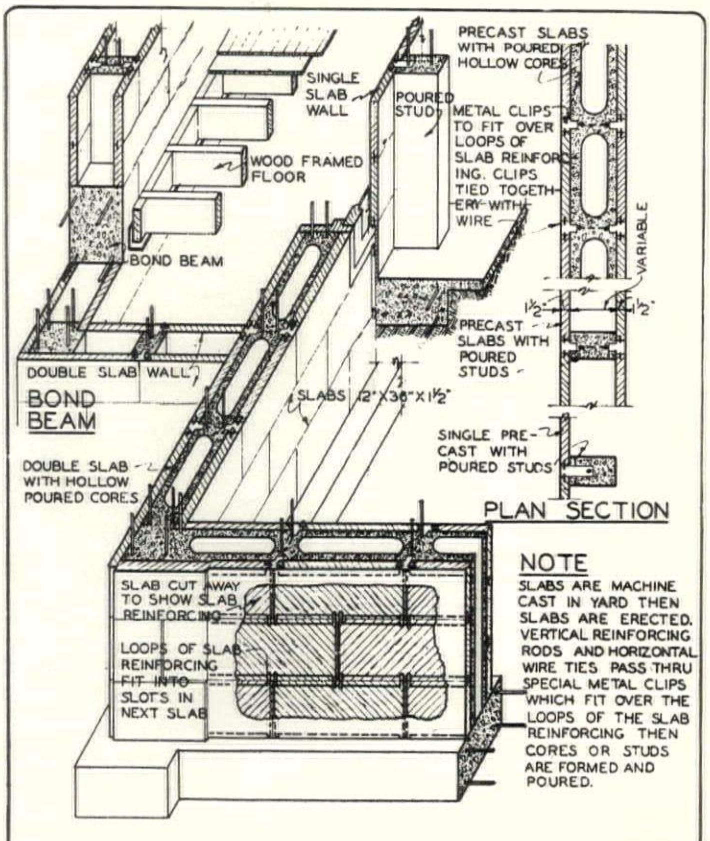
Reinforced concrete hollow walls poured in place (not a unit block construction). The exterior forms are wood, either 5/8" plywood or boards. These exterior wood forms, together with the reinforcing steel, are set up the full height of the wall to be poured. Wall core units are set into the forms as the placing of the concrete progresses. The collapsible metal wall core is made in units which are 30 inches high and so constructed that they can be set one on top of the other to any desired height. The wall is poured the full story without "cold" joints. Cores are removed in from 8 to 12 hours after the concrete has been poured. The hollow spaces in the wall provide insulation. Exterior plaster is usually omitted; interior plaster is applied directly to the concrete surfaces. The exterior is brush-coated to any desired color. The total cost of a building with hollow walls is about 10 per cent more than ordinary frame and stucco construction.

ARMOSTONE SYSTEM . . . DEVELOPED BY CONCRETE HOUSING CORPORATION OF AMERICA, NEW YORK

A system of wall construction employing precast units about 3 feet long by story height. The units are 1 inch thick with flanged edging all around and intermediate vertical stiffening ribs. Slab and ribs at edges and intermediate points are reinforced. The vertical edges are grooved in order to hold the mortar better. The foundations are prepared in the ordinary manner and the slab set thereon in a mortar bed. A wood plate is bolted along the tops of the erected slabs and wood attic floor and roof framing nailed thereto. The exterior is stuccoed. The inside is lathed and plastered, or plaster board is nailed to horizontal wood strips attached to wood inserts in the edge ribs.



From SURVEY OF CONCRETE HOUSE CONSTRUCTION SYSTEMS



LOCKSTONE SYSTEM
ERNEST. H. LOCKWOOD - PATENTEE

From SURVEY OF CONCRETE HOUSE CONSTRUCTION SYSTEMS

LOCKSTONE SYSTEM . . . .

ERNEST H. LOCKWOOD, PASADENA, CALIFORNIA

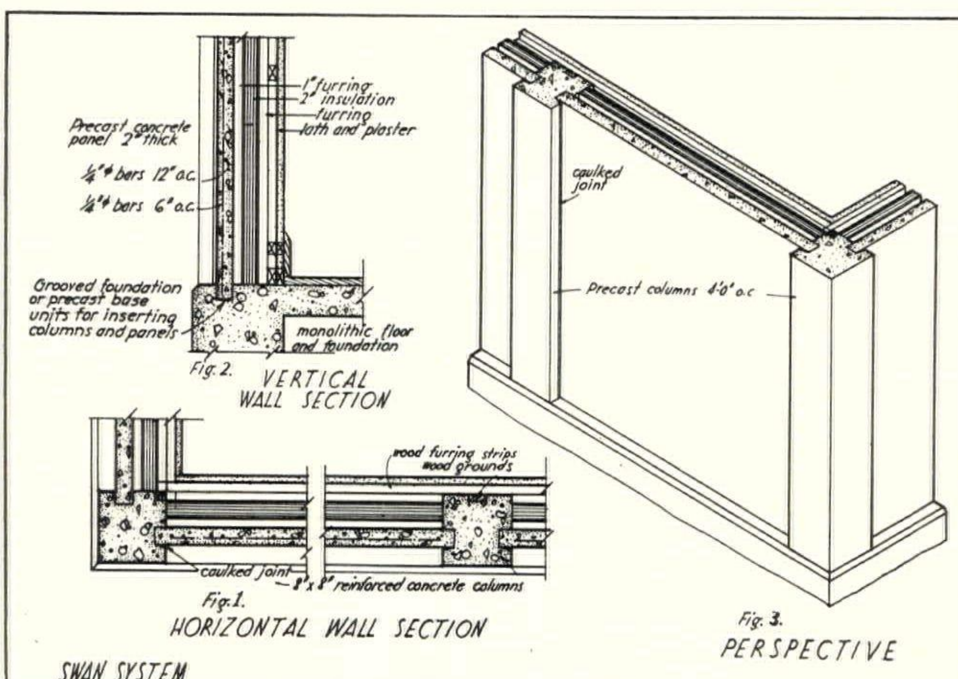
This system applies to wall construction and utilizes precast slabs 1½" by 12" by 36" erected on edge in single or double rows with intervening studs at frequent intervals or a cored or solid wall poured between the double row of slabs. Slabs are reinforced with a bar along each longitudinal edge. These bars are bent near the end so as to protrude from the edge and key with a corresponding slot in the slab above in the wall. Slabs are cast flat by a patented machine.

In the construction of walls, one or two rows of slabs are erected with staggered vertical joints. Flat metal ties placed at all slab junctions hold opposite sides in exact alignment. For hollow walls metal cores or stud forms are spaced within the slabs and concrete poured. For single faced walls, metal stud forms held against the slabs by ties inserted in joints are filled with concrete. Bond beams and corner columns generally are provided. The joints are pointed and as the slabs are attractively finished in the mould, they need no further treatment.

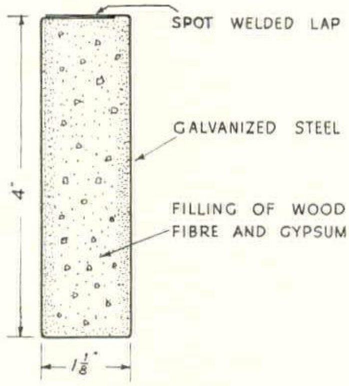
SWAN SYSTEM . . . . .

DEVELOPED BY FRANK S. SWAN, SWAN HOUSE, INC., CHICAGO

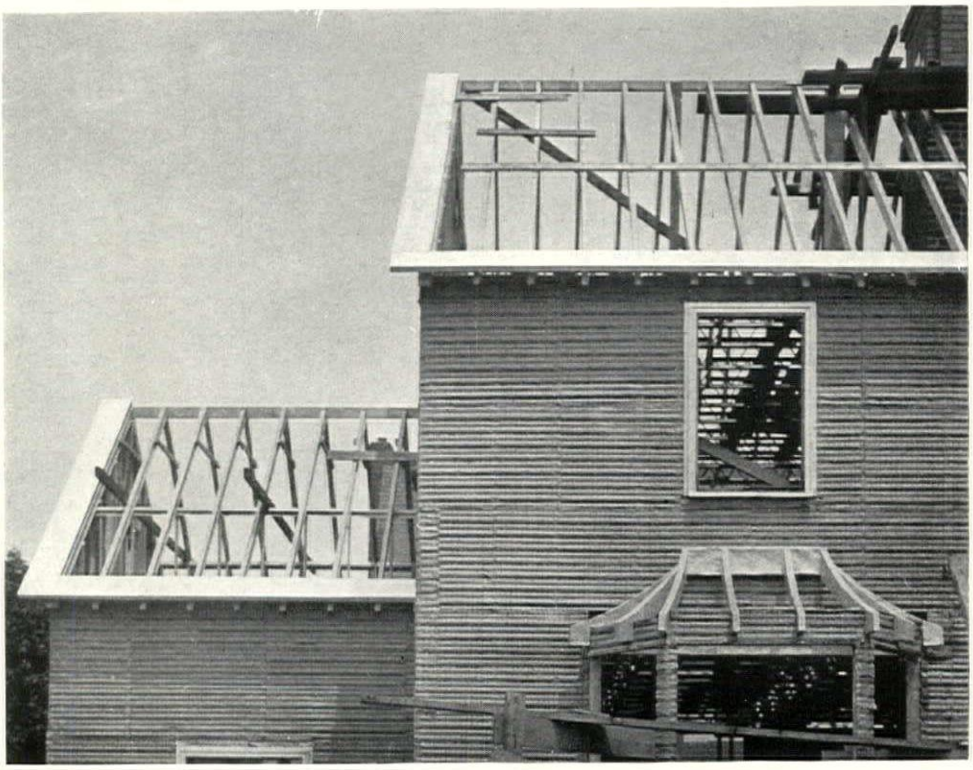
This system employs precast concrete studs spaced about 4 feet apart and precast slabs set between with edges inserted in the stud groove. Exterior surfaces are finished in the mould. The studs are story height. The slabs are 2" thick, 3'-4" wide and 2' to story height. In one-story houses a wood plate bolted to tops of studs extends around the wall. Reinforced belt course is built at first floor level in two-story houses. All joints are made with emulsified asphalt pointed with cement mortar. Special insulating materials, such as gypsum block, cork board, are erected between the studs and immediately inside of the slab.



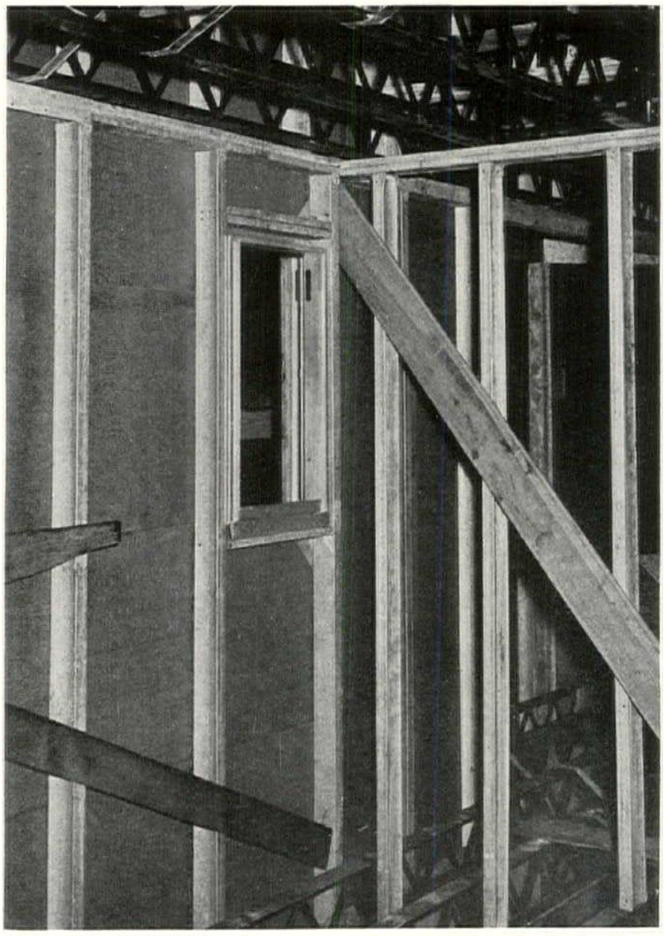
From SURVEY OF CONCRETE HOUSE CONSTRUCTION SYSTEMS



DETAIL OF METAL CLAD GYPSUM STUD,
USED FOR FRAMING. CAN BE NAILED, SAWED AND DRILLED

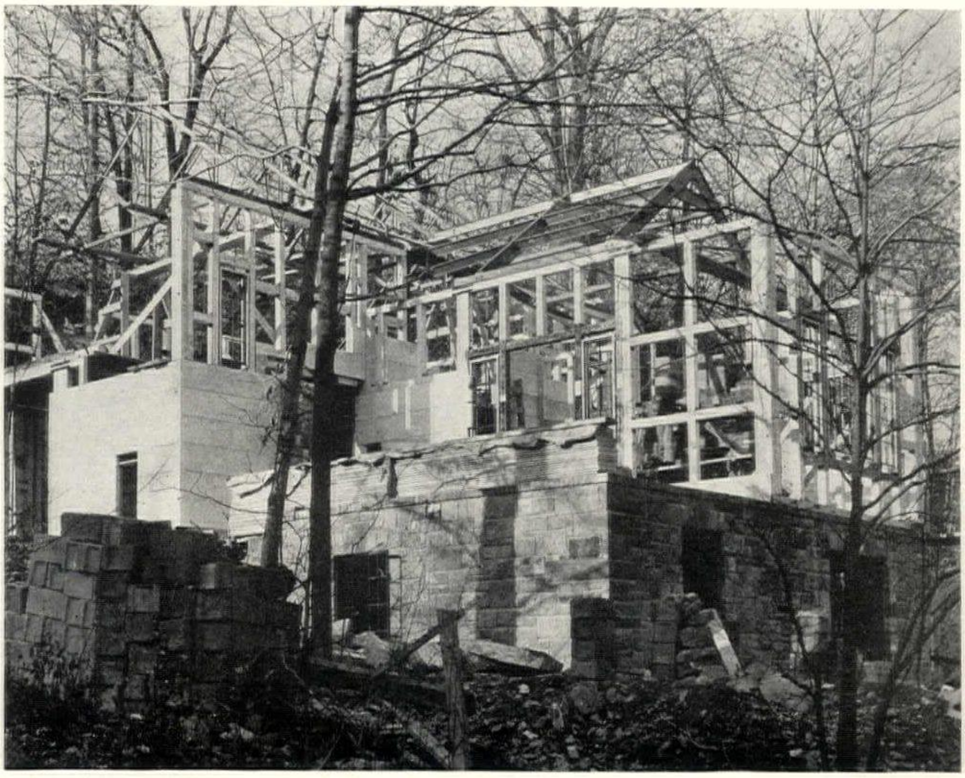


EXPERIMENTAL HOUSE AT HEMPSTEAD, LONG ISLAND



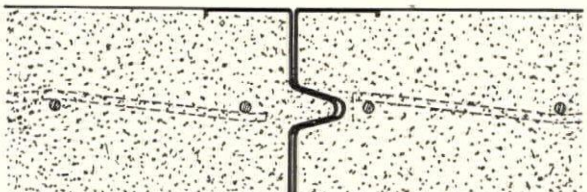
Photographs by Gustav Anderson

A feature of this house is its fireproof quality, developed by an ingenious framing of sheet metal with a filling of gypsum and wood fiber. The rake of roof and cornice edge is similarly constructed of metal with a filling of gypsum. The exterior faces of the house have an applied metal lath with paper backing as a base for stucco. Aluminum foil between studs and joists provides insulation against cold and heat. Floors and roof are surfaced with a mixture of slag and cement. All truss beams are welded. The method of construction differs very little from the construction of an ordinary wood frame house. Such elements as windows and doors are standard.



An experimental house, designed by Cecil Clair Briggs, architect, and utilizing gypsum structural framing produced by the American Cyanamid & Chemical Corporation, has been erected in New Jersey. Framing members are bolted together. The exterior facing consists of gypsum planks nailed to the frame. A waterproof, elastic cement is troweled to the surface as a single application. The walls and framing are watertight, fireproof and free from danger of attack by termites.

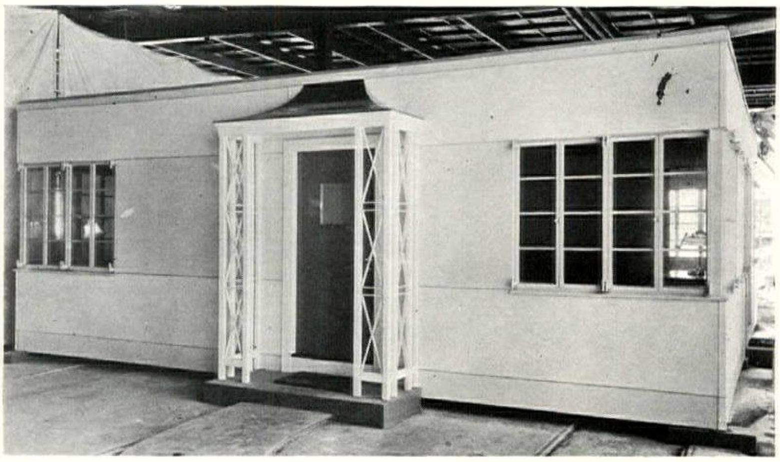
GYPSTEEL PLANK FOR FLOORS AND ROOFS



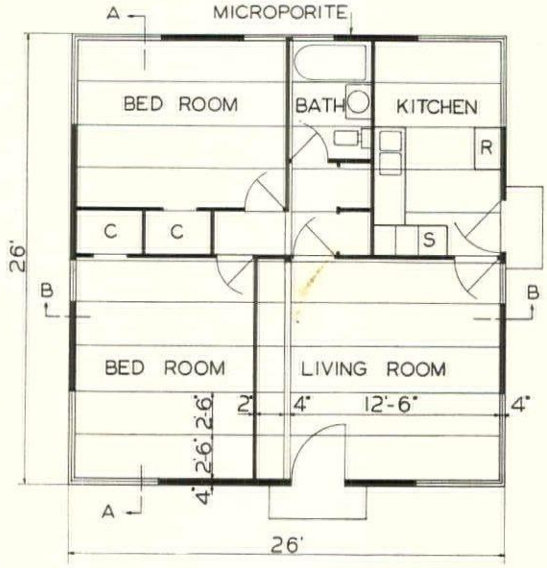
As units are erected, the edges mesh together to form a 2" I-beam which spans the distance between, and passes over, the supporting steel joists or purlins. "Tongues" and "grooves" are tapered so that they mesh as easily as wood decking to form a solid floor or roof deck.

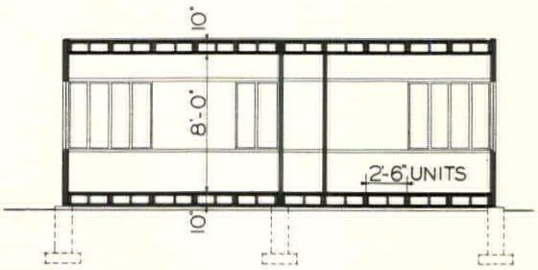
For floors the planks may be laid over either wood or steel joists of any type and of either uniform or variable spacing. Spans between joists up to 5 feet are suitable. Where a thin finish flooring, such as linoleum or composition tile, is to be applied over the plank without intermediate fill of substantial thickness, it is recommended that spans be limited to 4 feet. Linoleum, mastic tile and similar flooring may be laid over $\frac{1}{4}$" minimum coat of "Plankote" (manufactured by American Cyanamid & Chemical Corporation) troweled over the plank surface by the linoleum or tile contractor.

Planks are used for roofs in a manner similar to that for floors. End joints are staggered and need not come over the supports. Clips are used for fastening to joists.

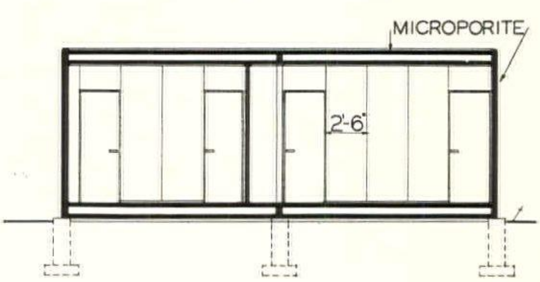


"MICROPORITE HOUSE" . . . . DEVELOPED BY PIERCE FOUNDATION, NEW YORK





SECTION A-A



SECTION B-B

Characteristics of "Microporite": Indurated calcium hydrosilicate. Inorganic. Incombustible. Insoluble in water, highly resistant to action of corrosive salts and acids. Neutral (pH near 7). White. Weight, 28 pounds per cubic foot. 75-80 per cent void. Pores submicroscopic. Compressive strength, 1,000 pounds per square inch. Tensile strength, 100 pounds per square inch. Modulus of rupture, 200 pounds per square inch (without reinforcing). Heat transmission, 0.70 B.t.u./hr./sq. ft./°F./1" thickness. Heat capacity, low. Sound transmission loss for 2" partition: average, 32 db. (at 300–1,000 cycles); minimum, 25 db. (at 200 cycles); maximum, 42 db. (at 1,000 cycles). Sound absorption, high. Fire resistance: on sample 2" thick, 1,832° F. one side for one hour, other side raised 18°. Resistance to freezing: average of 15 cycles of alternate freezing and thawing to disintegrate. Freezing has no effect unless material is wet.

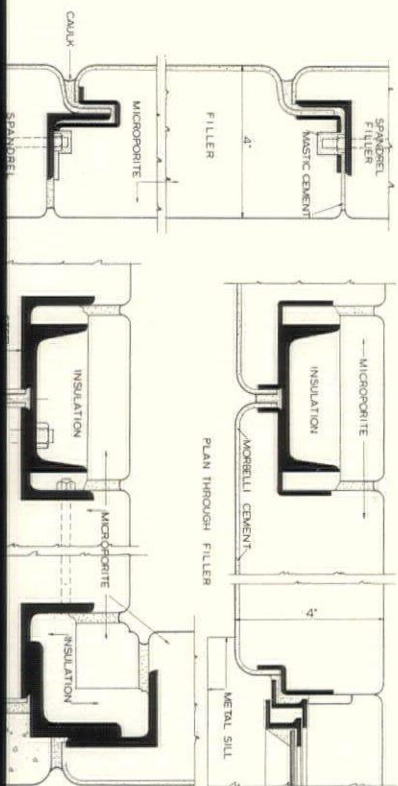
Structural System: Steel columns on concrete piers on 13-foot centers. Exterior wall slabs (structural) are 12'-6" x 2'-6" x 4", bolted to columns. Floor and roof slabs are 12'-6" x 2'-6" x 10" (hollow), carried on exterior wall and central steel girder. Partitions are nonbearing; panels are 8'-0" x 2'-6" x 2", held in place by floor and ceiling mouldings. Same structural system and units used for single or multi-story buildings—residences, apartment houses, office buildings, schools, factories, and the like.

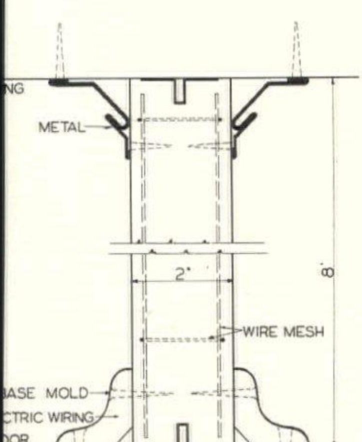
Surfacings: Exterior surface—$1/8$" thick "Morbelli," a very dense, inexpensive fibro-cement. This material is chemically and mechanically bonded to the "Microporite." Permeability to water, 1.7 milliliters per square foot in 48 hours under 2" head. Can be made in great variety of colors and textures; requires no paint or other maintenance. Interior surface—wall, partition, and ceiling—chemically hardened; can be painted or papered or left in natural white color, or integrally colored. All finishes are factory-applied.

Joints: A permanently elastic expansion joint in strip form is used for all joints. The edges of the sections are buttered with Latex-Alumina cement before they are put in place. All joints are exposed; no batten strips or mouldings are used. A shiplap type of joint is used for exterior. All metal is kept within the thickness of the wall; there is no through conduction.

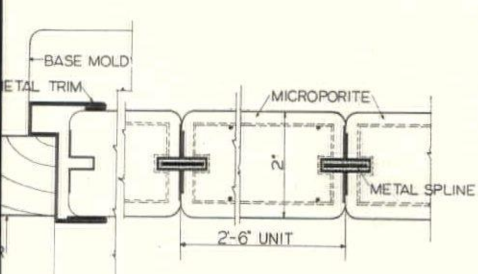
Method of Erection: Holes for piers are dug and steel frame erected on temporary supports. Exterior wall sections are bolted to columns and floor, and roof slabs are bolted to outside walls and steel girders. After the structure has been squared and leveled, the concrete piers are poured.

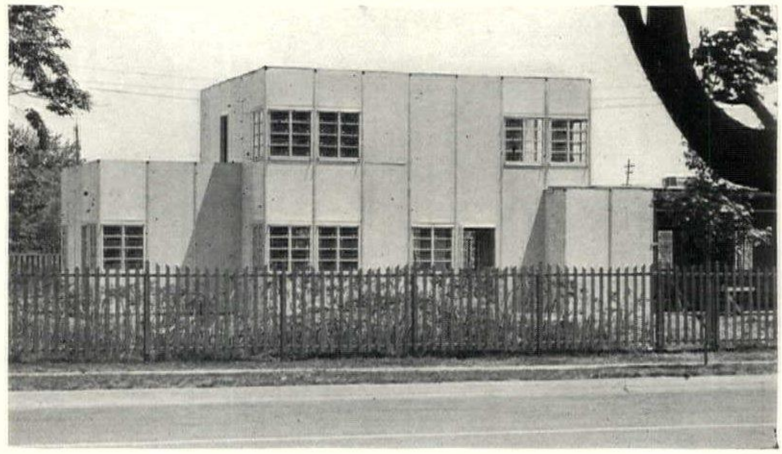
AILS OF MICROPORITE CONSTRUCTION





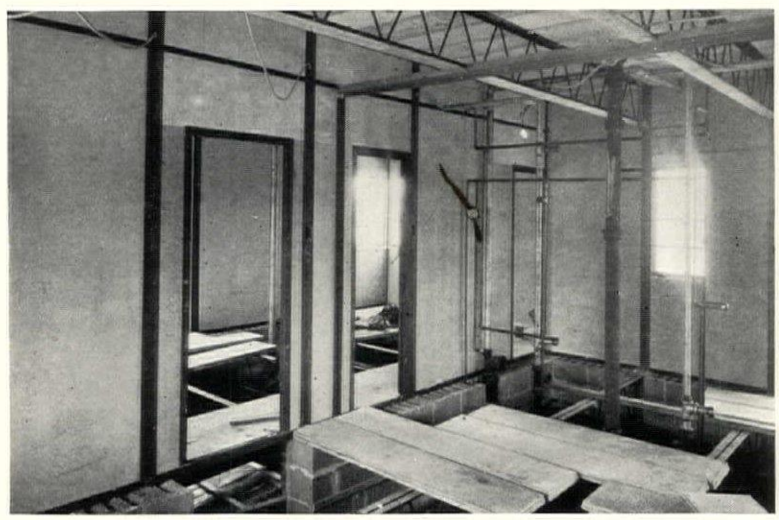
SECTION THROUGH PARTITION

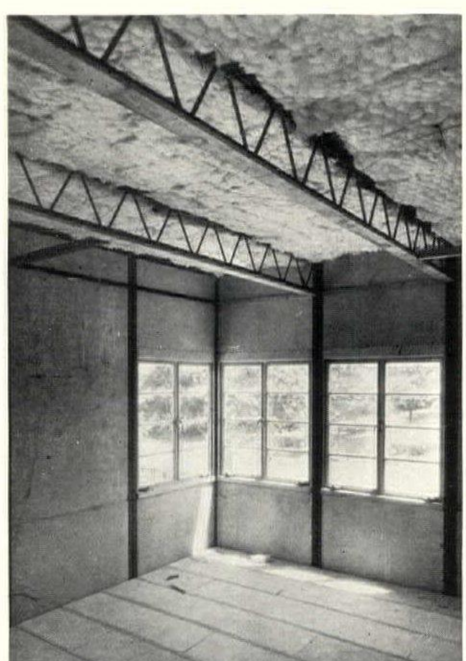




"MOTOHOME" AT GARDEN CITY, L. I.

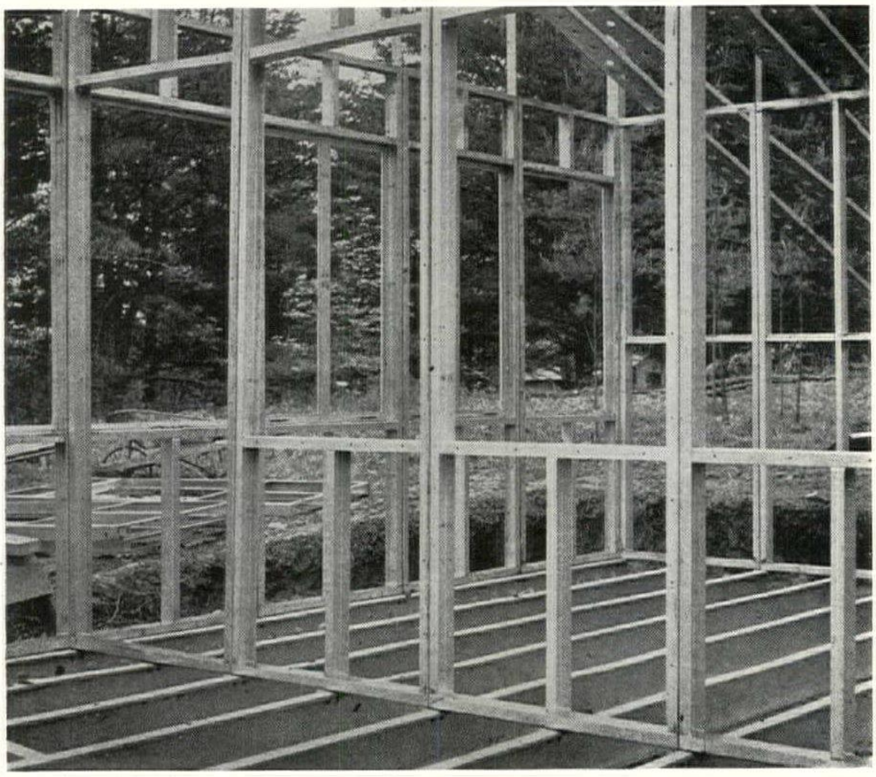
DEVELOPED BY AMERICAN HOUSES, INC., NEW YORK





Construction: Steel frame. Exterior walls—"Pyrestos" panels with aluminum trim. Floors and roof of "Minro-pak," a mineral compound, 2 inches thick and reinforced with steel. Steel casement windows.

Photographs by Gustav Anderson



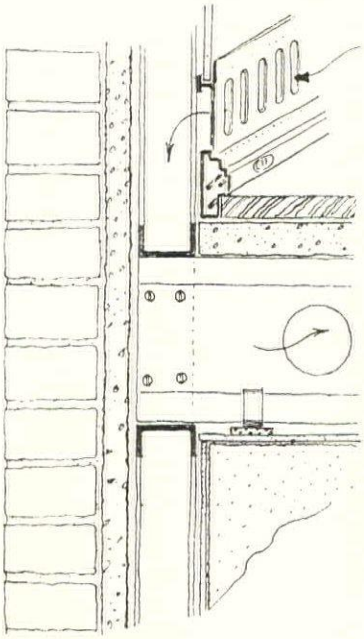
RIGID BERLOY STEEL FRAMES ARE BOLTED TO STEEL FLOOR JOISTS

BERLOY STEEL-FRAME HOUSE . . . . .

DEVELOPED BY THE BERGER MANUFACTURING COMPANY OF CANTON, OHIO, A SUBSIDIARY OF REPUBLIC STEEL CORPORATION.

The keynote of the Berloy system is the fabricated steel frame or skeleton—each unit of which has been designed to be easily handled by one man. This means no erection machinery on the job. The Berloy House differs from what is popularly known as a "steel house" in that only the frame is of steel. The exterior may be finished with any building material now in use, permitting wide variety in appearance.

AIR DUCTS FOR AIR CONDITIONING SYSTEM ARE BUILT INTO THE STEEL FRAMES



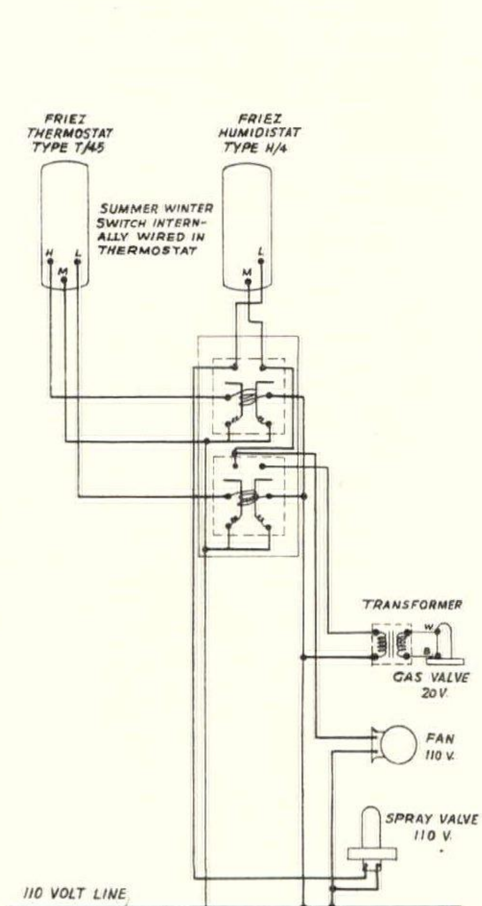
BERLOY STEEL-FRAME UNITS WEIGH 42 POUNDS

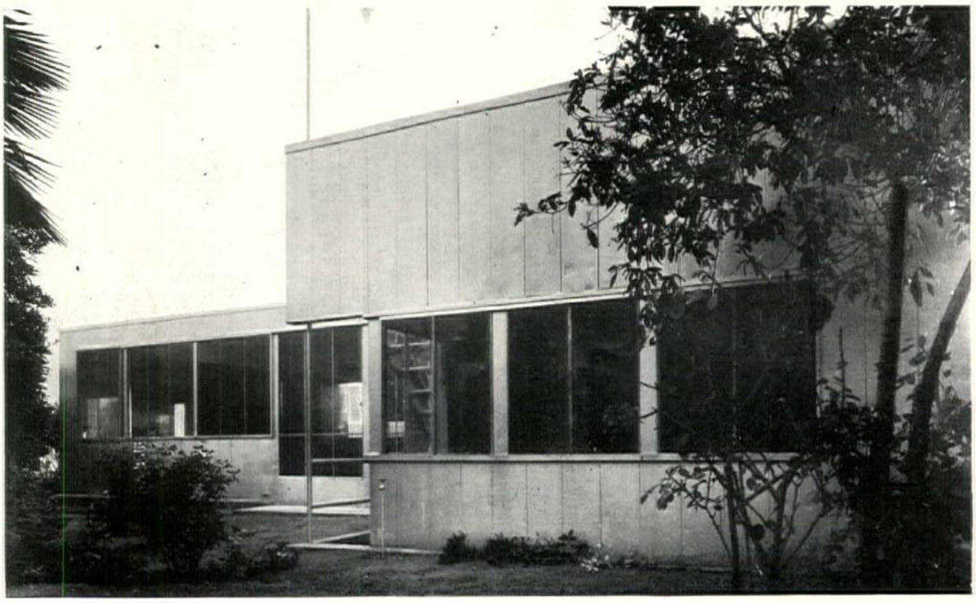
BERLOY HOUSE ERECTED AT WASHINGTON, D. C.—KASTNER AND STONOROV, ARCHITECTS

Air conditioning: Special Friez automatic control instruments are used on the Berloy houses. The equipment provided on these sets comprises the following: summer-winter thermostat, with built-in, change-over switch and ready interwired; humidistat; special relay set, containing two relays mounted into single "knock-out" type hinge-lidded box, 6" x 3" x 9" deep, and complete with diagram. The wiring is shown on accompanying diagram. The humidistat and thermostat are mounted side by side in the living quarters and the connections to the gas valve, fan and spray valve on the special Bryant Air Conditioner are shown in the diagram. The relay box is sunk flush with the kitchen wall, right across from the air conditioner itself.

In winter: On falling temperature the fan is started and simultaneously the gas valve turned on. When the temperature reaches satisfaction point, both fan and gas are simultaneously turned off. On falling humidity the solenoid valve to water spray is turned on but it is so arranged that this can only take place if the heater is running. This is desirable to prevent humidity spray from running unless there is distribution by means of the fan. Similarly, little or no humidification will be achieved unless heat is present in the air.

In summer: The summer-winter switch, which is mounted integrally into the thermostat cover, is thrown to the summer position and the following functions take place: If the temperature rises above the point set on the thermostat, the fan is started and simultaneously the cold water spray started. On satisfaction of the thermostat the fan and spray are simultaneously shut off. If it is desired that the humidistat should never be able to turn on the spray, the setting knob can be turned back to some low point, say 20 per cent, below which the humidity would never drop during summer; the spray would then never come on unless under demand of the thermostat. In the Berloy demonstration house cold water from an artesian well is available for cooling.

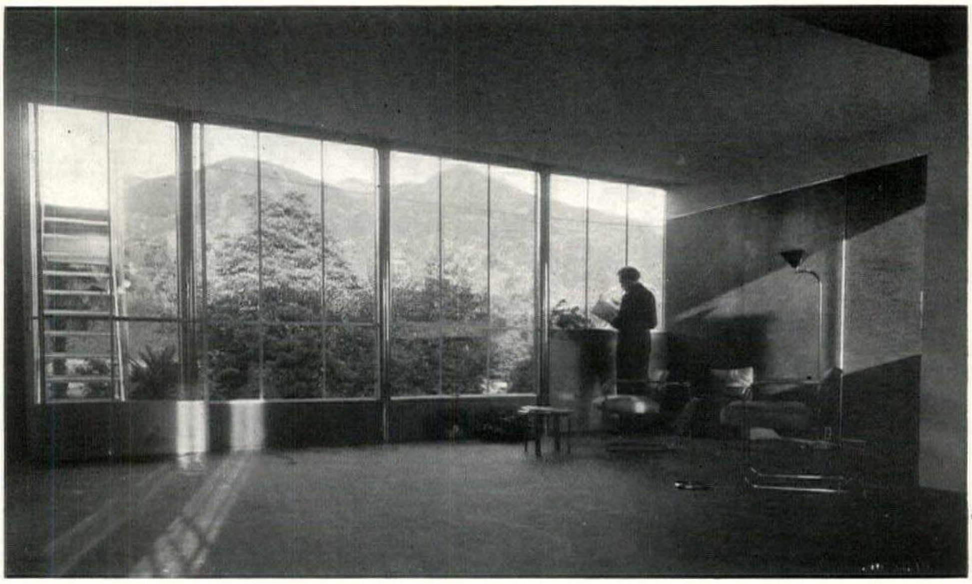




CELLULAR
COPPER-BEARING
STEEL HOUSE

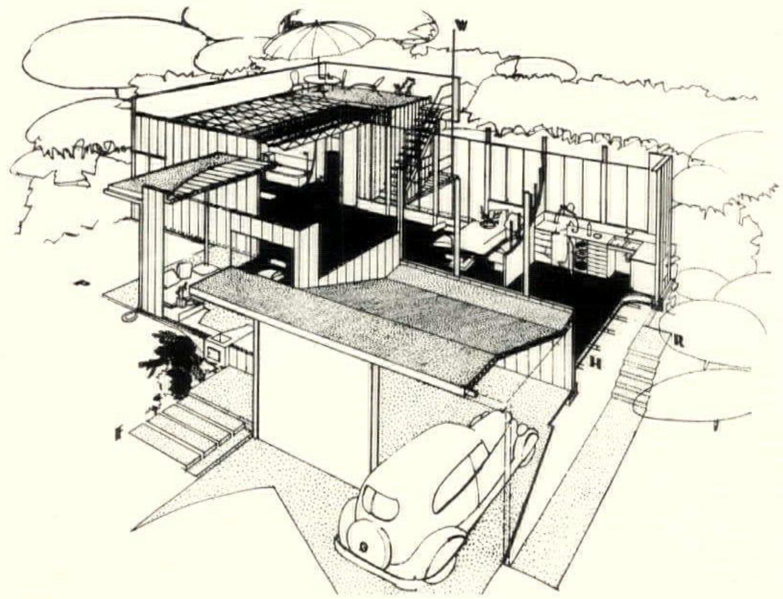
BUILT
FOR WILLIAM BEARD
ALTADENA, CALIFORNIA

RICHARD J. NEUTRA
ARCHITECT
GREGORY AIN, ASSOCIATE



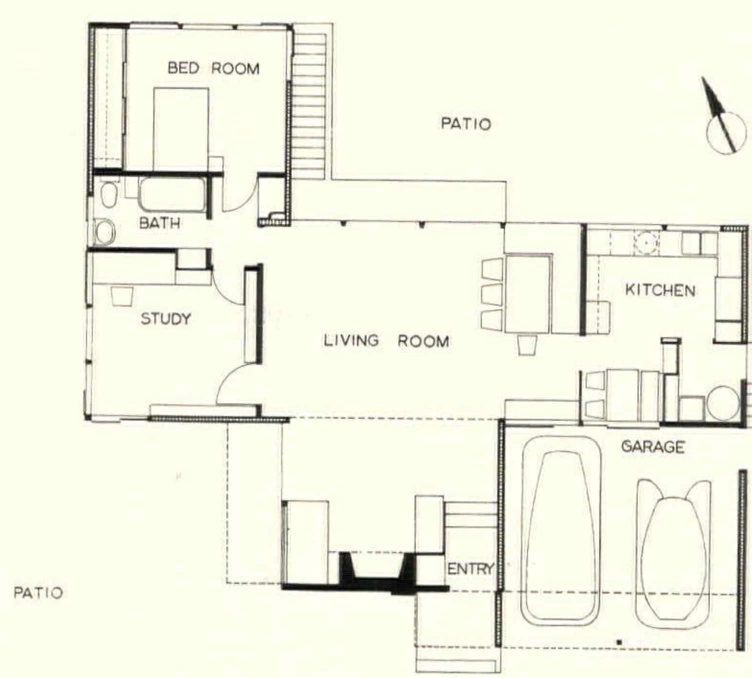
Photograph by Luckhaus Studio

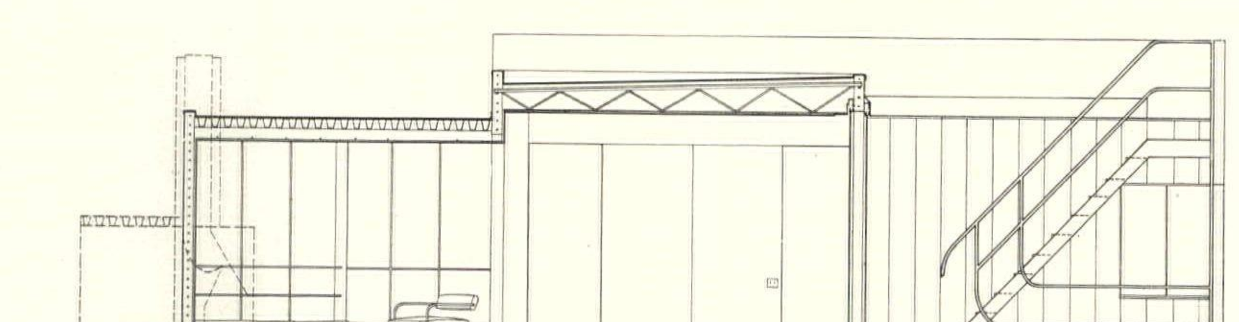
This house utilizes the standard Robertson steel (Keystone) floor system for both walls and horizontal spans. The vertical wall elements are erected in multiple sections. They are placed in a typical grooved concrete footing which is then grouted with waterproof cement to produce a fixed bearing of the wall elements. These now act like upright cantilevers and individually are designed to take lateral stresses of wind pressures or earth shocks. The joint of the standard section is tightened with caulking rope and compressed A. C. Horn "Vulcatex," a rubber-like vulcanization of china wood oil applied with an air gun, which permits relative elastic movement of the series of bottom-fixed cantilevers. Lintels are formed of the same sheet steel elements, which are traversed by 3/4" round steel bars to take tension stresses at the bottom zone of such girders and combine the top zone to compressive strength.



The ground floor is double shell construction of 12" overall depth. The upper slab of integrally colored and waxed "Diatom" cement composition is carried by cross-braced trussed open-web steel channel studs. It encloses a plenum chamber of 6" clear depth which extends under the entire building and into which, when desired, hot air is pressed electrically from the furnace. The "Diatom" cement slab forms and acts as a low-temperature radiating panel during the cold season, while a retarded convection carries the air volume of the sub floor void into the vertical hollows of the cellular steel walls.

On facades exposed to direct sun radiation, small intake openings at the foot of the cellular steel elements initiate simultaneously with the warming up of the exterior surface an automatic air convection to cool these walls and minimize heat transmission to the interior calorific insulation board lining. The sun rays themselves operate this cooling system.



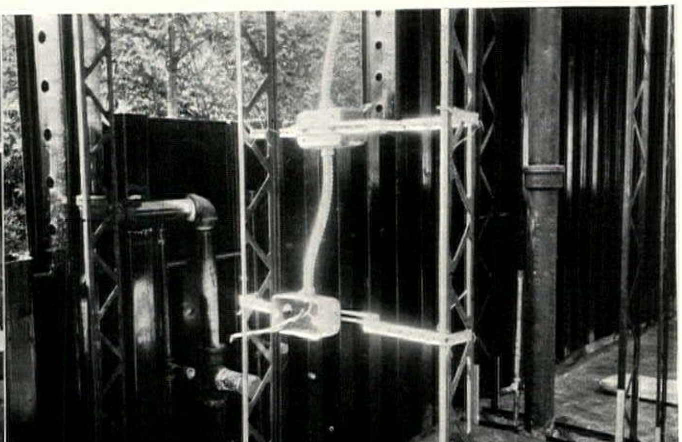


Cellular steel wall elements . . . .

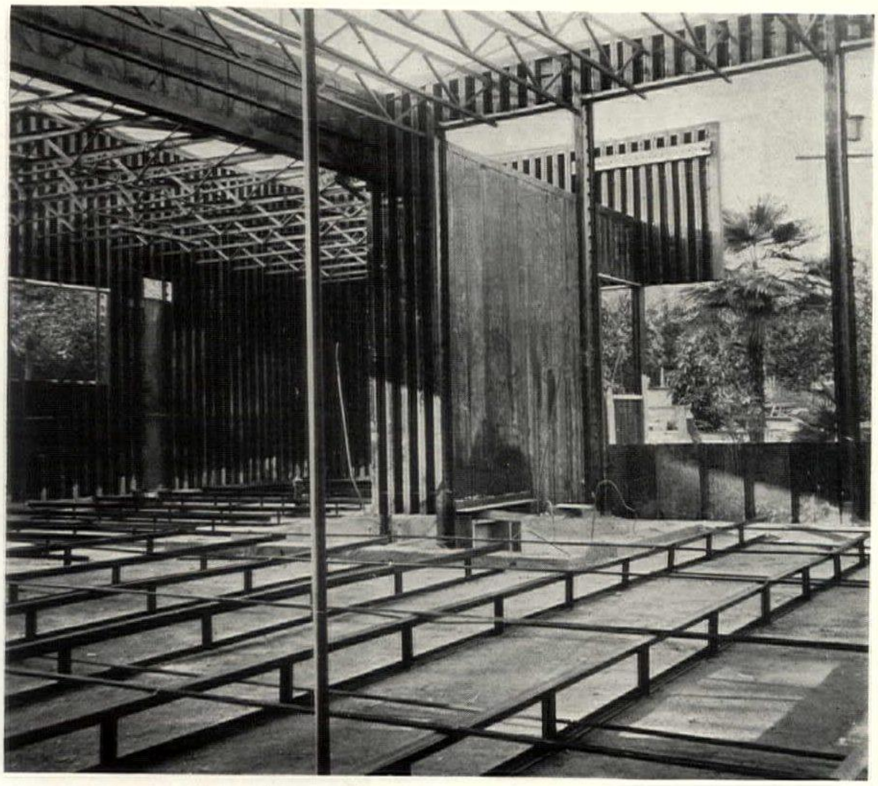
. . . are erected on grooved footings.

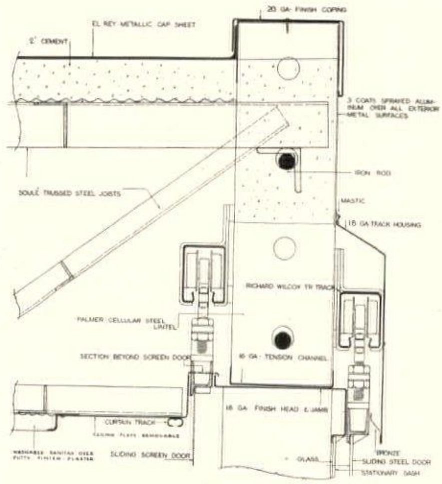
CELLULAR STEEL HOUSE AT ALTADENA, CALIFORNIA

Arc-welding of steel wall elements.



Utility conduits and fixtures.

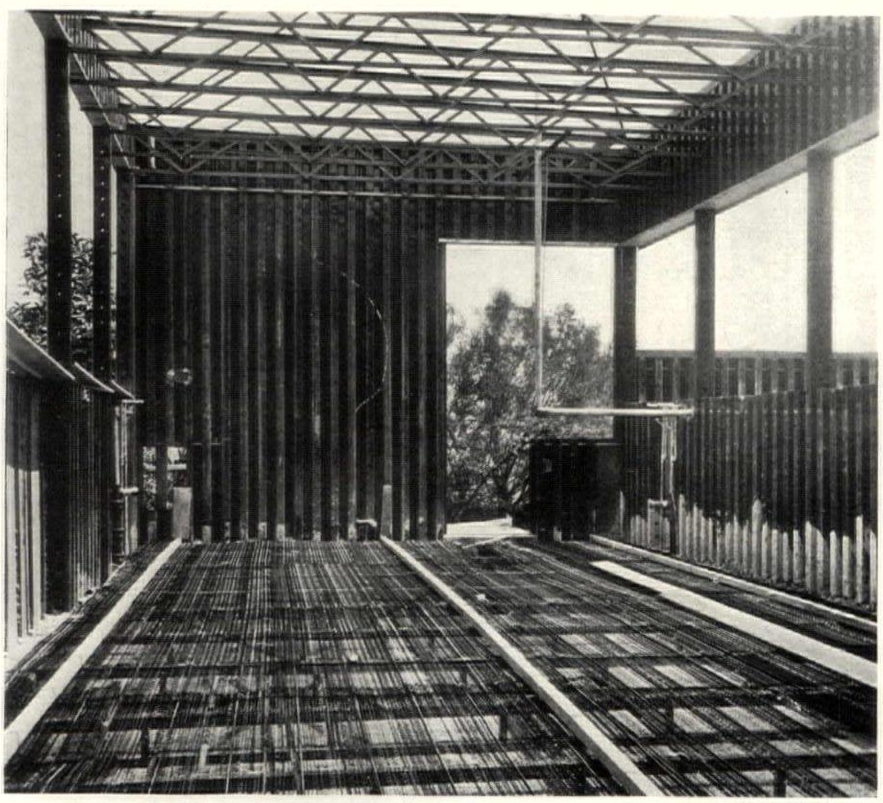


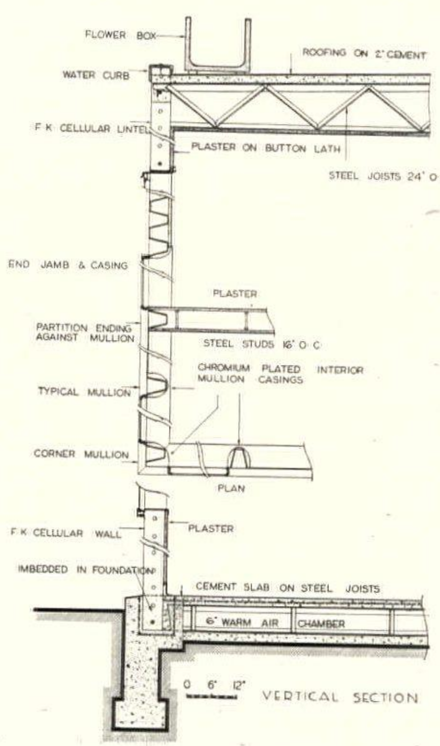


LINTEL OVER SLIDING STEEL GLASS DOORS

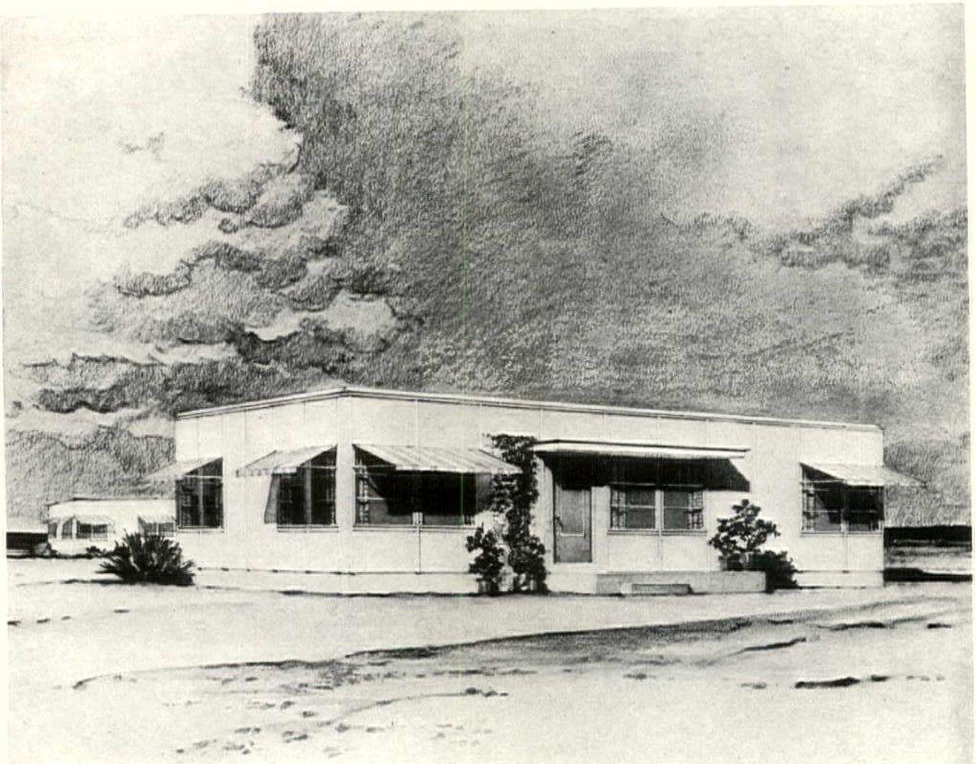
Hollow steel floors form plenum chamber for panel heating. . . .

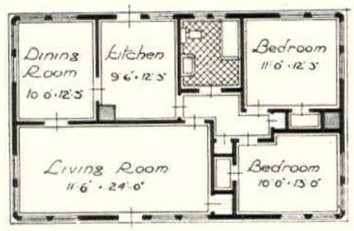
RICHARD J. NEUTRA, ARCHITECT — GREGORY AIN, COLLABORATOR





VERTICAL SECTION



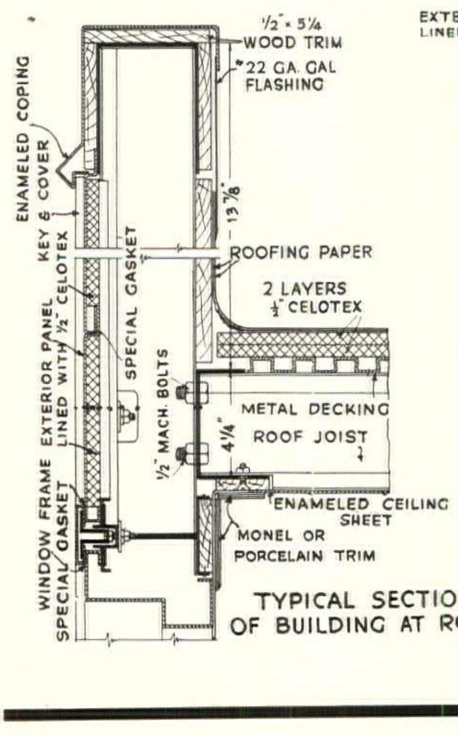


PORCELAIN STEEL HOUSE . . . . .

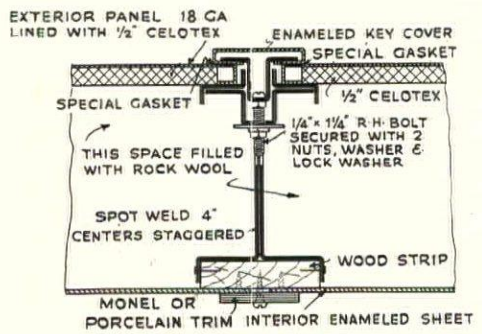
DEVELOPED BY PORCELAIN STEEL BUILDINGS COMPANY . . . COLUMBUS, OHIO

This company started its development of porcelain steel construction in 1925. The first building was erected in 1928, and since then 36 porcelain steel buildings have been constructed. All have been commercial buildings (lunchrooms). The house design illustrated above is a recent addition to the company's production; it is under consideration at present by several oil companies who expect to use the house in developing leases.

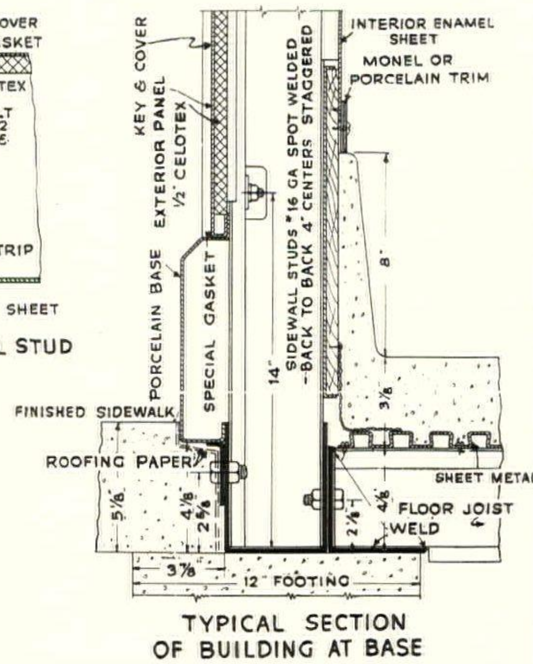
In the last 10 buildings erected, glass wool has been used for insulation. A 1/2" low density insulating board is cemented on inside of panels for sound insulation. On the roof two 1/2" layers of insulation board are used for thermal insulation.



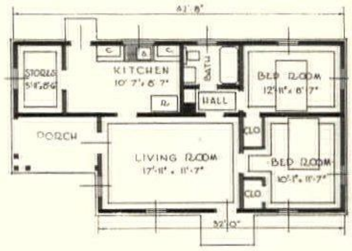
TYPICAL SECTION OF BUILDING AT ROOF



TYPICAL DETAIL OF SIDE WALL STUD



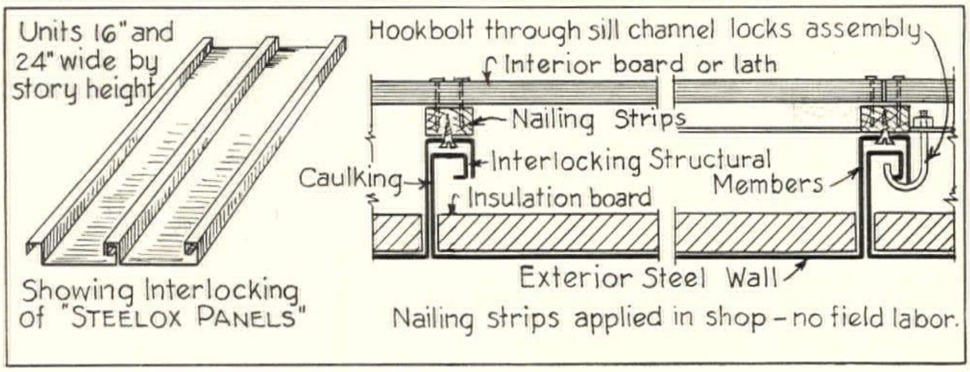
TYPICAL SECTION OF BUILDING AT BASE



STEELOX HOUSE

DEVELOPED BY
INSULATED STEEL CONSTRUCTION COMPANY
MIDDLETOWN, OHIO

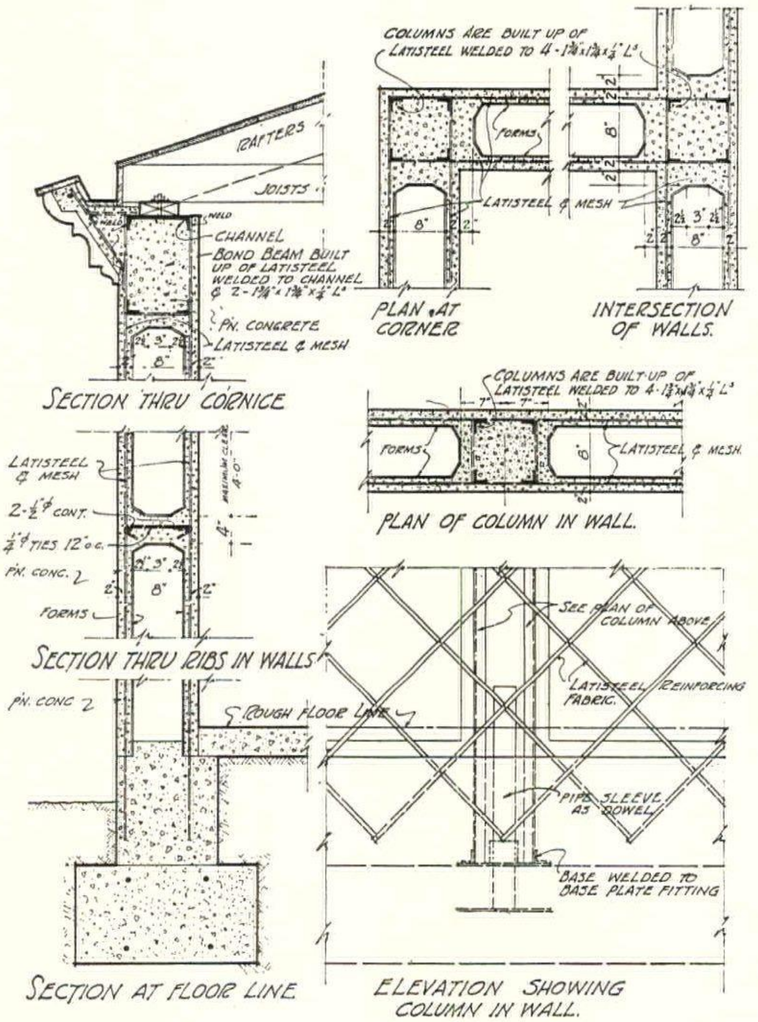
STEELOX CO., CHICAGO

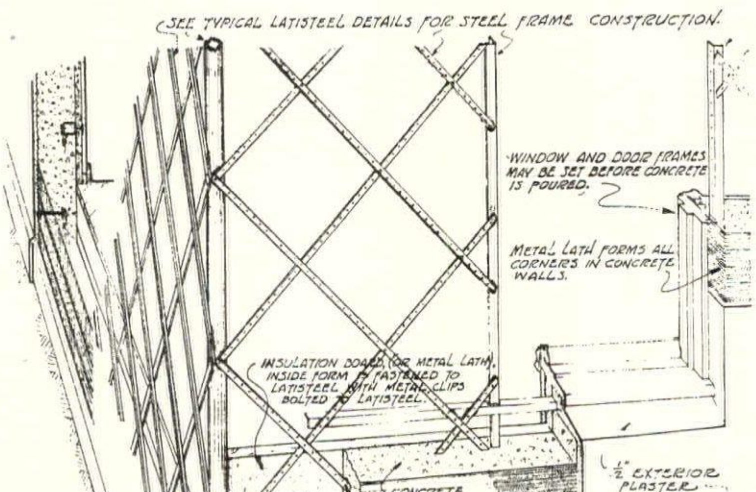


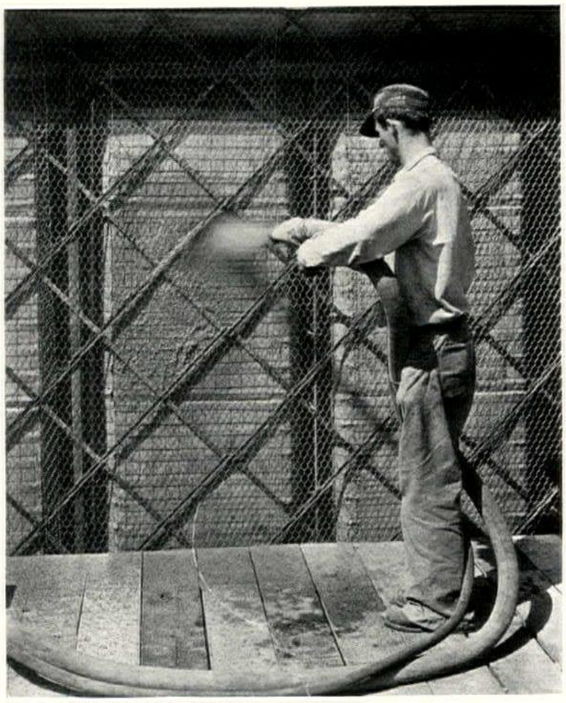
Walls and roof are made of 20-gauge heavily galvanized Armco steel channel-shaped sections 16" wide and with flanged sides. The flange on one section easily and securely interlocks with the flange on the adjoining section, forming strong, rigid steel columns which serve as studding or rafters. All wall and roof sections are of like length, excepting the gable ends. Parts are interchangeable and every piece is accurately cut to fit before it leaves the factory. No special tools are required.

The first step in erection is to attach the heavy 12-gauge galvanized base angles, wrapped in asphalt strips, to the foundation with expansion bolts. A corner section is then set on the angle and one by one the inner wall units are set in place and fastened to the base angle by a simple hook bolt. A calking compound tightly seals each joint. When a window opening is reached, shorter units are used. Next, the top plate is placed in position and hook-bolted, the short units over doors and windows inserted and fastened, and the wall is finished. The roof is assembled in almost the same manner. Each roof section has a small plate riveted to the underside which slides down over the top wall plate, and is fastened to a special ridge cap. The flanges of the roof sections are turned upward, forming a tight standing-seam roof which defies the wind and rain.

All walls are insulated with standard material, either board or bat form. Windows are weatherstripped. All materials necessary to complete the house (excepting cement, sand, gravel and other necessary materials) are supplied by the manufacturer. The house illustrated, with outside dimensions 42'-8" x 21'-4", is sold f.o.b. Middletown, Ohio, at $1,050. Price, including window shades, kitchen cabinets, and all plumbing and electrical fixtures and materials, is $1,350.







Photograph by A. E. Arnold

LATISTEEL SYSTEM

DEVELOPED BY F. A. RUPPEL, ARCHITECT
PASADENA, CALIFORNIA

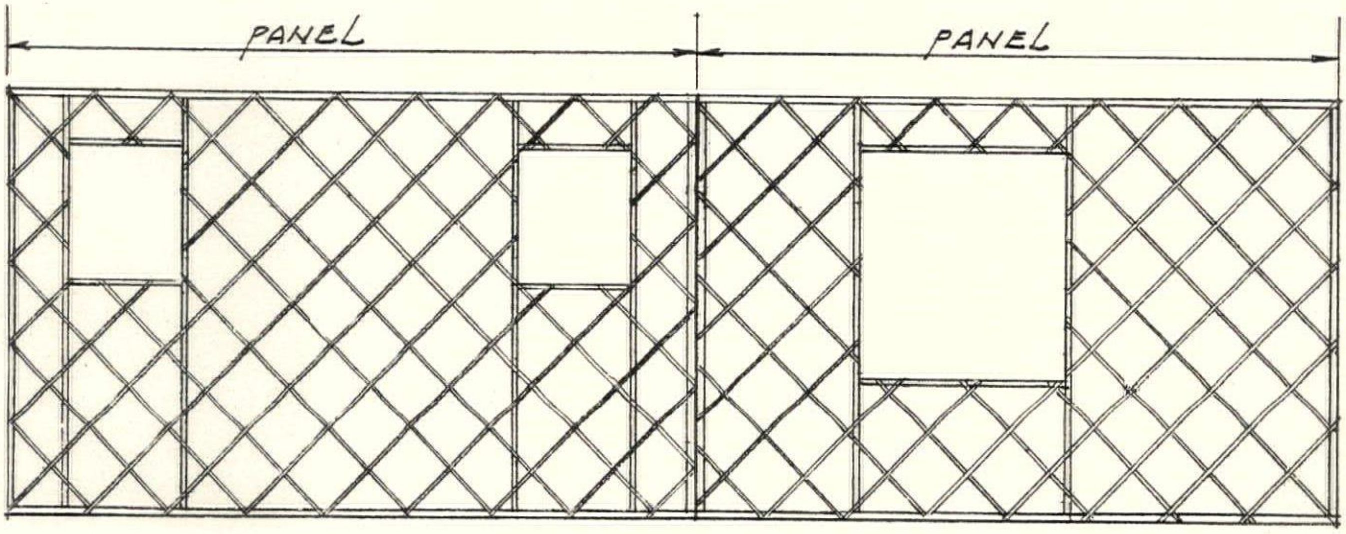
The Latisteel Corporation of California has developed and is distributing three types of steel frame which are competitive in price with building methods now in general practice. Each method is analogous in its functions with the others, and all three can be consistently combined in one design or structure.

Type No. 1 is developed by the site assemblage of factory fabricated steel wall panels easily handled by two men.

Type No. 2 is developed by the erection of a skeleton steel pipe framework of columns and beams, with the columns set and welded directly into heavy steel sleeves which are embedded in concrete. To this framework is welded a continuous and adjustable steel reinforcing fabric made of channels placed in closely spaced diagonal relation with one another and called Latisteel. The concrete foundations are poured after the steel framing is completed and embeds the lower sections of the Latisteel. The resulting steel frame is in effect a continuous series of tension trusses. This framework is further reinforced, protected and fireproofed by the application of concrete applied pneumatically, by hand, or by casting. When cast concrete is desired, the casting forms of reinforced rib metal lath are suspended from the frame itself by temporary steel whalers, and become an integral structural part of the wall.

Type No. 3 is developed with latticed structural steel columns and girders prefabricated of angles and heavy channels and provides a self-sufficient frame for heavy-duty and multi-story work. Latisteel fabric and plaster are used for filler walls.

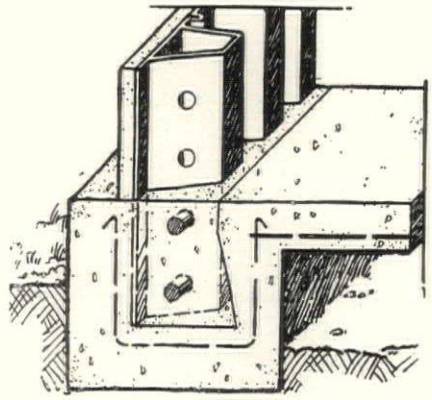
LATISTEEL SYSTEM: Prefabricated panels are bolted together at the job to form structural walls as shown in the sketch. These panels are built up in the factory of steel angles welded together and covered with a latisteel fabric likewise welded to angle frame. Openings are formed integral with panel frames. Holes are punched in angles for fastening sash and door frames.



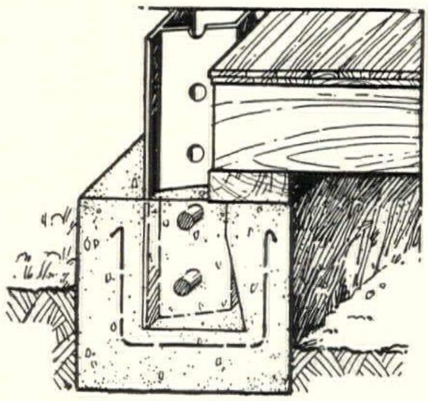
PALMER CELLULAR STEEL WALLS

ROBERTSON KEYSTONE BEAM STEEL UNITS

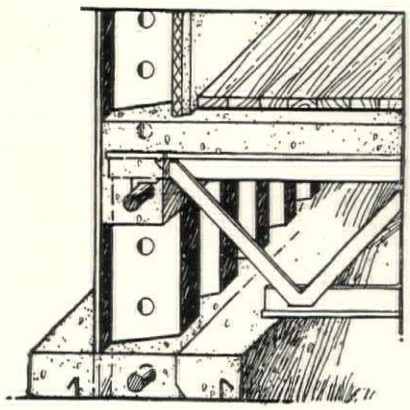
The feature of this construction system is earthquake resistance. Interlocking joints of units are welded every 2 feet and waterproofed with pressure caulking. Walls may be finished with enamel paint, composition board, plywood, stucco or any desired suitable facing.



Steel walls are recessed in footings and act as cantilevers against lateral stress.



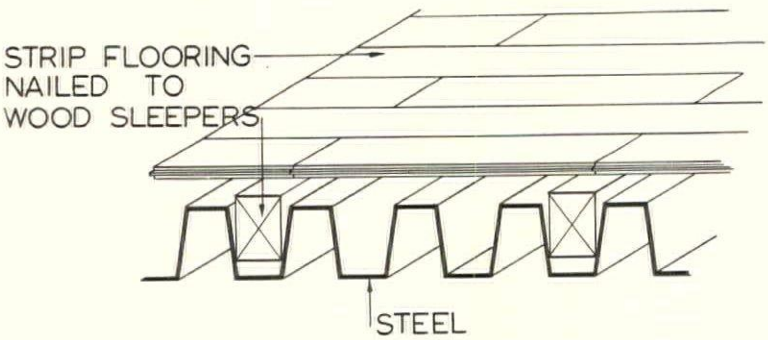
Steel walls and concrete footings are shown here in conjunction with wood floor.

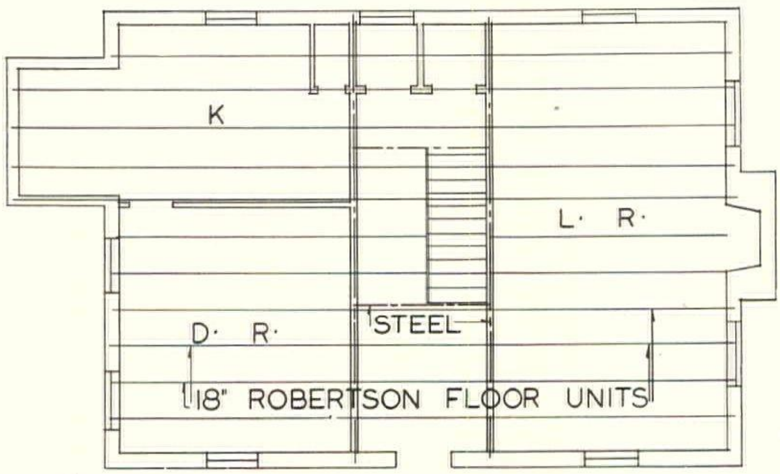


Joists bear on horizontal steel rod which runs through center of wall.

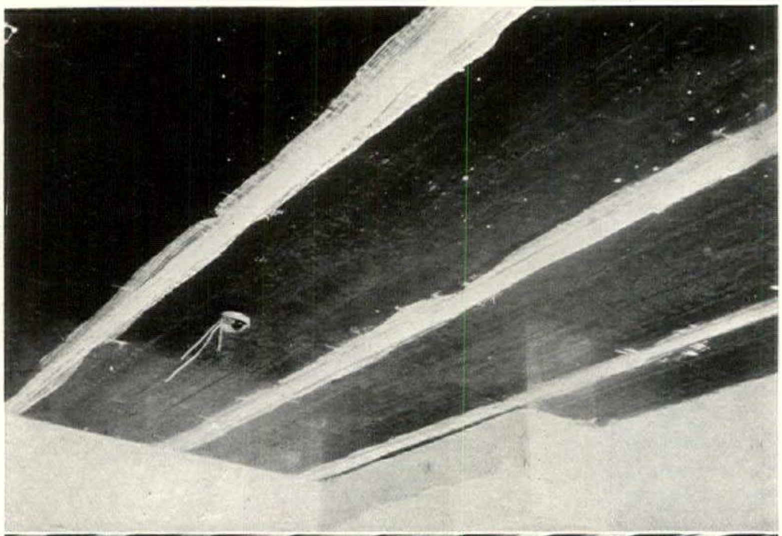
ROBERTSON SYSTEM

KEYSTONE CELLULAR STEEL UNITS

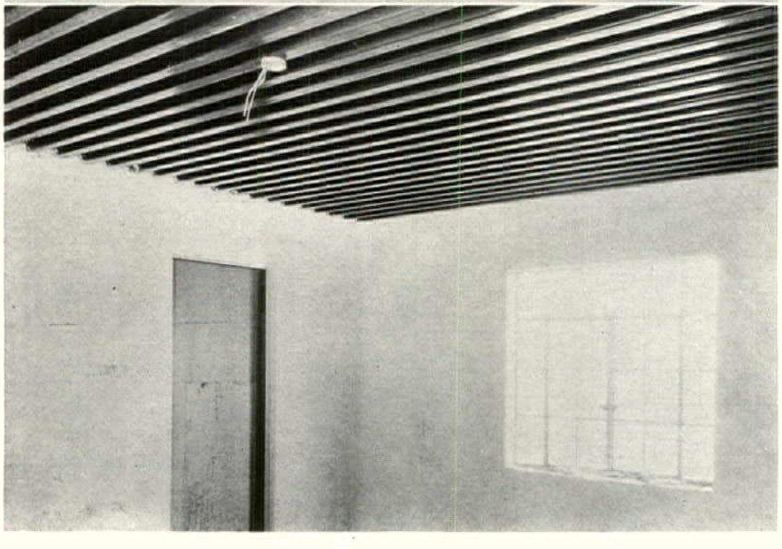




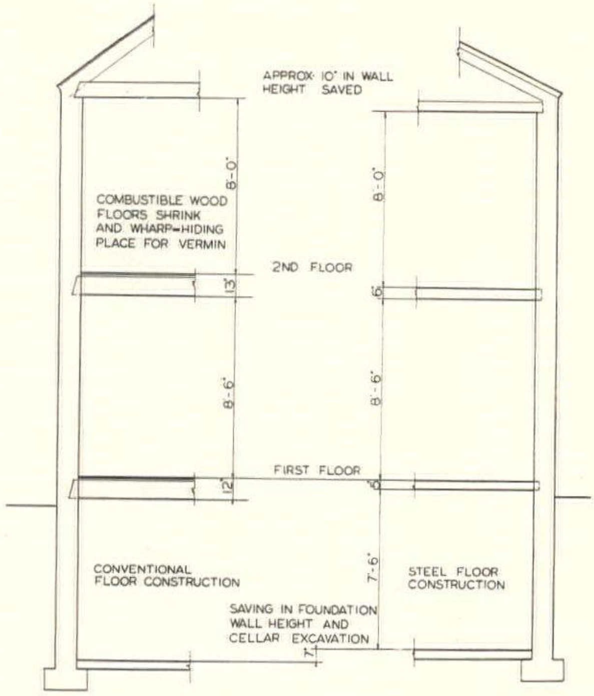
Floor plan of a typical six-room story-and-a-half house, showing the supporting plans required. It will be noted that in the layout the Keystone units are considered as planks 24" wide and 4½" in thickness. The technique in laying out these units is exactly the same as if wood planks of the same dimensions were used, except that bearing surfaces must be free from rivet heads, gusset plates and similar obstructions.



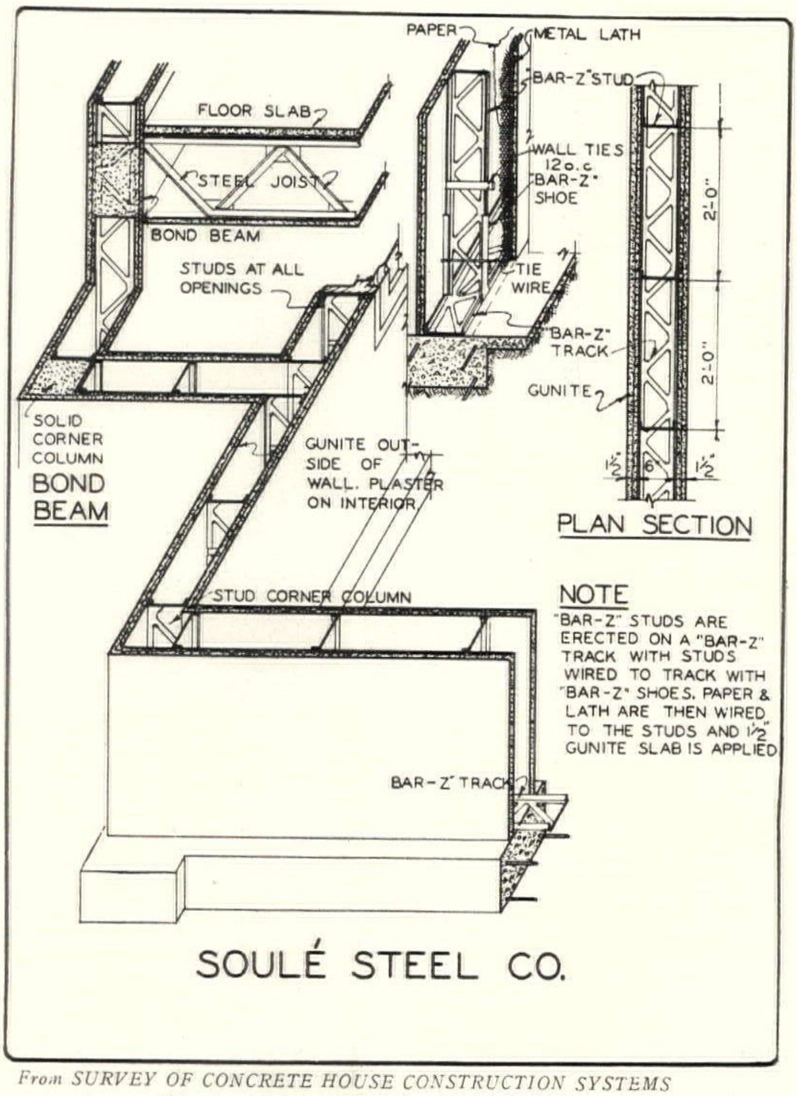
A flat ceiling detail showing the flat plate of the FK type unit turned downward. The joints between units have been filled with plaster of paris. The entire surface will later be painted. The wiring is carried through the cells of the cellular steel units.



Robertson cellular steel units with cells turned down to give a beamed ceiling in the dining room. The space between the cells at the wall bearing is plastered. The cells are to be decorated. The ceiling wiring is carried within the cells of the units.



COMPARISON OF CONVENTIONAL FLOOR AND ROBERTSON KEYSTONE FLOOR CONSTRUCTION

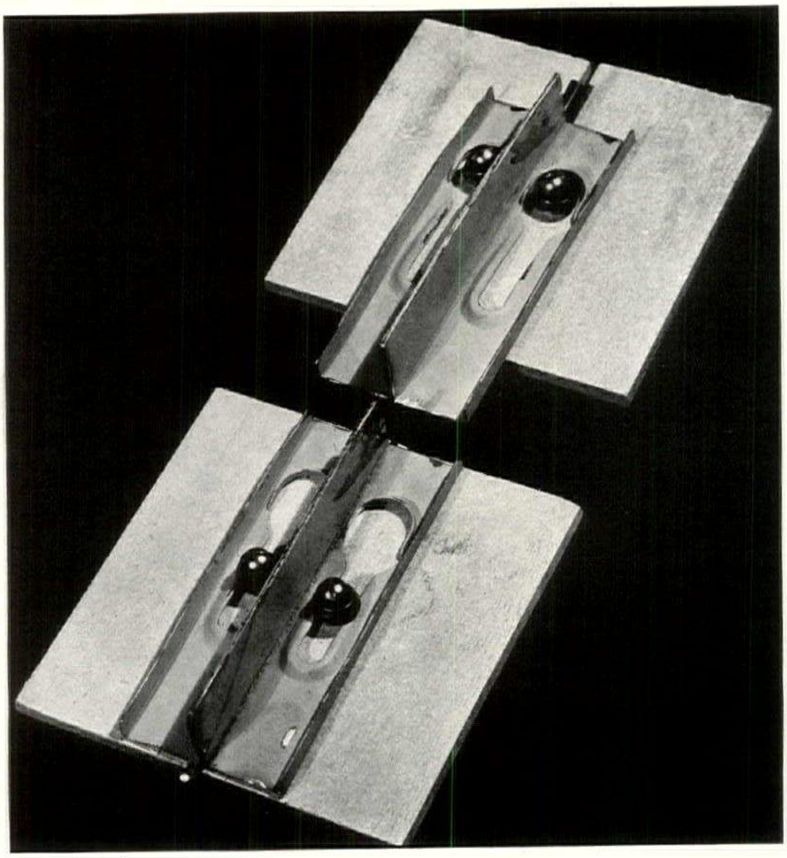


From SURVEY OF CONCRETE HOUSE CONSTRUCTION SYSTEMS

BAR Z GUNITE SYSTEM

DEVELOPED BY SOULÉ STEEL CO. LOS ANGELES

This is a system of building walls having open web steel studs 24" on center and outer and inner wall surfaces of stucco or gunite applied on 3.6 lb. metal lath. The studs are made in 2" to 6" widths and lengths up to 20 feet. Edges are flanged. In construction, lengths of these sections are fastened in a flatwise position to the top of the foundation to serve as a "track" to which the uprights are attached by means of a connecting shoe. Wall ties are shop welded to the studs. Ties have forked ends which are bent around the stucco lath. Structural connections such as stud to "track" are field welded prior to attaching lath. Exterior stucco or gunite generally is 1½" to 2" thick. Reinforced concrete corner columns and belt courses at floor and roof levels are built. Floors are built of open-web steel joists with concrete slab on metal lath.



J-M TRANSITE WALLS

DEVELOPED BY JOHNS-MANVILLE, NEW YORK

Screw heads on the back of the "Transite" sheet in the workman's hands are placed in the top part of the key-holes on the studding. When the sheet is pushed down, a patented spring device holds the sheet snugly against the studding, capable of withstanding a pull of 800 pounds.

HEATING THE SMALL HOUSE

A CHECK LIST COVERING INSULATION, HEATING METHODS, FUELS AND UTILITY ROOM

By THEODORE F. ROCKWELL, Instructor in Heating and Ventilation
Carnegie Institute of Technology

To keep expenditures for heating and ventilating consistent with a total cost of $5,000 or $6,000 for the house means that the initial cost of such equipment shall not exceed $700.[1]

For a 70° F. temperature difference, the heat loss from a house of this size is about 80,000 B.t.u./hr. (330 sq. ft. EDR). Houses of modern design with flat roofs may tend to exceed this amount.

I. INSULATION

A. INTRODUCTION

The outside walls and ceilings of all houses should possess sufficient resistance to the flow of heat so that with an inside air temperature of 70° F. the temperature of the inside surfaces of these walls and ceilings will remain higher than 62° F. during the periods of minimum temperature outside. Such surface temperatures are necessary for adequate human comfort.[2,3]

Unless the outdoor minimum temperature encountered during the heating season is above 30° F., this requirement for inside surface temperature will not be met by the standard wall constructions commonly used for dwellings; and it will be necessary to add sufficient insulation to produce the desired result.

Quite often, complying with this specification also means that the economical thickness of insulation has been installed.[3] The architect or heating engineer should, however, make a thorough investigation of the controlling factors to determine if this statement holds true for the particular locality. The results of this investigation may be applied to future houses so long as there is no great change in any of these conditions.

These controlling factors are:

1. Length and severity of heating season (degree days).
2. Annual cost of fuel.
3. Reduction in initial cost of heating plant resulting from use of insulation.
4. Cost of insulation in place.

The economical thickness increases as the first three increase and decreases as the fourth increases.

B. MATERIALS AVAILABLE

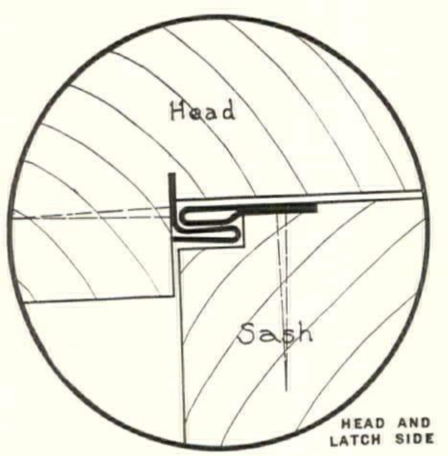
1. *Rigid or board form insulation:*
   a. Vegetable fibers of varied origin processed to form boards of low density (common thicknesses, 7/16″, ¾″, 1″, 1½″ and 2″).
   b. This material may be used in place of sheathing or lath; it is also available for interior finish.
2. *Blanket or flexible insulation:*
   a. Polished metallic foil.
   b. Vegetable or animal fibers quilted between two sheets of heavy kraft paper.
   c. Flexible materials are used solely for insulating purposes and best results are obtained when installed in air space construction so as to create one or more additional air spaces which are completely separated.[4]
3. *Fill insulation:*
   a. Generally a gypsum or limestone product resulting from the natural rock being subjected to some heat treating process to produce a wool-like material of low density.
   b. These materials possess no structural qualities and must generally be applied with considerable thickness, both because of a somewhat higher conductivity and because of the almost standard thickness of air spaces in frame walls.

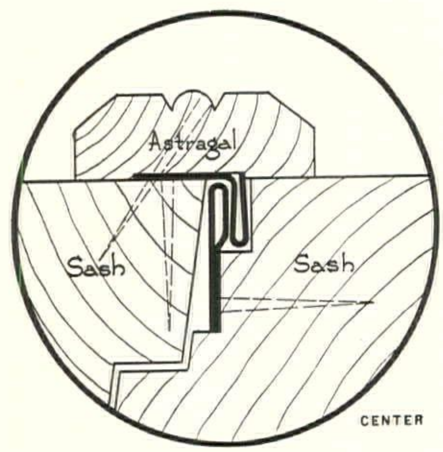
C. COMPARATIVE COST

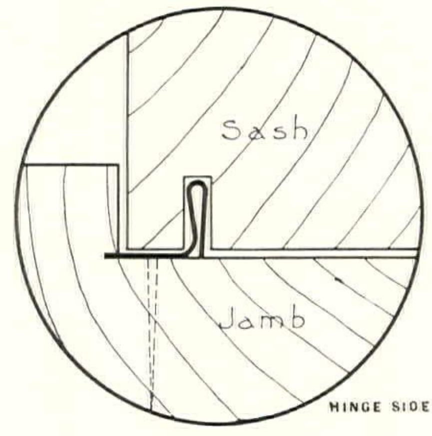
These insulating materials are listed approximately in the order of increasing cost of application and as long as the material meets the following additional requirements:

1. Durability,
2. Vermin proofness,
3. Moisture proofness,
4. Mechanical strength,
5. No increase in fire hazard, and
6. Non-odorous.

[1] Report of President Hoover's Conference on Home Building and Home Ownership—Vol. 5. *House Design, Construction and Equipment.*
[2] *Cold Walls and Their Relation to the Feeling of Warmth.* Houghten & McDermott. Heating, Piping and Air Conditioning, January 1933.
[3] *The Selection of Building Insulation.* Theo. F. Rockwell. The Architectural Record, July and August 1933.
[4] University of Minnesota Engineering Experimental Station Bulletin No. 8. *Heat Transmission Through Building Walls.* *Rowley and Algren.*







The final choice should be dictated by economic considerations.

D. OTHER METHODS OF REDUCING HEAT LOSS

1. *Weather Stripping and calking:*[5]
   a. Seal all cracks back of window and door frames against air leakage. A plastic calking material placed on the outer surface is preferable.

   b. Provide weather stripping for all windows and doors to reduce infiltration.

   c. The use of calking material not only reduces heat loss, but also reduces cleaning expense by preventing the entrance of dirt-laden outdoor air.

2. *Double glazing:*
   a. Two new conditions are arising which will make double glazing more and more desirable as part of the original equipment of this class of house.
      (1) Forced circulation warm-air heating systems equipped with humidifiers are being installed in houses of this size. If the humidifier is to be used at all in cold weather, double windows become mandatory in order to prevent condensation.

      (2) A feature of modern architecture is the use of corner windows. The tendency is towards large areas of glass which, unless double-glazed, will make a considerable portion of the room very uncomfortable whenever the outdoor temperature is below 30° F. (Sunshine is not available during the most important hours of residence occupancy.)

   b. The simplest way to provide for double glazing is to design the window frame so that the storm sash will be readily interchangeable with the screen.

II. HEATING METHODS

A. DEFINITION OF AIR CONDITIONING

1. Air conditioning consists of the production and maintenance of all of the qualities of the air as near to the ideal as practicable for the service performed. These qualities include temperature, relative temperature, relative humidity, air motion, dust content, odor, purity, and noise level.[6]
   a. Both the definition and the term itself imply control. It is possible for such control to be manual, but in practically every case manual control would be neither as effective nor as reliable as the control accomplished by medium-priced automatic equipment now available.

2. The A. S. H. V. E. code for minimum requirements[7] permits systems which provide for the control of temperature, relative humidity, and air motion to be classed as air conditioners.

3. To make the term more flexible, it is commonly divided[8] into:
   a. Winter air conditioning. Minimum equipment provides for (1) heating, (2) humidification, (3) air motion.

   b. Summer air conditioning. Minimum equipment provides for (1) cooling, (2) dehumidification, (3) air motion.

4. All of the ordinary heating and ventilating devices—boilers, radiators, furnaces, heat exchangers, fans, filters, humidifiers, control equipment, ducts, grilles, dampers, and so on—are parts of a potential air conditioning system. But there is no air conditioning system until these parts, carefully selected for the loads they are to carry, have been properly arranged to respond to satisfactory control equipment.

   Generally the purchase of more than extremely simple control systems, and arranging the equipment to respond to control, requires a greater initial expenditure than is warranted for a house of this price class. It is possible, however, to approach satisfactorily the ideal for winter air conditioning[9] and stay within the allowable first cost. (See forced circulation warm-air systems.)

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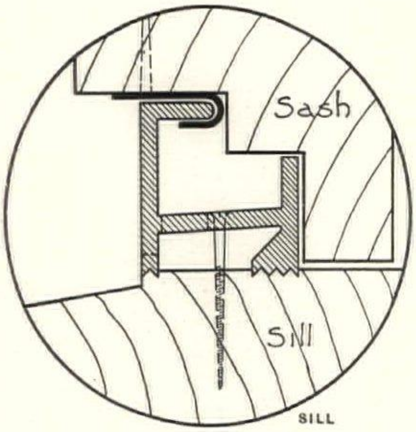
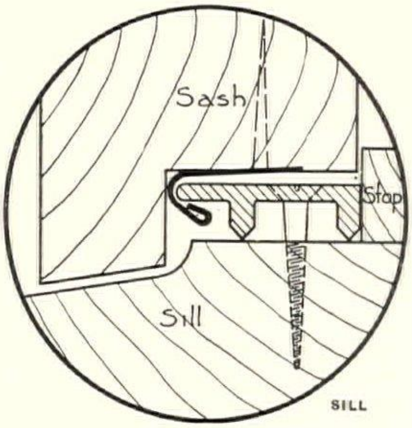
[5] Recommended minimum standard of construction.
[6] R. E. Waterfill. Railway Age. February 1931.
[7] A. S. H. V. E. *Guide* 1935.
[8] Year round industrial air conditioning is not to be included in this discussion.
[9] The heating season is the more important of the two for well over half the people of the United States.



(Left)
WEATHER STRIPPING FOR IN-OPENING CASEMENT WINDOWS: Zinc or cold-rolled bronze.

WEATHER STRIPPING FOR OUT-OPENING CASEMENT WINDOWS: Same types as for in-opening casements except that interior and exterior sides are reversed and sill stripping varies as shown.

Chamberlain Metal Weather Strip Co.



B. RELATION OF AIR CONDITIONING TO VENTILATION

1. Ventilation means the supply or removal of air to or from an inclosed space. The process may be induced by either natural or mechanical means, and the air may or may not be conditioned.[7]
2. Sufficient oxygen for the usual occupancy of this size house (seldom over 6) will be brought in by natural leakage.
3. Reasons for bringing in outdoor air:
   a. To reduce concentration of undesirable odors.
      (1) Kitchens.
      (2) Bathrooms.
   b. To remove excess heat whenever outdoor temperature is lower than the indoor temperature.

C. TYPES OF HEATING PLANTS

(Arrangement approximately in the order of increasing initial cost.)

1. *Warm air—gravity circulation:*
   a. Structural requirements:
      (1) House approximately square in plan; maximum dimension, 45′.
      (2) Basement, 7′ minimum clear height.
      (3) Locate furnace near center of basement.
      (4) Locate furnace chimney near center of house.
      (5) Space in inside walls for ducts.
      (6) Suitable location for return air grille.
   b. Fuels:
      (1) Hand-fired coal or coke.
      (2) Gas.
      (3) Oil.
2. *Hot water—gravity or forced circulation:*
   a. Structural requirements:
      (1) Basement not essential for hot water. Boiler may be located on same level as heated spaces. Use overhead supply. Give careful consideration to fuel storage when there is no basement.
      (2) Boiler does not need to be centrally placed.
      (3) Preferable to locate all risers in inside partitions. Dependent on floor framing.
   b. Fuels:
      (1) Hand-fired or coke. Magazine boilers for coke or anthracite coal.
      (2) Stoker-fired coal.
      (3) Gas.
      (4) Oil.
3. *Vapor systems (two-pipe):*
   a. Structural requirements:
      (1) Water line of boiler must be not less than 20″ below lowest radiator or heating unit. Requires basement or pitting of boiler.
      (2) Avoid placing return lines in spaces where temperature may fall below 35°.
      (3) Boiler need not be centrally located.
   b. Fuels: Same as for hot water.
4. *Forced-circulation warm air:*
   Note: The dividing line between the forced circulation warm-air heating system and the residential winter air conditioning system still remains a controversial subject. The item of equipment mentioned here, if provided with acceptable control devices, would constitute a winter air conditioning system.
   a. Structural requirements.
      (1) Geometry of floor plan is not a controlling factor as for gravity circulation.
      (2) Furnace may be located on same floor as heated space.
      (3) Furnace need not be centrally located.
      (4) Provide space in walls for risers. With forced circulation there is some advantage in placing supply grilles in walls 7 feet above floor. Consider relation of grille location to interior decoration.
      (5) Allow sufficient space around furnace and fan housing so that parts (fan, motor, filter, and the like) may be removed without requiring complete disassembly of the entire unit.
   b. Fuels[10]:
      (1) Hand-fired coal or coke. Magazine feed.
      (2) Gas. (Furnace designed for gas firing.)
      (3) Oil.

[10] Indirect systems using steam or hot-water heat exchanges will generally exceed the upper limit of allowable first cost as set in the introduction.

c. Component parts:
   (1) Furnace.
   (2) Fan. Ample volume and static pressure. Low speed for minimum noise.
   (3) Duct system. Supply: (a) prefabricated square or rectangular individual duct system; (b) made-to-order trunk duct system (higher priced). Return: (a) prefabricated duct parts; (b) made to order.
   (4) Humidifier. Type: (a) evaporating pan—float control; (b) spray nozzle.
   (5) Filter (optional but very desirable). Locate in return air connection. "Throw away" type or type which permits easy cleaning with usual household equipment.
   (6) Control. Room temperature: (a) air quantity (intermittent operation of fan); (b) air delivery temperature (by-passing part of air around heating surfaces). Combustion control: (a) reduce consumption of fuel; (b) improve temperature control. Humidity control.
   (7) Outside air intake (optional but desirable). To provide for some summer cooling by forcing cool night air through the house; manual control is sufficient. Requires variable control of fan speed: (a) adjustable speed motor; (b) change size of driving pulley.

D. NOTES ON RESIDENTIAL COOLING

1. Cooling by mechanical means is too expensive both in initial and operating costs for the class of house to which this check list refers. Additional first costs for cooling range from $300 upward[11] and operating costs start at $50 per season.[12]
2. Admitting the desirability of cooling residences in summer, the necessity of so doing remains a matter of opinion. This need is influenced by the severity of weather conditions (simultaneous conditions of dry and wet bulb air temperatures, wind velocity and sunshine) and length of cooling season. For most parts of the United States the "necessary" operation of mechanical cooling systems seldom exceeds 300 hours, whereas the heating season generally exceeds 4,000 hours and in a large number of places it is greater than 5,000 hours.[13]
3. The actual need for mechanical cooling in residences can be almost obviated by
   a. Judicious use of insulation in structure.
   b. Shading of windows on sunny side by awnings or venetian blinds.[14]
   c. Keeping doors and windows closed from 6:00 A.M. to 6:00 P.M. (sun time) on hot sunny days.[15]

To make these methods more completely effective, it is important that the house be well ventilated during the night. In practically all cases the daily minimum outdoor dry bulb temperature will be 10 degrees or more below the maximum inside temperature. Moving sufficient quantities of this outdoor air through the house will remove the heat stored up in the structure during the previous day.

This ventilation may be accomplished by gravity (two-story houses with large openings in attic space) or by mechanical ventilation. The forced circulation warm-air heating system previously mentioned can be used for this work and in the radiator-heated home a propeller-type exhaust fan may be installed in the attic. These exhaust fans will not add much to the first cost, and the original plan of the house should consider the installation of such a fan even though the actual installation may be deferred for several years.

III. FUELS

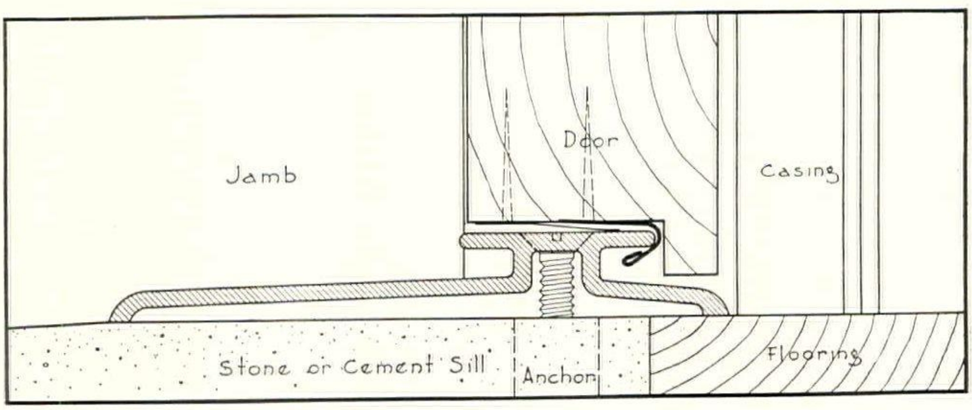
A. INTRODUCTION

1. In nearly every case in a house of this size the final choice of fuel will be governed by the annual cash expenditure for fuel. And in determining this amount it is very questionable to price the householder's labor in an effort to make one of the "automatic" fuels appear more favorable.
2. Because of the great variation in the cost of fuel in different localities it is difficult to say what a reasonable annual expenditure for fuel should be; but if the estimated annual cost exceeds $100[15], additional insulation is easily justified.

[11] Ice tank and circulating pump.
[12] Helmrich and Tuttle. Heating, Piping and Air Conditioning. February 1933.
[13] Kratz and Konzo. Heating, Piping and Air Conditioning. February and December 1933.
[14] Houghten, Gutberlet and Blackshaw. Heating, Piping and Air Conditioning. February 1934.
[15] The method for estimating annual fuel cost is found in Chapter 29. A. S. H. V. E. *Guide* 1935.

WEATHER STRIPPING FOR EXTERIOR DOORS: Brass or aluminum. Illustration shows section for door sill; jamb and head sections similar to types for in-opening casements.

Chamberlain Metal Weather Strip Co.



B. FUELS AVAILABLE

1. Wood.
2. Coal. Coke.
3. Oil.
4. Gas.

Note: No attempt is made here to list fuels in any order with respect to their price, because the same order will not hold for all parts of the country. Coal will, however, be the lowest in price in many communities; and the difference will be enough so that, regardless of other disadvantages, it should not be eliminated from consideration for houses of this size.

C. CHARACTERISTICS OF DIFFERENT FUELS

1. *Coal:*
   a. Requires storage space (50 to 60. lb./cu. ft.).
      (1) Locate space so that coal may be transferred from truck to bin with minimum labor.
      (2) Location must also be properly related to arrangement of heating system. Minimum of 5 feet clear space in front of fire door. Door to coal bin near to fire door.
      (3) Make space large enough to hold season's supply if possible, because desirable savings may be effected by purchasing the season's supply during the summer.
   b. Burning:
      (1) *Anthracite.* Anthracite coal can be burned successfully without smoke in plants increasing in size from the kitchen range to large power boilers. It also has the property of burning for long periods of time without attention. This property makes it well suited for use in magazine-fed furnaces or boilers, which in anthracite districts will give a satisfactory approach to automatic combustion at a cost within reach of home owners of this class.
      (2) *Bituminous.* The present designs of furnaces for the smokeless combustion of bituminous coal generally result in combustion charges larger than are required by the houses under consideration. Many bituminous coals also tend to cake and shut off the air supply which means that the fire requires more frequent attention. Because of these properties, the firing of bituminous coal is somewhat dirty and the furnace is preferably located in a separate room which is not used for other living purposes.
   c. Stacks:
      (1) Furnace and heating boiler manufacturers hesitate to recommend their products if they are connected to stacks less than 30 feet high (vertical distance from grate bars to top of chimney). This requirement may preclude the use of house plans without basements unless the stack is carried to a considerable height above the roof line.

2. *Coke:*
   a. Storage:
      Requires somewhat larger volume because of lower density (28-30 lb./cu. ft.), otherwise problem is same as for coal.
   b. Burning:
      Coke burns in about same manner as anthracite coal and is also adapted to magazine feed.
   c. Stacks:
      Because of its porous structure, coke does not require as strong a draft as coal and may possibly be burned with lower stacks provided surrounding buildings are not higher than top of stack.

3. *Oil.*
   a. Storage:
      (1) Requires tank preferably buried in ground outside of house to reduce fire hazard. Filler pipe must be easily accessible to tank truck. Location of burner is not dictated by location of tank because oil can be easily piped to burner.
      (2) Volume of tank should exceed 400 gal. because oil companies offer a lower price (about ½ cent per gallon less) if quantity purchased at one delivery exceeds 400 gal. Storage should be sufficient to last through long periods of bad weather when delivery may be interrupted by icy roads or the like.
   b. Burning:
      (1) To burn oil efficiently, it must first be broken down to very small particles and thoroughly mixed with the right amount of air to produce complete combustion. At present this is best done by mechanical devices on which a lower limit of size is placed by practical considerations of construction and operation. This limit occurs in the neighborhood of 65,000 to 75,000 B.t.u./hr. of useful heat production.
      (2) Good engineering calls for the selection of a boiler or furnace designed especially for the burning of oil.
      (3) The noise caused by the burner should be given consideration in the final choice of burners.
      (4) The electrical energy required averages about 70 watt hours per gallon of oil. The cost of this energy must be considered when the annual cash expenditures for fuel are being estimated.
      (5) Both safety and economy make it mandatory that full automatic control of combustion be supplied with oil-fired heating plants.
   c. Stacks:
      (1) Lower stacks are permissible with oil because the induced draft required from the stack is less. Motor-driven fan supplies air for combustion. There is no fuel bed to offer draft resistance.

4. *Gas:*
   a. Storage:
      (1) None required.
      (2) Furnace or boiler location may be controlled by other features of floor plan rather than by fuel storage location.

   b. Burning:
      (1) Requires careful mixture of air and gas to prevent (a) waste of gas, (b) smoky combustion, (c) unsafe conditions.
      (2) Proper combustion conditions are brought about by (a) use of proper sized gas orifice, determined by manufacturer in cooperation with local gas company; (b) maintenance of proper supply pressure by a pressure governor; (c) proper adjustment of air shutter (inspection service offered by gas companies); (d) use of furnaces or boilers designed for utilization of gas fuels.

   c. Stack:
      (1) With modern gas appliances, the stack serves only to carry off the products of combustion, and the stack height may therefore be controlled by the architecture of building.

IV. UTILITY ROOM

A. PURPOSES

1. Provide a utility room in which all mechanical and electrical equipment may be located.
   a. Heating equipment.
   b. Cooling equipment, if any.
   c. Domestic hot-water heater.
   d. Fuel storage if solid fuel is used.
   e. Pipe shaft for
      (1) Water supply.
      (2) Drainage lines.
   f. Switchboard and fuse block.

2. Locate kitchen, bathroom and laundry as near utility room as possible.
   a. Plan kitchen and bathroom with common wall to carry water and waste lines.
   b. If either oil or gas is used for heating, the utility room may be enlarged to include laundry.

B. SIZE

1. Room must be large enough to contain all equipment without crowding to allow for
   a. Cleaning, servicing, oiling, and so on.
   b. Changing of filters.
   c. Adjustment of burners, dampers, control devices, and the like.
   d. Replacement of damaged or worn parts without complete dismantling of plant.
      (1) Clear space on one side equal to width of equipment measured in the same direction plus 1 foot.
   e. Firing of solid fuels and removal of ashes.
      (1) See "Fuels."
2. Space required in utility room by heating plants in order of increasing volume.
   a. Classified by *types*:
      (1) Steam and hot water.
      (2) Gravity circulation warm air.
      (3) Forced circulation warm air (winter air conditioning).
   b. Classified by *fuels*:
      (1) Coal—hand- or stoker-fired.
      (2) Oil.
      (3) Gas.
3. Door large enough to pass largest piece of equipment which is shipped as a unit.

C. AIR SUPPLY; ASH REMOVAL; LIGHTS

1. In small houses using utility rooms the air for combustion may be easily supplied by louvers in the door or by cutting off the bottom of the door (1″ to 2″ above floor).
   a. This air can be made up by leakage and will also help produce the necessary ventilation for a small house.
2. *Ash removal—solid fuels:*
   a. Provide covered storage cans for ashes.
   b. If possible bury can in floor just in front of ash pit door. Make top of can flush with fire room floor. Provide foot-operated cover.
   c. Make all other openings (for pipe, ducts and conduit), except air supply, dust-tight. Special attention must be given to those openings at the top of the room. Air motion will tend to be inward in lower portion of room.
3. Have room well-lighted. Paint walls and ceiling a medium light color.

D. DOMESTIC HOT-WATER HEATING

1. *Methods:*
   a. Coil placed in furnace or boiler connected to insulated storage tank.
      (1) In case of oil or gas, the combustion control may be so arranged that the heating plant may be operated the year round to supply hot water. Additional control and valves increase initial cost.
      (2) Separate gas-fired coil heater for summer use.
   b. Coil heater and insulated storage tank for year round use.
      (1) Fuels: (a) gas with automatic control, without automatic control; (b) anthracite coal or coke; (c) kerosene.
   c. Instantaneous gas-fired coil heater.
   d. Electrically heated insulated storage tank.
      (1) Equipped with time switch, thermostat, and separate meter, for use of "off-peak" energy.
2. *Selection:*
   a. Governed by fuels available in each locality, and by their relative costs.

ELECTRICITY FOR THE HOUSE

A CHECK LIST OF OPTIMUM ELECTRICAL FACILITIES FOR A SIX-ROOM DWELLING

By HENRY L. LOGAN, Engineering Consultant

A sensible (optimum) degree of electrification of the home in any given case will be dependent principally on:

(1) local power rates;
(2) the degree to which the electrical facilities will be used, *i.e.,* family habits.

As local power rates steadily decrease the amount of electricity the user can afford to consume increases. This process can be anticipated to some extent in planning home electrification.

High power rates not only discourage consumption but also restrict the installation of electrical facilities owing to the assumption that expanded facilities mean proportionately increased consumption. This is not necessarily so, depending on family habits and the physical characteristics of the home.

To illustrate this point two cases are cited:

Case A

Six-room house on plot, frontage 130 feet, depth 80 feet. Family of three. Both parents away most of each day; child at school or out with parents. Thirty-two windows. Total connected load, 9 kilowatts. Average monthly consumption, 150 kilowatts.

Case B

Six-room house on plot, frontage 50 feet, depth 100 feet. Family of five. Mother home most of the time. Entire family home a fair percentage of the time. Twenty windows. Nearby buildings shadow home. Total connected load, 6.3 kilowatts. Average monthly consumption, 420 kilowatts.

These cases show that the amount of daylight admitted into the home, the size of the family, and the extent to which the family uses the home, are the principal factors in the size of the electric bill. There is only an indirect relationship between the total connected load and the amount of electricity used, but a very direct tie-up between the total connected load and the work-saving conveniences of electricity. The latter are low-powered and intermittent or momentary in their operation, adding little to the monthly bill but a great deal to the comfort and the convenience of the occupants of the house.

Stating it differently, the average home has a connected load of 3 kilowatts and a total of 65 electric outlets of all kinds. An "adequately electrified" home,* with a connected load eight times greater (24 kilowatts), and four times as many electric outlets (260), would not consume from four to eight times as much current, but only from two to three times as much.

OPTIMUM CIRCUITS:

Six *main circuits,* plus one additional when electric range is used, and two additional (total of 8) if oil burner or air conditioning equipment is installed. Usual distribution:

- 2 circuits from service equipment control panel to circuit breakers in cellars
- 2 to circuit breakers on first floor and
- 2 to circuit breakers on second floor; plus
- 1 additional in cellar from service panel to air conditioning panel (when used), and
- 1 from service panel to electric range on first floor (when used).

Fourteen *sub-circuits* if no air conditioning equipment, otherwise 8 additional. Usual distribution:

- 4 from cellar circuit breakers
- 6 from first-floor circuit breakers, and
- 4 from second-floor circuit breakers.

Main circuits should be No. 10 A.W.G. conductors, except those to electric range and air conditioning panel which should be 3 No. 8 A.W.G. Sub-circuits should be No. 12 A.W.G.

For available types of standard conductors and conduits, refer to pages 454 and 455 of THE ARCHITECTURAL RECORD for May 1934.

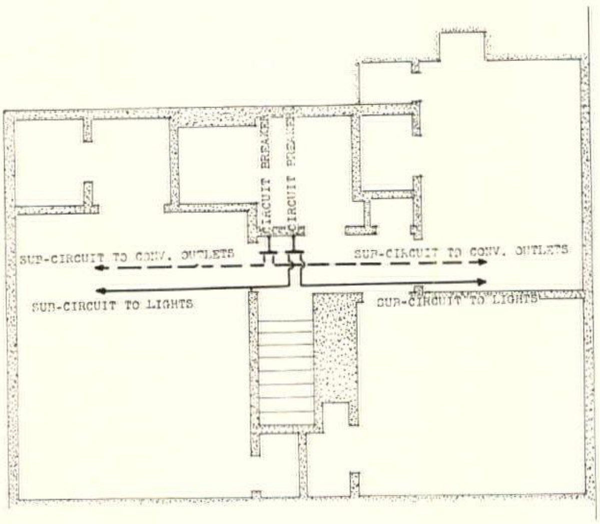
CIRCUIT BREAKERS:

Two in cellar, plus 1 if electric range is used, and another if air conditioning equipment is installed: 4 in all. Two on the first floor. Two on second floor: located 5 feet from floor and not more than 25 running feet from service panel.

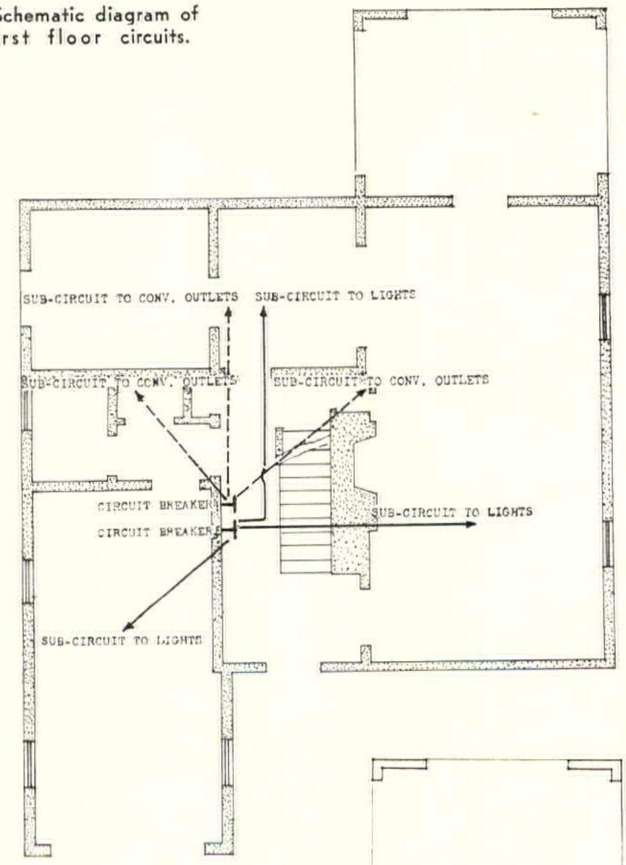
*See pages 449 and 450 of THE ARCHITECTURAL RECORD for May 1934.

ELECTRICAL LAYOUT FOR GENERAL ELECTRIC "NEW AMERICAN HOME"

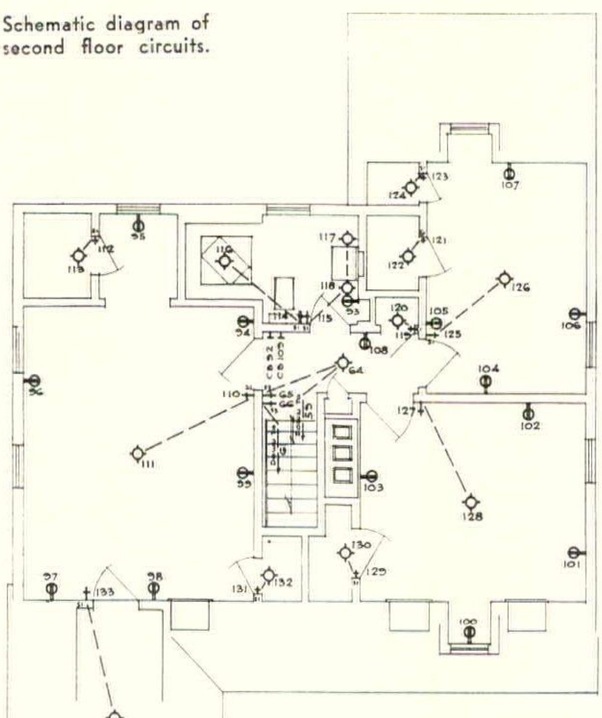
ROYAL BARRY WILLS, Architect



Schematic diagram of first floor circuits.

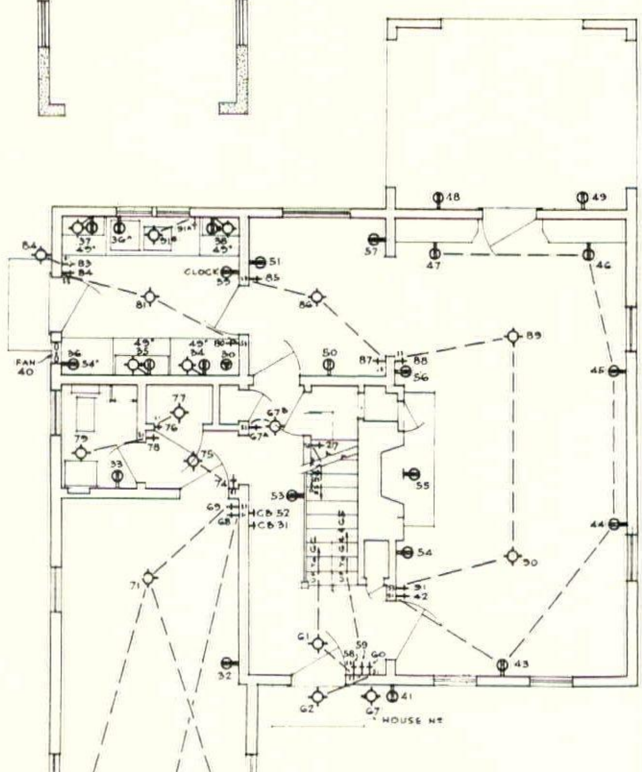


Schematic diagram of second floor circuits.



92, 20-amp. single pole circuit breaker; 93-109, convenience outlets; 110, 125, 127, 133, single pole switches; 111, 116-118, 126, 128, 134, ceiling lights; 112, 119, 121, 123, 129, 131, door switches; 113, 120, 122, 124, 130, 132, closet lights; 114, 115, combination (2) single pole switches.

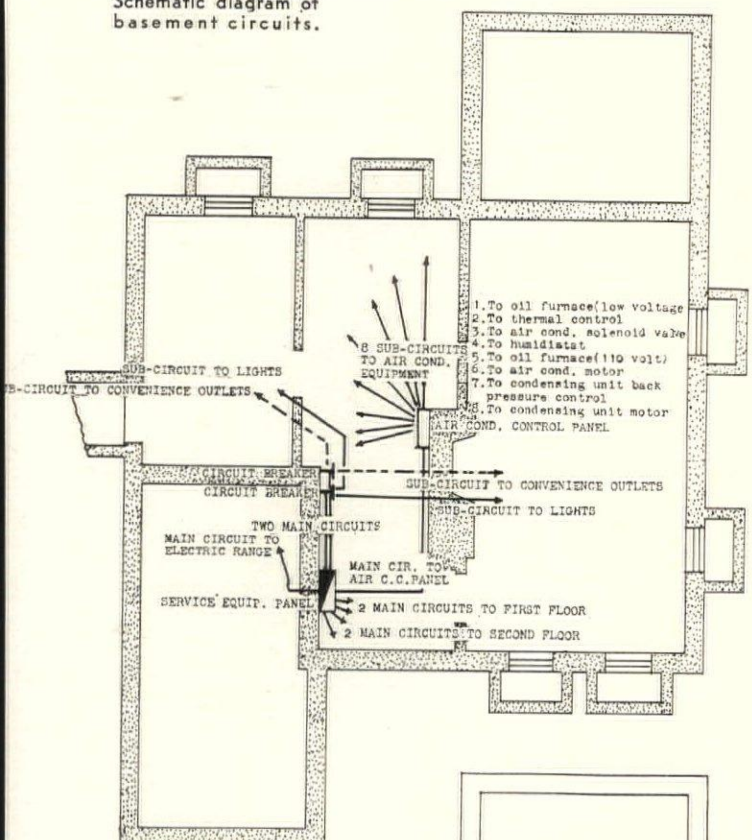
SECOND FLOOR

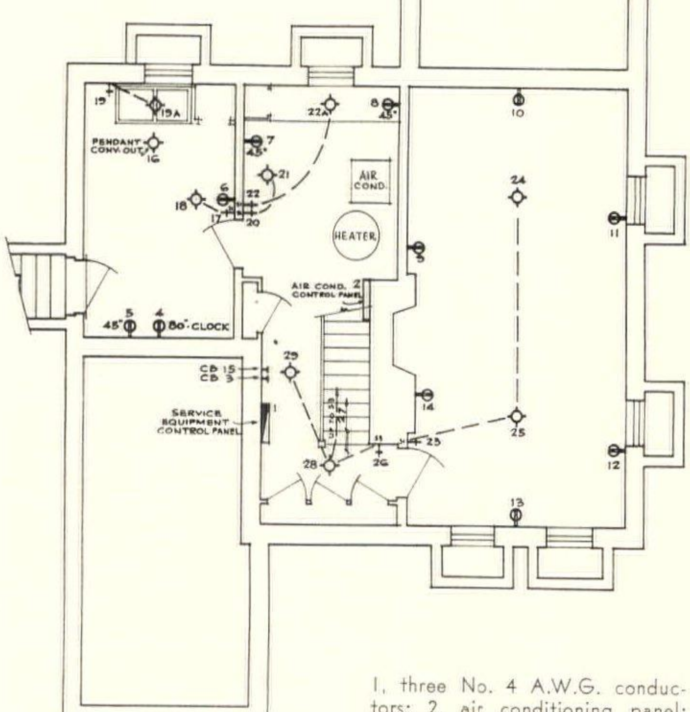


30, electric range; 31, 20-amp. circuit breaker; 32, 33, 36, 36A, 43-47, 50, 51, 53-57, convenience outlets; 34, 35, 37, 38, combination twin convenience outlet and wall fixture; 39, clock outlet; 40, fan; 41, 48, 49, weatherproof outlet; 42, 20-amp. switch; 52, 15-amp. single pole circuit breaker; 58-60, (2) 3-way and (1) single pole switch; 61, 62, 64, 67B, 70, 71, 73, 73A, 75, 79, 81, 84, 86, 89, 90, 91B, ceiling lights; 65, 66, combination (2) 3-way switches; 67, wall light for house number; 67A, 74, 78, 91A, single pole switches; 68, 69, 82, 83, (1) 3-way and (1) single pole combination switches; 72, 80, 85, 87, 88, 3-way switches; 76, door switch; 77, closet light.

FIRST FLOOR

Schematic diagram of basement circuits.





1, three No. 4 A.W.G. conductors; 2, air conditioning panel; 3, 20-amp. single pole circuit breaker; 4-14, twin convenience outlets; 15, 15-amp. single pole circuit breaker; 16, pendant convenience outlet; 17, 19, 23, single pole switches; 18, 19A, 21, 22A, 24, 25, 28, 29, ceiling lights; 20, 22, combination (2) single pole switches; 26, 27, 3-way switches.

BASEMENT

OUTLET BOXES:

Optimum number, 48, usually distributed:
Cellar, 8.
First floor, 27.
Second floor, 13.

Waterproof, adjustable floor boxes in masonry floors; utility floor boxes in wood joist floors. Side wall and ceiling boxes should be provided with fixture studs and covers. Outside boxes should be weatherproof.

SWITCHES

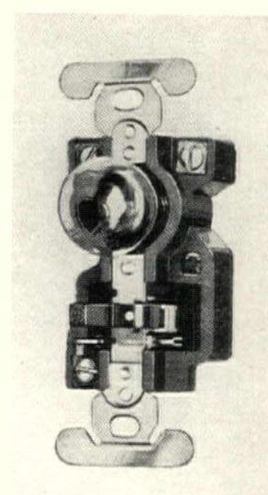
Optimum number, 39, distributed as follows:

PLACE	SINGLE POLE	STEP-SAVER	MER-CURY	DOOR
Cellar	6	2	—	—
First Floor	8	6	—	1
Second Floor	5	2	3	6

Four types: (1) single pole, flush tumbler; (2) "stepsaver" (three-way and four-way); (3) silent action mercury; (4) "door" switches.

"Telltale" lights should be provided on switch plates and convenience outlets, controlling or serving silent equipment, or controlling or serving lights that cannot be seen from the switch or outlet location.

Mercury switches should control the nursery and night lights.



Combination single pole flush tumbler switch with "telltale" or pilot light.

CONVENIENCE OUTLETS

Twin (duplex) outlets.

Optimum number, 44: 11 in cellar, 15 on first floor (plus 2 weatherproof outlets), 16 on second floor.

Fan hanger outlets: 4 (for living room and each bedroom).

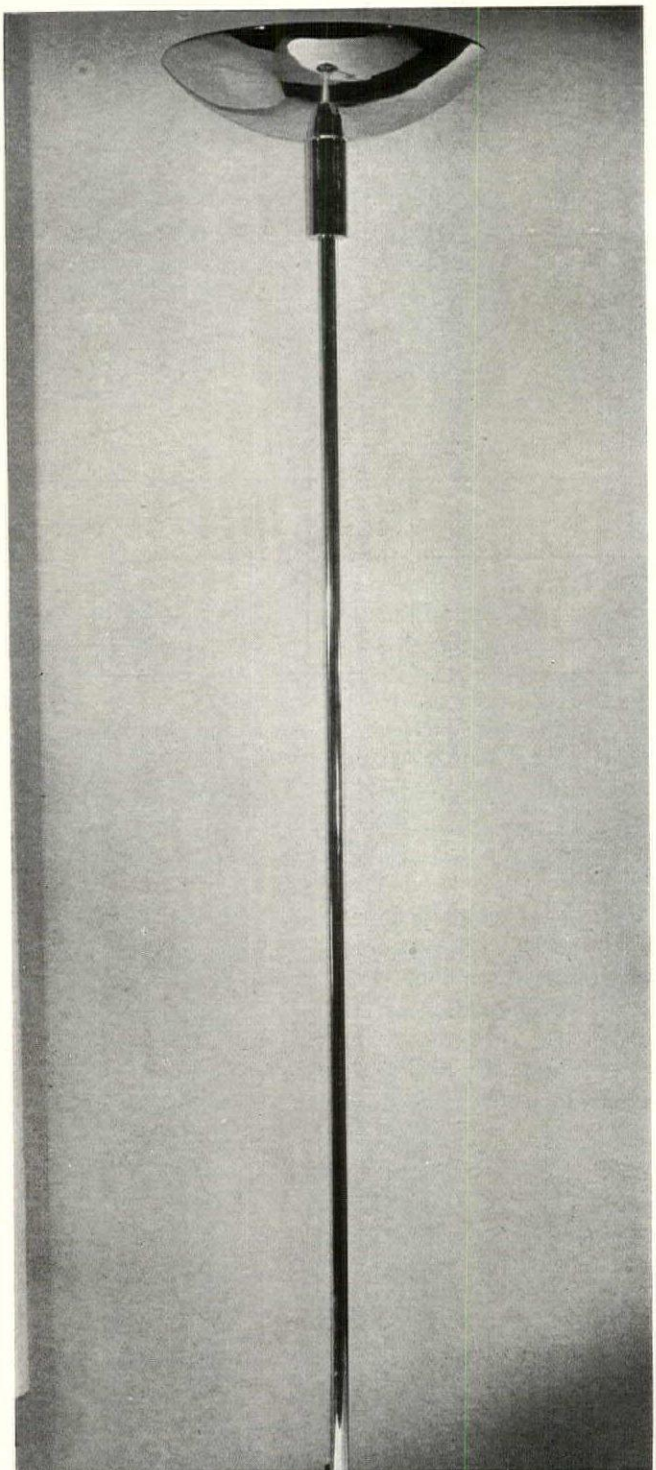
Electric wall clock hanger outlets: 4 (laundry, kitchen, living room and master bedroom).

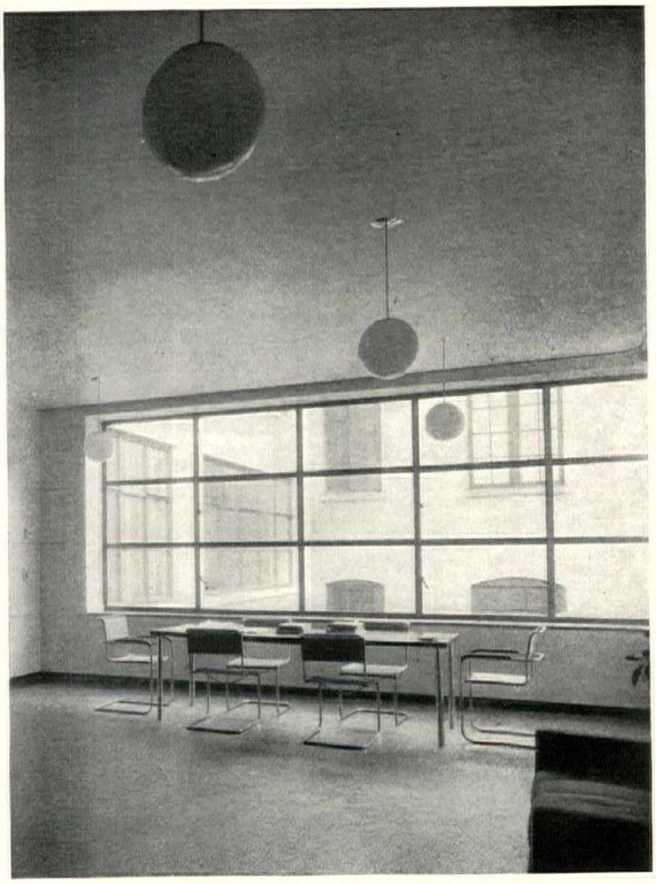
SPECIAL CIRCUITS

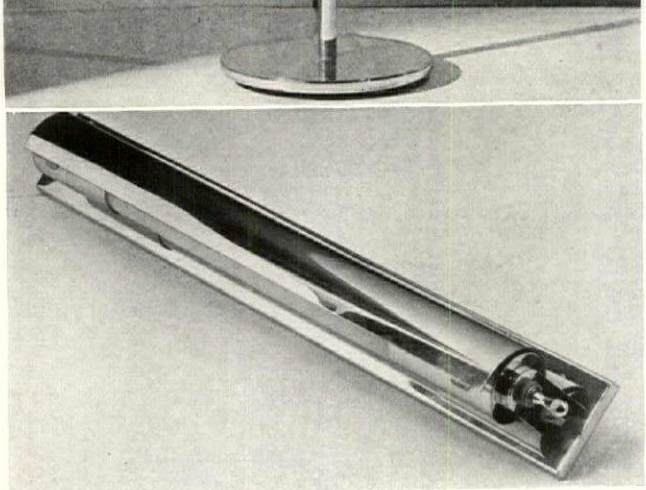
Rubber-covered fixture wire for low-voltage circuits: bells, annunciators, thermostats, and the like.

Electrical metallic tubing for public telephone extensions and radio circuits.

Rigid conduit for protective, signaling and voltage control device circuits, where tampering would endanger operation.







Lighting fixtures designed by Kurt Versen: (above) pendant lights; (upper left) floor lamp for indirect lighting; (lower left) wall and over-bed light.

FIXED ELECTRICAL EQUIPMENT

All year round *air conditioning equipment* consists of a furnace (usually an oil or gas burner), and "air conditioner," evaporators, filters, ducts, condenser and controls. The space requirements of such equipment for a six-room insulated house in the latitude of lower New York State are given in Diagram 1. A schematic elevation is shown in Diagram 2.

Winter air conditioning consists of means for heating, humidifying, cleaning and circulating the air. Summer air conditioning adds cooling and dehumidifying to these processes. Therefore, if winter air conditioning only is required, the evaporators, condenser and allied ducts and controls can be omitted.

The lack of summer air conditioning in houses with attics can be partially met by installing an air circulator in the attic. It operates by inducing a forced circulation of air through the attic during the day, substantially eliminating the heat leakage effect into the living quarters due to the hot sun on the roof; as the sun declines and the outside air temperature decreases, the cooling effect is increased, as it draws the cooler outside air through the living quarters, reducing the heat stored in the house. The apparatus is approximately 25″ square and 15″ deep. It is supported on legs at the proper height suitable to the conditions, never more than 48″ to top of equipment.

ELECTRICAL KITCHEN

Refrigerator: Electrical refrigerators suitable for use in a six-room house vary in over-all dimensions:

CUBIC CAPACITY	TYPE	HEIGHT	FLOOR SPACE WIDTH	FLOOR SPACE DEPTH
5.0	monitor	64¼″	24″	21½″
5.3	flat top	52¾″	26¾″	23″
7.0	monitor	65¾″	29″	22¾″
7.2	flat top	56¾″	29½″	25¼″
9.0	monitor	68¼″	34¼″	26¼″
10.7	monitor	65¼″	44¾″	25¾″

Electric ranges: The floor space required by suitable electric ranges varies from 42″ to 45¾″ in length, and from 26″ to 27½″ in depth. The height varies from 41¼″ to 55½″.

Electric dishwashers: Combination dishwasher and sink cabinets take up the following floor space: from 44½″ to 79½″ in length, and 25″ in depth. They vary from 35″ to 36″ to the counter level.

ELECTRICAL LAUNDRY

Washers: Floor space required is given in the following table:

TYPE	WIDTH	DEPTH
6 pound	26½″	26¼″
7 pound	26¼″	26¼″
	26¼″	26¼″
8 pound	34½″	21½″
	35½″	24″
9 pound	24¾″	24¾″
	25¾″	25¾″

Flatplate ironers require 56″ x 20″ floor space, when not in use. In use they require about 80″ x 32″.

Electric driers are 60″ wide, 24¾″ deep, 72″ high and increase in width, when open, to 108″. For convenient operation a floor space of 10′0″ x 2′ ¾″ should be provided.

Diagram No. 3 illustrates a minimum space layout for an electrical kitchen and laundry.

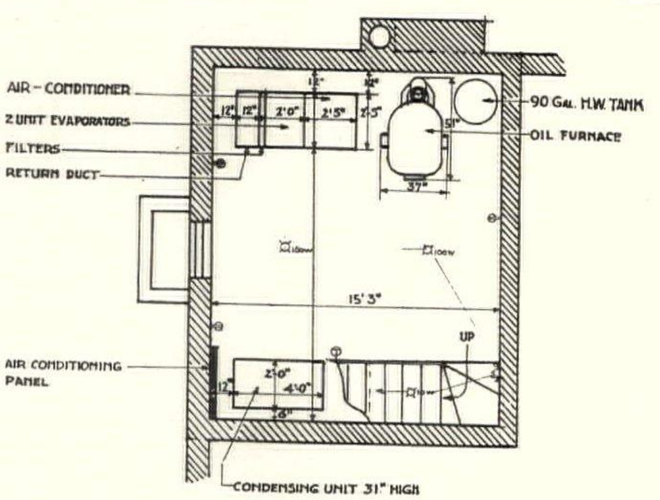


Diagram 1—
AIR CONDITIONING LAYOUT

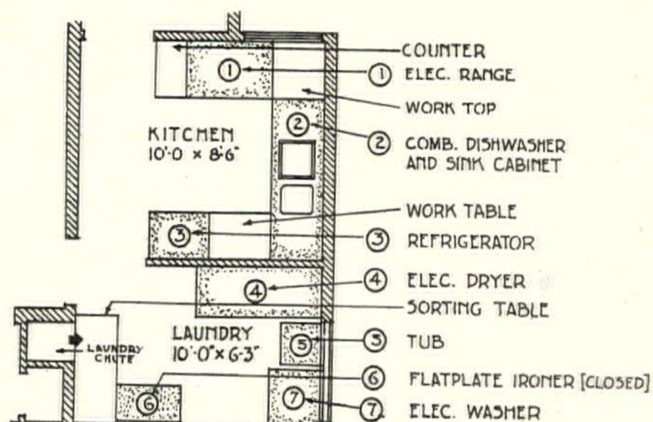


Diagram 3—ELECTRICAL KITCHEN AND LAUNDRY

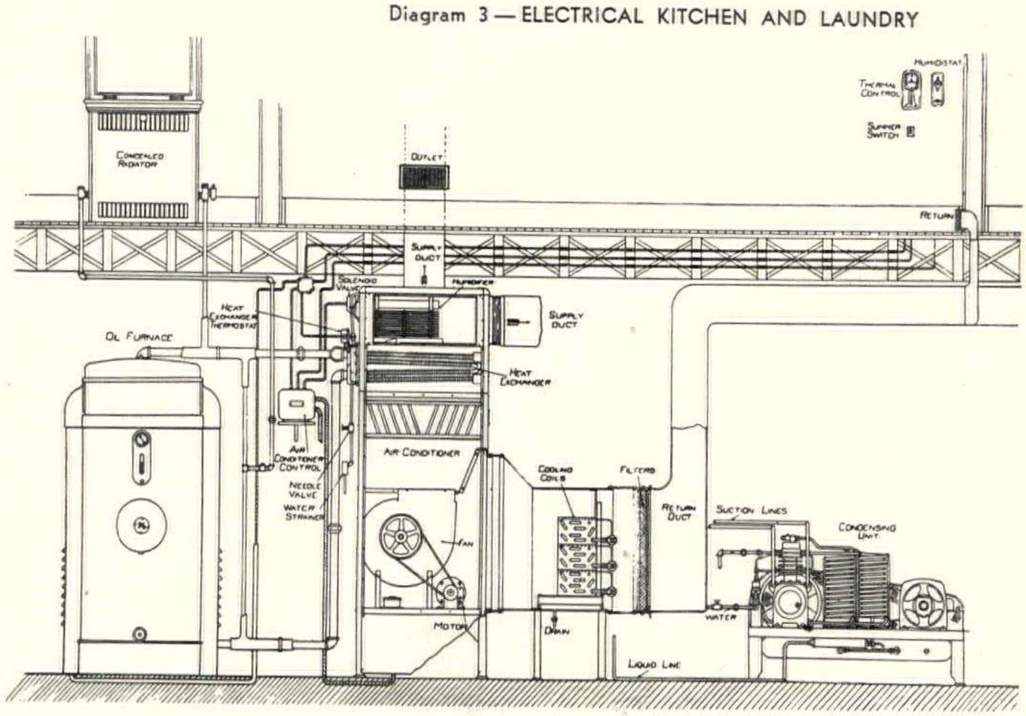
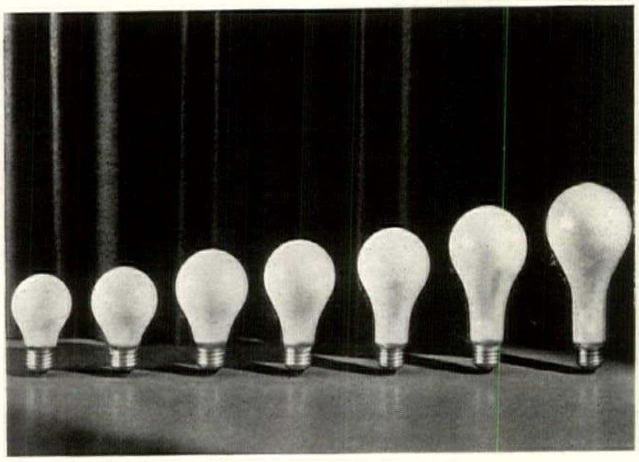


Diagram 2—
Schematic elevation of air conditioning equipment.
Courtesy of General Electric Co.



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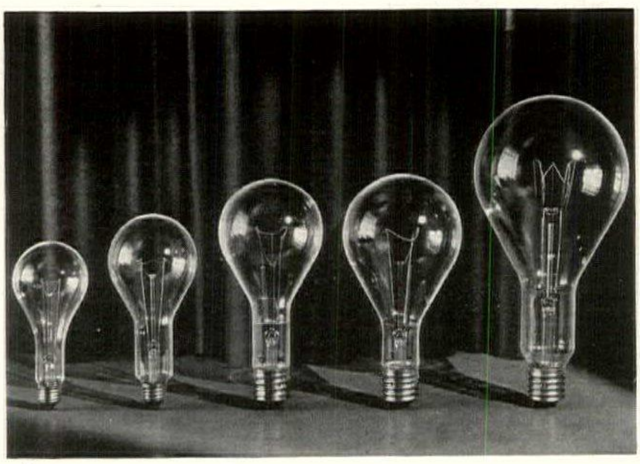

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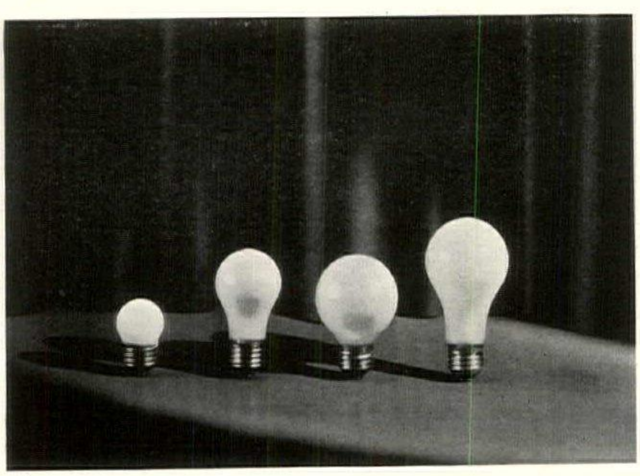

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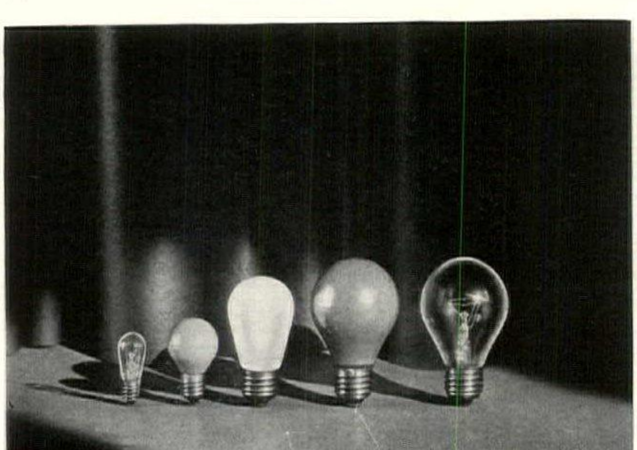

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SUGGESTED LIST OF PORTABLE APPLIANCES

APPLIANCE	CONSUMPTION	APPROX. COST PER HOUR
4 Clocks	2 watts each	$0.0001
1 Cooker	475 watts	.025
1 Curling Iron	20 watts	.001
1 Coffee Maker	550 watts	.025
2 Flat Irons	660 watts each	.033
1 Flat Iron	1000 watts each	.05
1 16" Fan	60 watts	.003
3 8" Fans	25 watts each	.001
2 Heating Pads	60 watts each	.003
1 Mixer	70 watts each	.0035
1 Infra-red Lamp	250 watts	.0125
1 Radio, 8-tube	100 watts	.005
1 Radio, 5-tube	100 watts	.005
1 Sewing Machine	65 watts	.003
1 Sun Lamp	400 watts	.02
1 Toaster	500 watts	.025
2 Floor Cleaners	50 watts each	.003
1 Waffle Iron	700 watts	.035

Additional Appliances that may be desirable in individual cases:

2 Fan Heaters (or other portable electric heaters).
1 Razor Blade Sharpener.
1 Soldering Iron Kit.
1 "Electric Workshop."

GENERAL ELECTRIC LAMPS

(1) General house lighting service. Lamps illustrated are 15, 25, 40, 60, 75, 100, 150 watts, inside frosted.

(2) Clear bulb lamps—150, 200, 300, 500, 750-1000-1500 watts—for indirect lighting.

(3) Type D lamps, priced at 10 cents each—7½, 15, 30, 60 watts.

(4) Clear, inside colored, tinted and frosted Mazda lamps for decorative lighting—6, 10, 6 and 10, 25, 25 and 50 watts.

(5) Outside coated flame shape and round bulb Mazda lamps for decorative luminaires—15, 25, 25 and 40 watts.

5

OPTIMUM LIGHTING

Ordinary daylight intensities are up in the thousands of foot-candles. Average residence lighting is from one to three; that is, it is around 1/1000 or less of the intensity of natural lighting.

Daylight intensities are not economically feasible. Fortunately the eye can see effectively at much lower levels, although a person benefits, both visually and hygienically, from much higher levels than he can afford to pay for. In short, all we can establish is a minimum below which we should not go. This minimum is largely a matter of deciding what is actually attainable by home owners in general. In the opinion of the writer this minimum is 10 foot-candles, which requires a total connected lighting load for the average six-room house of 4 to 5 kilowatts.

It should be distributed as follows (approximately):

Cellar	0.5 kilowatt.
First Floor......	2.4 kilowatts.
Second Floor	1.6 kilowatts.

The type of lighting equipment selected will greatly affect the wattage required. This is shown in a table published on page 62 of the July 1934 issue of THE ARCHITECTURAL RECORD.

Certain areas in the home require much higher lighting than other areas:

GENERAL ELECTRIC LAMPS

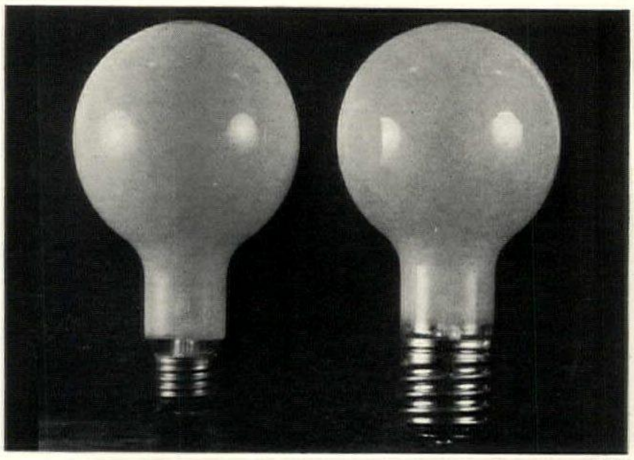
(6) Tubular bulb Mazda lamps with conventional screw base—25, 25, 50 watts.

(7) Mazda lumiline lamps with disk bases—40, 40, 30 and 60, 30 and 60 watts.

(8) Mazda Three-lite lamp for indirect portables and wall urns — 100-200-300 watts — and spotlight service lamps — 100, 250 and 400, 1000 watts.

(9) Mazda sunlight lamps for use where a combination lamp emitting ultraviolet radiation and considerable light is desired, and Type G lamps where much light is not essential.

(10) Mazda indirect lite lamp and Mazda three-lite lamp.



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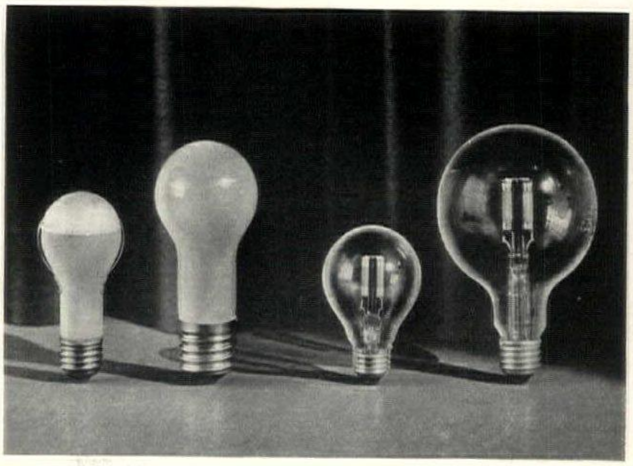

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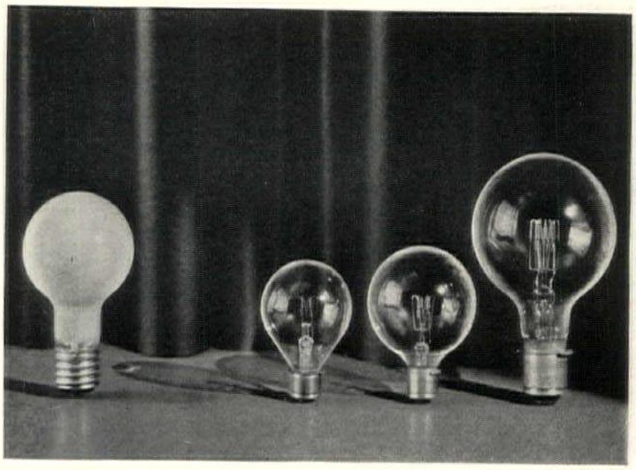

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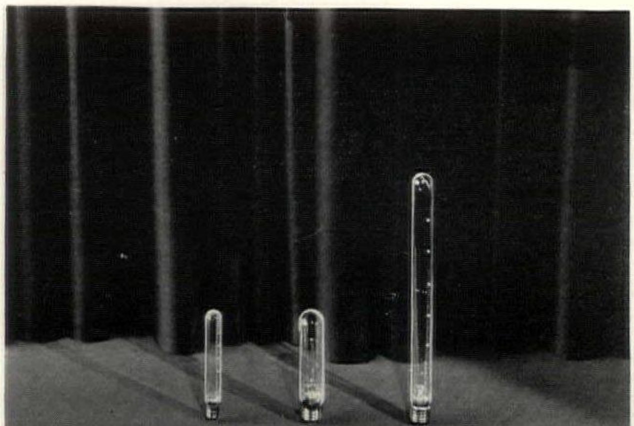

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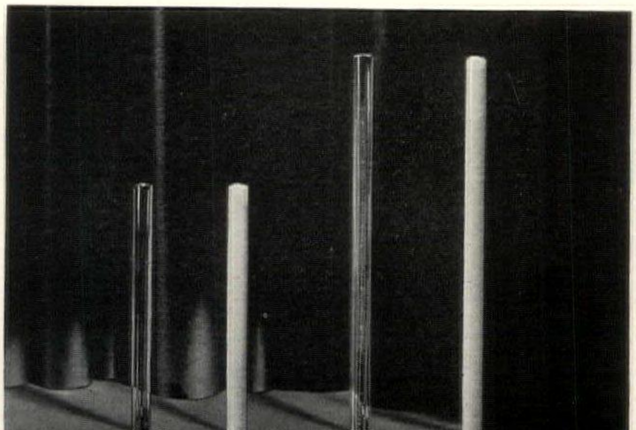

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LOCATION	MINIMUM LIGHTING INTENSITY
Kitchen:	
Sink	20 foot-candles
Range	
Work counter	
Laundry:	
Tub	20 foot-candles
Ironer	
Ironing board	
Garage:	
Car motor	40 foot-candles
Work bench	20 foot-candles

Reading: not less than 25 foot-candles, which can now be secured by using the new types of study lamps generally available.

FIXTURES

Ceiling type fixtures are preferable to brackets. Their location results in a better distribution of the light and less interference with vision. They should either entirely inclose the lamps or so screen them that the latter are not visible under ordinary conditions.

The flush built-in ceiling type requires the least maintenance, if well constructed; it increases the feeling of spaciousness so desirable in the rooms of a small house, and is necessary as a safety measure in earthquake regions where suspended fixtures are likely to be shaken down.

LAMPS

The photographs on pages 142 and 143 illustrate the types of lamp available for home service, and the particular service to which they are best adapted.

SAFETY REQUIREMENTS

If the requirements of the National Electric Code of the National Board of Fire Underwriters are fully complied with, the electrical installation will not present a fire hazard. However, carelessness during construction is often responsible for hidden hazards that show up later.

Pinching armored cable under a joist and putting nails through flexible conduit are two common causes of later trouble.

Leaving surplus wire coiled and rubbing together in the canopies of ceiling fixtures, where the heat of the lamp can gradually bake the "life" out of the insulation, is a common cause for "shorts" that begin to show up after the house has been in use a few years.

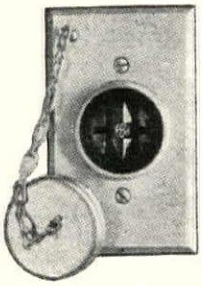
Convenience receptacles of poor quality frequently develop "shorts" after very little use.

PRECAUTIONS AGAINST ELECTRIC SHOCK

If the requirements of the Fire Underwriters have been met the owner is reasonably protected against the hazard of electric shock. Compliance with these requirements cannot protect the owner against his own carelessness, however, and as electric shocks in the home are frequently connected with the bath tub, it is well to place convenience outlets, switches and fixed electrical equipment sufficiently distant from the tub to make impossible an electrical contact while the owner is in it.

If the floor of the laundry is cement and not covered with some insulating material, the work space should be covered with a wooden slat floor to prevent the worker with wet hands being grounded when making electrical contact. A wet insulated floor with a drain in it doesn't insulate. The laundry equipment should be fitted into a continuous, tight, counter surface, with splash boards to reduce the spilt water to a minimum.

Children occasionally receive burns by pushing hair pins into convenience outlets. Outlets with spring flap or screw type covers that successfully defy little fingers are available. Only instruction can protect the older children.



Convenience outlet with screw cover.

Extension cords frequently "short" and become a fire hazard when they are laid under carpets or furniture and the abrasion breaks down the insulation, or when they are long enough to kink. If convenience outlets are located with sufficient closeness (5 feet apart), long cords will not be necessary. They should never be longer than 6 feet. A cord over the regulation length that causes a fire may be sufficient to invalidate the insurance protection.

REFERENCE PUBLICATIONS:

"National Electric Code" of the National Board of Fire Underwriters.

Croft's handbook on "Wiring."

Cushing's "Standard Wiring."

GESCO Catalog.

GESCO "Lighting Handbook."

GRAYBAR Catalog.

WESCO Catalog.

VOL · 78 NUMBER 3

1 9 **9** 3 5

SEPTEMBER

THE ARCHITECTURAL RECORD

RESIDENTIAL CONSTRUCTION A NEW FACTOR IN THE 1935 RECOVERY TREND

The spurts of recovery in 1932, 1933 and 1934 were checked mainly because real estate and mortgage conditions remained unfavorable to building. These conditions have now undergone a fundamental change. Rents and real estate values are on the upturn, the Federal reorganization of the home mortgage market has been completed by the action of some forty State Legislatures this spring, and the insured modernization-loan plan has been extended to include loans up to $50,000 on apartment houses and other income-producing property. In response to improved real estate and mortgage conditions, the building contracts for owner-occupied dwellings have increased uninterruptedly for nine months while residential construction as a whole (apartment houses and hotels as well as all types of dwellings) for the first seven months of 1935 has had a gain of almost 70 per cent over the total for the corresponding period of 1934.

It is this sustained advance in residential construction by private capital, not present in 1932, 1933 and 1934, which accounts for the belief that permanent recovery is now in sight. The building industry is the key to sustained recovery and for the first time since the depression set in private capital is freely supporting a class of construction which normally constitutes 50 per cent of the total volume of building.

Priming the pump, so far as the building industry is concerned, presupposes restored rents and a restored supply of mortgage money. Until this spring the well was too nearly empty to respond to priming, but the chances are that the Work-Relief program of 1935 will actually prime the building pump. The belief that this year's priming will be effective is based on the knowledge that private capital has already set up a revival in residential construction. This revival is a new factor in the business situation. It differentiates the 1935 recovery trend from those of 1932, 1933 and 1934, and gives a new significance to the Work-Relief program of 1935.

The Act allocated $900,000,000 to non-Federal public works projects by States, cities and other political units, consisting of airports, auditoriums, hospitals, schools, parks, sewage disposal plants and the like. The Public Works Administration is offering 45 per cent grants to the local governments, which may obtain the remaining 55 per cent by borrowing from the Administration at 4 per cent or by borrowing in the investment market at lower rates.

The non-Federal public works allocation directly affects the building industry and is the largest allocation under the Work-Relief program. Projects amounting to $25,000 or more will be carried out by the contract method customary in the building industry. Other allocations, though affecting the building industry less directly, are nevertheless important. The purpose of the program is to put an average of 3,500,000 people back to work for one year. Of this number about 500,000 will procure direct employment in the building industry. For each person reemployed in the building industry it is estimated by the Public Works Administration that two will be reemployed by private enterprise in the service and other industries. Given the favorable mortgage and real estate conditions that have made themselves definitely felt this year, the Work-Relief program should have a cumulative or priming effect—increased employment accelerating the rise in rents and expanding the demand for private construction.

PORTFOLIO OF SPECIAL BUILDING TYPES

NEW YORK TERMINAL OF GREYHOUND LINES:
Thomas W. Lamb, Architect.

BEAUTY CLINIC FOR COSMETIC DEMONSTRATIONS BY GOOD HOUSEKEEPING MAGAZINE, NEW YORK.
Eleanor Lemaire, Designer.

ART CENTER SCHOOL IN LOS ANGELES:
Alterations by Kem Weber, Designer.

STUDY AND DRESSING ALCOVE FOR MR. OSCAR MOSS, LOS ANGELES:
Edgar Bissantz, Architect.

A FIELD HOUSE FOR A PARK:
Maynard Lyndon, Architect.

CHILDREN'S PLAYGROUND—PARQUE DE LA REVOLUCION, GUADALAJARA, JALISCO, MEXICO.
Luis Barragan, Architect; Juan Luis Barragan, Civil Engineer.

ATLANTIC BIG BEAR MARKET, HOLLIS, NEW YORK:
B. Sumner Gruzen, Architect.

DIVING TOWER AND BATHING PAVILION, WIESBADEN, GERMANY:
Franz Schuster and Edmund Fabry, Architects; Wilhelm Hirsch, Landscape Architect.

THEATER, OSLO, NORWAY:
Gudolf Blakstad and Jens Dunker, Architects.

STADIUM DESIGN:
Arthur J. Barzaghi, Engineer.

SPORTS BUILDING, KENT SCHOOL, KENT, CONNECTICUT:
Willis N. Mills, Architect.

CHAPEL IN PARGAS, FINLAND:
Erik Bryggman, Architect.

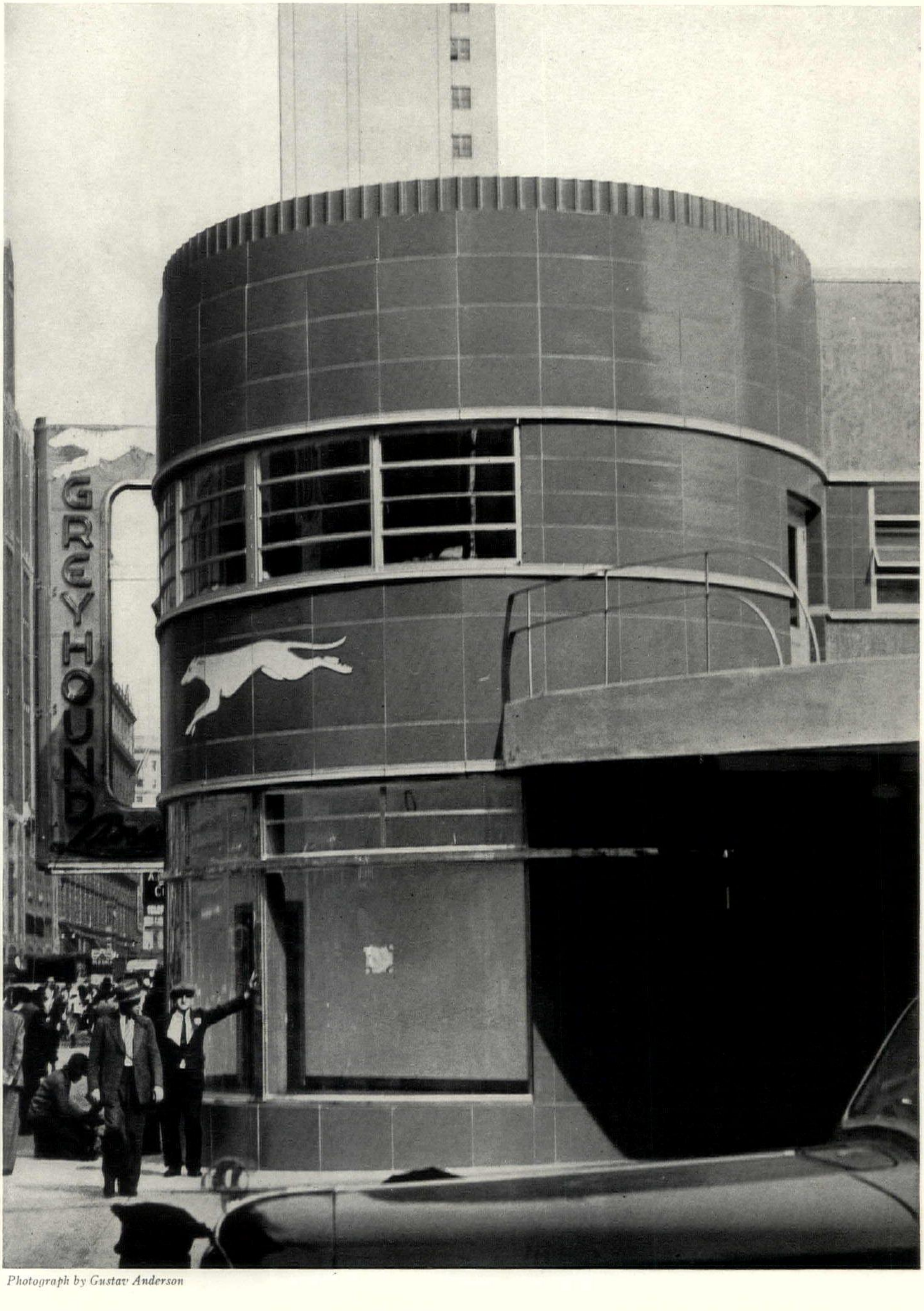
"THE PEWTER MUG" LUNCH ROOM, KENT, CONNECTICUT:
Designed by Allan McDowell.

OFFICES, EDITORIAL PUBLICATIONS, INC., NEW YORK:
William Lescaze, Architect.

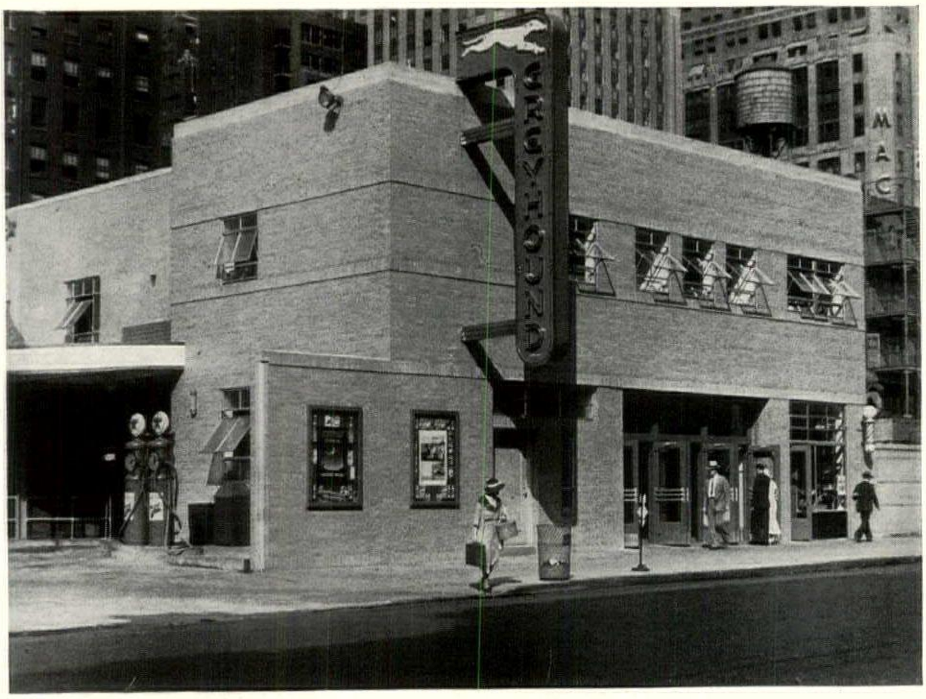
CALIFORNIA MILITARY ACADEMY:
Richard Neutra, Architect.

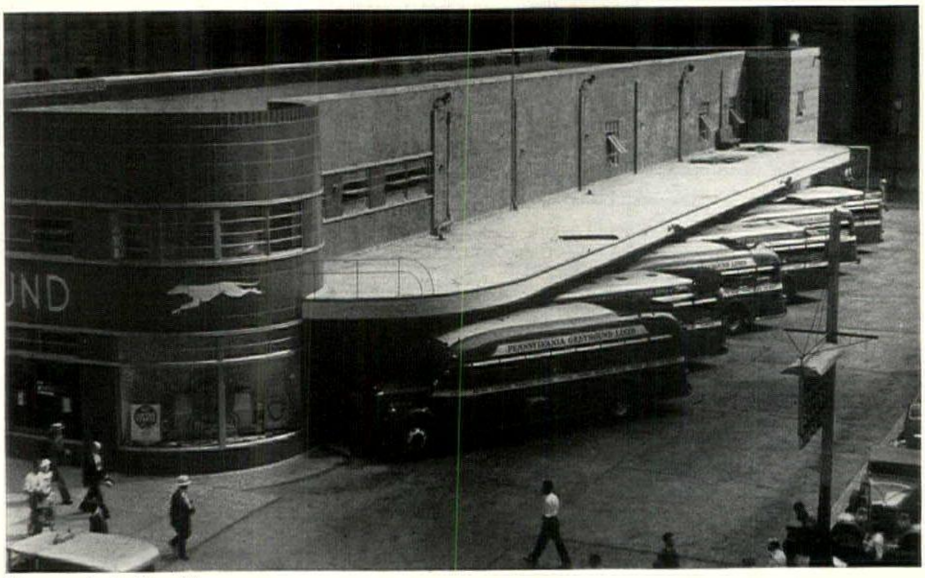
PATTERSON PARK JUNIOR HIGH SCHOOL IN BALTIMORE, MARYLAND:
Wyatt and Nolting, Architects.

NEW YORK TERMINAL OF GREYHOUND LINES . . . THOMAS W. LAMB, ARCHITECT

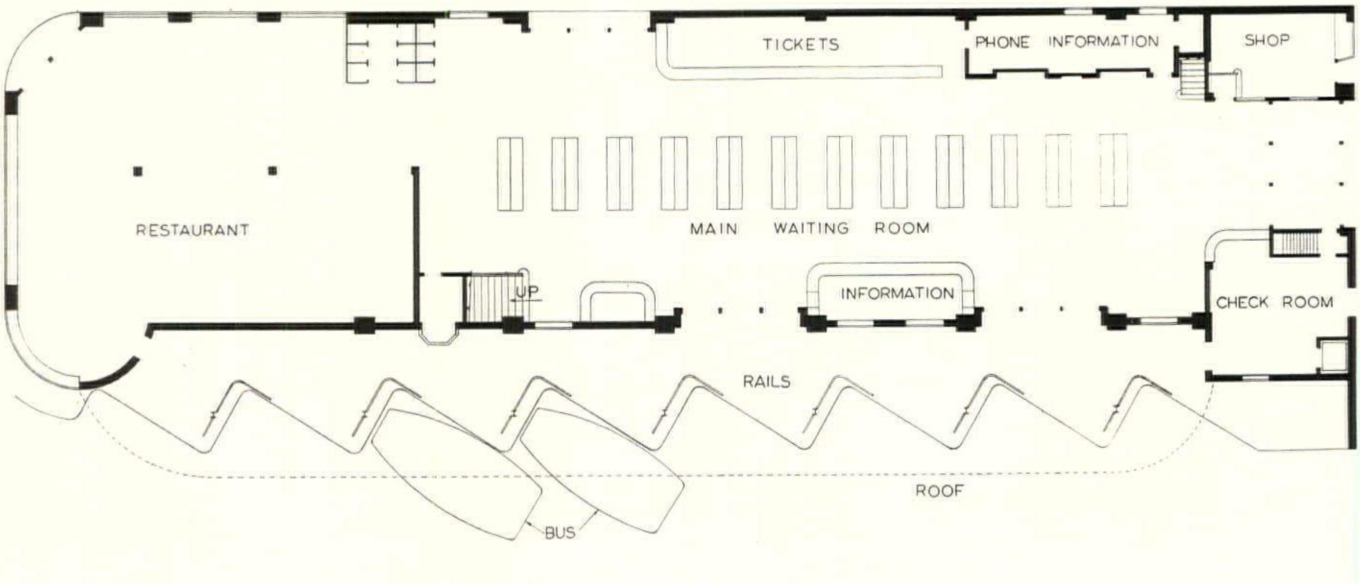


Photograph by Gustav Anderson



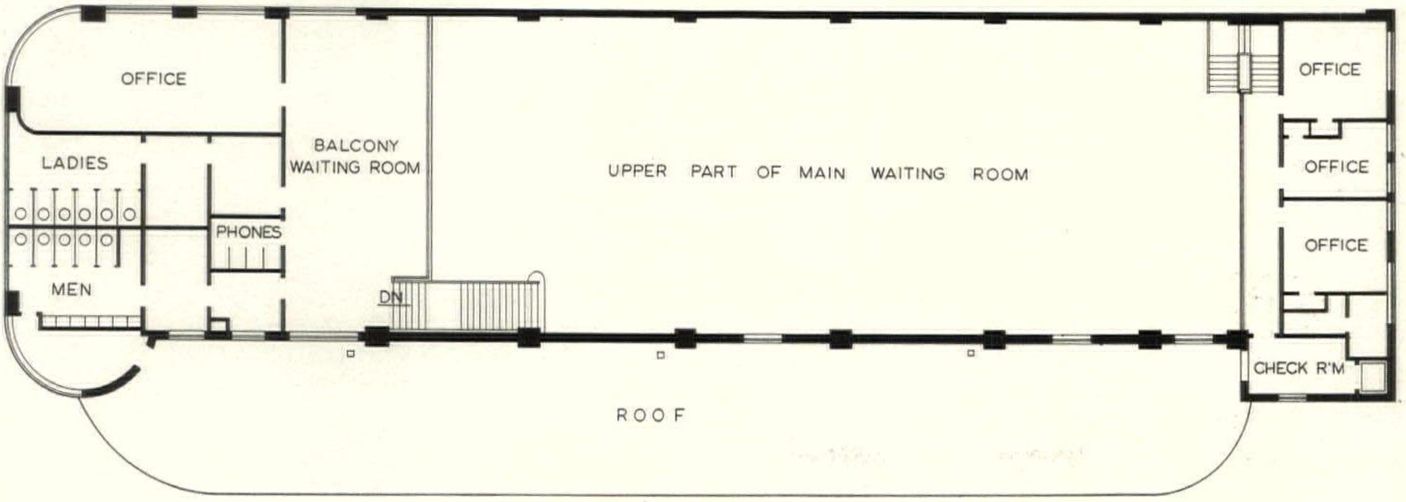


Photographs by Max Zimmerman



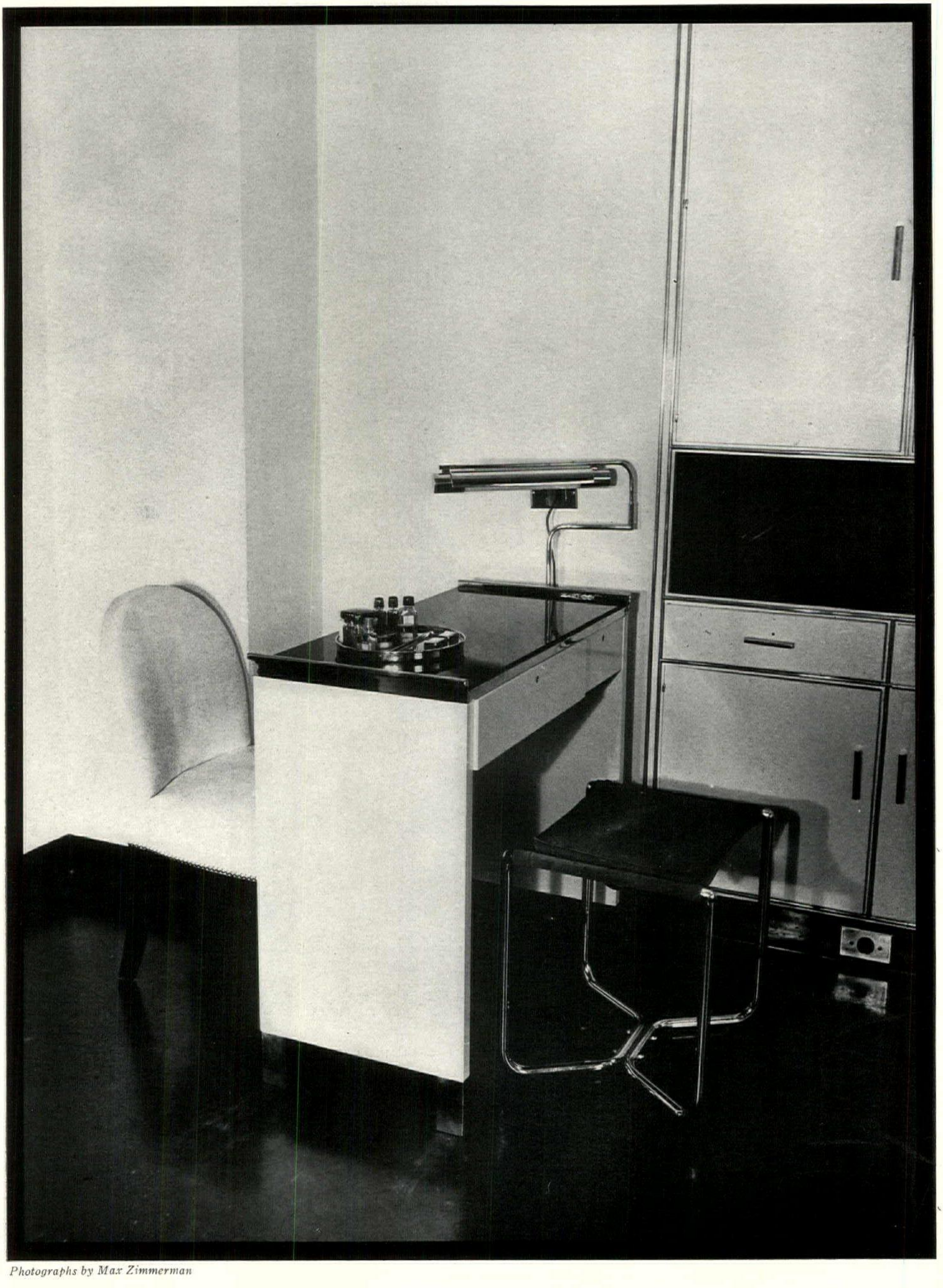
Photograph by Gustav Anderson

NEW YORK TERMINAL OF GREYHOUND LINES . . . THOMAS W. LAMB, ARCHITECT

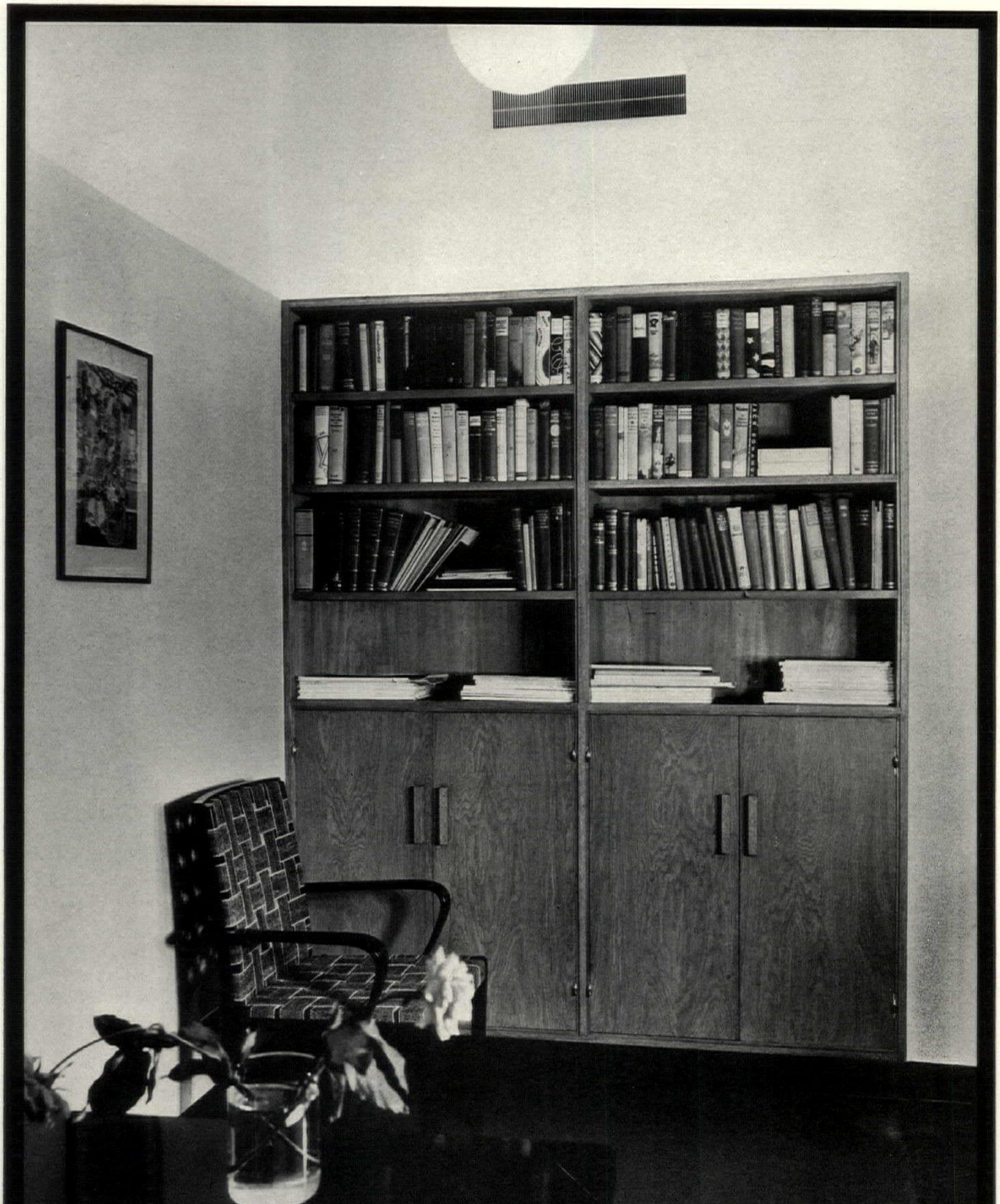


BEAUTY CLINIC

FOR COSMETIC DEMONSTRATIONS BY GOOD HOUSEKEEPING MAGAZINE, NEW YORK



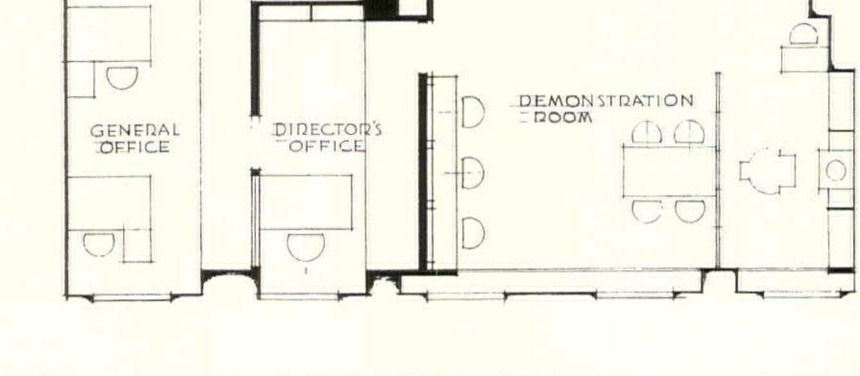
Photographs by Max Zimmerman



Photographs by Max Zimmerman

BEAUTY CLINIC . . . **ELEANOR LEMAIRE, DESIGNER**

GOOD HOUSEKEEPING MAGAZINE, NEW YORK



An important feature of the demonstration room is the long make-up table and its accompanying mirrors with shadowless lighting.

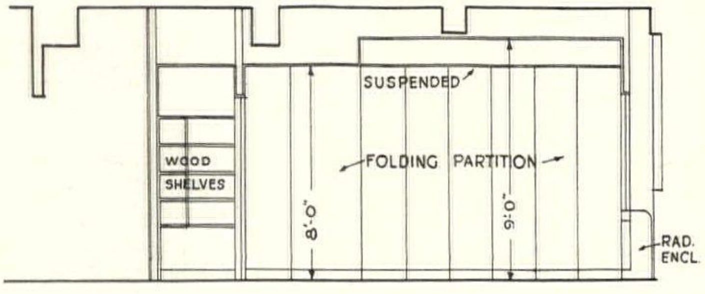
Existing exterior windows are concealed by a glazed partition of sand-blasted glass. The space between the outer wall and this screen has overhead illumination which gives the effect of daylight.

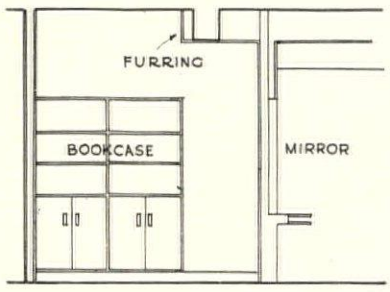
The treatment room which contains an all-purpose beauty chair and wash basin is separated from the demonstration room by a Horn folding partition lacquered in white. This permits privacy for actual testing in the treatment room. A large group may watch a demonstration when the screens are folded back.

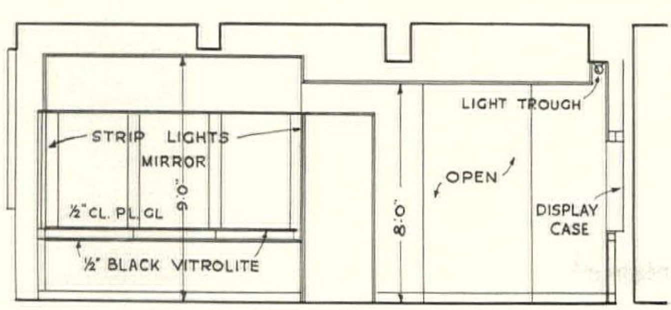
The floor is black linoleum. The walls are white, the doors blue lacquer, and the furred ceiling at entrance citron yellow.

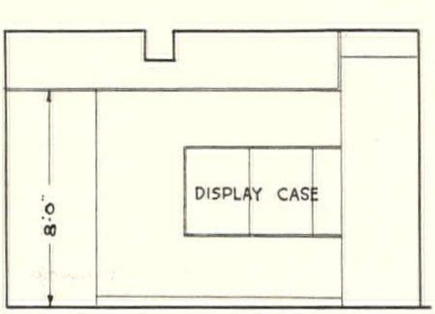
The ceiling conceals unsightly beams and also contains the air conditioning ducts.

DEMONSTRATION ROOM

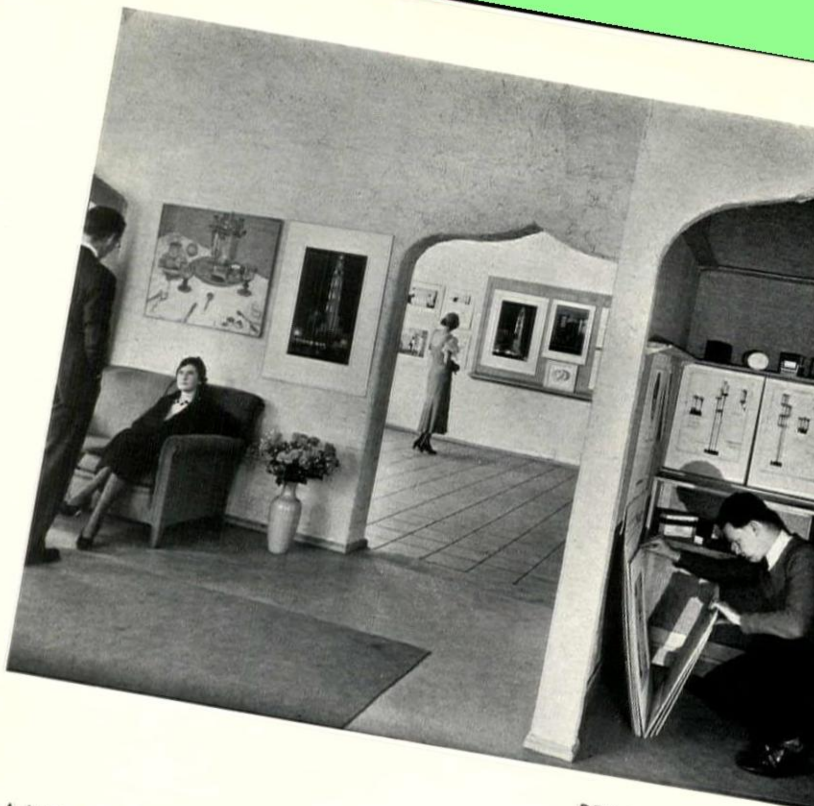








ART GALLERY



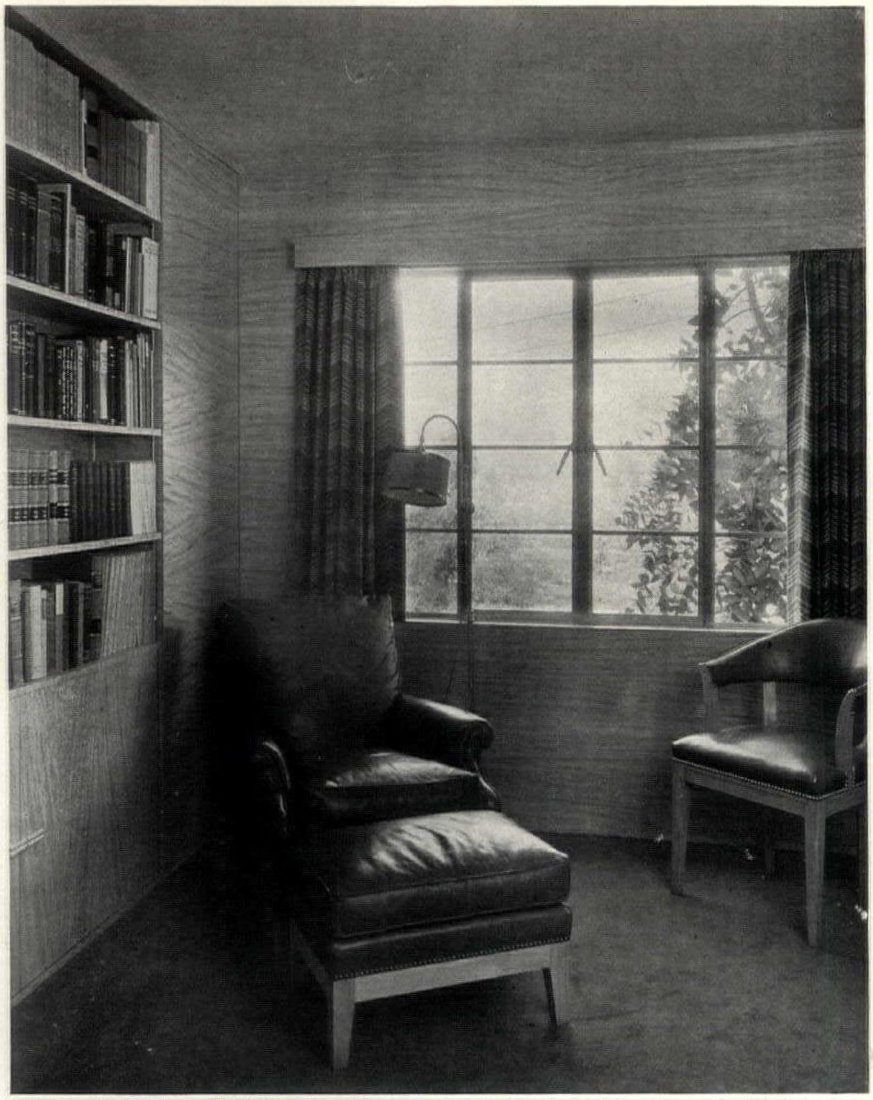
ART CENTER SCHOOL IN LOS ANGELES
ALTERATIONS BY KEM WEBER, DESIGNER

BEFORE ALTERATIO

AFTER ALTERATION

Photographs by Will Connell

A STUDY

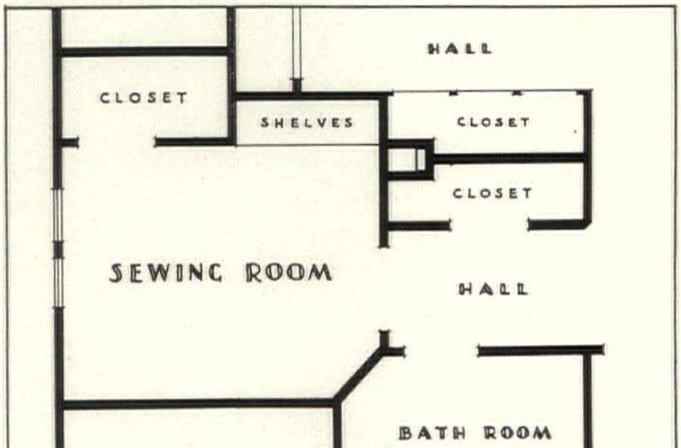


Photographs by George D. Haight

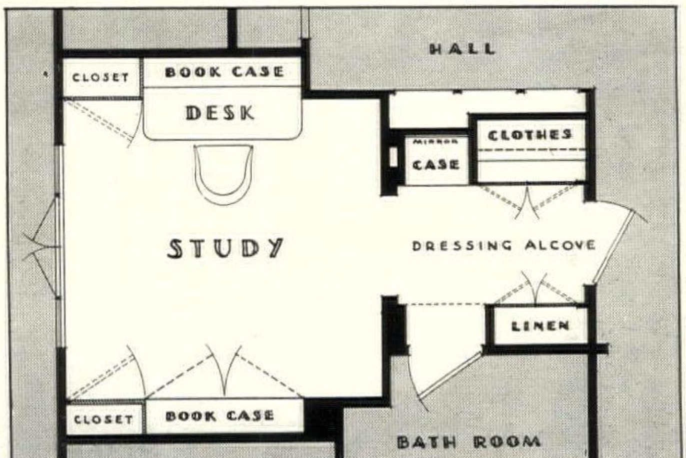
STUDY FOR MR. OSCAR MOSS, LOS ANGELES . . . EDGAR BISSANTZ, ARCHITECT

The owner, an attorney and income tax counsellor, needed a private study where he could retire to work or read. A small room, built for a sewing room but used mostly for general storage, was utilized for this purpose, as shown on the plans. The resulting study is larger than the original sewing room, and has adequate shelves and storage space for books, and a convenient dressing alcove. All woodwork is Prima Vera, bleached with oxalic acid and filled with a clear lacquer, then waxed. The lighting fixtures, blotter pad and desk set are made of polished brass. The chairs were designed for the room, and are upholstered with light tan leather. The ceilings are plastered off-white in the study and chartreuse green in the small dressing alcove. Door knobs are Catalin and brass. The rug is brown and the curtains are olive green and gray. The window is a steel sash unit with rolling screen.

PLAN BEFORE ALTERATIONS



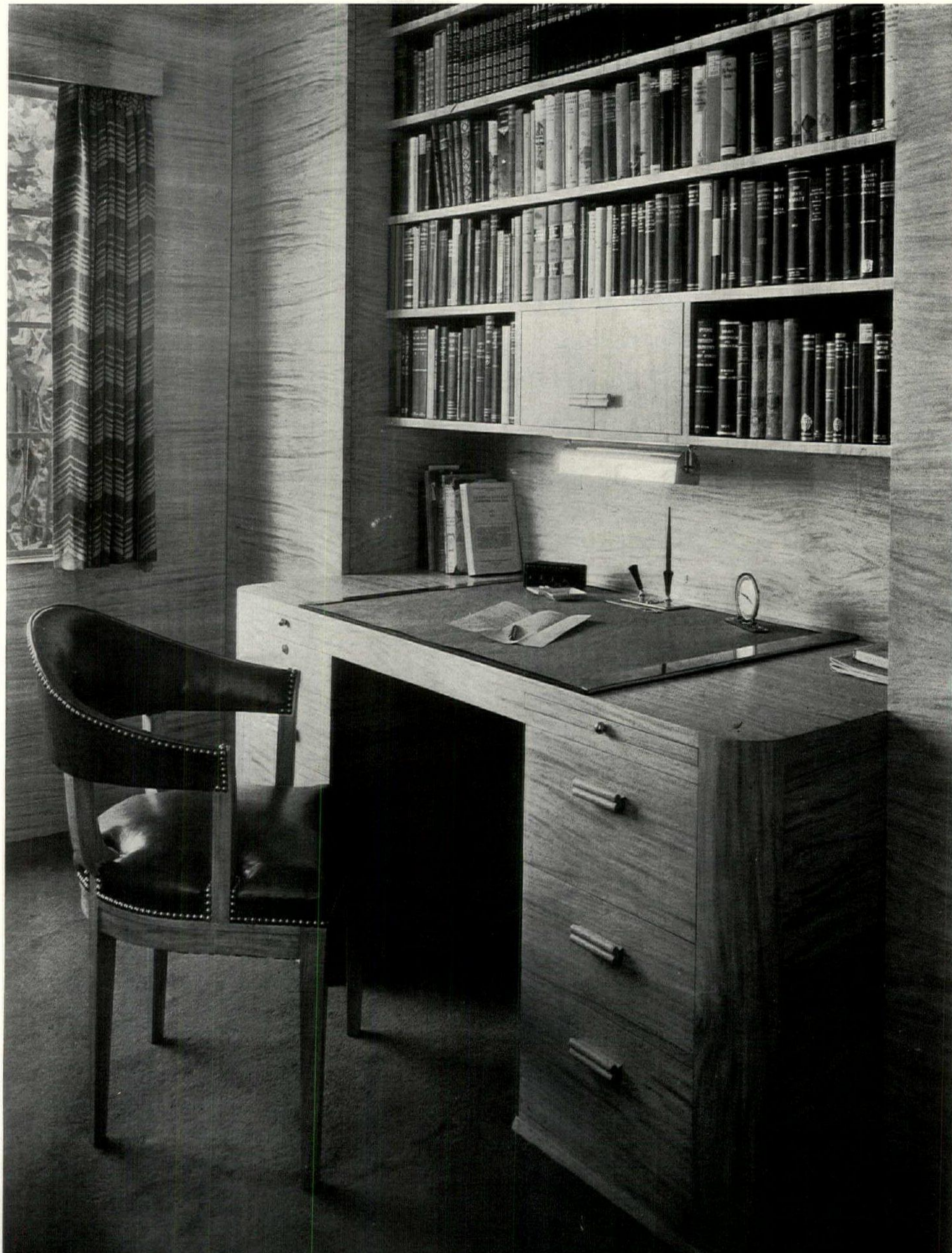
PLAN AFTER ALTERATIONS

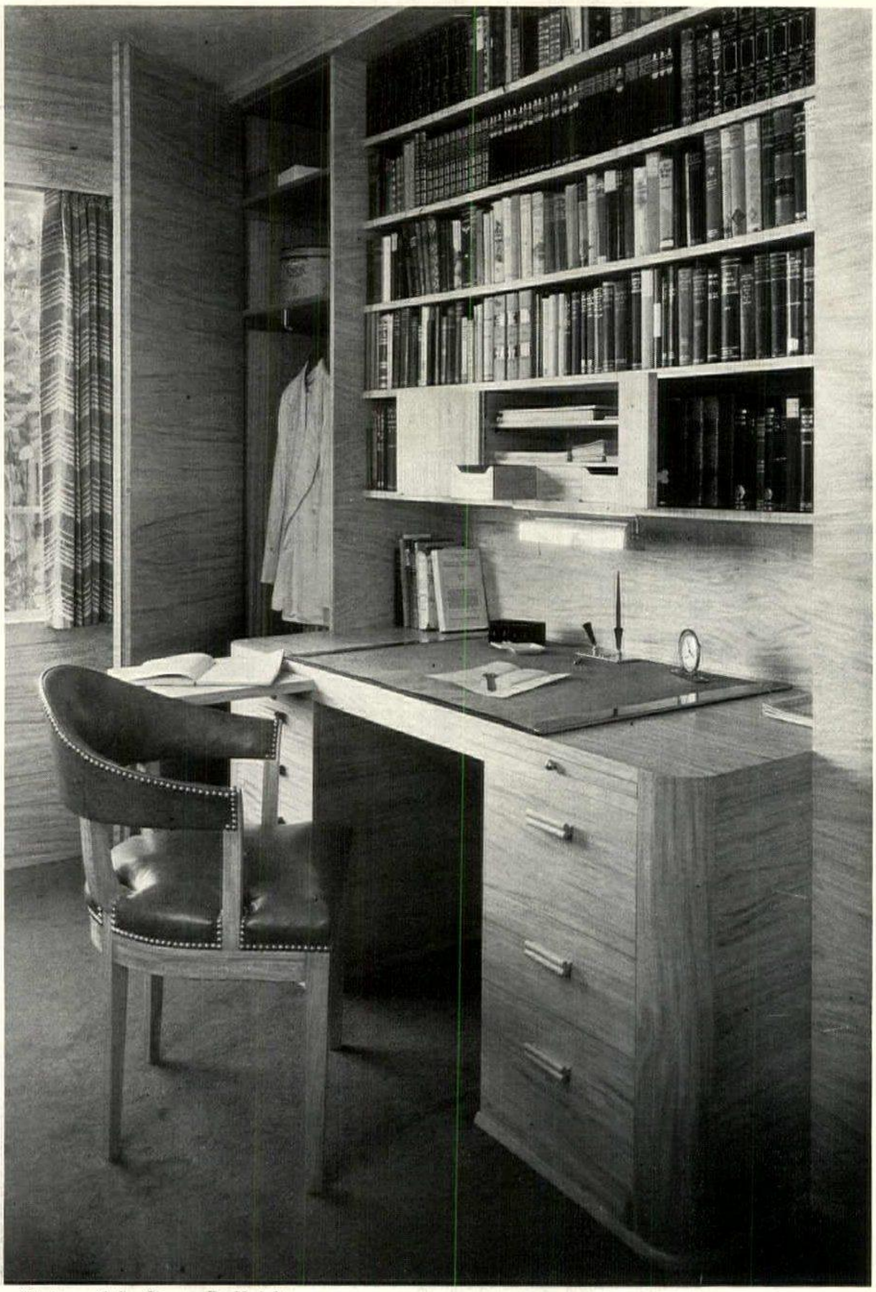


STUDY AND DRESSING ALCOVE

FOR MR. OSCAR MOSS, LOS ANGELES

DETAIL OF DESK



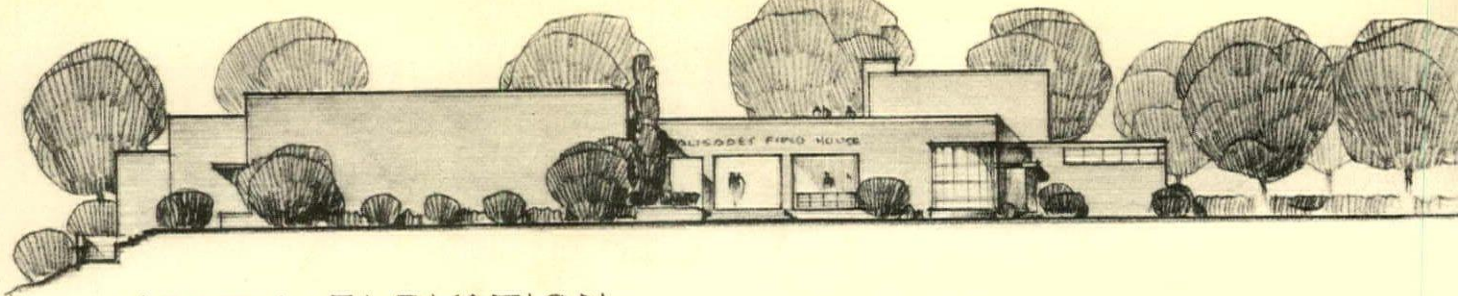


Photograph by George D. Haight

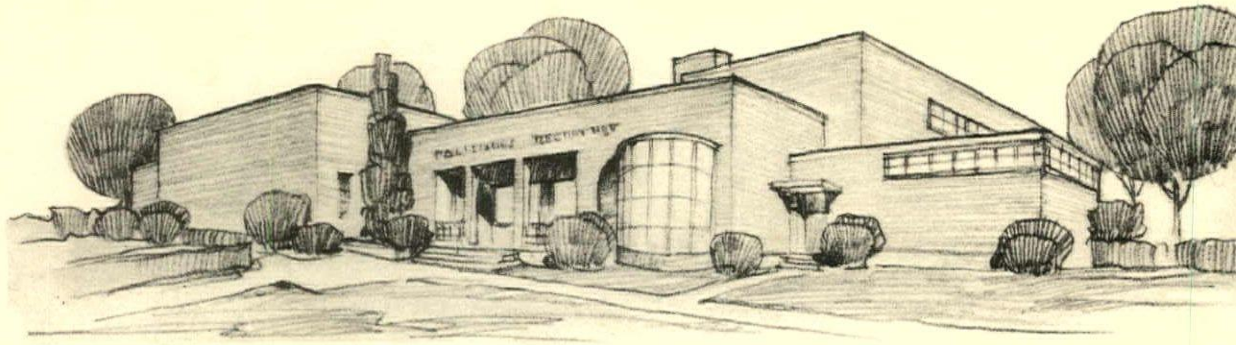
STUDY FOR MR. OSCAR MOSS, LOS ANGELES
ALTERATIONS BY EDGAR BISSANTZ, ARCHITECT

A FIELD HOUSE FOR A PARK

DESIGNED BY MAYNARD LYNDON, ARCHITECT

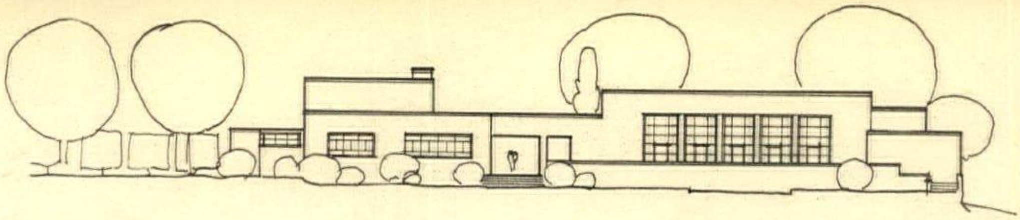


NORTH · ELEVATION

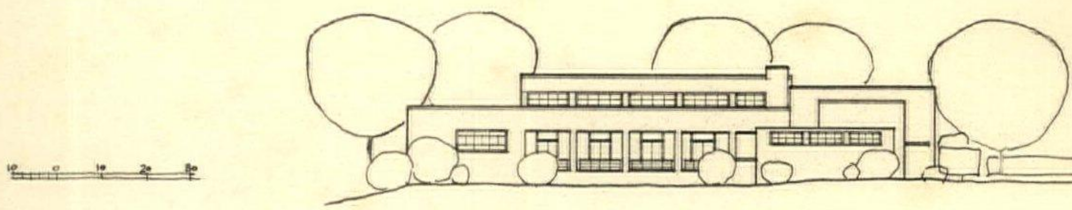


PERSPECTIVE
FROM THE NORTH

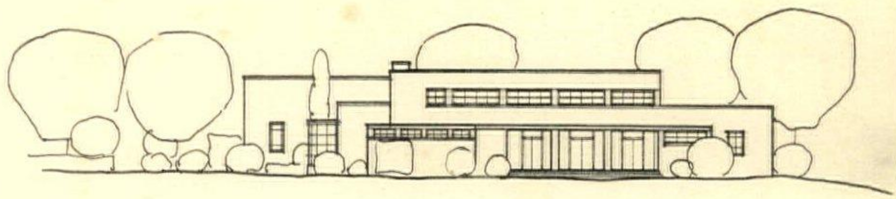
FIRST FLOOR
PLAN



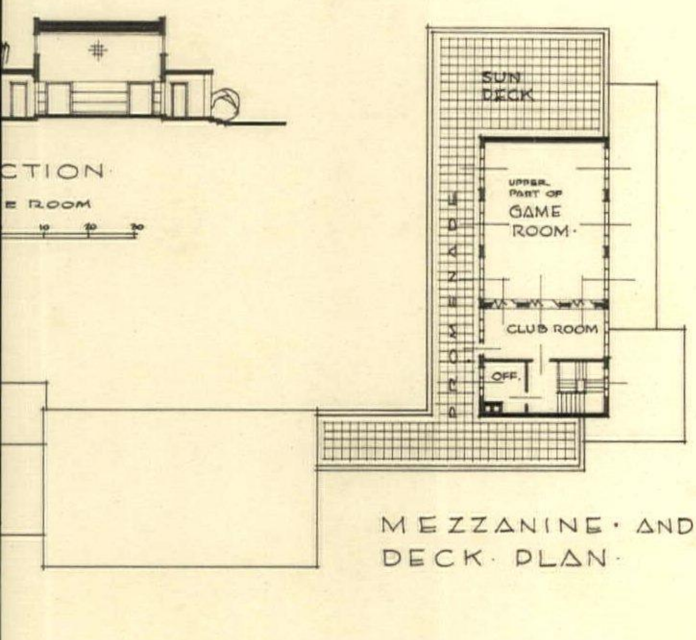
SOUTH · ELEVATION ·



EAST · ELEVATION ·



WEST · ELEVATION ·



CTION ·

E ROOM

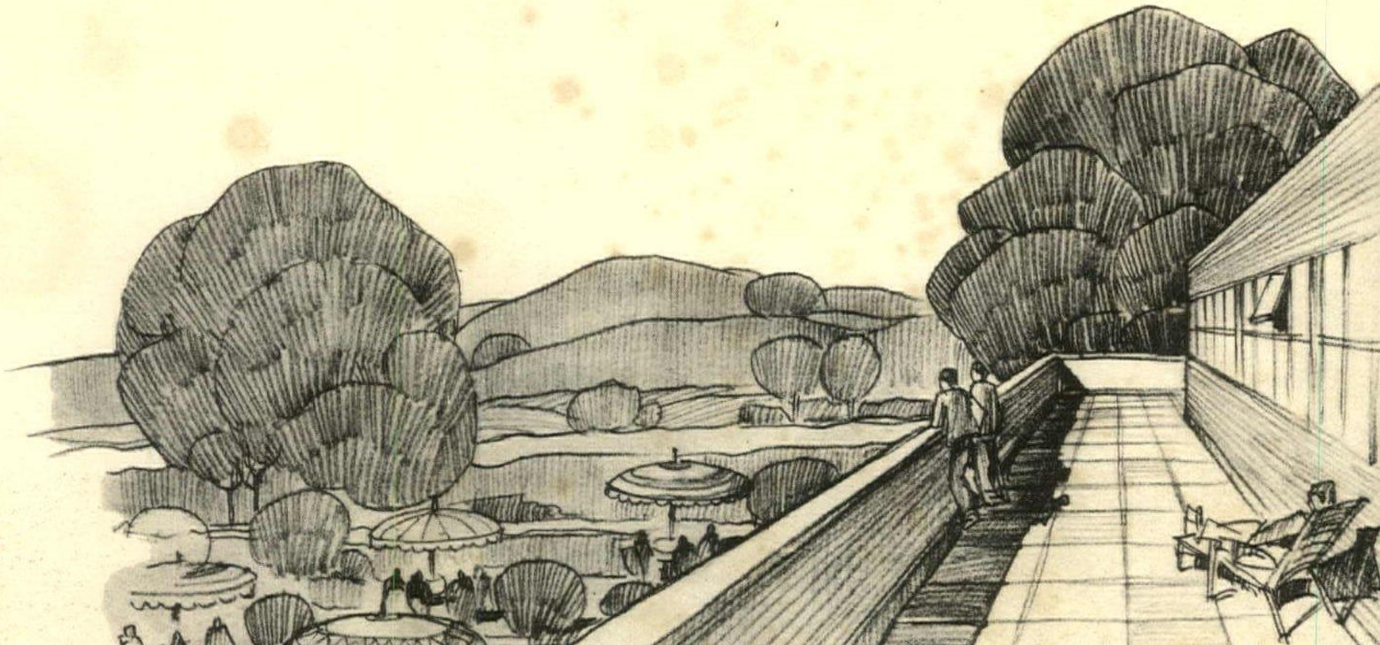
MEZZANINE · AND
DECK · PLAN ·

A FIELD HOUSE FOR A PARK

DESIGNED BY MAYNARD LYNDON, ARCHITECT

A FIELD HOUSE FOR A PARK

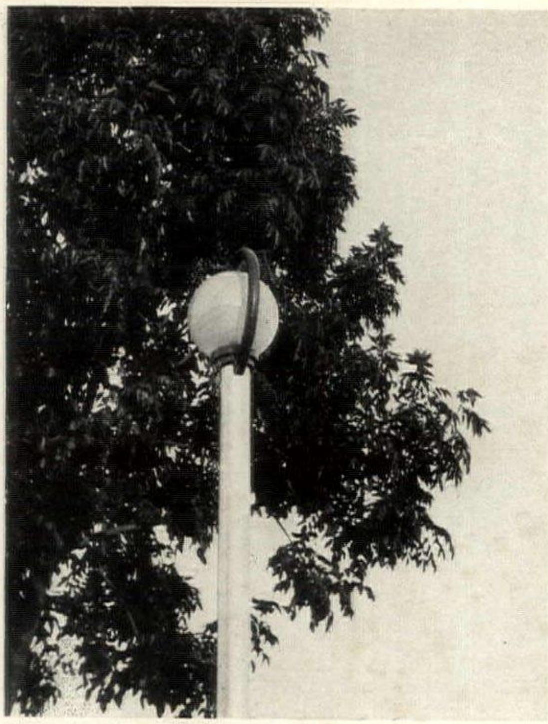
DESIGNED BY MAYNARD LYNDON, ARCHITECT



CHILDREN'S PARK

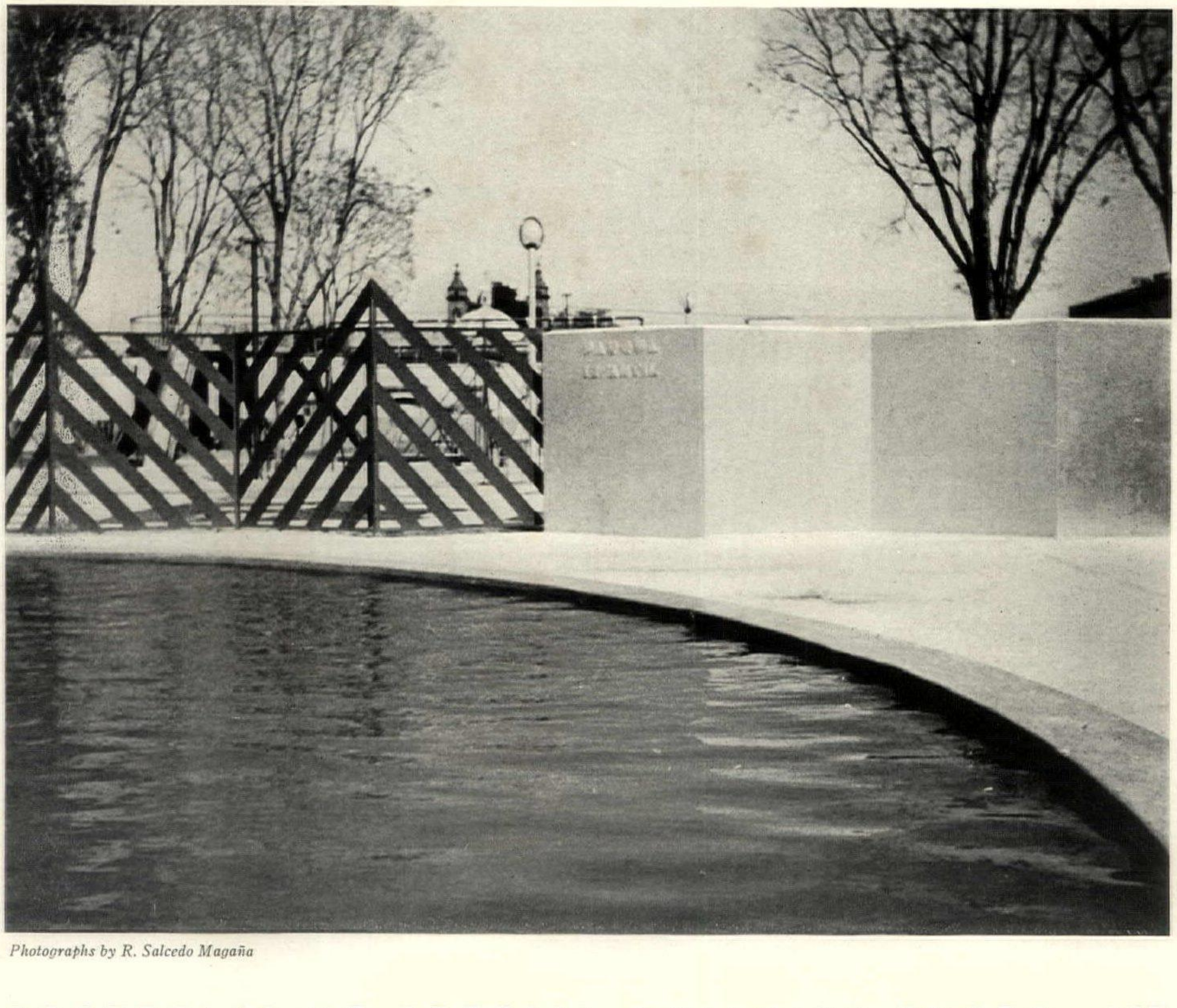
PARQUE DE LA REVOLUCION
GUADALAJARA, JALISCO, MEXICO

DESIGNED BY LUIS BARRAGAN, ARCHITECT
JUAN LUIS BARRAGAN, CIVIL ENGINEER



STREET LAMP

ENTRANCE TO PLAYGROUND AND POOL: PAINTED ALUMINUM WALL, VERMILION GRILLE



Photographs by R. Salcedo Magaña

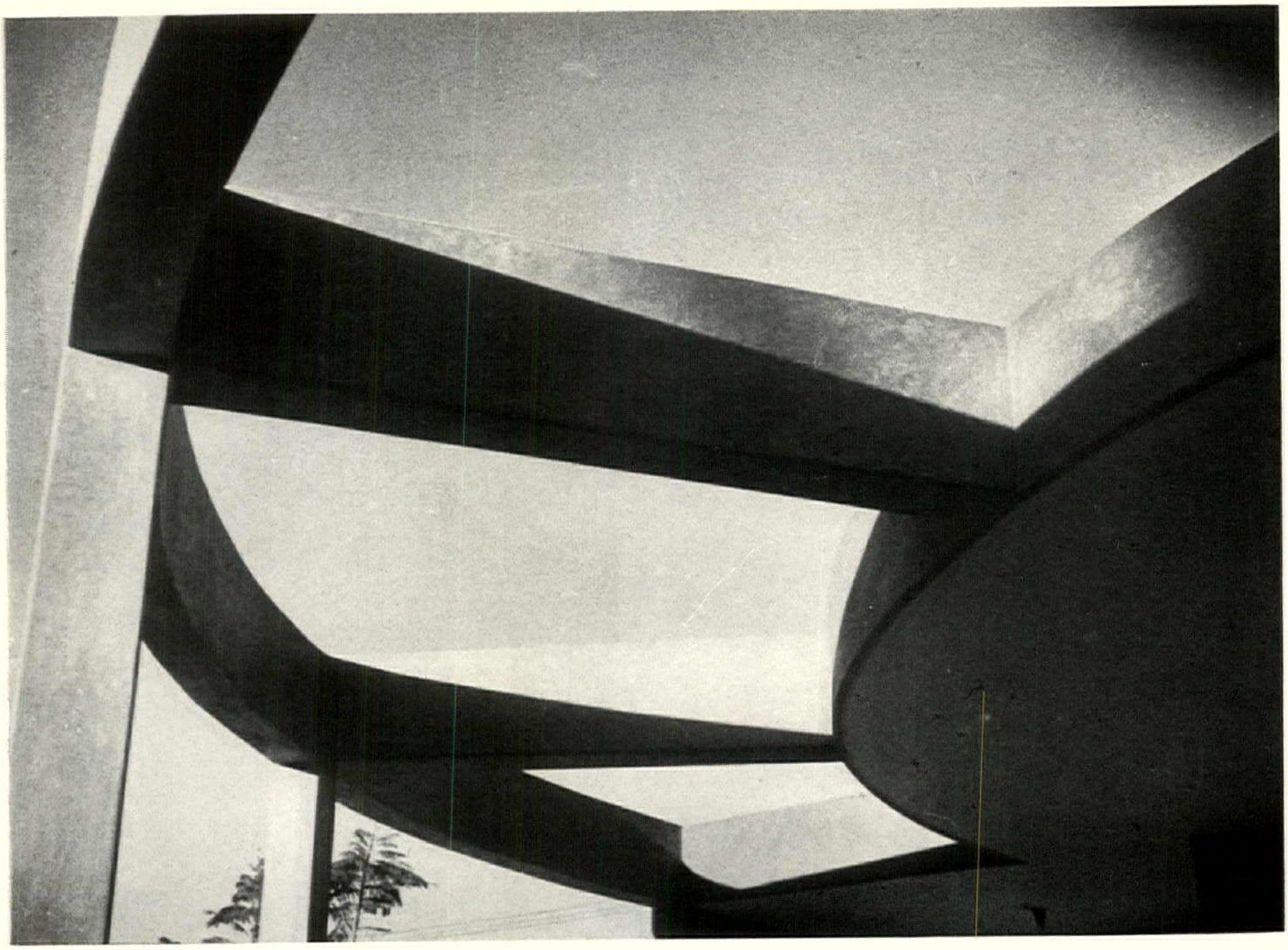
SEE-SAWS AND SLIDES

PARQUE DE LA REVOLUCION AT GUADALAJARA, JALISCO, MEXICO

Photographs by R. Salcedo Magaña

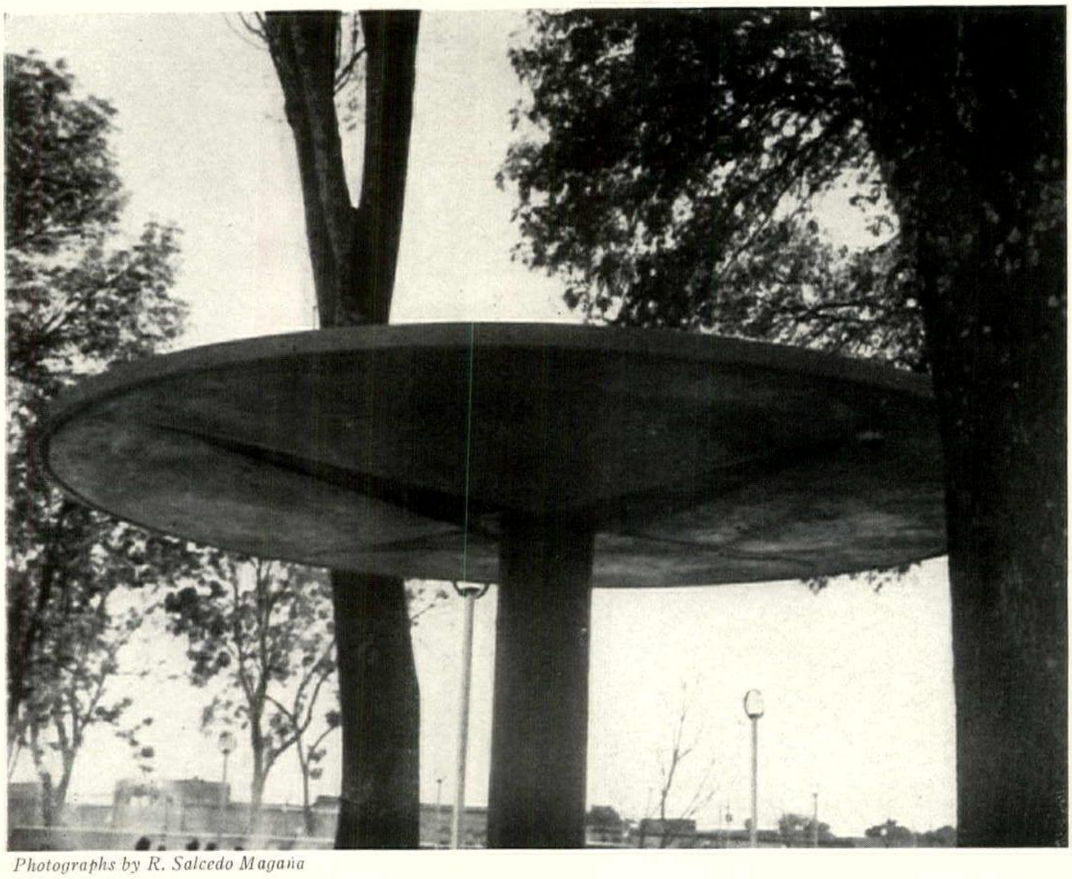
PLATFORM FOR SLIDES

LUIS BARRAGAN, ARCHITECT . . . JUAN LUIS BARRAGAN, ENGINEER



DETAIL OF PERGOLA

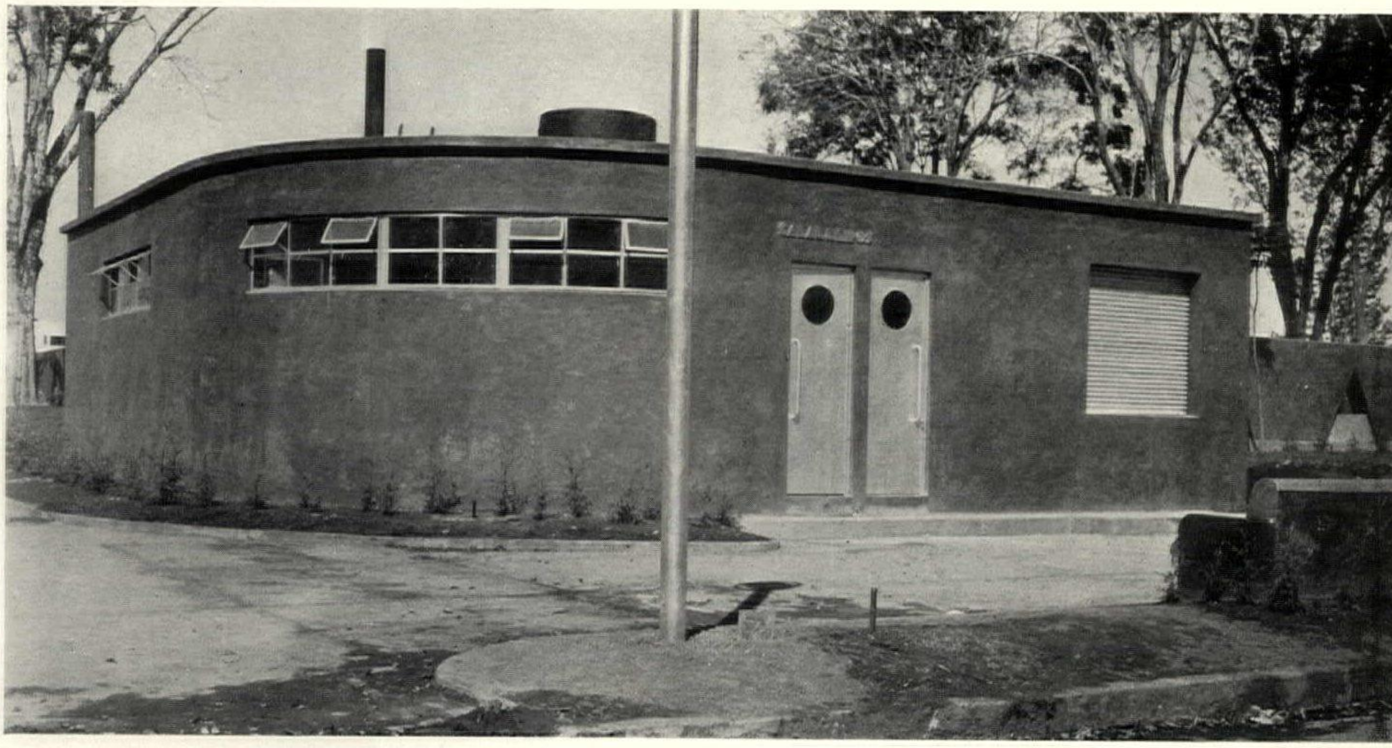
SUN AND RAIN PROTECTOR



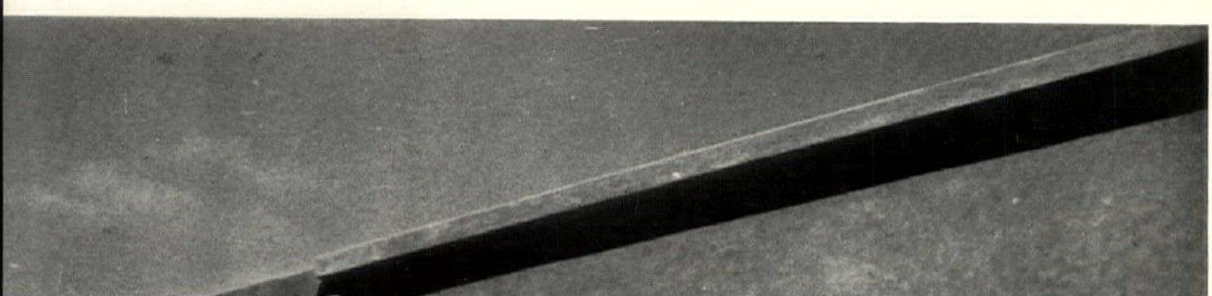
Photographs by R. Salcedo Magaña

CHILDREN'S PLAYGROUND

PARQUE DE LA REVOLUCION, GUADALAJARA, MEXICO . . . . LUIS BARRAGAN, ARCHITECT

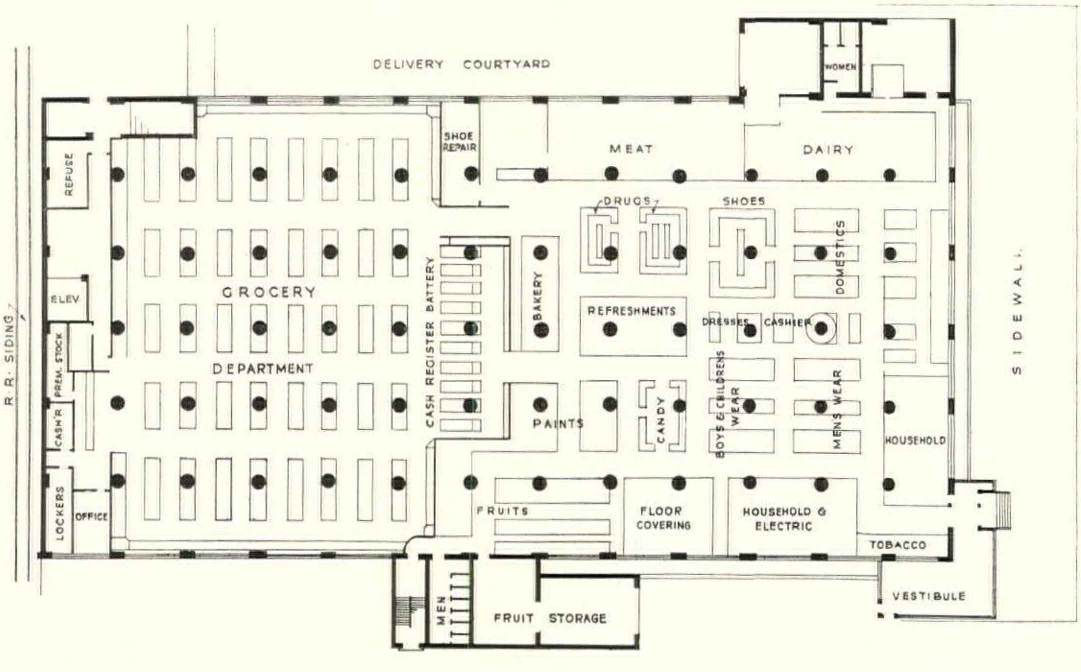


COMFORT STATIONS



FOOD MARKET

ATLANTIC BIG BEAR, HOLLIS, NEW YORK . . . B. SUMNER GRUZEN, ARCHITECT



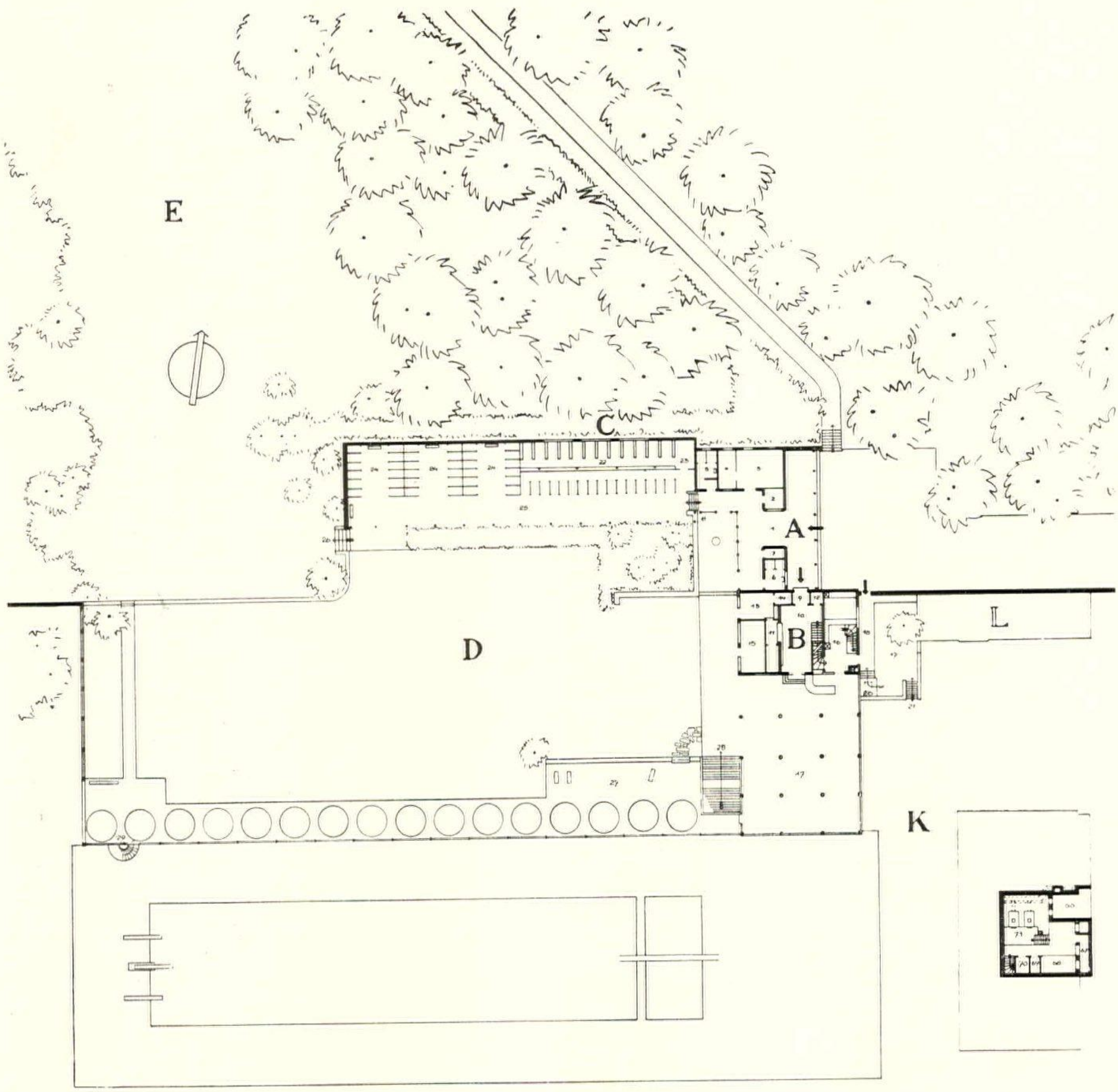
Photographs by Gustav Anderson

DIVING TOWER

WIESBADEN, GERMANY . . . FRANZ SCHUSTER AND EDMUND FABRY, ARCHITECTS

BATHING PAVILION

WILHELM HIRSCH
LANDSCAPE ARCHITECT



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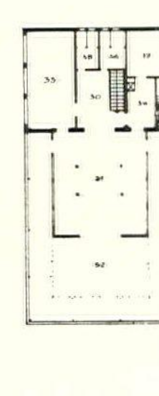


A. Entrance building: 1 Entrance, 2 Cashier, 3 Rental office for deck chairs and towels, 4 Store room for towels, 5 Men's toilet, 6 Women's toilet, 7 Telephone, 8 Small court with drinking fountain.

B. Main building: 9 Guests' entrance, 10 Lobby, 11 Cloakroom, 12 Telephone, 13 Barber shop, 14 Store room, 15 Shop for sportswear, 16 Pantry and coffee kitchen, 17 Guest terrace, 18 Service entrance, 19 Service court, 20 Coal receiver, 21 Stairway to boiler room.

C. Bath houses with dressing rooms for women: 22 Check room, 23 Employees, 24 Court with individual bath houses, 25 Pergola, 26 Stairway to sun lawn.

D. Lower sun lawn: 27 Terrace for beach umbrellas, 28 Main stairway to bathing terrace and women's dressing room, 29 Spiral stairs.

E. Upper sun lawn.

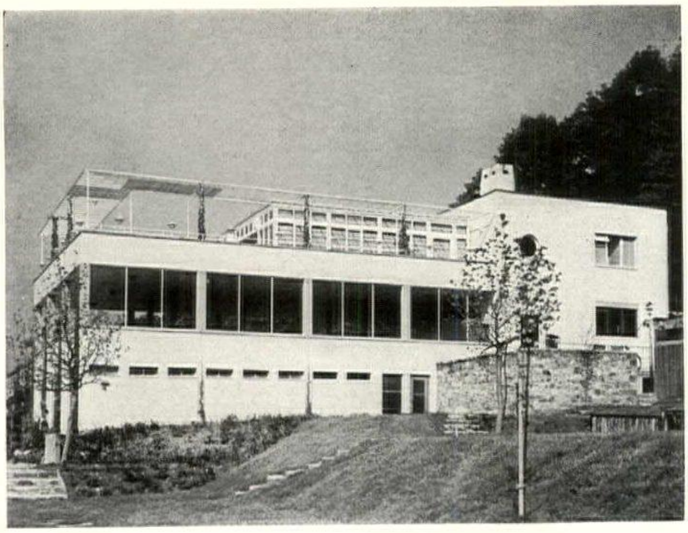
F. Top floor, main building: 30 Top hall, 31 Glass veranda, 32 Terrace with pergola, 33 Club room, 34 Service room, 35 Women's toilet, 36 Men's toilet, 37 Office.

K. Heating plant: 68 Pumps, 69 and 70 Control and motor room, 71 Heating plant.

Photograph by E. H. Carl

SPIRAL STAIR at the lower bath houses connects the bathing terrace with the sun lawns.

WIESBADEN, GERMANY . . . . FRANZ SCHUSTER AND EDMUND FABRY, ARCHITECTS

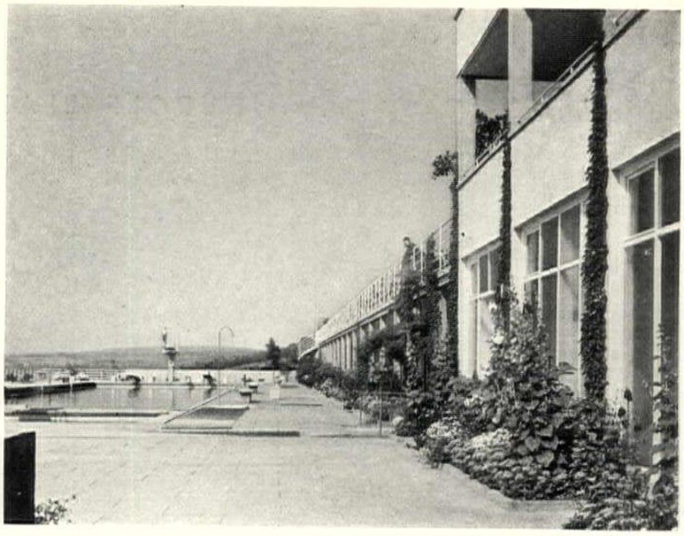


BATHING PAVILION

AT WIESBADEN, GERMANY

VIEWS toward the main building from the upper sun lawn and from play and sports field.

Photographs by R. H. Carl

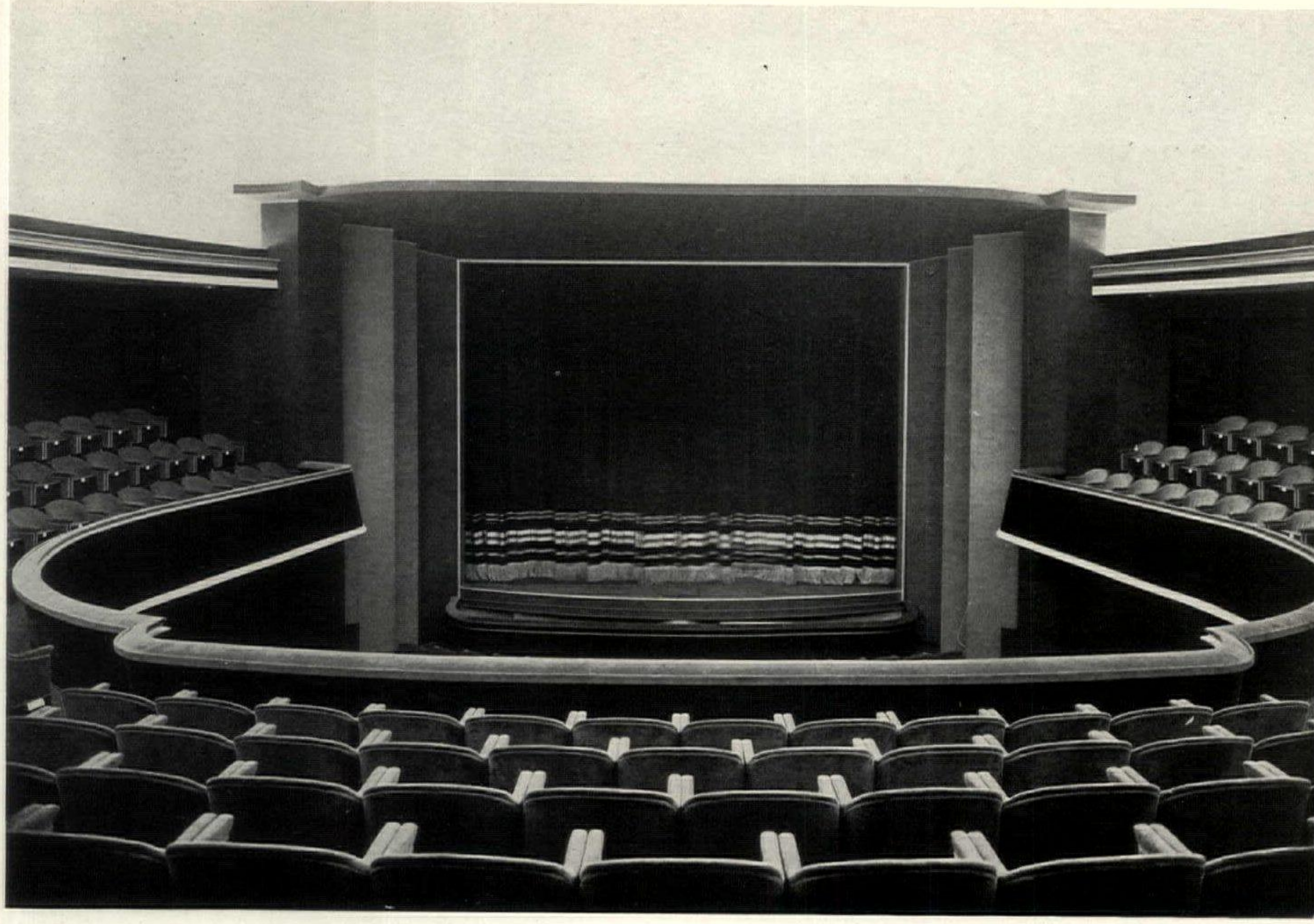


BATHING TERRACE (above) and DRESSING ROOMS (below): Flower beds border passageway to pool.

THEATER

OSLO, NORWAY . . . GUDOLF BLAKSTAD AND JENS DUNKER, ARCHITECTS

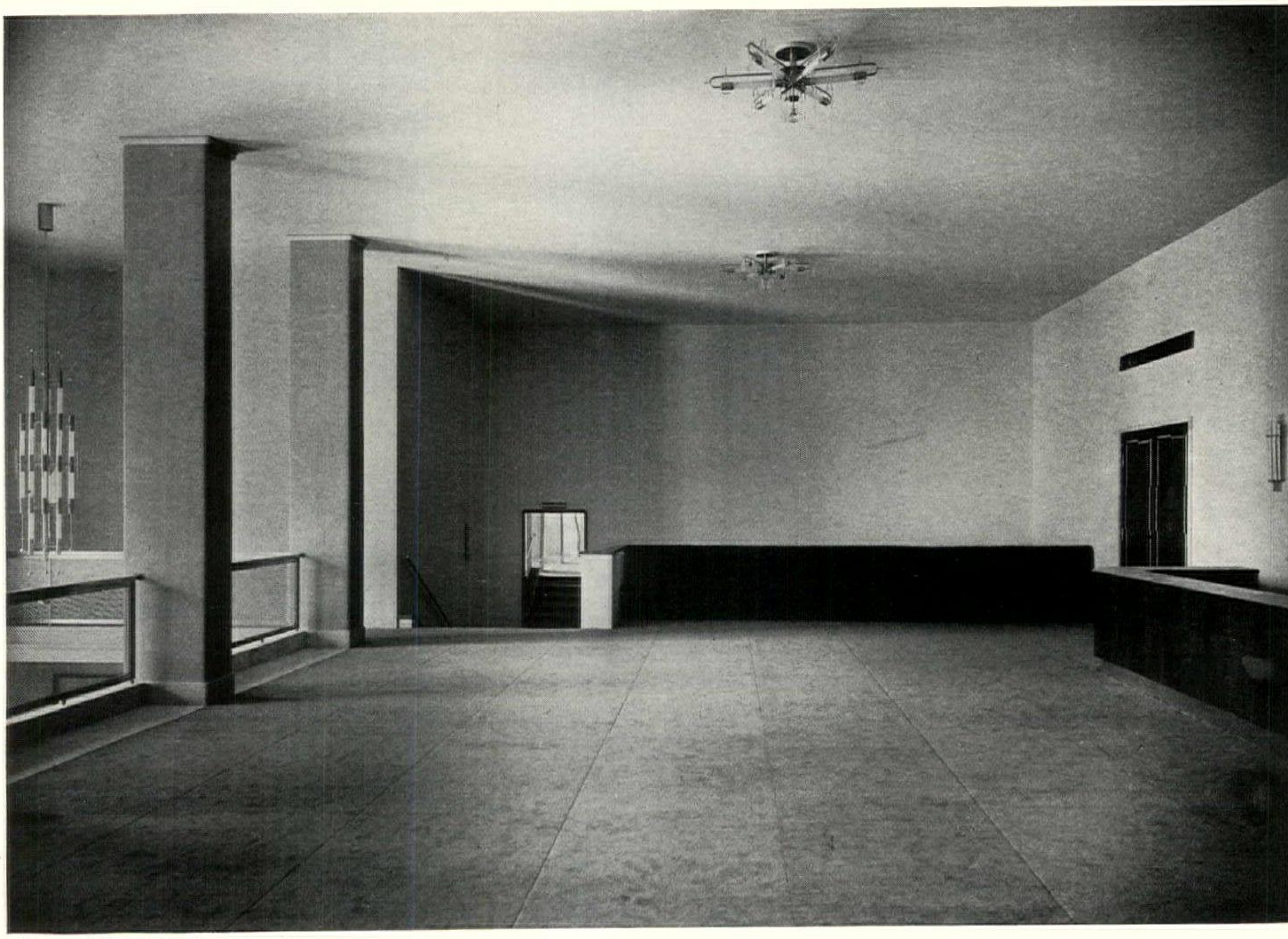
Photographs by O. Vaering



THE GROUND FLOOR of the theater proper contains box office and checking facilities for all persons to check and collect their wraps without delay.

THE AUDITORIUM is reached by stairs, so placed that exit delays are eliminated. There are two foyers, one for the main floor and the other for the balcony. The seats are about 775 in number. The walls that lie in shadow are a subdued red brown. The seats are covered in flame color, brilliantly illuminated by indirect light reflected down from the cream-colored ceiling. In contrast to this warm scale of color, the balcony curve, the columns under the balcony, and the doors are lacquered in black with a scant use of green and gold.

CHECK ROOM LOBBY



Photograph by O. Vaering

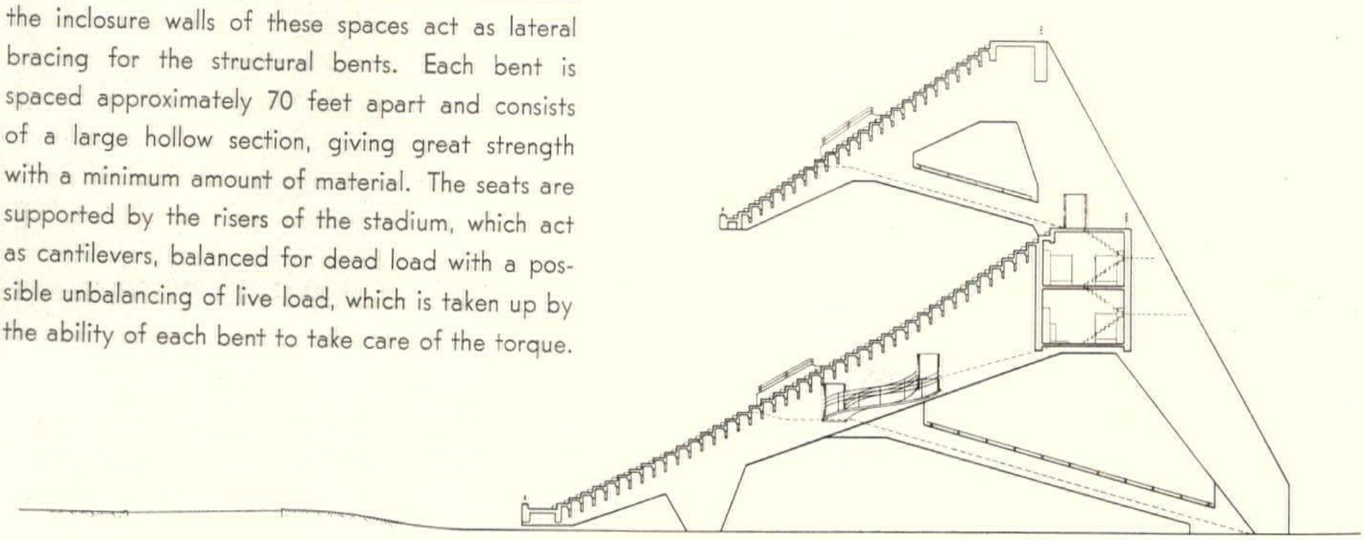
FOYERS AND STAIRWAYS are simple, stress being laid on plain surfaces. The color is light, thus making a contrasting note to the auditorium. During intermission the groups of promenaders chatting or gathering at the refreshment bar give life and movement to the foyers.

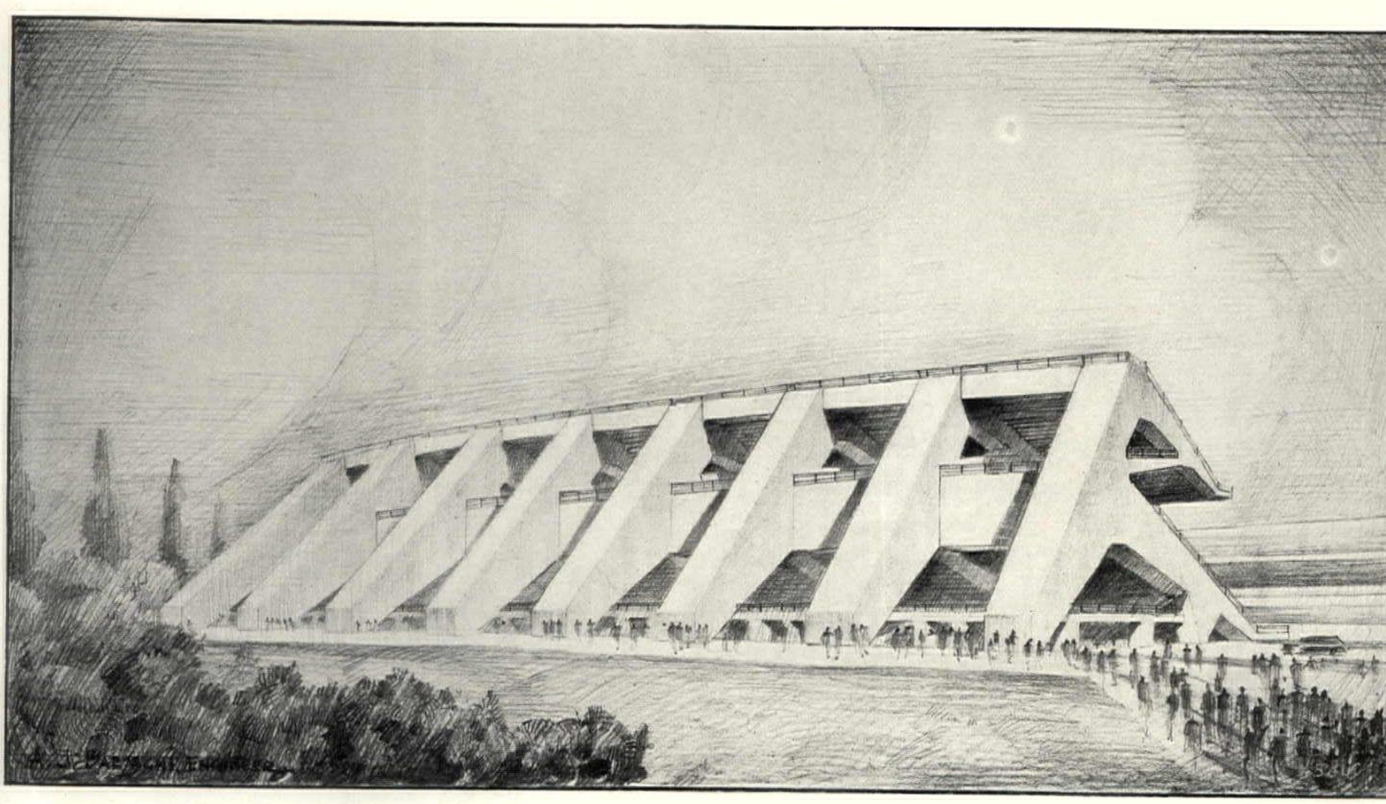
THEATER AT OSLO, NORWAY . . . GUDOLF BLAKSTAD AND JENS DUNKER, ARCHITECTS

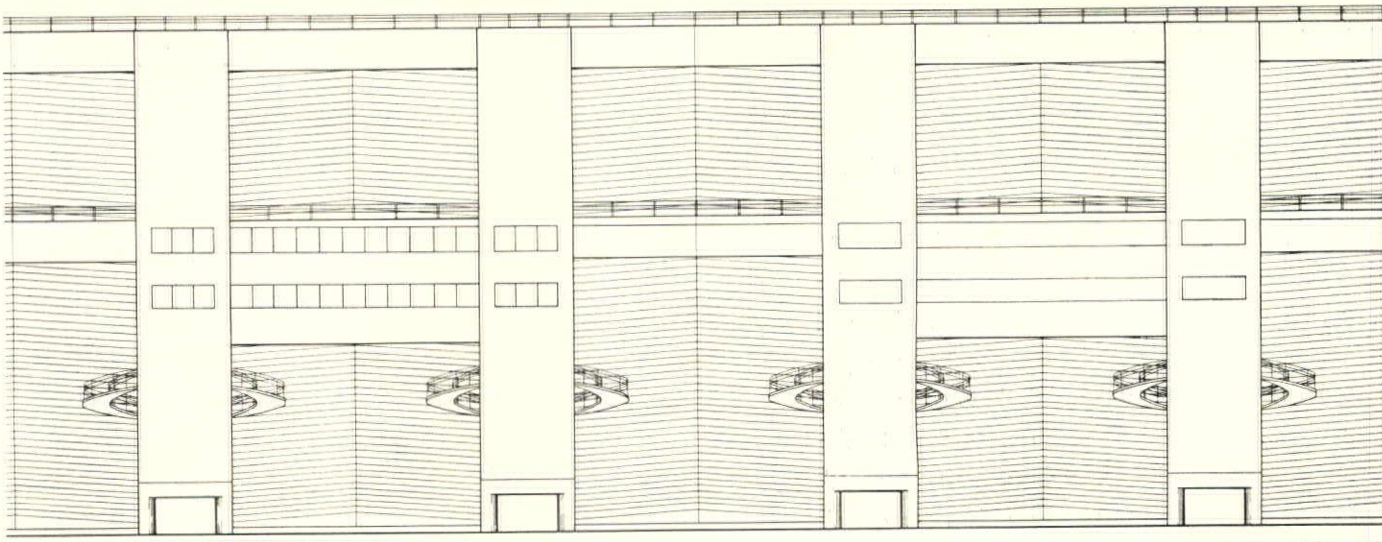
STADIUM

ARTHUR J. BARZAGHI, ENGINEER

The stadium was originally laid out to inclose a standard Olympic athletic field and to have a seating capacity of from 100,000 to 120,000. This necessitated a double deck stadium, similar in general layout to the Ohio Stadium. It was designed to have no columns which might interfere with the view of spectators on the lower tier; a diagonal strut was designed instead to support the upper tier. Entrance at each portal is by means of an inclined ramp which brings the spectators to the lower deck. Those having seats on the upper deck go out around the circular ramp and re-enter each bent, where two short flights of stairs carry them up to the inclined strut, which also acts as a ramp. The utilities and concession booths have been placed between each row of structural bents and the inclosure walls of these spaces act as lateral bracing for the structural bents. Each bent is spaced approximately 70 feet apart and consists of a large hollow section, giving great strength with a minimum amount of material. The seats are supported by the risers of the stadium, which act as cantilevers, balanced for dead load with a possible unbalancing of live load, which is taken up by the ability of each bent to take care of the torque.

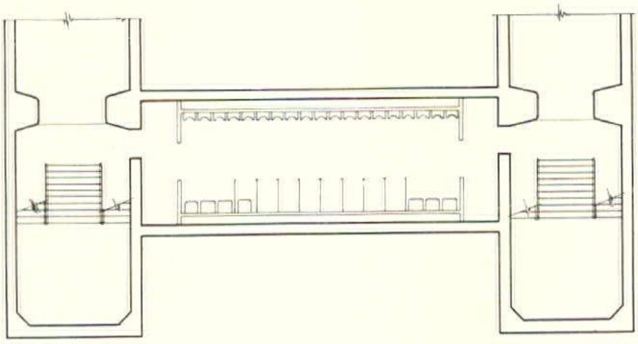


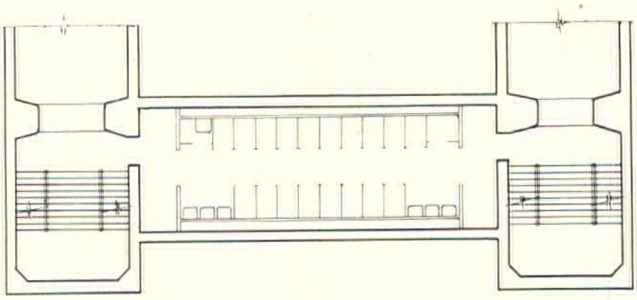




REAR ELEVATION

STADIUM





PLANS OF TOILET ROOMS AT TWO LEVELS

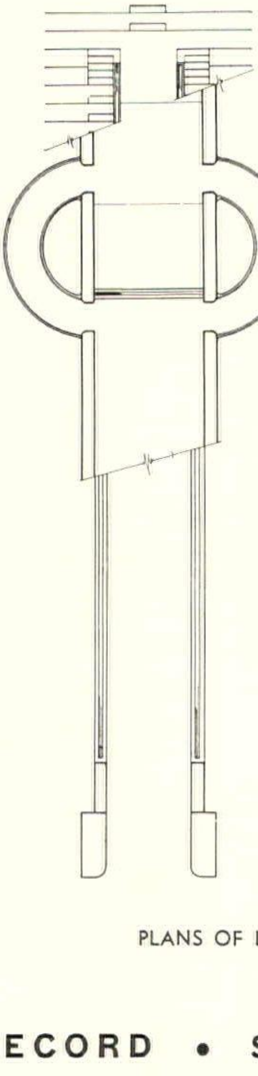
ARTHUR J. BARZAGHI, ENGINEER

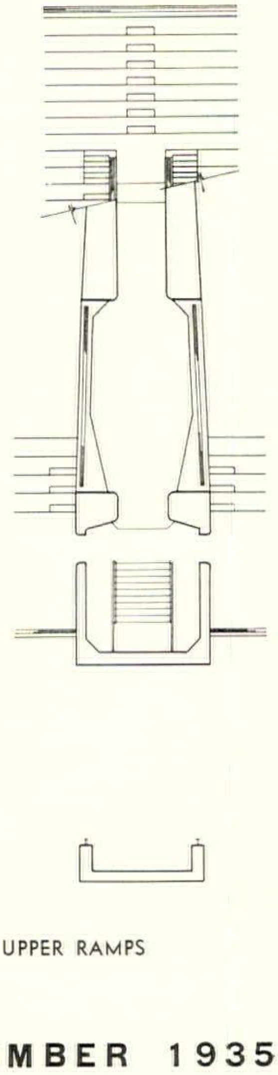
The proposed method of construction: Light structural steel bents would be constructed, capable of carrying, at high working stresses, the loads of the forms and plastic concrete. Such bents would have auxiliary reinforcing steel, attached before pouring concrete. The forms would be hoisted by means of Gantry cranes, and when the concrete has been placed, cured and set, the structure becomes a composite section. This method is the Melan System. The inclosure walls of the large hollow sections should be no thicker than required by structural analysis.

It is estimated that these walls will not be more than 8″ in thickness. The general principle of large hollow sections combining great strength with a minimum of material represents the most recent European practice. The best known example of this is the Albert Loppe Bridge, at Brest, designed by E. Freyssinet.

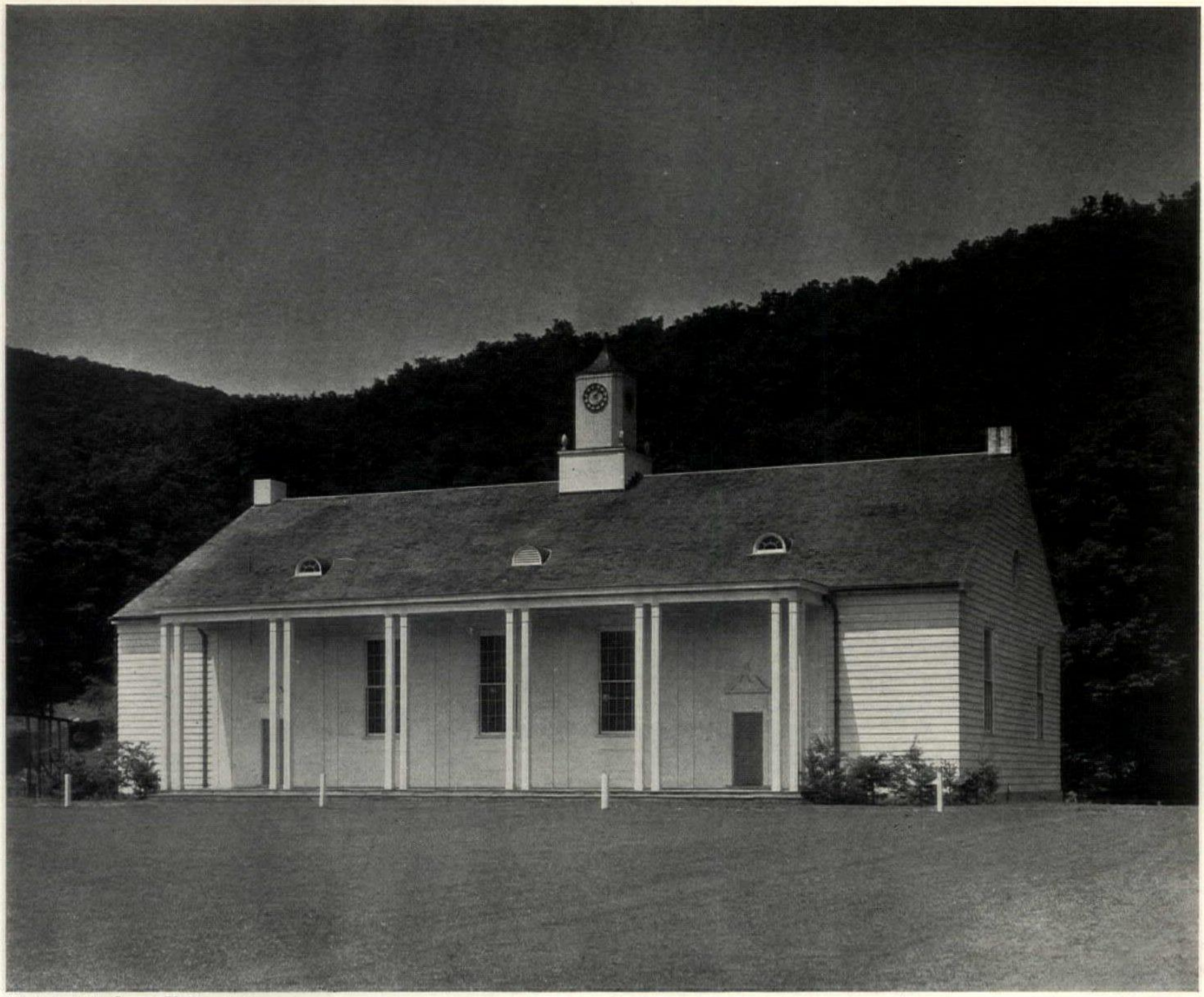
Complete circulation is provided around the stadium at the walk around at the top of the upper deck; and complete circulation could be provided at the top of the lower deck if required. The inclined ramp to the lower deck could be modified in design so as to allow automobile circulation throughout the under part of the stadium if required.

Smaller stadiums could be built in accordance with this design, using the upper tier, which might be transferred into a roof design over the tribunal portion of the stadium.





PLANS OF LOWER AND UPPER RAMPS

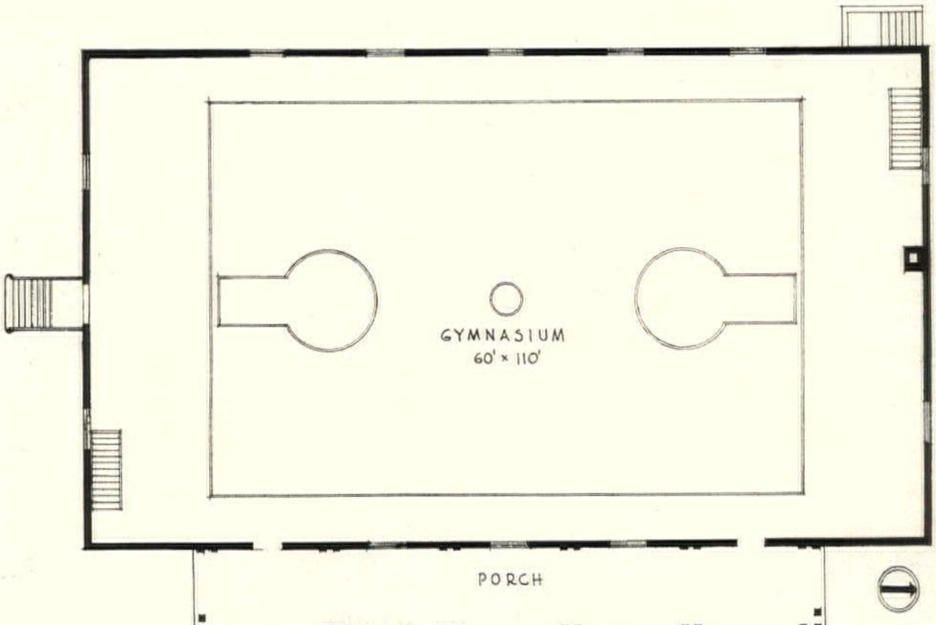


Photograph by George H. Van Anda

KENT SCHOOL, KENT, CONN.
WILLIS N. MILLS, ARCHITECT

SPORTS BUILDING

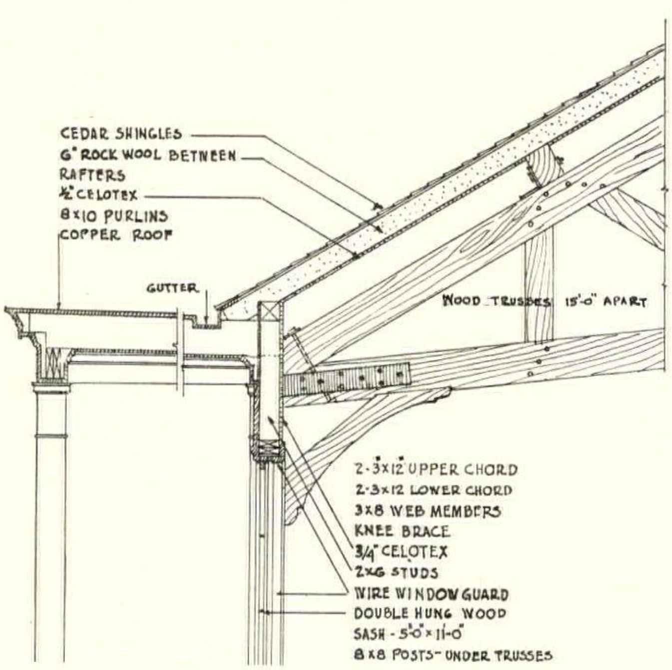
The building has one regulation size basketball court with movable bleacher space for about 300 spectators, two handball walls, indoor tennis court. The basement includes wrestling room 30′ x 30′, two locker rooms, two shower rooms, toilet facilities, boiler room, storage space. The building will also be used for dances and dramatics (with temporary stage). The porch flanking the football field gives shelter to the stands during football games.
The total cost of the building, including sewage disposal system was $28,800, or 11.3c a cubic foot.

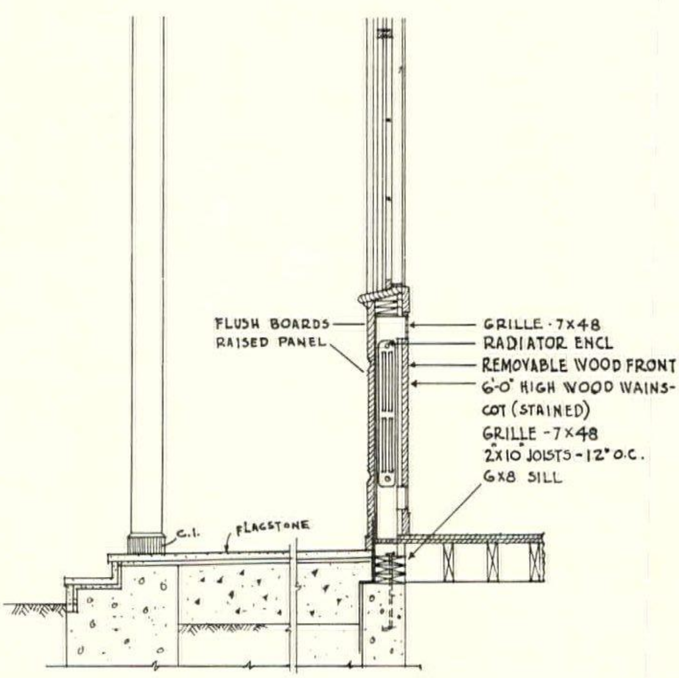


TOWER DETAIL

Photographs by George H. Van Anda

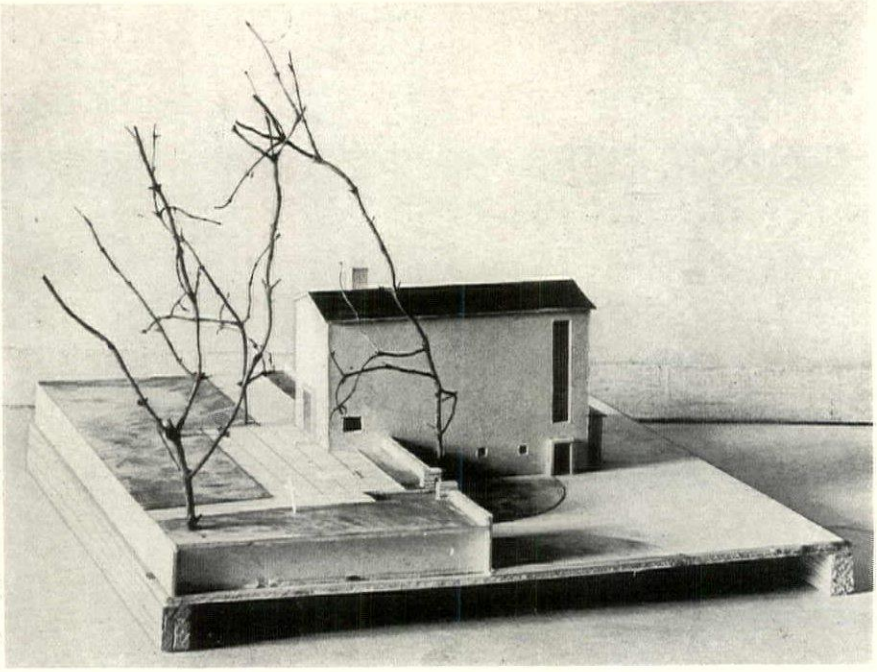
Photograph by George H. Van Anda

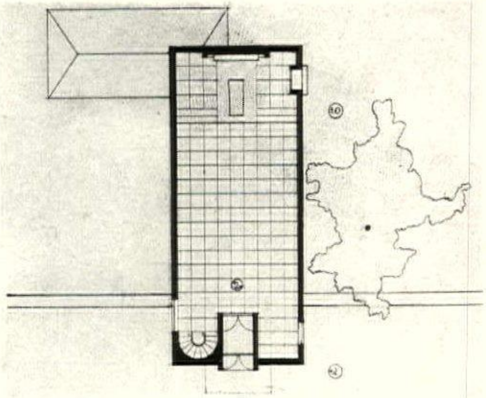




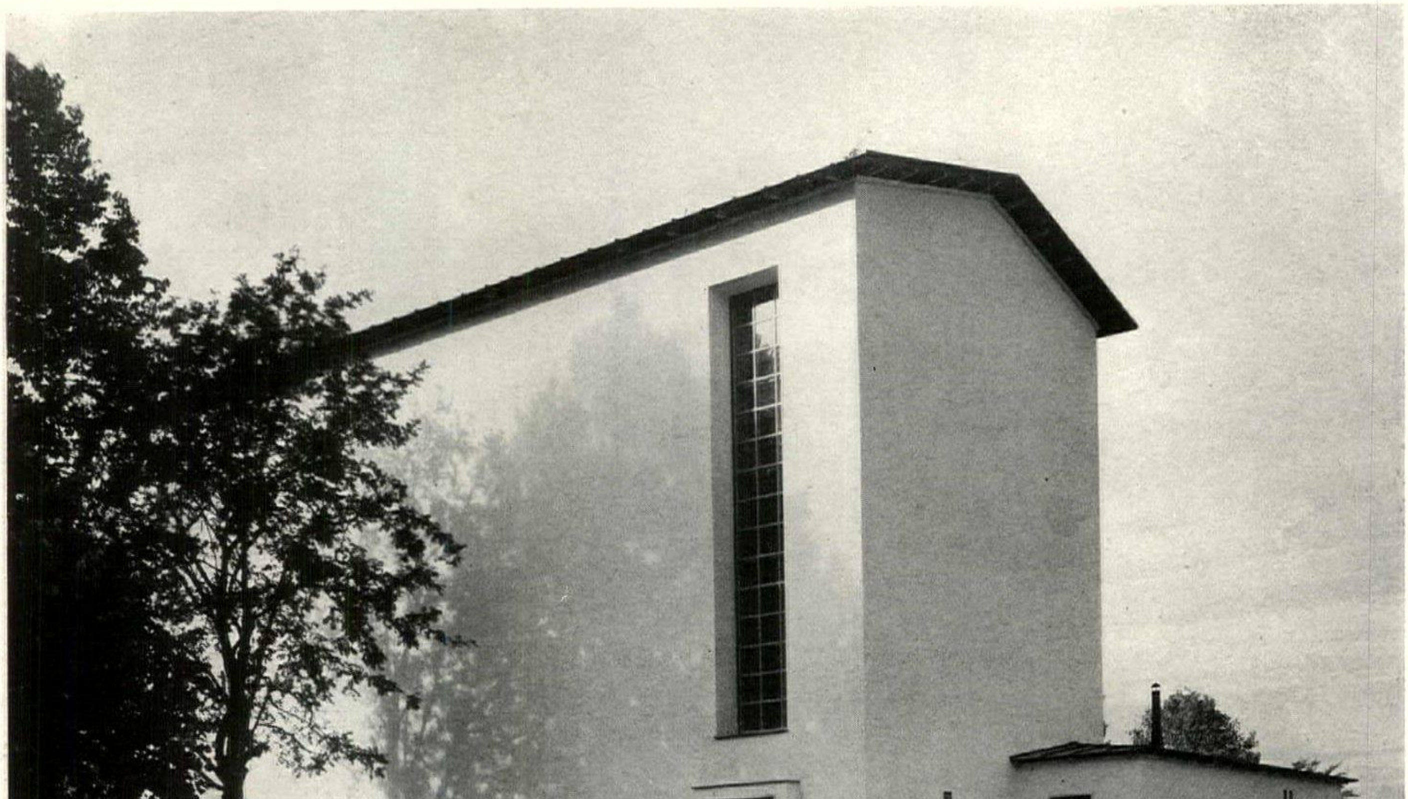
SPORTS BUILDING AT KENT SCHOOL, KENT, CONN., DESIGNED BY WILLIS N. MILLS

CHAPEL IN PARGAS, FINLAND . . . DESIGNED BY ERIK BRYGGMAN, ARCHITECT



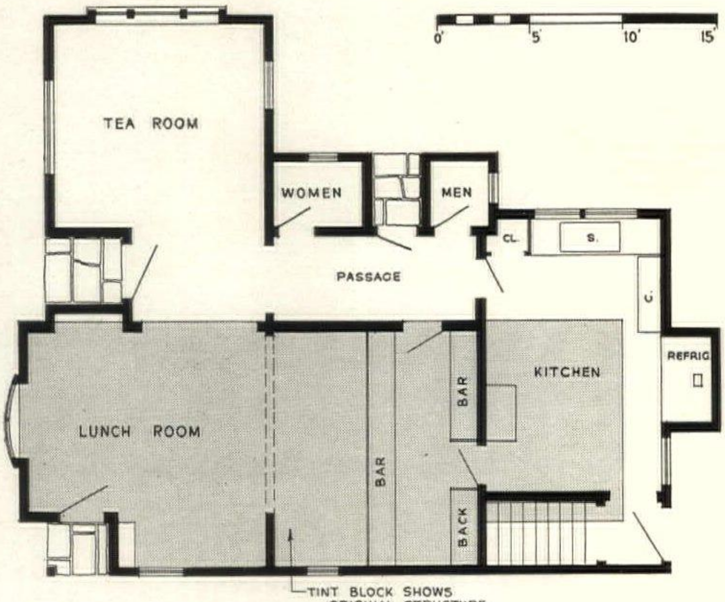


CHAPEL IN PARGAS, FINLAND . . . DESIGNED BY ERIK BRYGGMAN, ARCHITECT



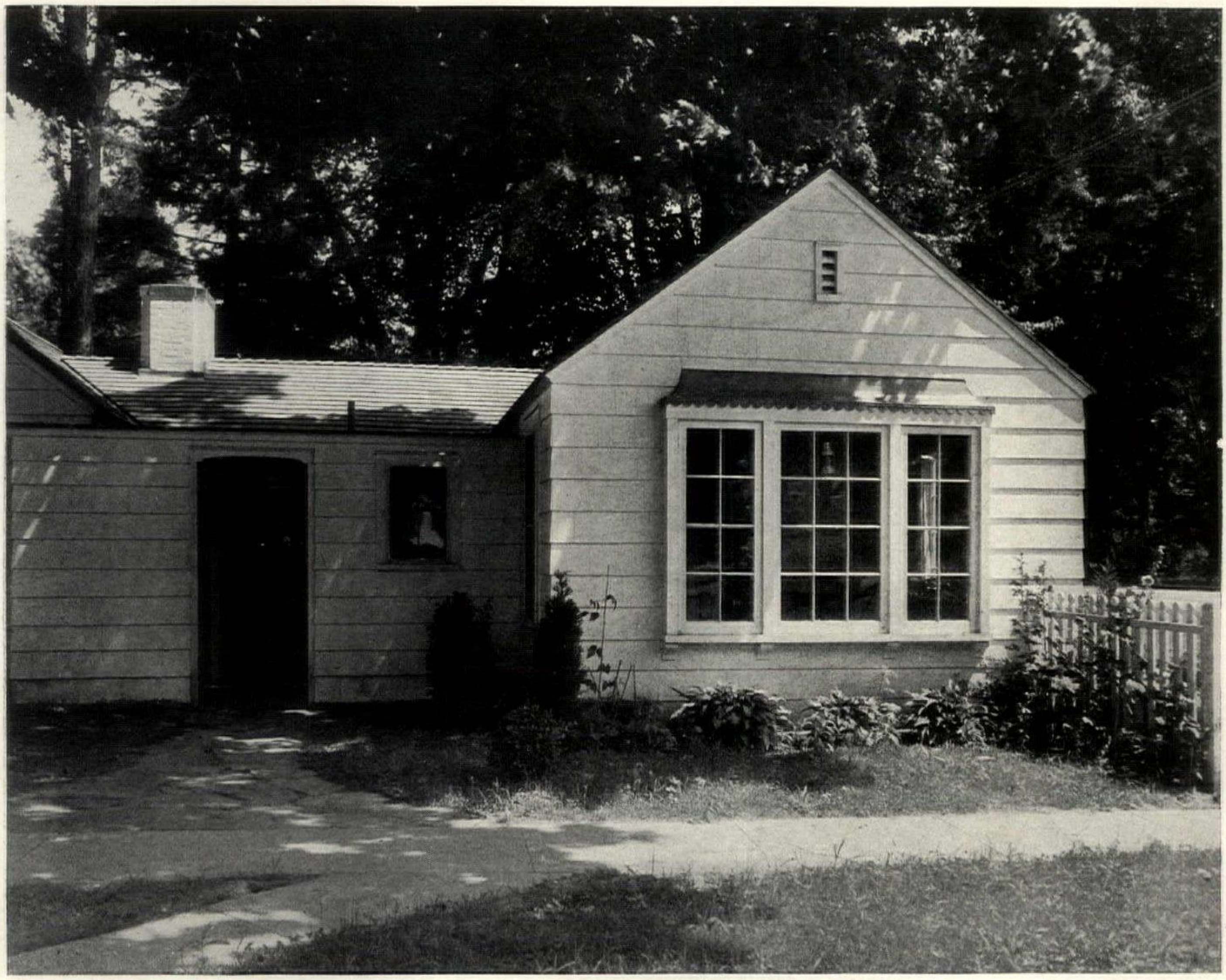
Photograph by Gustav Velin

"THE PEWTER MUG" AT KENT, CONN. DESIGNED BY ALLAN McDOWELL

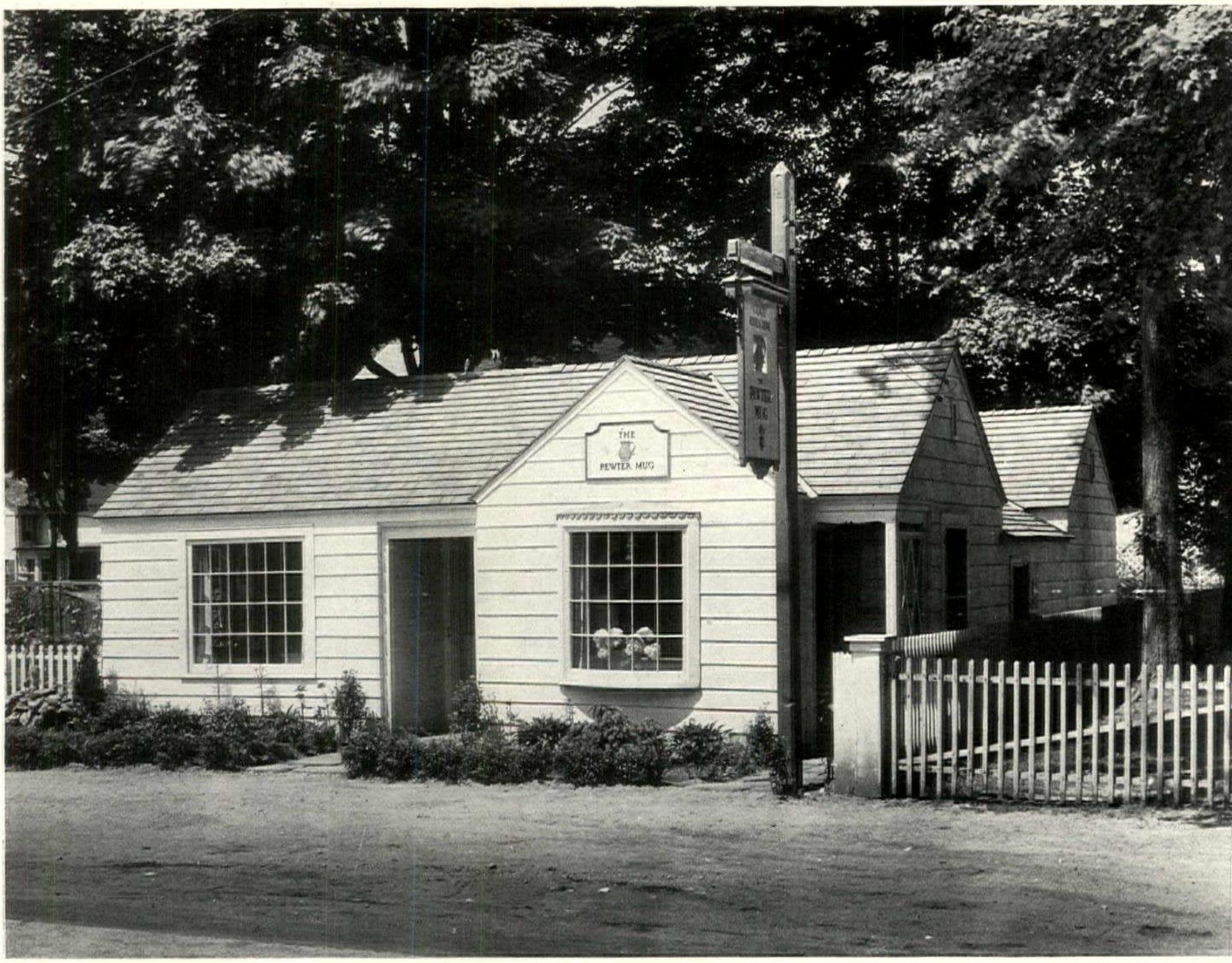


BEFORE REMODELING

AFTER REMODELING



Photographs by George H. Van Anda



Photograph by George H. Van Anda

"THE PEWTER MUG" AT KENT, CONN. . . . DESIGNED BY ALLAN McDOWELL

The original lunch room was considered an eyesore on the village street. In an effort to stay in business, the proprietor decided to sell beer and improve the appearance of the place. With limited funds he had to make use of the existing structure. The cost of remodeling and new equipment was just over $2,000. Side walls: white shingles. Roof: gray shingles. Blinds and outside ceiling: horizon blue. Light fixtures: handmade by local tinsmith. Wrought iron latches by local blacksmith. Back bar and bar: soft gray green. Lunch room: white trim and gray green and white wall paper.

REMODELED LUNCH ROOM

EDITORIAL OFFICES

EDITORIAL PUBLICATIONS, INC., NEW YORK . . . WILLIAM LESCAZE, ARCHITECT

Photograph by F. S. Lincoln

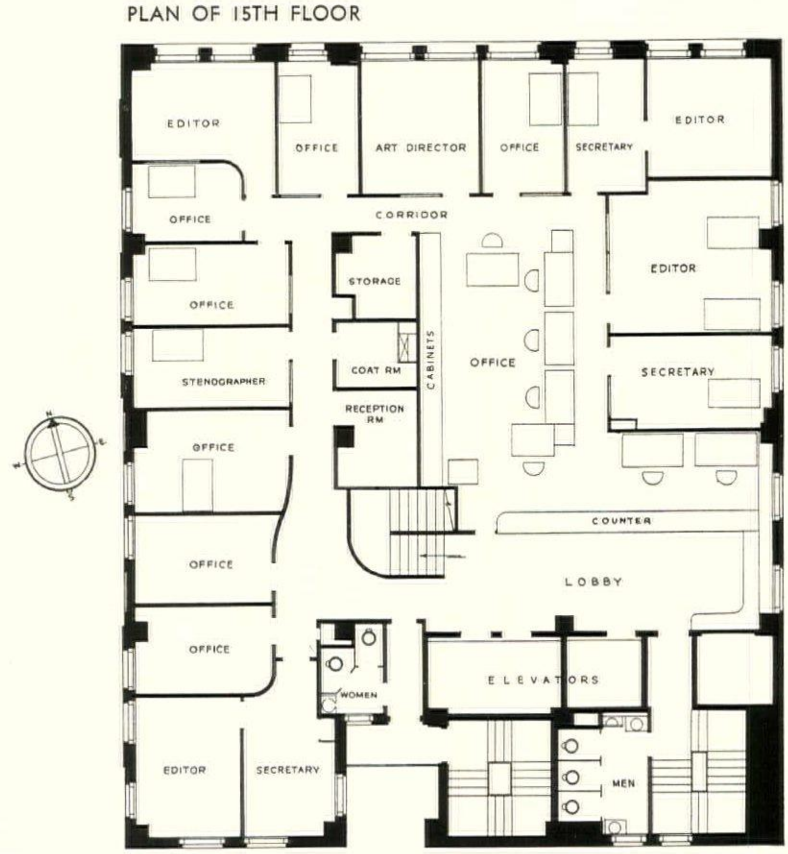
Photographs by F. S. Lincoln

EDITORIAL OFFICES

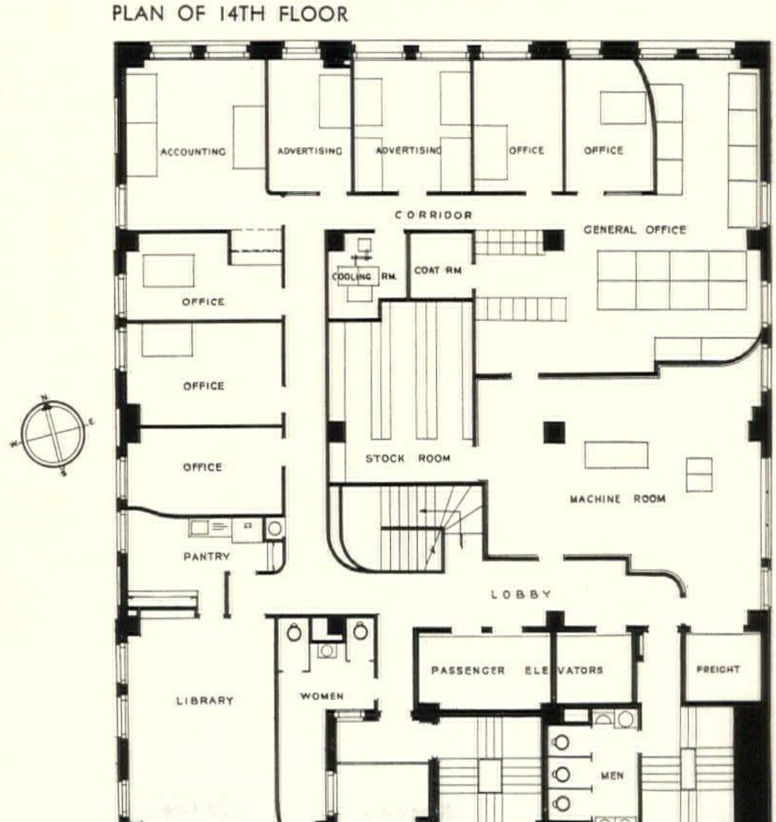
EDITORIAL PUBLICATIONS, INC.
NEW YORK

WILLIAM LESCAZE, ARCHITECT

PLAN OF 15TH FLOOR



PLAN OF 14TH FLOOR

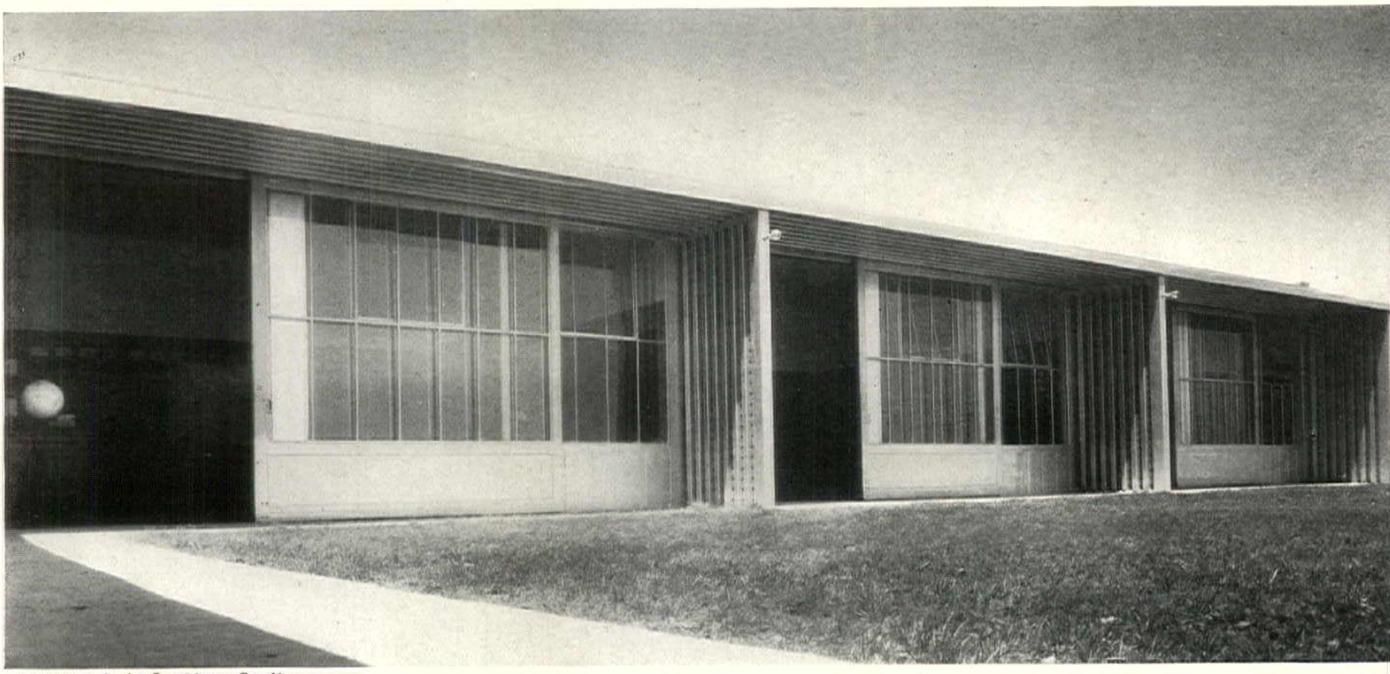


The offices occupy two floors. The fifteenth floor is given over entirely to the editorial departments of the four magazines—The New Republic, Theatre Arts, Antiques, and Asia. The central portion of this floor is a general office for stenographic and clerical workers connected with the editorial departments, and for switchboard operator and receptionist. This is separated by a long receiving counter from the elevator lobby which serves as a general reception room. There is also a small alcove for receiving visitors whose business does not require that they be taken into one of the private offices.

A stairway leads down to the fourteenth floor. On this floor are the business staffs of the four magazines, including a general office for workers in the subscription department, and a separate soundproof room for the machinery used in addressing; a stockroom and rest room for women employees, and the machinery used for ventilating both floors. There is also in the southwest corner of this floor a room which combines the functions of general library and dining room, where lunches are held almost daily, at which the editors of the several magazines meet and entertain guests. Adjoining this room is a small pantry and kitchenette.

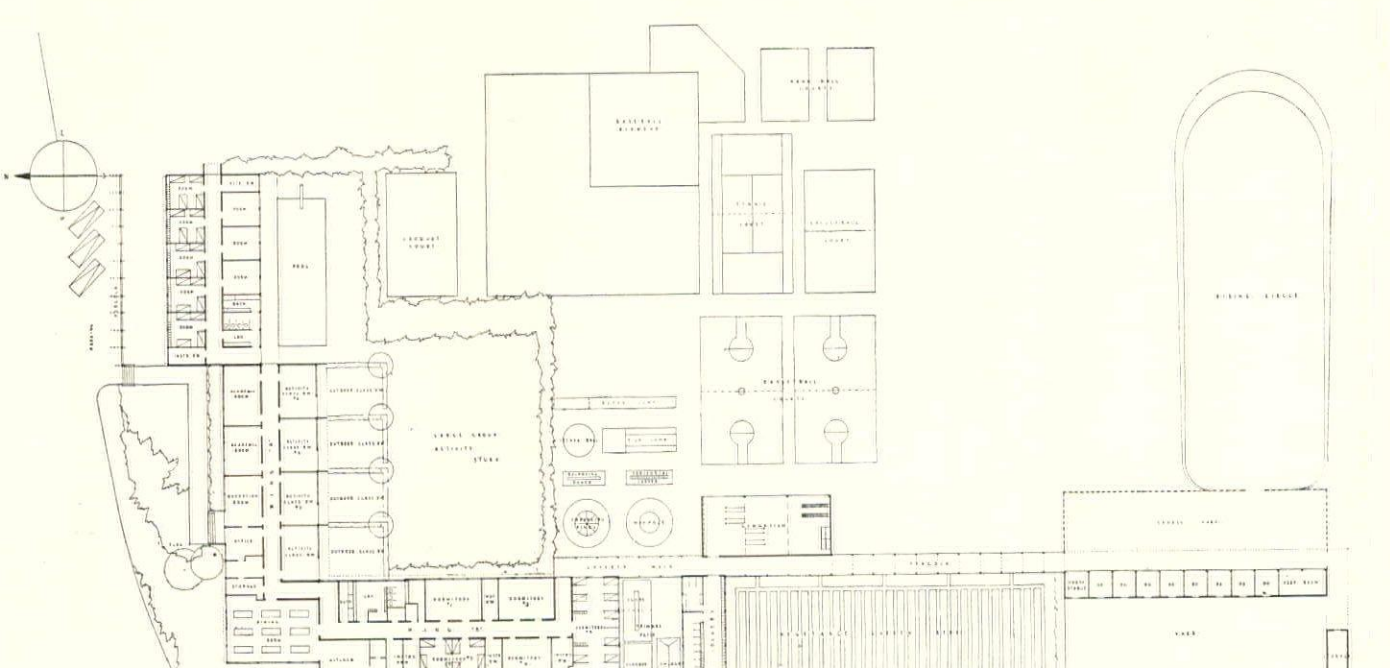
BOYS' SCHOOL

CALIFORNIA MILITARY ACADEMY . . . RICHARD NEUTRA, ARCHITECT



Photographs by Luckhaus Studio

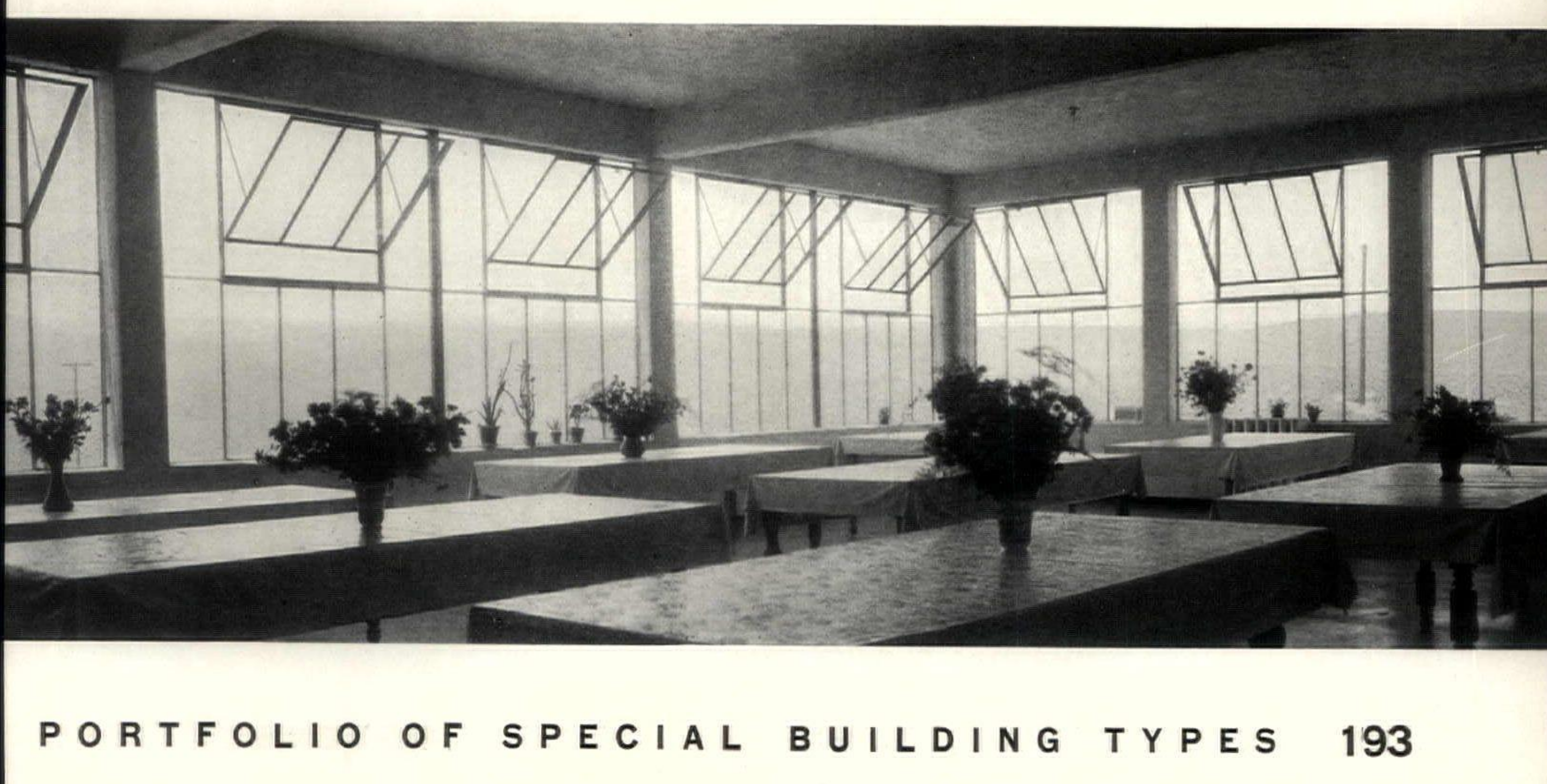
CLASSROOM WING



GENERAL PLAN

THIS PREPARATORY SCHOOL for boys is located in the Baldwin Hills, overlooking the plain of Los Angeles, the elevations of the San Bernardino mountains on the east and the ocean on the west. The first phase of the building program included dormitories for boarding students of elementary school age, dining room with kitchen, private rooms for educators, administration offices, classrooms for activity and academic study, tub baths, showers, lavatories, toilets, horse stables and riding ring. The second building phase, now under way, adds dormitories for older boys, a pool and a gymnasium. Most physical exercise is carried on outdoors on the extensive playgrounds.

ACTIVITY ROOMS open by means of wide sliding metal glass doors into open-air classrooms, partly protected by root overhangs. Robertson cellular steel was chosen as structural and wall forming material. The steel construction follows principles of Palmer Steel Buildings, Inc., and was executed by this company. Sixteen-gauge copper-bearing cellular steel is used for bearing walls, cantilevering up out of grooved concrete footings, and for the roof. Joints are caulked with Horn's plastic compound, applied with a gun. All exterior surfaces are made heat-reflecting by a spray coat of aluminum. Metal lath, celotex lath and cement form interior non-bear ing partitions and ceilings. Continuous monitor skylights give distributed illumination to classroom and dormitory corridors.

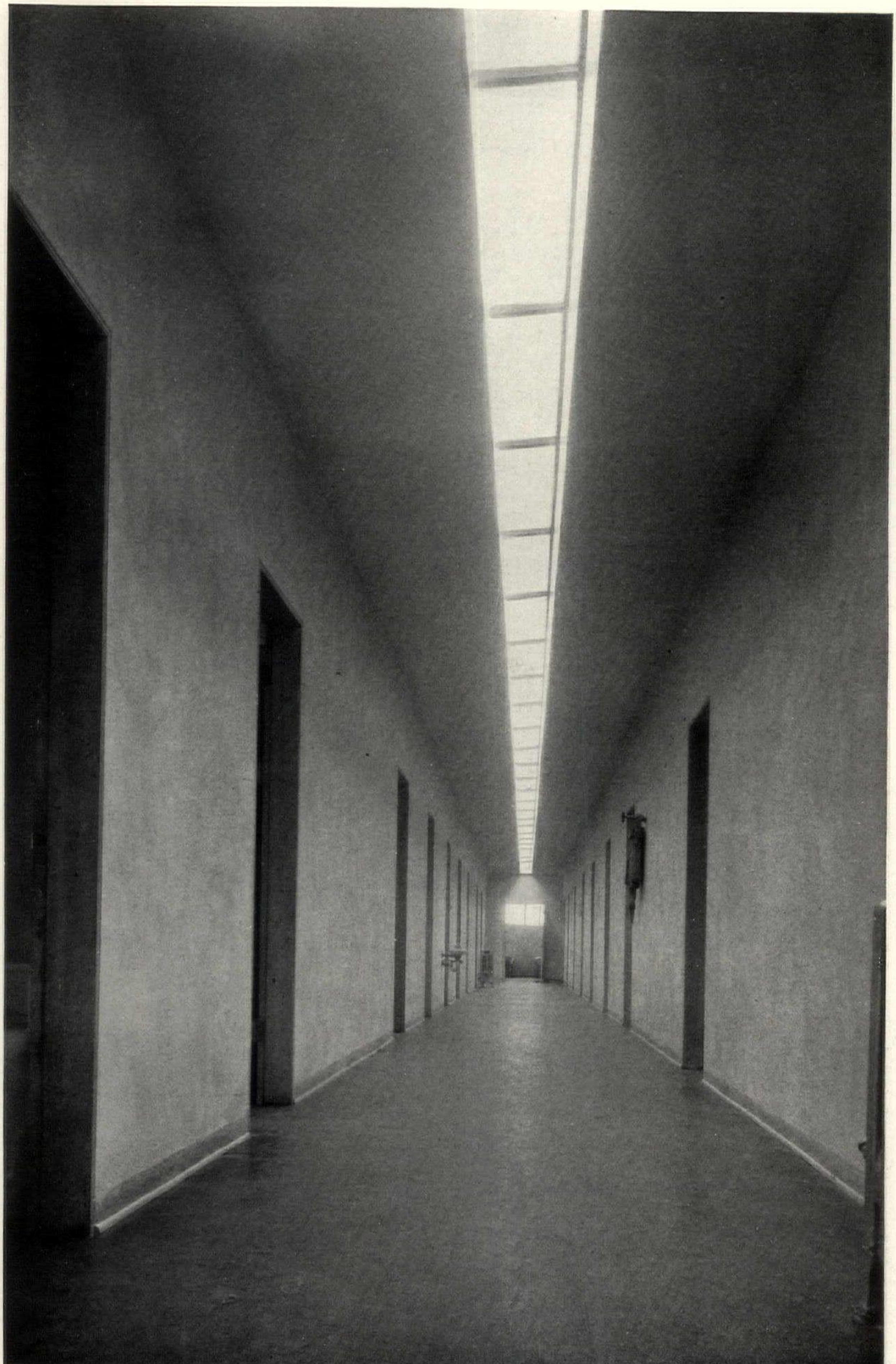


BOYS' SCHOOL

CALIFORNIA MILITARY ACADEMY

EAST ENTRANCE

Photographs by Luckhaus Studio



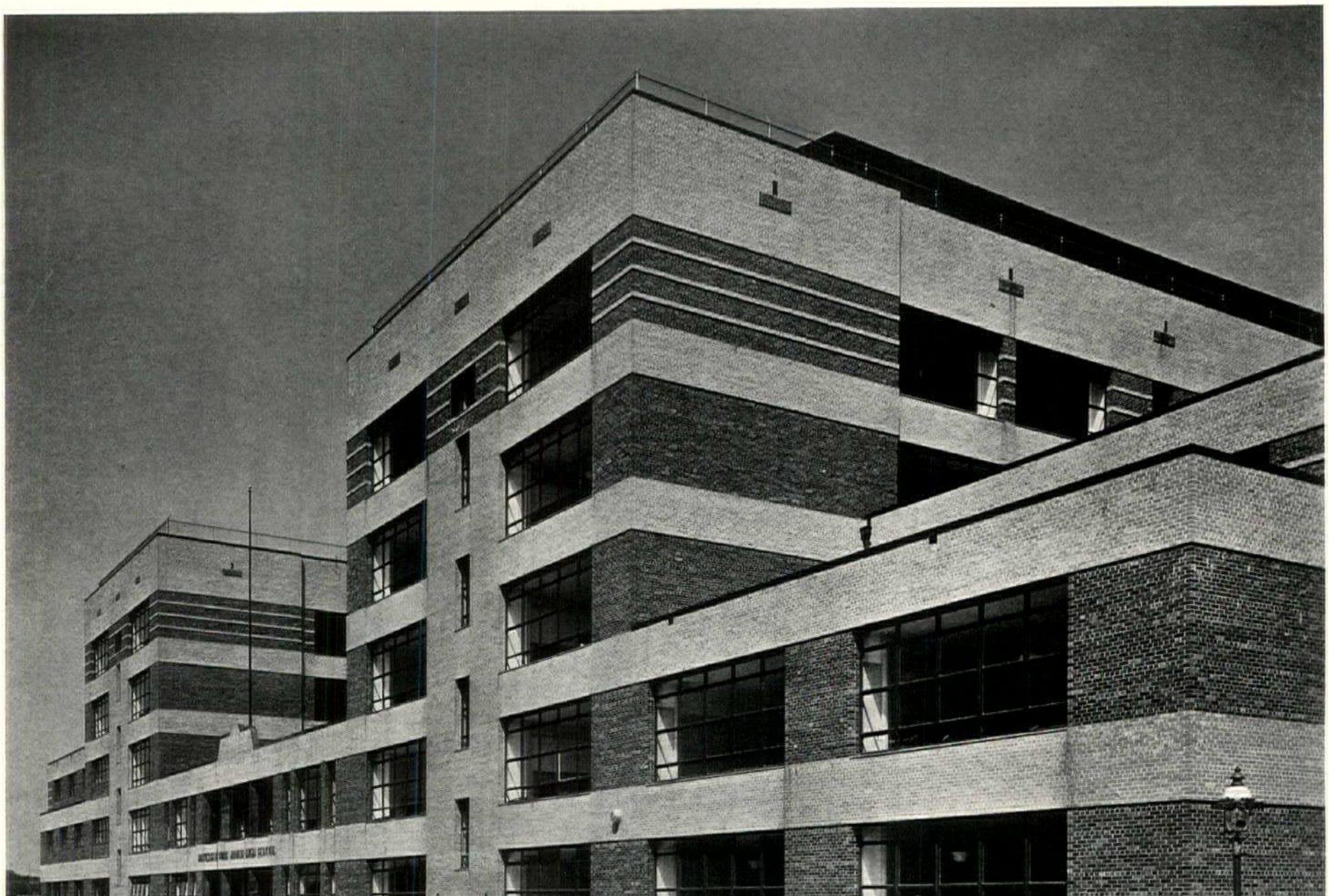
HIGH SCHOOL

This school covers an entire city block, and is seven stories high, the cafeteria being located on the top floor. The building is equipped with two elevators, one running from the basement to the cafeteria (8 floors) and the other from the shop floor (7 floors). These elevators are completely automatic and embody all logical safety appliances.

The contract was let in October, 1932, for the sum of $714,000. The building was intended to accommodate 3,185 pupils, making a building cost per pupil of $224.89. The cubic foot cost was 21.6 cents.

The cost of this building was taken from a $10,000,000 School Loan, passed by the 1927 General Assembly (Chapter 470) and an ordinance of the Mayor and City Council (No. 1054) ratified by the people in the same year. It was built under the jurisdiction of the Public Improvement Commission, a specially appointed municipal agency for the expenditure of loan funds. The actual construction was supervised by the Bureau of Construction of this agency, under the direction of Herbert J. Leimbach, supervising engineer.

This building is heated by direct cast-iron radiation, set behind metal inclosures in each window panel; the auditorium by fans operating over coils. The cost of this installation was approximately $1.38 a foot for radiation, and represented 10.7% of the contract. The plumbing includes pupils' toilets and teachers' rooms on all



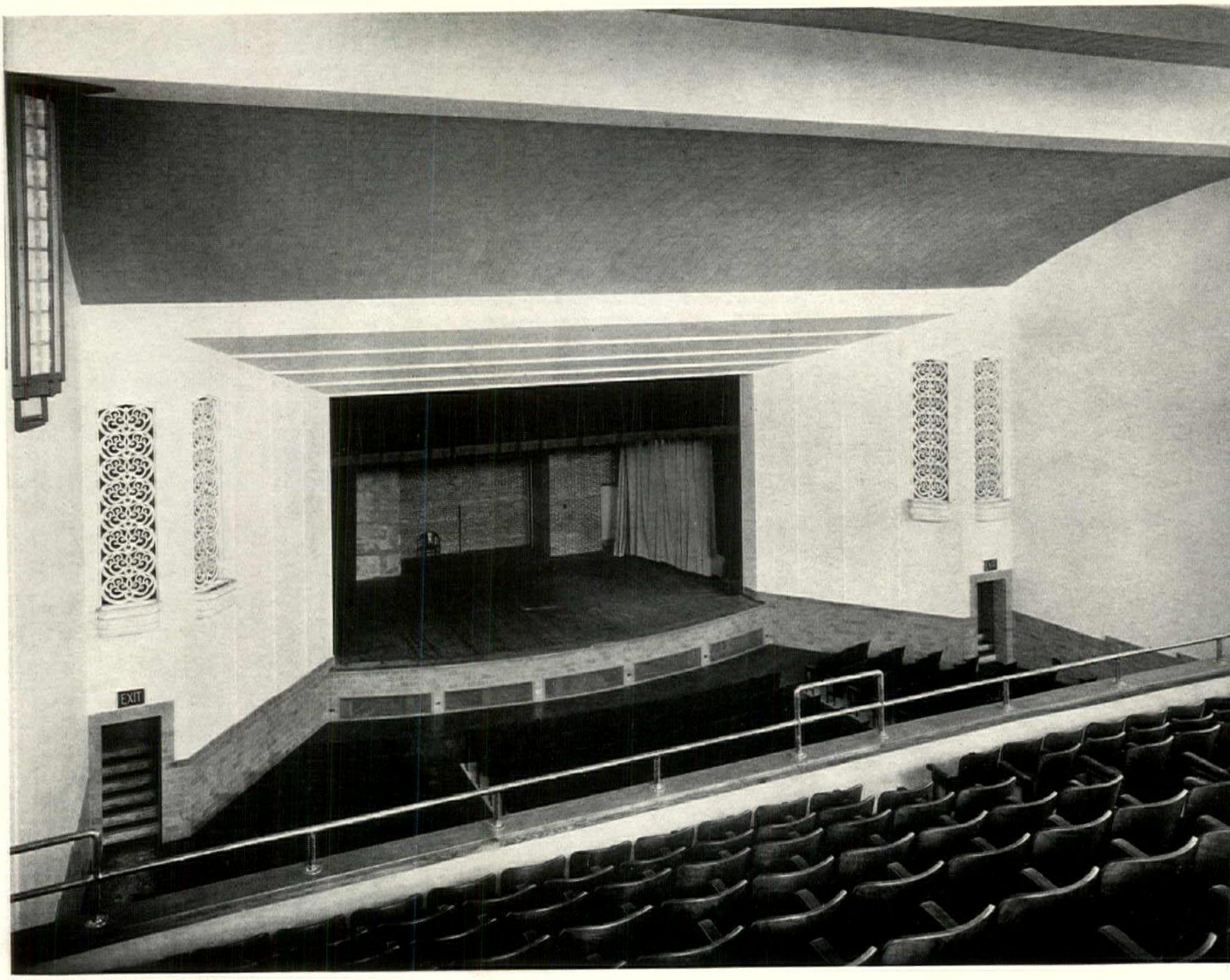
Photographs by Harry B. Leopold

floors, with groups of help wash rooms on the cafeteria and boiler room floors; and represented 7% of the contract.

The school is completely fire-resistive, except for certain trim and floor finish. It has brick bearing walls over concrete footings, with reinforced concrete and steel columns; steel trusses and beams, concrete beams and Schuster slab floor construction.

The exterior walls are of selected red brick with bands of black brick and are trimmed with Alberene stone. The exterior steps and platforms are granite. The windows are steel of architectural grade, and are generally of the projected type with hopper vents at top and bottom. The interior walls and partitions in the stair towers, toilets, cafeteria, gymnasiums, shops, drawing rooms and cooking rooms, and the wainscot in the corridors, locker alcoves and lobby are finished in light buff salt glazed bricktile. The roof at the cafeteria level has been arranged for a play area, being of promenade tile. It is partly sheltered with asbestone roofing on a steel framework. Interior stairways are steel with precast terrazzo treads.

Floors of toilet rooms, entrance halls and auditorium lobby are terrazzo; the cafeteria kitchen, passage, pantry, etc., are promenade tile; corridors, cafeteria, locker alcoves have mastic tile finish, and the drawing rooms and shops have wood block floors. All other instruction rooms, health suite, office suite and auditorium aisles are finished with linoleum; in general all other floors have cement finish.

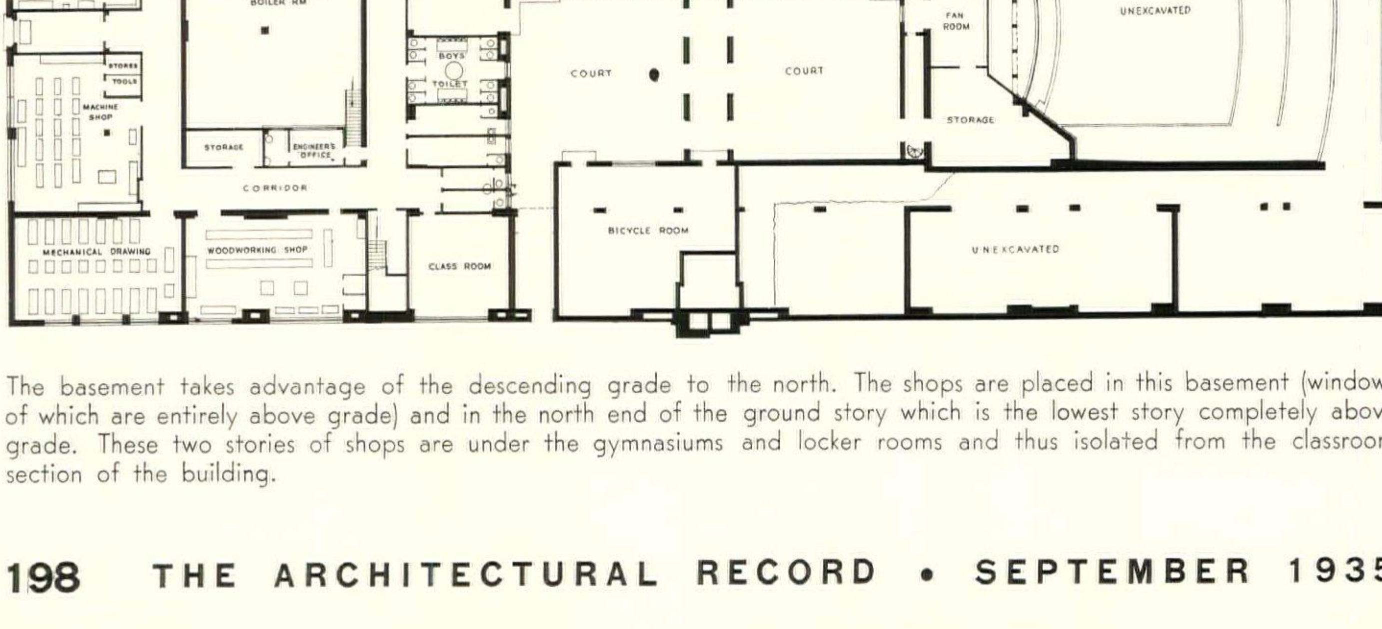


Photographs by Harry B. Leopold

AUDITORIUM

HIGH SCHOOL

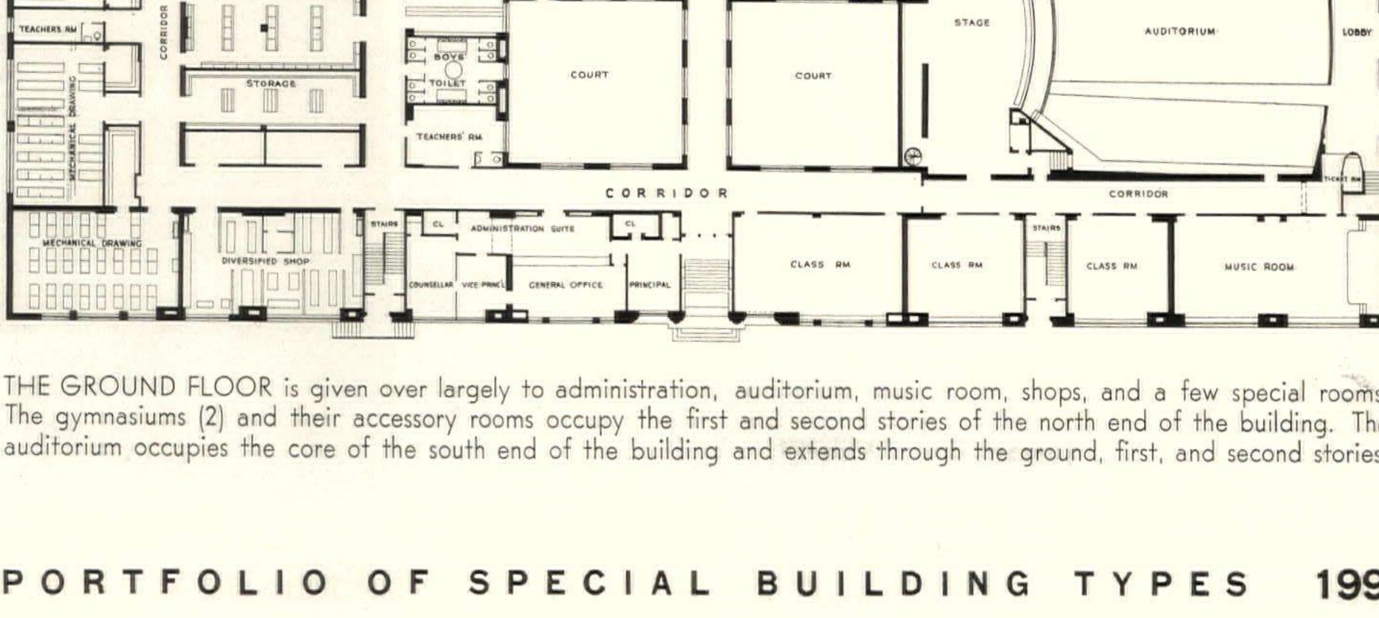
BALTIMORE, MARYLAND



The basement takes advantage of the descending grade to the north. The shops are placed in this basement (windows of which are entirely above grade) and in the north end of the ground story which is the lowest story completely above grade. These two stories of shops are under the gymnasiums and locker rooms and thus isolated from the classroom section of the building.

LIBRARY

PATTERSON PARK JUNIOR HIGH SCHOOL . . . WYATT AND NOLTING, ARCHITECTS

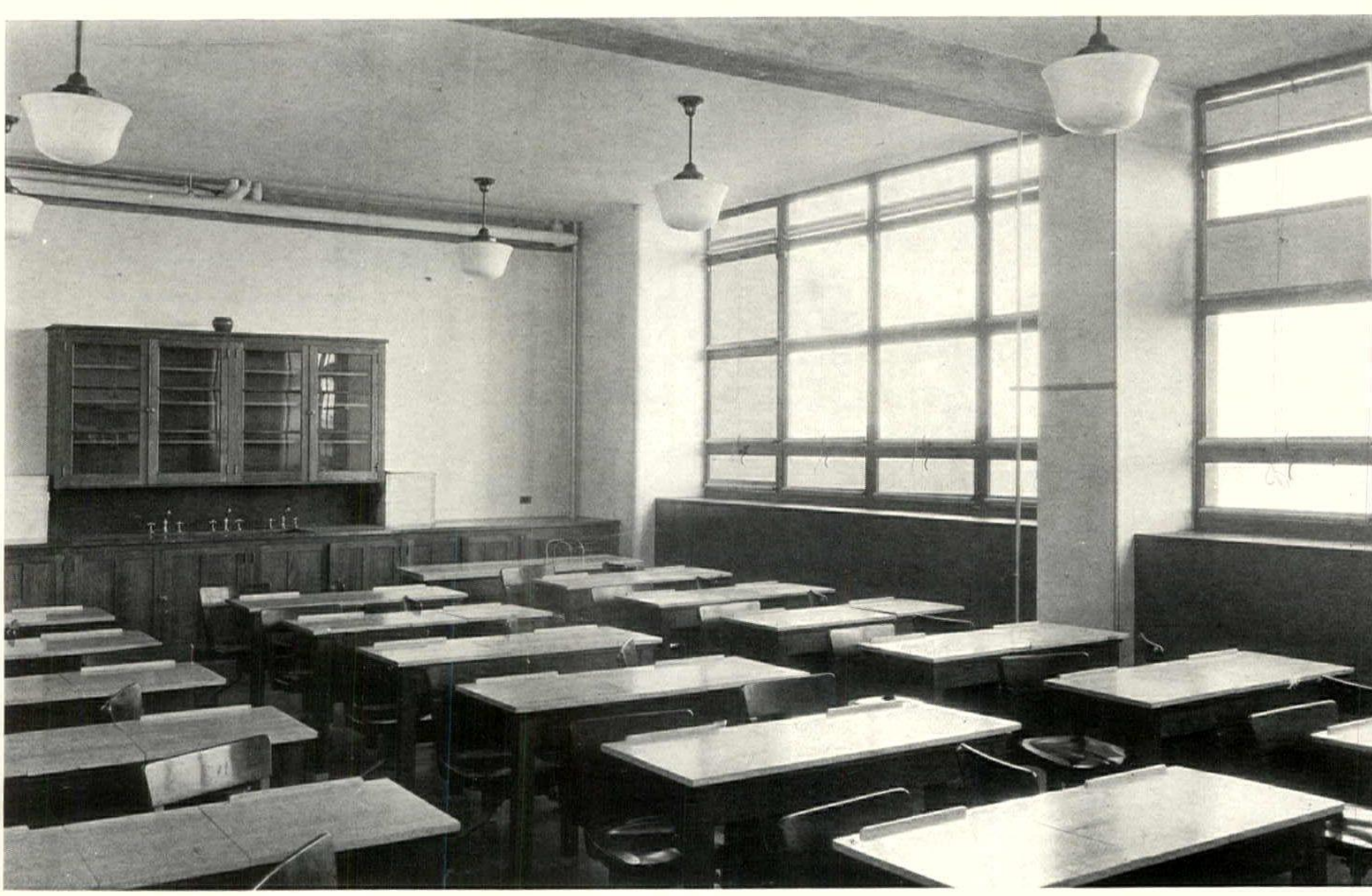


THE GROUND FLOOR is given over largely to administration, auditorium, music room, shops, and a few special rooms. The gymnasiums (2) and their accessory rooms occupy the first and second stories of the north end of the building. The auditorium occupies the core of the south end of the building and extends through the ground, first, and second stories.

CAFETERIA

PATTERSON PARK JUNIOR HIGH SCHOOL
BALTIMORE, MARYLAND
DESIGNED BY WYATT & NOLTING, ARCHITECTS

ART ROOM



Photographs by Harry B. Leopold

OPPORTUNITIES IN SCHOOL MODERNIZATION

A SURVEY OF SCHOOL CONDITIONS AND PROSPECTS IN FUTURE SCHOOL CONSTRUCTION

By WILLIAM G. CARR, Director, Research Division, National Education Association

The average high school graduate has spent about 13,000 hours within the walls of a public school building. These 13,000 hours are potentially the most impressionable and valuable hours of his life. Quite apart from the formal educational processes, the physical school environment during these hours is bound to make a profound impression on the growing child. Through this environment eyesight may be conserved or injured, life-long health may be developed or endangered, tastes for beauty or for ugliness may be developed, and the whole costly process of education may be encouraged or nullified. The school building is the tangible and visible evidence of the attitude of the public towards education. Suitable school buildings are indispensable to an efficient system of general education at public expense.

The current situation with regard to school housing needs is by no means gratifying to those who realize that learning can proceed in a normal manner only when children are housed in safe, clean, and comfortable quarters and that desirable attitudes and character traits are developed with difficulty, if at all, unless the school environment is gracious and wholesome. A conservative estimate indicates that school building costs in the United States since 1918 have been more than a billion dollars below the reasonable needs of our rapidly expanding school system.[1] During the depression years this school building deficit has increased at an alarming rate which has resulted in completely unsatisfactory school-housing conditions in thousands of American public schools.

Since 1930, the construction of school buildings has been all but abandoned. Figure I shows how sharply capital outlay expenditures have fallen during the depression years, from nearly $371,000,000 in 1930 to approximately $100,000,000 in each year since 1933.

The cessation of building activity has occurred in both urban and rural areas. One of the reports of the United States Office of Education shows that between 1931 and 1934, in 262 city school systems, capital outlays declined 80.1 per cent.[2] Another report from that office, based on questionnaire returns received from 1,111 county superintendents during the autumn of 1933, cites 1,425 building projects in rural areas where the need was urgent but construction was being postponed because of lack of funds.[3]

Figure II shows graphically the trends since 1926 with respect to school enrollments, expenditures for school buildings, and total expenditures for all school purposes. By going back to 1926, the effect of the depression on prevailing trends is revealed. This diagram makes it clear that the decrease in school building construction cannot be explained in terms of a stationary school population—enrollment is increasing steadily. The growth in high school enrollment especially stands in sharp contrast to the rapid drop in capital outlay.

A recent survey covering 31 states, the District of Columbia, and 153 cities over 30,000 in population indicates that:

> Approximately 1,400,000 pupils are enrolled in 12,300 buildings which have actually been condemned as unsafe or insanitary.
>
> Approximately 600,000 children are able to attend school only part time because of inadequate building facilities.
>
> Approximately 1,000,000 children are housed in tents, portable and temporary schools, or in rented quarters.
>
> About 8 per cent of all school buildings now in use date back to the Civil War period; more than 40 per cent are more than 35 years old; less than 5 per cent have been built since 1930.
>
> Approximately 16,000 rural school districts could be advantageously consolidated if funds were available for building the new consolidated school, thus improving the economy and effectiveness of the education of over 2,300,000 children.

Some of these conditions are shown graphically in Figure III. It should be remembered that the above figures do not cover the many cases of serious overcrowding in schoolrooms, insufficient lighting, and semi-hazardous school plants which perhaps ought to be condemned but which have not formally been designated as unfit for use. Incomplete as these figures are, they surely indicate a definite need for a school plant program on a large scale. Whether such a program will be forthcoming remains to be seen. Considering school finance conditions in the nation as a whole, it is clear that local funds for this purpose cannot usually be made available in sufficiently large amounts to meet the needs. When the Federal Works Progress appropriation was before Congress, an amendment was introduced by Senator Neely of West Virginia earmarking $500,000,000 for school building purposes. Since the amendment was defeated by a close margin, there remains only the possibility of securing Federal aid for school building projects in competition with all other public works. As this article is written, it appears unlikely that under existing conditions Federal funds will be made available in large amounts for the building of needed new public schools.

It thus appears probable that school finance is doomed to repeat an unfortunate cycle. During the World War

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[1]Space does not permit description in detail of the method of deriving this estimate. Briefly, it is based on an assumed average useful life of fifty years for school buildings and on an average expenditure of $400 per additional pupil for capital outlay purposes. For details, consult: National Education Association, Research Division. "The Nation's School Building Needs." *Research Bulletin* 13: 1-36; January, 1935. Washington, D. C.: the Association.

[2]Covert, Timon; Foster, Emery M.; and Herlihy, Lester B. *City Schools and the Economic Situation.* Circular No. 124, October, 1933. Washington, D. C.: U. S. Dept. of the Interior, Office of Education, 1933. p. 4. (mimeo.)

[3]Gaumnitz, W. H. *Some Effects of the Economic Situation upon the Rural Schools.* Circular No. 80, February, 1933. Washington, D. C.: U. S. Dept. of the Interior, Office of Education, 1933. 18 p. (mimeo.)

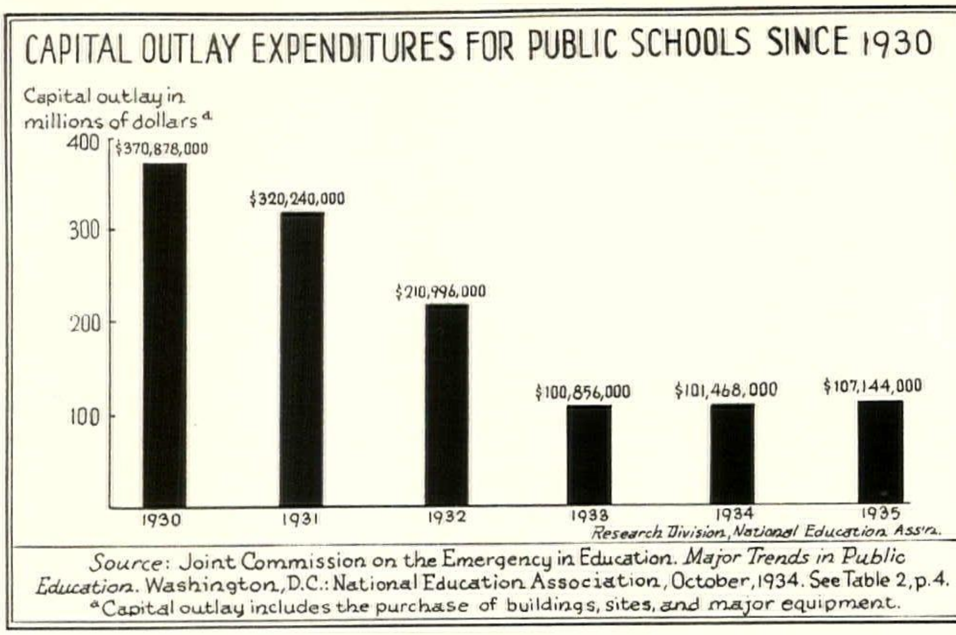


FIGURE I

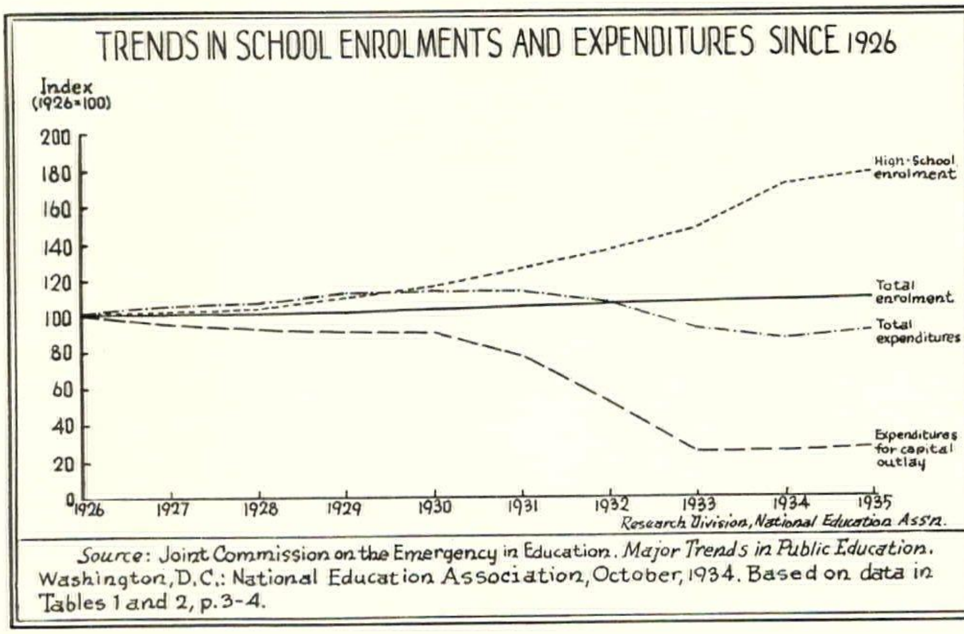


FIGURE II

there was a practical cessation of school house construction, just as there has been since 1930. The War also increased school enrollments, just as the depression has done. When the War was over school districts were compelled to build their way back to normalcy on borrowed money. Large bond issues for schools were the general rule. By 1924 the building program could become somewhat more normal and steady in scope and cost. By 1928 capital outlays for schools seemed to be fairly well stabilized at about $400,000,000 a year. Then came the depression, starting off again the cycle of suspended building programs, building shortages, borrowing, repayment. Many of the present serious fiscal problems of school districts can be traced in large part to the heavy cost of debt services arising from bonds issued shortly after the War. Apparently the only factor which could now check this unfortunate cycle would be a truly adequate Federally-financed program of school building construction. Desirable as such a program would be, it does not seem, at present, to be "in the cards."

This is not to say that a limited amount of Federal funds under WPA will not be usefully allocated to school districts. It is probable, however, that under existing rulings of the Administration the greatest opportunity for school building improvement will be in the remodeling and modernizing of existing plants. School officials and architects may well be alert to the possibilities of thus improving the housing of the children in their care. Out of the many opportunities for such work, a few possibilities will be indicated here.

There are many opportunities for the improvement of school grounds so as to make them more attractive, safe and usable. This work can often be done at little or no cost for materials. The barren ugliness of many school sites is difficult to justify either from the aesthetic or from the strictly educational viewpoints. As playgrounds and other school grounds are regarded as primarily *educational* centers, comparable in importance to the classroom, the shop, the library, and excelling these indoor places in certain important respects, the importance of the outdoor school plant is bound to increase. The school grounds can become, not merely a convenient place to deposit the children, but one of the main educational centers of the school. There is a real opportunity here for cooperation among architects, landscape architects, and students of both general and physical education.

The increasing use of school buildings for late afternoon and evening meetings calls attention to another possibility both in improving existing plants and planning new ones. Many small schools have no adequate light for use after daylight hours. Other schools have such harsh lighting that they appear at night as unattractive as a prison. Inviting and adequate lighting of schools at night can greatly increase their service for a wide variety of community activities. Such use is desirable since it tends to make for wholesome relations between the public and its schools, to stimulate educational activities among adults, to lift the cultural level of the community, and to get a greater use from the public investment in the school properties.

In rural areas there arise certain special needs and opportunities. The bad condition of many small rural schools is notorious. Some of these schools should be abandoned for larger consolidated schools.[4] Where this arrangement is impossible for financial or geographic reasons, much can still be done to improve the school buildings attended by rural children. Many of the state departments of education can supply excellent suggestions on this topic. Some of the needs and possibilities in the rural school building field, exclusive of the consolidation problem, are suggested by the following recent reports:

Colorado. A 1934 survey of building needs in 47 counties shows that among one-room schools alone, 41 needed new roofs; 153, new foundations; 160, new floors; and 420, painting jobs.[5]

Kentucky. The 1933 report of the State Educational Commission summarized conditions in the rural schools as follows: Most of the small rural schools of the state are poorly planned, box-like structures, with windows on both sides and the flue in the center. In many instances, the school building consists of four bare walls, with no provision for pupils' wraps, or any built-in shelving, or other special features so essential to a desirable school program. A large percentage of the smaller schools are set on locust posts, or stone or concrete piers, without other underpinning. Only in a few instances is there a solid foundation or a sub-floor. Consequently, these schools are very uncomfortable in severe weather to both teachers and pupils. The old-fashioned, unjacketed stove is still the principal source of heat. It is usually placed in the center of the room and those children immediately around the stove scorch with the intense heat while those in the far corners suffer from the cold. . . . In some cases, the building has never received a coat of paint, the roof leaks, the walls are marked and open, window panes are shattered, and the floor is rough and uneven. . . . Rural school sites are invariably small. . . . Very often school grounds are acquired simply because the character of the soil renders it worthless for any other use.[6]

Mississippi. A school plant survey dated 1934 shows the following conditions among the schools (chiefly rural schools) of this state: No water supply, 1,681 schools; surface water draining into water supply, 157 schools; no toilet facilities whatever for boys, 1,693 schools; for girls, 1,044 schools; no publicly-owned school plant whatever, 1,506 schools.[7]

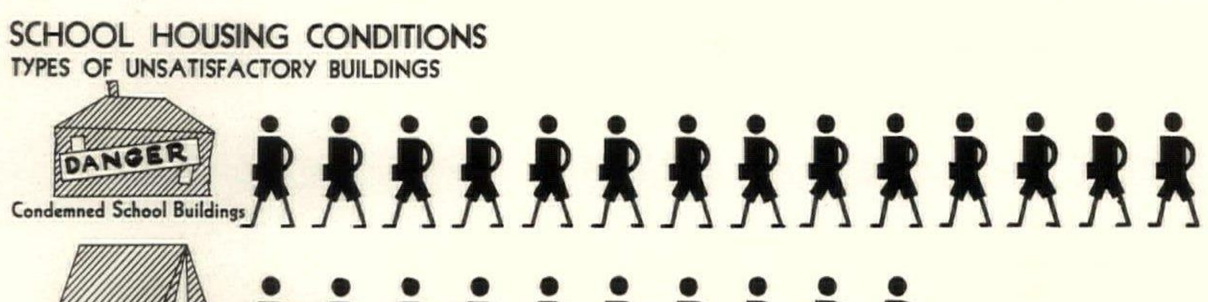
[4]There are especially cogent reasons favoring Federal financing of a nationwide program of rural school rehousing. See: U. S. Office of Education. National Survey of School Finance. *Research Problems in School Finance.* Washington, D. C.: American Council on Education, 1933. 164 p.

[5]Colorado State Department of Education. *Summary of Building Survey, State of Colorado,* 1934. Denver: the Department, 1934. 9 p. (typewritten).

[6]Kentucky Educational Commission. *Report of the Kentucky Educational Commission.* Educational Bulletin, Vol. 1, No. 8, Frankfort, Kentucky: State Department of Education, October, 1933. Ch. V, "School Buildings and Grounds," p. 121-34.

[7]Mississippi State Department of Education. *Some Facts Derived from the School Plant Survey.* Jackson: the State Department, 1934. 7 p. (mimeo.)

FIGURE III



Source: National Education Association, Research Division. "The Nation's School Building Needs." *Research Bulletin* 13: 10; January, 1935. Washington, D. C.: the Association.

South Carolina. An informal report written in 1934 contains the following statements: "Approximately one-half of the rural school buildings are in such dilapidated condition or of such poor type of construction as to be unfit for school use. To replace these buildings would require $5,000,000. The local districts being dependent entirely upon agricultural income are unable to pay the cost of this program. No state or county aid is available. Approximately 1,200 negro schools are being operated in lodge halls, churches, and tenant houses not owned by the district. None of such buildings is suitable for school purposes. To replace these buildings would require $4,000,000. To remodel, repair, and replace village schools so as to provide an adequate educational program would require an outlay of approximately $5,000,000. To provide adequate classroom facilities for city schools would require the construction of approximately 500 new general and specialized classrooms at a cost of $2,000,000, and the remodeling of 1,000 classrooms at a cost of $2,000,000.[8]

West Virginia. In 1929, among the one-room schools of this state, 34 per cent had unsatisfactory floors; 41 per cent, unsatisfactory blackboards; 63 per cent, no bulletin board; 27 per cent, no bookshelves or cases; 33 per cent, no water supply on the grounds; 25 per cent, bucket-and-dipper water supply; 54 per cent, unsatisfactory toilet facilities.[9]

These examples show what some of the unsatisfactory conditions are and suggest points to be considered in remedying them. Many of the needed repair and modernization projects could be carried out with relatively little cost for material.

Another important area of school building repair and modernization concerns fire protection. The importance of such measures from the standpoint of safety needs only to be mentioned. Worthwhile economies in lowering insurance premiums are also possible by removing fire hazards.[10] The cost of removing such hazards often amounts to less than the annual saving on insurance premiums. Heating apparatus, storage vaults, flues and chimneys, electrical wiring, electric machines, ash heaps, and rubbish heaps should be subjected to careful study, primarily because of added safety to the children, but also as a means of lowering the insurance premiums. The presence of a regularly organized local fire department lowers premiums required for fire insurance. Rates can often be lowered by installing the ordinary type of small chemical fire extinguisher. These should always be on hand in laboratories, furnace rooms, kitchens, and the other places where fire is used. Automatic sprinkler systems may also be effective in reducing both hazards and premiums. The secretary of one school district cut $1,000 per year from insurance costs by correcting hazards about the schools.

Attention may well be given also to sound-proofing in the modernization of school plants. Recent studies of the psychological and physiological effects of noise strongly suggest that this problem should be given adequate consideration in school plant programs.

The foregoing are only a few of the many suggestions which might be given regarding the improvement of school buildings. Even if funds are not at the moment available for a truly adequate school housing program, there is yet much that can be done to make the school environment better serve the safety and welfare of the boys and girls who are in attendance. It must be emphasized in closing, however, that such remodeling and modernization will in no way bring about a final solution to the current school building problem. That solution must await a program of Federal, state, and local financing commensurate with the needs and importance of the public schools.

[8]Letter from S. P. Clemons, Director of the Division of Schoolhouse Planning and Construction, South Carolina State Department of Education. April 7, 1934.

[9]Holy, Thomas C. *School Buildings.* Survey of Education in West Virginia, Vol. 3. Charleston: State Department of Education, 1929. Ch. 2.

[10]National Education Association, Research Division. "Constructive Economy in Education." *Research Bulletin* 11: 57-90; September, 1933. Washington, D. C.: the Association. Ch. VIII, "Economy in the School Insurance Program," p. 81-83.

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In announcing the formation of a partnership by Norman Bel Geddes and George Howe in the July issue of The Architectural Record some architectural jobs were credited to Mr. Howe during the period of partnership with Mr. William Lescaze. The Record has been informed by Mr. Lescaze and Mr. Howe that the design responsibility on all jobs completed by the firm of Howe & Lescaze is allocated as follows:

HOWE & LESCAZE: Oak Lane Country Day School; House for Frederick V. Field; Hessian Hills School; House for William B. Curry; Philadelphia Saving Fund Society's Garage; Wilbur Library, Brooklyn; Chrystie-Forsyth Street Housing Development.

GEORGE HOWE: House for J. M. R. Sinkler; American Battle Monuments; House for H. R. S. Stikeman; House for M. J. Speiser; House for Mr. Welsch; House for William Stix Wasserman.

WILLIAM LESCAZE: House for Roy F. Spreter; House for Mr. Lescaze, 211 East 48th Street, New York; Columbia Broadcasting; House for R. C. Kramer; House for B. J. Buttenwieser; All new English work; All new work in Brooklyn Museum; Editorial Publications; S. Philadelphia Housing; Boston Small House; Unity House.

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O C T O B E R

THE

ARCHITECTURAL RECORD

FHA MODERNIZATION CREDIT PLAN OFFERS OPPORTUNITIES TO ARCHITECTS

By STEWART McDONALD, Acting Federal Housing Administrator

Opportunities for architects to obtain new business have arisen as a result of the amendment by Congress to the National Housing Act permitting the Federal Housing Administration to insure loans made by private financial institutions up to a maximum of $50,000 under its Modernization Credit Plan.

Formerly the maximum was $2,000. The change allows large-scale jobs in repairing, improving or altering many types of structures, with consequent possibilities for the retaining of architects, consulting engineers and other professional men.

The principal benefit to architects lies in the obvious fact that modernization projects calling for expenditures from $2,000 to $50,000 usually necessitate the aid of competent consultants. A second benefit is the ruling that an architect's fee may be included in the amount of the loan, so that the consultant can be fully reimbursed in cash within a reasonable time after his work is done.

The plan is both an opportunity and a challenge for the architect. His opportunity depends upon whether or not he happens to be retained; but there is a challenge to him to promote his interests by active selling of the Modernization Credit Plan to clients with properties for which repairs and improvements are necessary or desirable.

To sell the plan successfully, the architect must understand it thoroughly, and be able to explain its advantages in an effective way.

The Modernization Credit Plan is essentially a simple operation. A prospective borrower seeks credit from a bank, trust company or other private financial institution holding a contract of insurance issued by the Federal Housing Administration. If the borrower and the purpose for which he will use the money fulfill certain requirements, a loan is made. The lending agency is insured by the Federal Housing Administration against any loss up to 20 per cent of the aggregate amount of any suitable loans it grants.

The insurance feature is intended, and has operated, as an incentive to private lenders to loosen credit. They are virtually guaranteed against loss, because losses from this type of loan in the past have seldom reached more than three per cent of aggregate amounts loaned, a figure much smaller than the 20 per cent of the aggregate insured under the Modernization Credit Plan.

A maximum amount that may be charged the borrower for the privilege of obtaining the credit has been laid down. It can best be explained as a $5 discount on each $100 face amount of a one-year note repayable in equal monthly installments. Lenders may charge less if they desire—and usually do where large amounts are concerned—but all charges for interest, fees or any other purpose cannot exceed the maximum.

Prospective borrowers thus have a means of getting credit readily and comparatively inexpensively. Financial institutions have a means of investing safely. To bring the two together is a rôle which can be played by an architect.

The first requirement, obviously, is to have knowledge of, or find, suitable properties requiring modernization. Under the terms of the amendment to the National Housing Act establishing the $50,000 loan limit, eligible properties are apartment houses, multiple family houses (two or more separate dwelling units under one roof), hotels, office, business or other commercial buildings, hospitals, orphanages, colleges, schools and manufacturing or industrial plants. Loans in excess of $2,000 are not insurable when applied to properties other than these, unless it is to convert them into a type of property that is eligible.

Several reasons for modernization of such properties immediately suggest themselves. An old apartment house may be improved to bring in greater revenue, by altering its style; changing the number of rooms in apartment units; installing mechanical refrigeration, air conditioning or new heating and ventilating systems; or by any number of other operations.

Commercial buildings of many types, especially retail stores, are often capable of treatment that will enable them better to meet competition by increasing their comfort, beauty or utility, bringing them in line with modern merchandising requirements.

An industrial or manufacturing plant may need larger quarters, replacements or installations of equipment, or some other improvement, to enable it to increase production, step up efficiency, present a better appearance to the purchasing public or augment the comfort and health of its employees.

Uses to which a modernization loan may be put are simply explained as any structural alteration, repair, improvement of the real estate itself, the enlargement or reduction of the buildings thereon, and the purchase and installation of such permanent equipment as definitely and universally becomes a fixture on the real estate, such as plumbing, wiring, built-in items, and all others which may not be removed thereafter by the purchaser if he is not the owner of the real property.

In addition to such equipment as definitely becomes a permanent fixture attached to the realty, certain other items of movable equipment and machinery are eligible.

Landscaping a property, installing carbonating machinery in a bottling works, replacing store shelving, purchasing a dentist's chair and power drill are all eligible. But furniture, radios, small movable supplies and hand-tools are not. Architects are urged to get from any office of the Federal Housing Administration a copy of its booklet, FHA No. 145, "Equipment and Machinery Eligible for Modernization Credit," which goes into greater detail than could be achieved in this space. Special rulings on eligibility can be obtained from the Washington, D. C., headquarters of the Administration, at 1001 Vermont Avenue, N. W.

Having inspected a piece of property and determined needed or desirable improvements, the architect equipped with a working knowledge of the Modernization Credit Plan is in a position to explain to a client how he can obtain the money—a most important detail inasmuch as credit in many sections has been so tight.

There are several advantages to the borrower under the Modernization Credit Plan, which can be used as talking points by architects. In the first place, the prospective borrower can readily find sources of credit by asking any office of the Federal Housing Administration for a list of financial institutions offering modernization credit service in his locality.

In the second place, his loan is repaid in monthly installments, allowing him to finance improvements out of future income, without impairing capital.

In the third place, he knows beforehand that financing charges cannot exceed a reasonable maximum, lower than rates involved in many other types of financing.

In the fourth place, he can avoid "red tape." Whether the borrower obtains credit *is determined exclusively by the lending agency*. The borrower deals with no one except the lender in getting a loan.

In the fifth place, a modernization loan may run for any period up to five years, making possible the acquisition of a large sum of money repayable in small easily-met installments.

Much activity has already been manifested under the plan. Within a week after the passage by Congress, on May 28, of the amendment authorizing the $50,000 loan limit, two loans for large amounts were made.

An example is the Middle Western brewery which financed the purchase of much needed equipment through a loan of $50,000. Another loan for the same amount has been granted for the improvement of a factory in the Rocky Mountain region.

A loan of $10,000 has been applied to improving a school in the Dakotas; $23,040 for an apartment house in the South; $37,408 for a combination business house and hotel in the blue grass territory; $12,000 for a meat-packing plant on the Missouri River; $31,083 for a winery-distillery in the Pacific area; other properties improved by loans of more than $10,000 include a tea room, an office building, a cold storage plant, a multiple-family dwelling, and a warehouse.

These loans have been granted by many types of financial institutions approved by the Federal Housing Administration, including State and national banks, trust companies, a land title trust company, a mutual savings bank, etc.

Surveys have demonstrated that many thousands of America's industrial and commercial establishments, apartment buildings and hotels are urgently in need of structural improvements, or machinery and equipment. They require immediate treatment, not only to make them safer, more attractive or efficient, but to place them on equal basis with competition.

The architect is not only needed in curing this condition—he can play an aggressive rôle in bringing about a change. Opportunities exist in every community.

As our economic status advances, the opportunities will become greater and greater. Years of neglect, because of uncertain conditions and the freezing of credit, have made hundreds of thousands of properties immediate prospects for business.

That business can now be promoted through the Modernization Credit Plan, which opens up lines of credit whose use benefits the nation socially and economically. It is squarely up to each individual architect to determine how far and how well he should foster this movement, and thus attain a greater measure of prosperity for himself as well as his fellow citizens.

Photograph by A. Grant Wight

ETITION

d by The tural Rec- Jury Report companying ning designs yright 1935 ey - Owens - ss Company W. Dodge oration.

THE JURY:

Standing (left to right)—Albert Kahn, Melvin T. Copeland, William Lescaze, John W. Root. Seated—F. R. Walker, Kenneth K. Stowell (professional adviser), J. André Fouilhoux, Kenneth C. Welch.

ODERNIZE-MAIN-STREET" COMPETITION AWARDS

E JURY was impressed by the unusually high standard of orkmanship and presentation in the drawings submitted. gratifying that so many architects and designers had themselves to the solution of the universal problems as h in the program of this unique competition. However, felt that many creditable designs, which showed that ime had been spent in execution, would have been much had the program been carefully analyzed in advance by mpetitor to determine just what would constitute the olution for successful merchandising.

problems had been purposely reduced to their funda- s. Only the essential requirements were given in order e competitor might have maximum freedom in imagina- nd ingenuity. The major objective of the competition create designs for remodeling stores which would "attract blic, display goods to the best advantage, and provide convenience, and light so that purchasing is a pleasure." signer, therefore, was forced to analyze both the actions actions of purchasers, and the psychology methods and of selling. While the standard of the drawings and ns was high, there seemed to be few designs which were ndingly superior to the others. Many of the designs, while nt in some respects, had notable or obvious defects a little further study of the problem and requirements part of the designer would have corrected. Such de- as a rule, could easily be improved greatly with a few changes. Some of these changes would undoubtedly be ted by the merchant or would be made by an architect ng the project.

"The Jury believes that this competition should have a far-reaching effect on raising the standards of store design, both through directing the interest of the designers to this field, and by providing merchants and dealers with a guide as to what an intelligent public taste will demand.

"The Jury was gratified at the timeliness of the competition which synchronizes with the government's extensive program to "Modernize Main Street," and the announcement of the terms on which guaranteed loans of $50,000 can be made for modernizing through the FHA.

"The Jury appreciates the service which the sponsors have rendered in the interest of raising the standard of public taste and commercial design, and takes this opportunity to commend The Architectural Record and Kenneth K. Stowell, professional adviser, for the splendid way in which the competition was conducted to insure the fairest possible judgment.

"The Jury believes that the most constructive report is one which comments on both the excellencies and deficiencies of the prize-winning designs, and that such comment is most effective if conveniently placed in conjunction with the reproductions of the designs. The remarks of the Jury on the specific designs are, therefore, published on the following pages of this issue."

Melvin T. Copeland
Albert Kahn
William Lescaze
John W. Root
F. R. Walker
Kenneth C. Welch
J. André Fouilhoux, Chairman.

M. RIGHTON SWICEGOOD
Graduate of Georgia School of Technology (1928) and Massachusetts Institute of Technology (1931). Designed theatrical and window displays after graduation. At present designing bridges in office of Borough President of the Bronx, New York.

SUREN PILAFIAN
Born in Smyrna, Turkey. Studied architecture at Pratt Institute, Columbia University, New York University. Worked 7 years in office of Cass Gilbert. At present designing interiors in office of Shreve, Lamb and Harmon. Also own private practice.

MAURICE LUBIN
Graduate of Ohio State University (1928) and New York University (1935). At present supervising preliminary studies, particularly subsurface surveys, for various projects to be undertaken by the Housing Authority of New York City

G. FOSTER HARRELL, JR.
Graduate of Georgia School of Technology (1930) and University of Pennsylvania (1931). Worked 2 years in office of Hobart Upjohn and Otto F. Langmann. For past 2 years designing store interiors for B. Altman & Co., New York.

ALFRED CLAUSS
Born in Munich, Germany. Graduate of Munich Architectural School (1926). Worked with Howe and Lescaze in New York, Sears Roebuck and Century of Progress in Chicago. At present in Knoxville with Tennessee Valley Authority.

LESTER COHN
Graduate of Carnegie Institute of Technology (1931). Worked with several architectural firms in Chicago, Illinois. At present specializing in merchandise presentation with W. L. Stensgaard and Associates, Chicago.

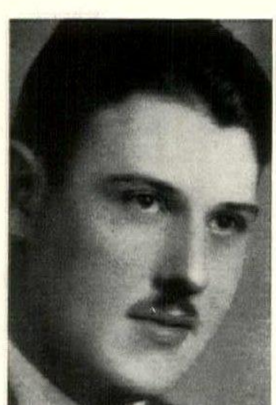
ADRIAN WALDORF
Studied privately with Lloyd Morgan for past 6 years. Winner of several Beaux Arts awards, including 1931 Fontainebleau Scholarship. Paris Prize logeist in 1933 and 1935. Now at Ecole des Beaux Arts, Paris, France.

SIDNEY L. KATZ
Graduate of New York University (1935). In a recent competition won master's degree scholarship at university. Studied privately with Lloyd Morgan for past 6 years. Placed in Chicago Tribune competition.

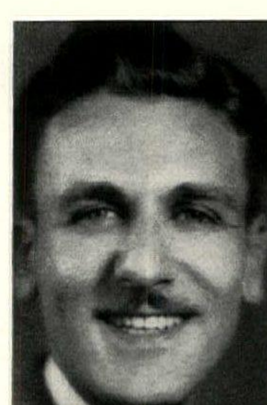
JOHN R. SPROULE
Entered University of Washington in 1927 to study painting. Changed to architecture in 1930 and graduated in 1934. Has spent most of his 27 years on the Pacific Coast. Says he "owns a baritone voice."

NICHOLAS B. VASSILIEVE
Born in St. Petersburg, Russia. Graduate of Institute of Civil Engineers (1901) and Imperial Academy of Arts (1904). Designed and built the St. Petersburg Mosque. In voluntary exile from U. S. S. R., now resides in New York.

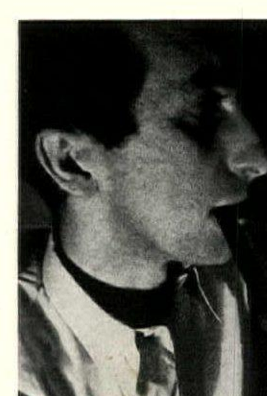
PRIZE WINNERS



RAOUL L. DUBRUL
Graduate of New York University. Pupil of Lloyd Morgan. At present with office of Frederic P. Wiedersum, Valley Stream, Long Island. Also assistant critic in design, School of Architecture, New York University.



HARRY J. TRIVISONNO
Studied architecture at Pratt Institute. Worked with N. Y. State Department of Engineering and in architectural office of Vahan Hagopian. New York. Author, "Illustrations and Interpretations of the Multiple Dwelling Law."



ISADORE SHANK
Graduate of Washington University, St. Louis. Holder of A. I. A. fellowship (1925). Studied and traveled abroad, 1925 and 1926. Practiced architecture in St. Louis and New York. At present designing advertising exhibits.

PROBLEM A
DRUG STORE

Requirements: The modernized corner drug store is to provide for the selling of many types of small merchandise, as well as medicines and prescriptions. Among other things the following "departments" must be provided for: soda fountain and lunch counter, cigars, candy, toilet articles and cosmetics, proprietary medicines and home remedies, sick room supplies and rubber goods, packaged drugs, and prescriptions. ¶ The kitchen for the lunch counter may be considered to be in the basement if proper stairs, conveyors or dumbwaiters and flues are shown on the plan. . . . Dimensions: The building is on a level corner lot 25'-0" x 75'-0", the short side on the north side of Main Street; the long side faces west on the side street. The east party wall extends 6" into store lot. The present clear height, floor to ceiling, 12'-0".

FIRST PRIZE:

M. RIGHTON SWICEGOOD, NEW YORK 212

This design is straightforward and restrained and has window of proper size for the display of drugs. It possesses an intimate character which makes it suitable for a small community. It could effectively adjoin any building or habitation. It is original without being bizarre, and entirely modern in its design. ¶ The corner display is arranged to attract prospective customers. The projecting window recalls the similar projection of the old store which was to be modernized. Many merchants may want to enlarge the display window area by a substitute treatment of area at right of entrance. The objective of this smaller window, with its wall enframement, is evidently to concentrate attention on special objects for display—a principle that has been used with success in several types of stores. ¶ The compounding of prescriptions, which is the original and continuing function of the business, can be emphasized by having the pharmacist work behind glass partitions where he can be seen. Some few neighborhood druggists might prefer to putter in a secluded back room. The plan of the first-prize design is readily adaptable to either type of prescription department. ¶ The exterior, the plan, and the interior design are consistently simple and attractive. The sign is located near the corner where it would be readily seen. ¶ The entrance to the main street is conveniently near the corner; the side street entrance is beyond the center of the store, affording good circulation through the store.

SECOND PRIZE:

G. FOSTER HARRELL, JR., NEW YORK 213

A difference of opinion exists regarding the advisability of corner entrances or center main street entrances. For corner stores the choice is usually a matter of personal preference, or, in particular locations, of greater accessibility versus greater display. ¶ This drug store has the corner entrance and also a large amount of well disposed window display. The projecting hood is an attractive feature, serving both to emphasize the horizontality of the design and to prevent excessive glare from window reflections. ¶ The design is well adapted to a drug store, and is simple and consistent throughout. The plan is a good standard layout. An interesting minor feature of the front is the toe-space for those who must stand close to the window.

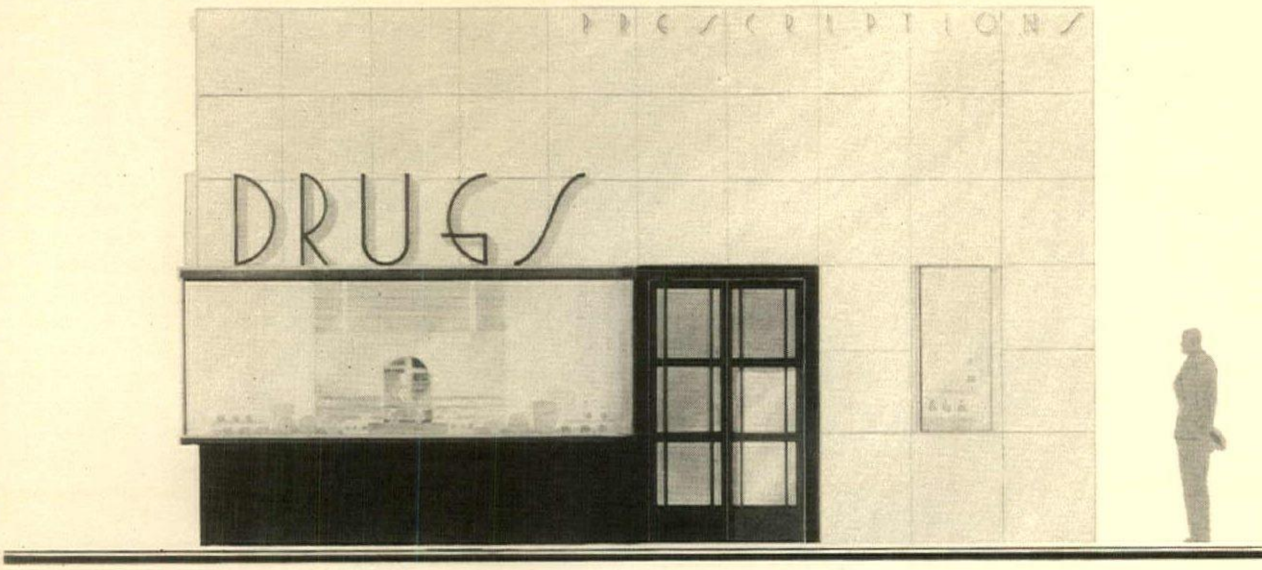
THIRD PRIZE:

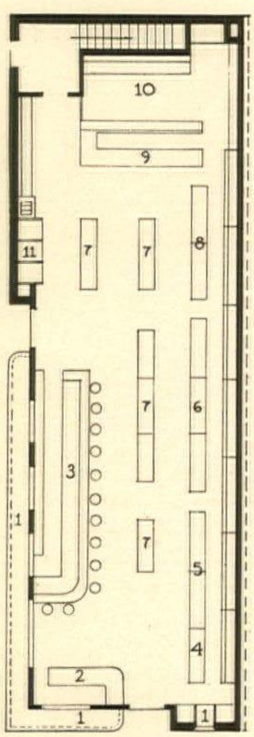
NICHOLAS B. VASSILIEVE, NEW YORK 214

Openness of access has been overemphasized with some loss to interior space. In some communities this store would provide more entrances than necessary for the traffic, except at movie hours, and more of the front could be used for show window display. Display has, however, been reclaimed by showcases at side of entrances. ¶ The octagonal corner case would be effective for the display of merchandise. The shadow box window at the right would probably need to be lowered so that small customers could see the special dramatizing display. ¶ The distribution of merchandise in the actual store would undoubtedly be changed for greater convenience than indicated by the lettering on the plan.

HONORABLE MENTIONS:

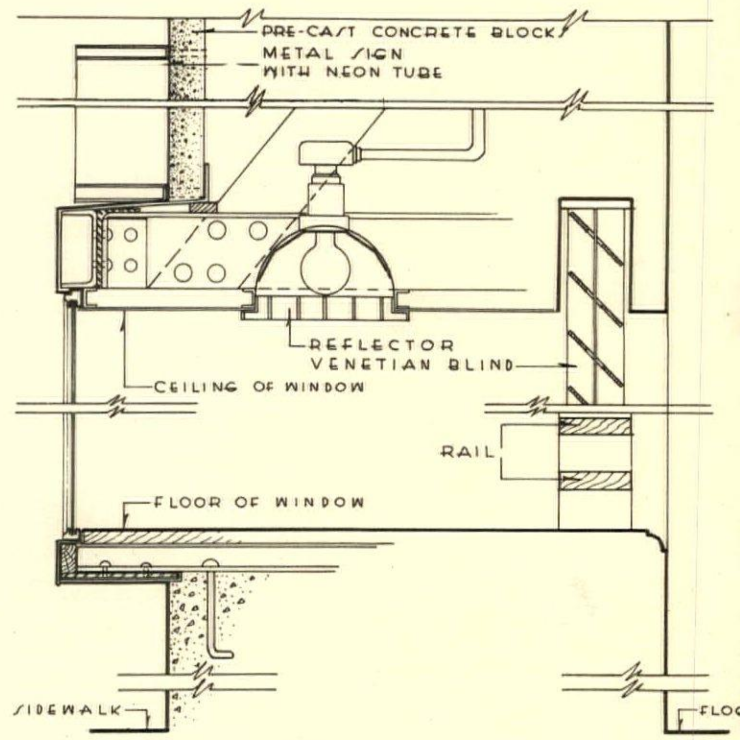
MORRISON BROUNN, NEW YORK 215
MICHAEL AUER, NEW YORK 216
ISADORE SHANK, ST. LOUIS 217
MONTGOMERY FERAR, DETROIT 218
VERNER WALTER JOHNSON, PHIL BIRNBAUM,
FAR ROCKAWAY, N. Y. 219
WILLIAM TUNTKE, HOLLYWOOD, CALIF. 220
ROBERT F. McCLELLAND, VICTOR N. JONES, SEATTLE, WASH. 221
HARRY LON ROSS, PHILADELPHIA 222
MELVIN L. WOLFSON, OAK PARK, ILL. 223



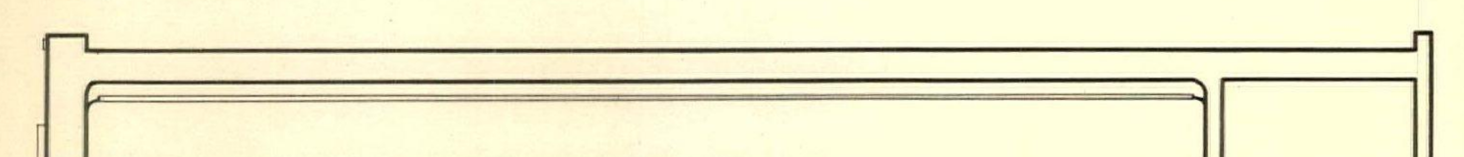


PLAN

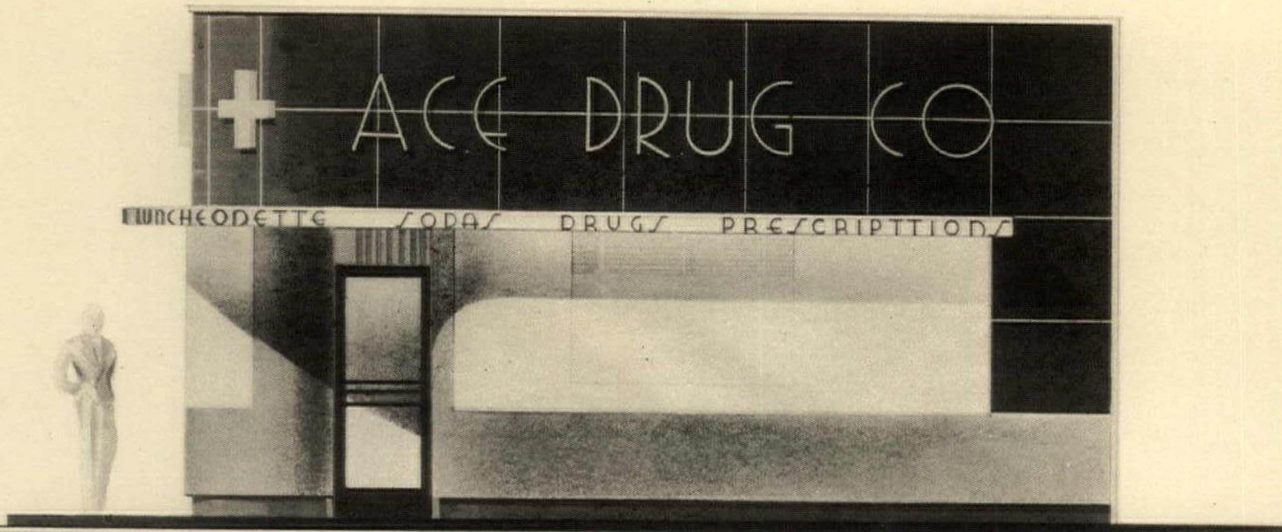
LEGEND
1 DISPLAY WINDOW
2 CIGARS
3 SODA FOUNTAIN &
3 LUNCH COUNTER
4 CANDY
5 COSMETICS &
5 TOILET ARTICLES
6 PROPRIETY MEDICINES
6 & HOME REMEDIES
7 DISPLAY TABLES
8 RUBBER GOODS &
8 SICK ROOM SUPPLIES
9 PACKAGE DRUGS &
9 PRESCRIPTION COUNTER
10 PRESCRIPTION ROOM
11 TELEPHONES

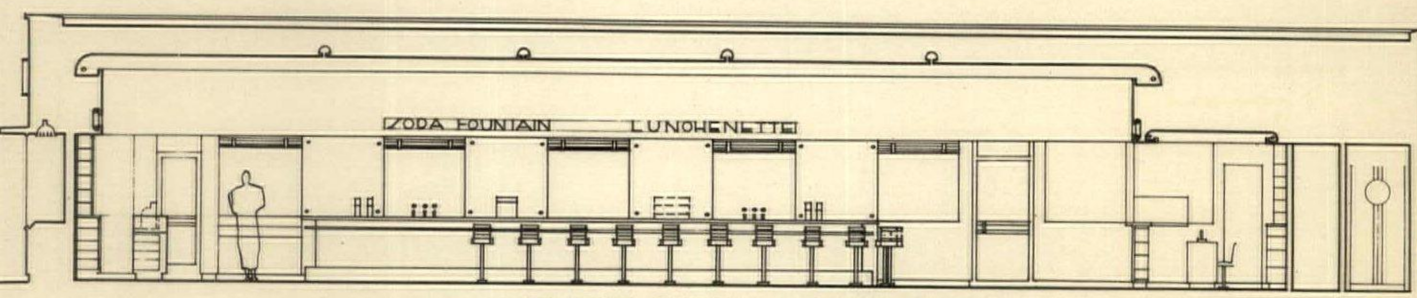


SECTION THROUGH WINDOW

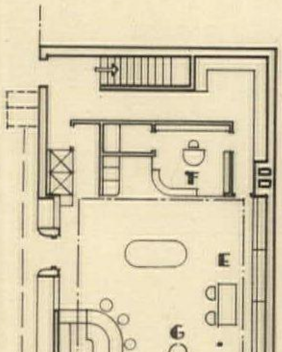


SECTION





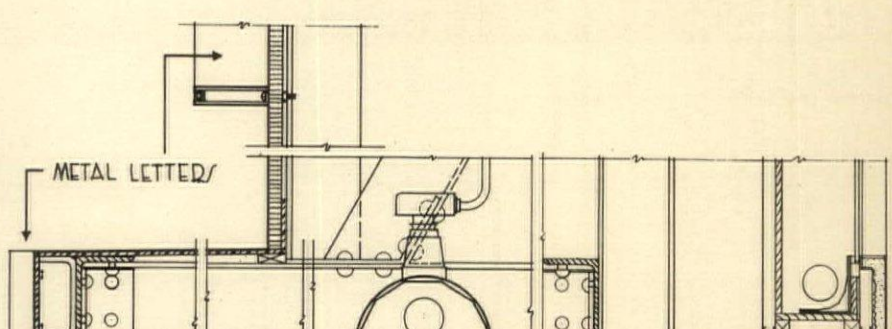
LONGITUDINAL SECTION



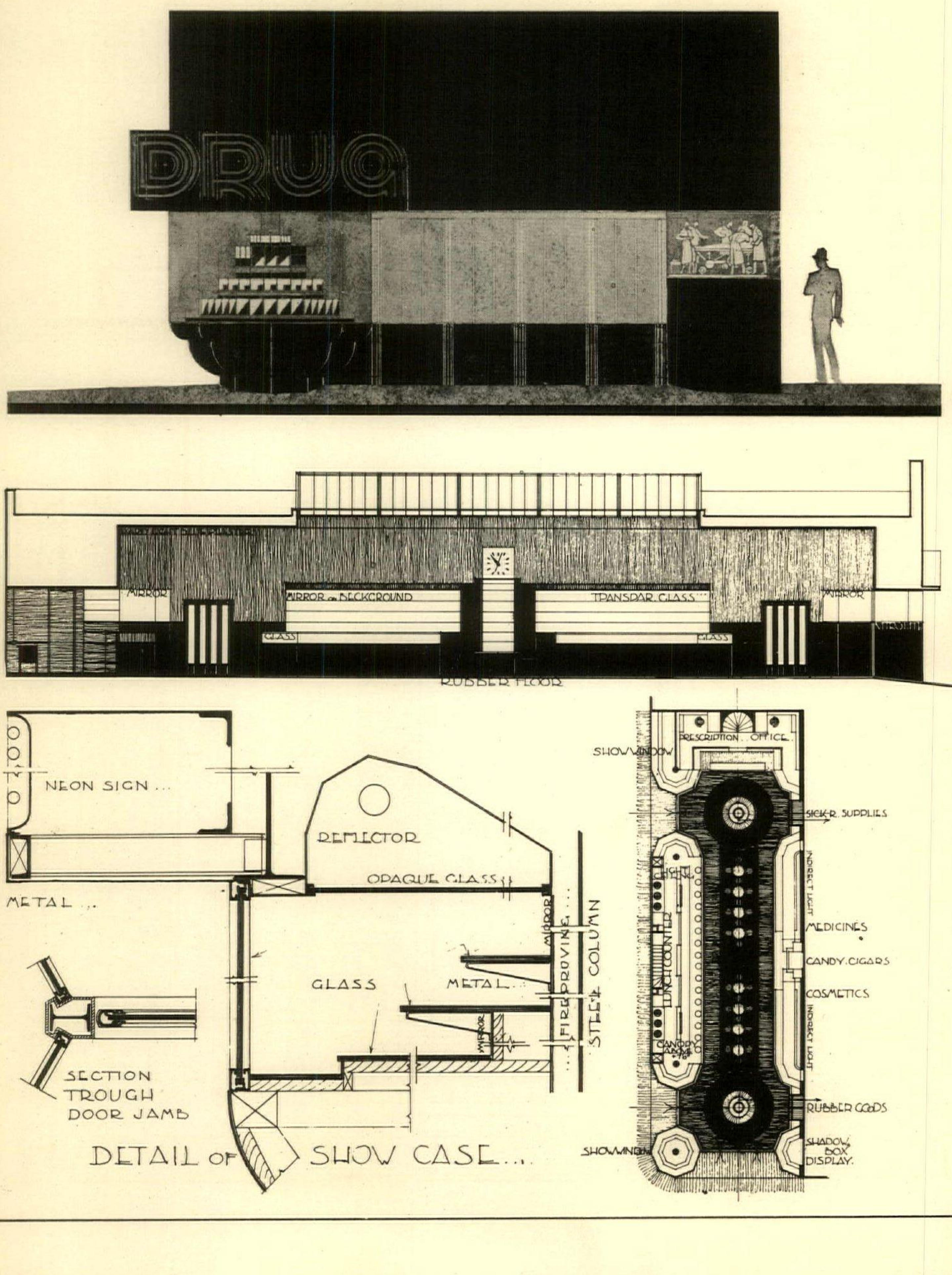
LEGEND

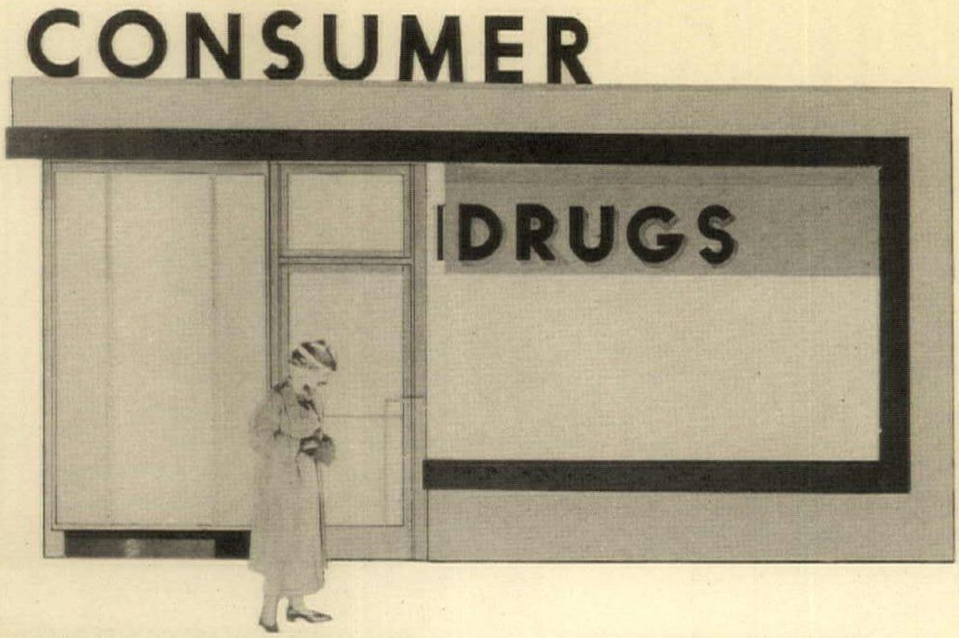
A. SODA FOUNTAIN
B. CASH, CIGARS, CANDY
C. TOILETRIES, COSMETICS
D. MEDICINES REMEDIES
E. SICK ROOM SUPPLIES RUBBER GOODS
F. PRESCRIPTIONS
G. SALES TABLES

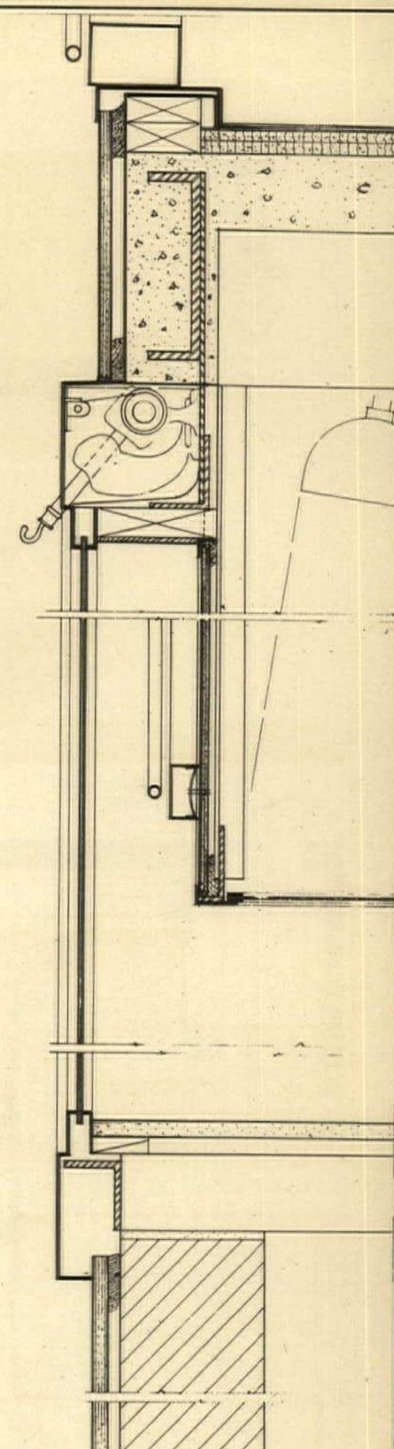
FLOOR PLAN

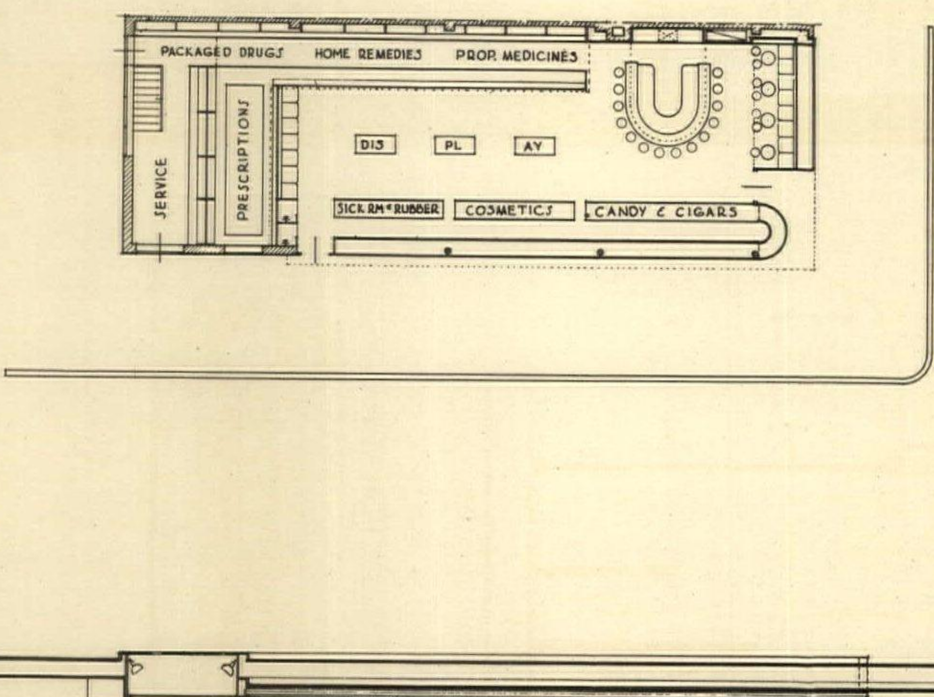


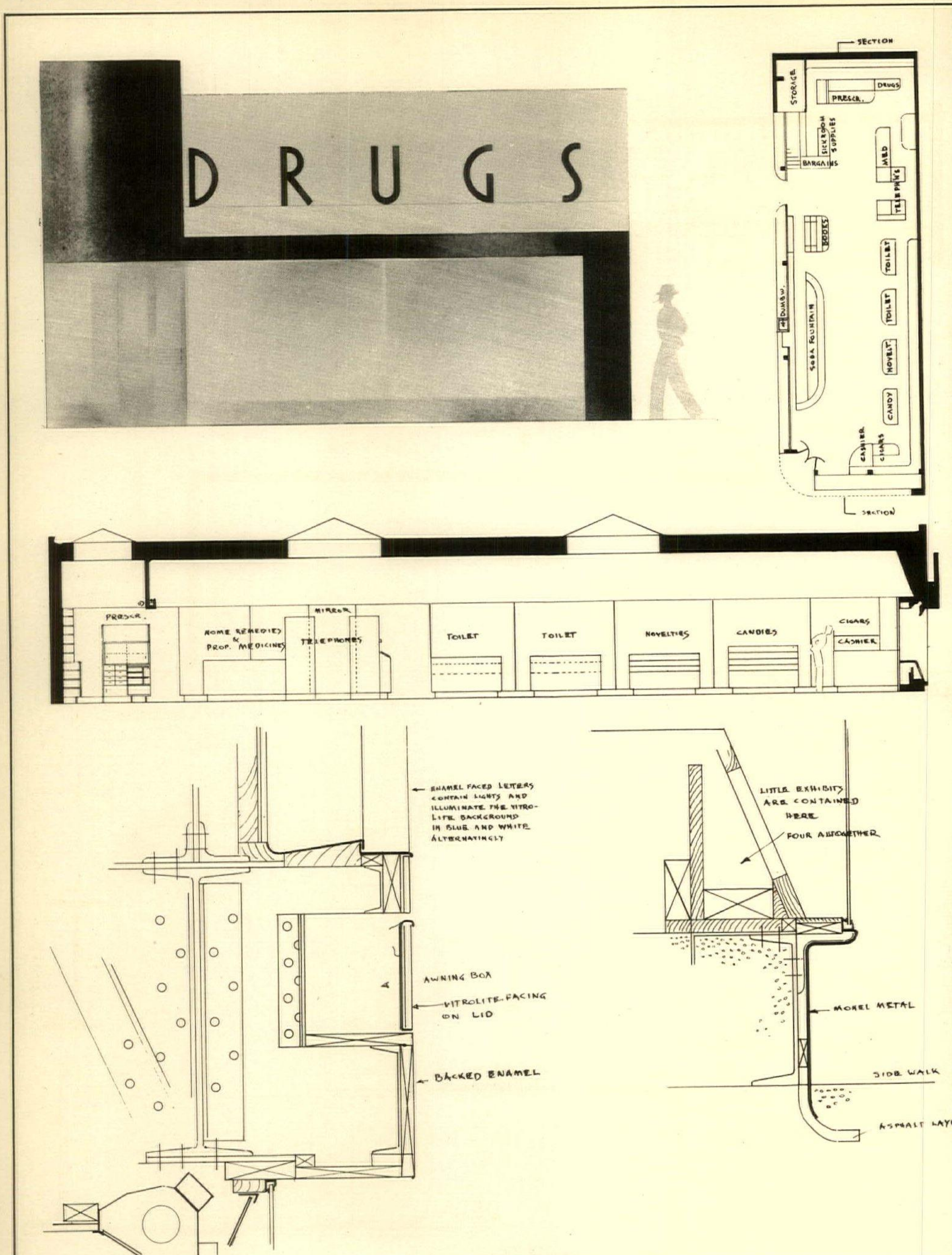
NICHOLAS B. VASSILIEVE

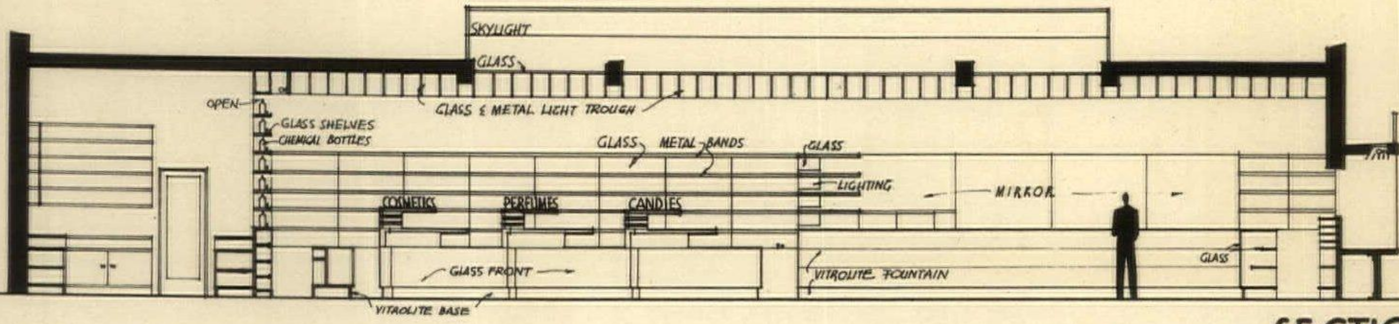



CONSUMER
DRUGS

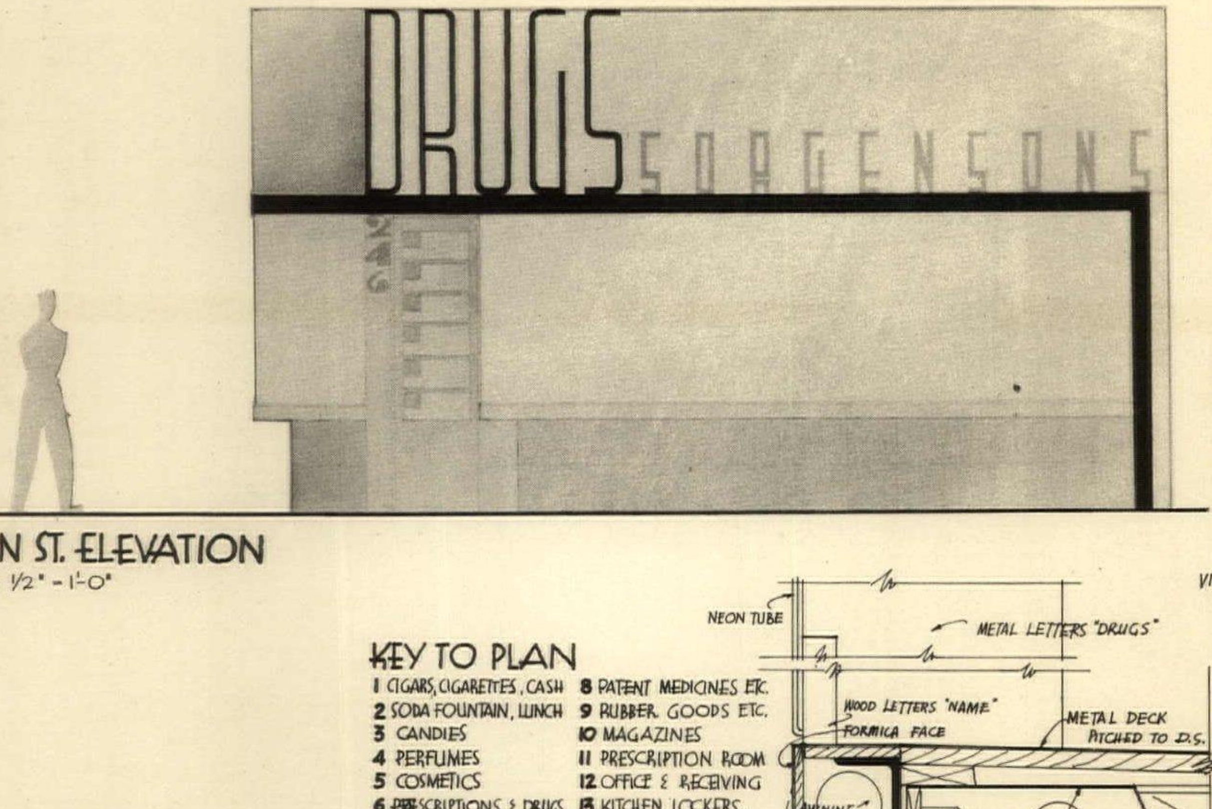



PACKAGED DRUGS
HOME REMEDIES
PROP. MEDICINES
SERVICE
PRESCRIPTIONS
DIS
PL
AY
SICK RM & RUBBER
COSMETICS
CANDY & CIGARS


DRUGS
SECTION
STORAGE
DRUGS
PRESCR.
SICKROOM SUPPLIES
BARGAINS
MED
TELEPHN'S
BOOKS
TOILET
TOILET
DUMBW.
SODA FOUNTAIN
NOVELT.
CANDY
CASHIER
CIGARS
SECTION
PRESCR.
HOME REMEDIES & PROP. MEDICINES
MIRROR
TELEPHONES
TOILET
TOILET
NOVELTIES
CANDIES
CIGARS
CASHIER
ENAMEL FACED LETTERS CONTAIN LIGHTS AND ILLUMINATE THE VITROLITE BACKGROUND IN BLUE AND WHITE ALTERNATINGLY
AWNING BOX
VITROLITE FACING ON LID
BACKED ENAMEL
LITTLE EXHIBITS ARE CONTAINED HERE
FOUR ALTOGETHER
MONEL METAL
SIDE WALK
ASPHALT LAYER



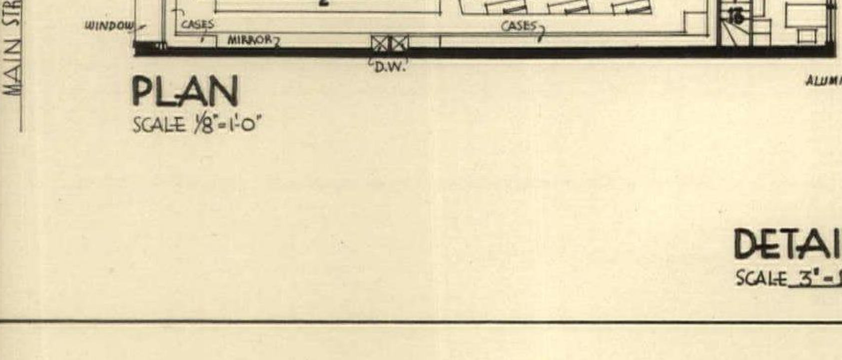
SECTION
SCALE 1/4"-1'-0"



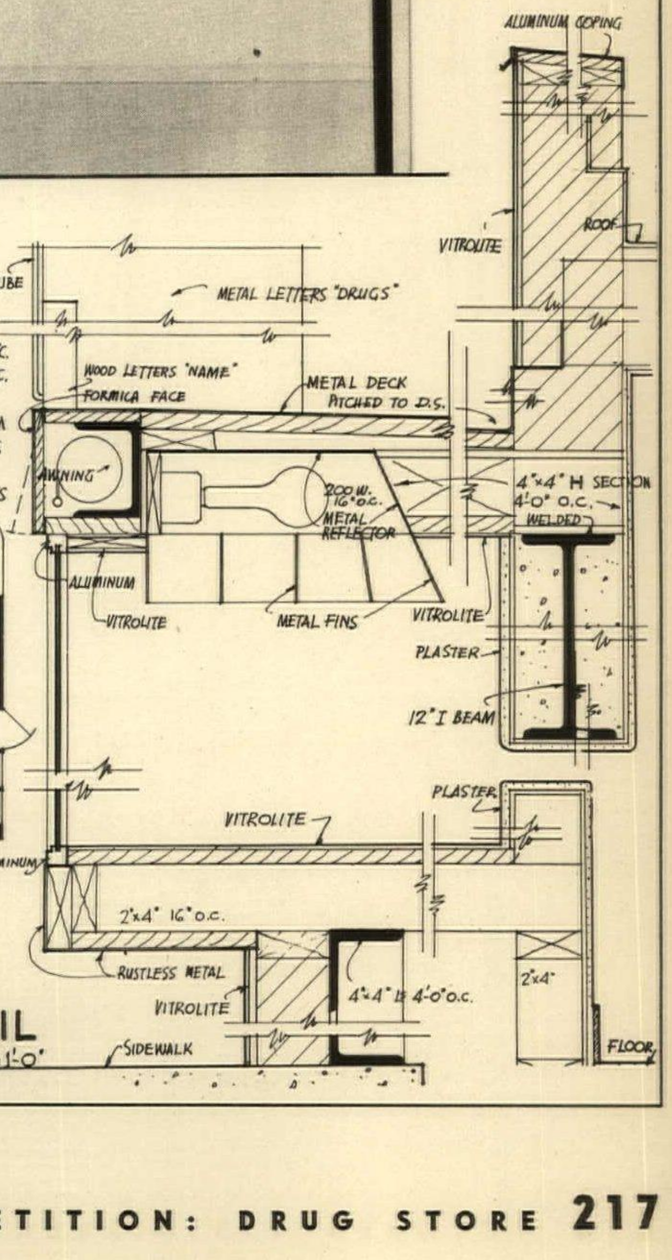
MAIN ST. ELEVATION
SCALE 1/2"-1'-0"

KEY TO PLAN

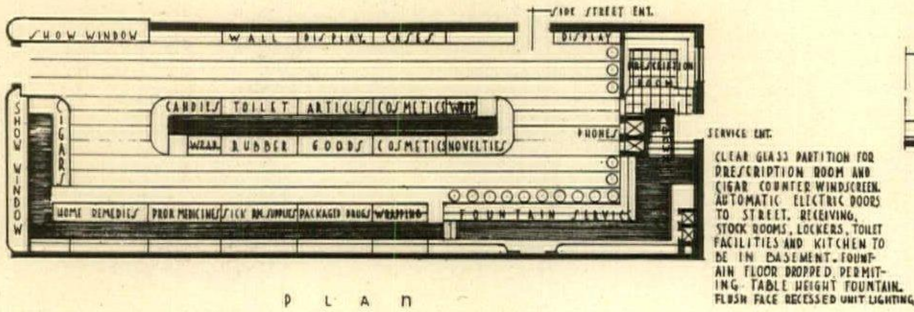
1 CIGARS, CIGARETTES, CASH
2 SODA FOUNTAIN, LUNCH
3 CANDIES
4 PERFUMES
5 COSMETICS
6 PRESCRIPTIONS & DRUGS
7 SMALL MERCHANDISE
8 PATENT MEDICINES ETC.
9 RUBBER GOODS ETC.
10 MAGAZINES
11 PRESCRIPTION ROOM
12 OFFICE & RECEIVING
13 KITCHEN, LOCKERS, MARKING, STORING, TOILETS



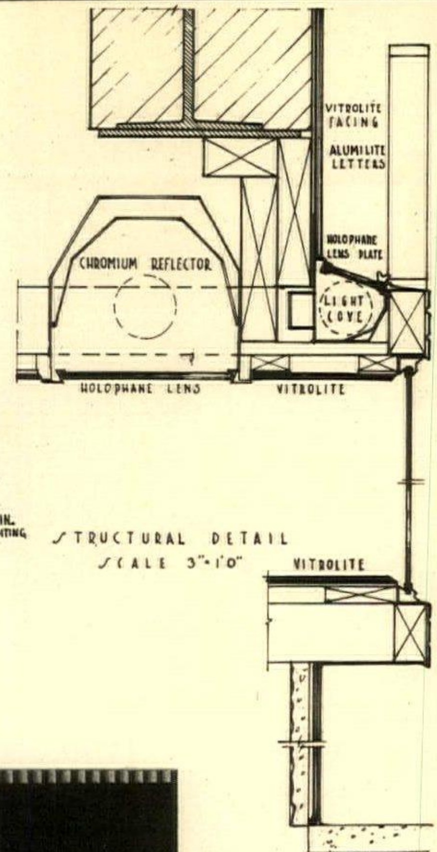
PLAN
SCALE 1/8"=1'-0"



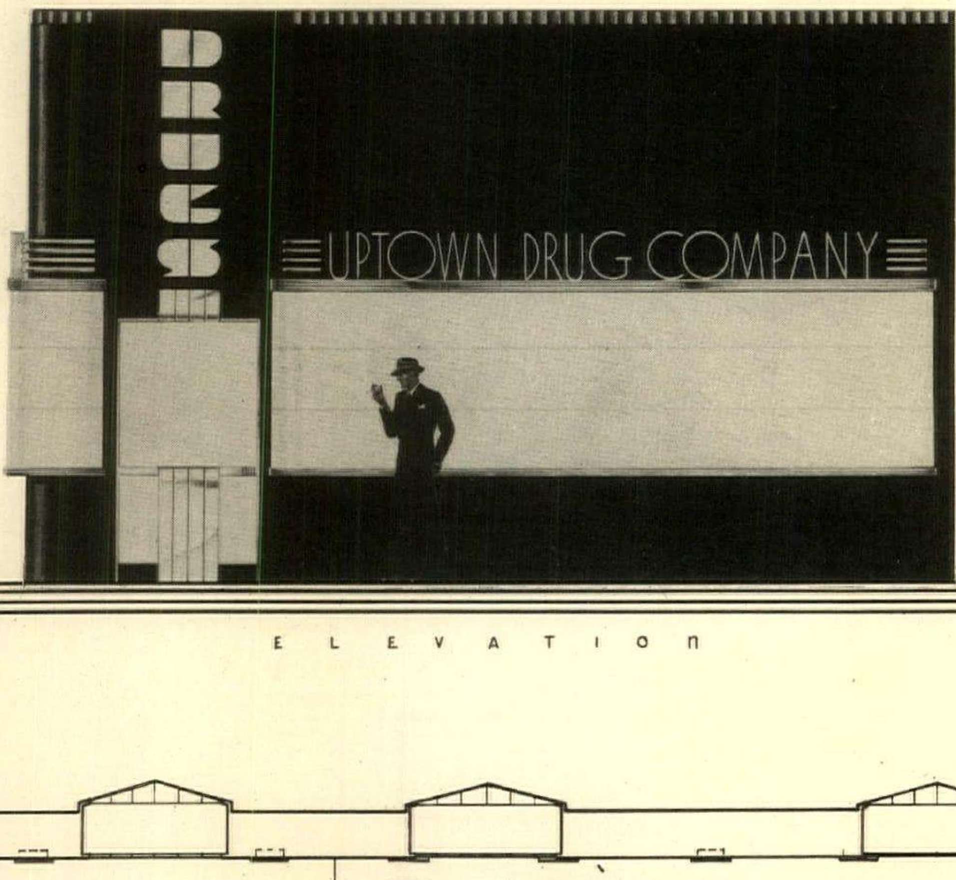
DETAIL
SCALE 3"-1'-0"



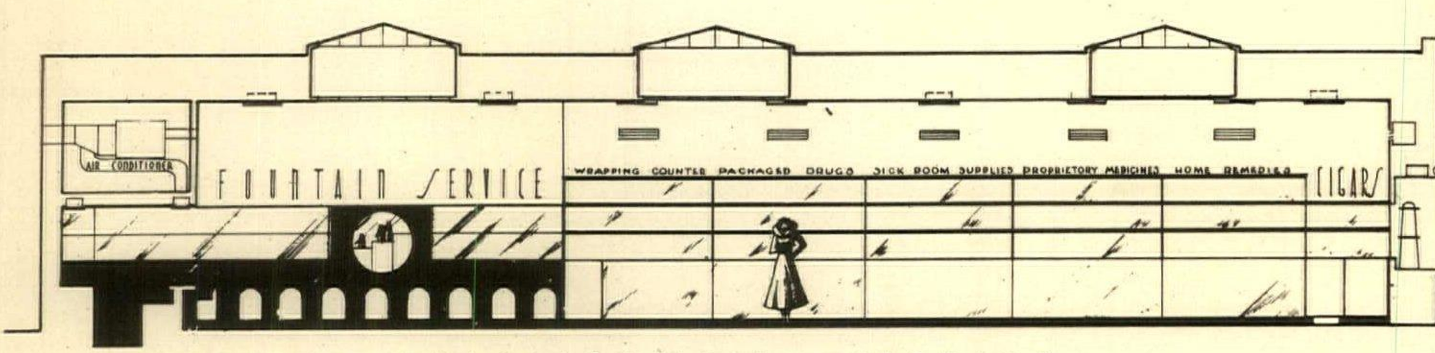
PLAN
1/8" = 1'0"



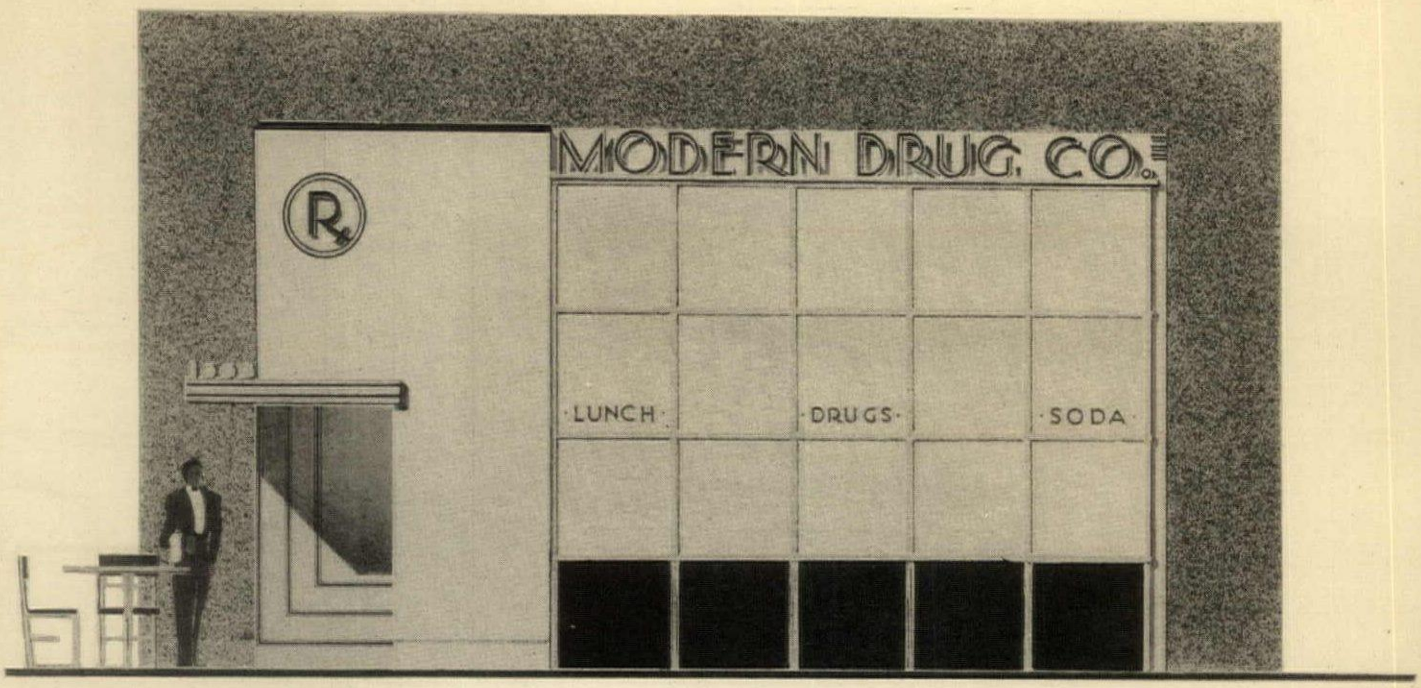
STRUCTURAL DETAIL
SCALE 3" = 1'0"

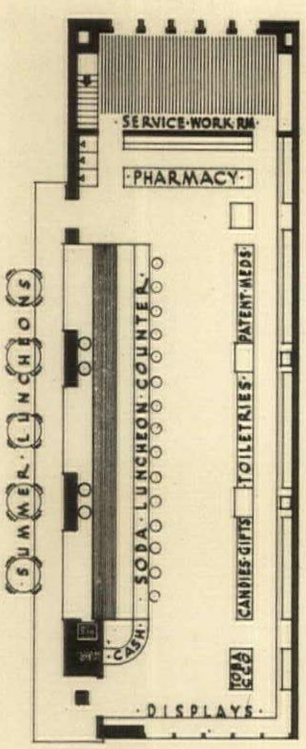


ELEVATION



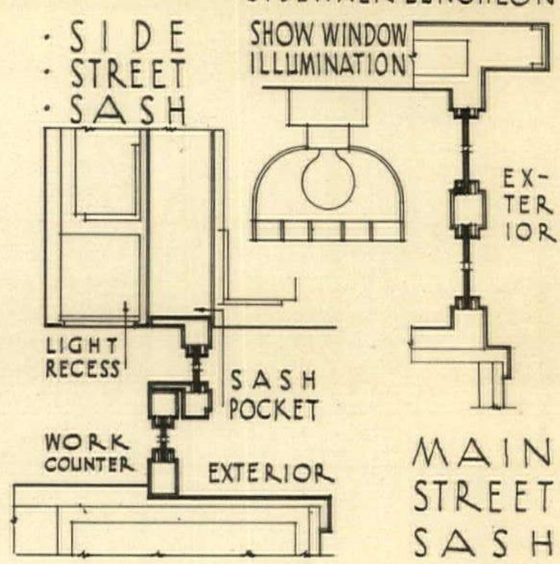
LONGITUDINAL SECTION
SCALE 1/4" = 1'0"

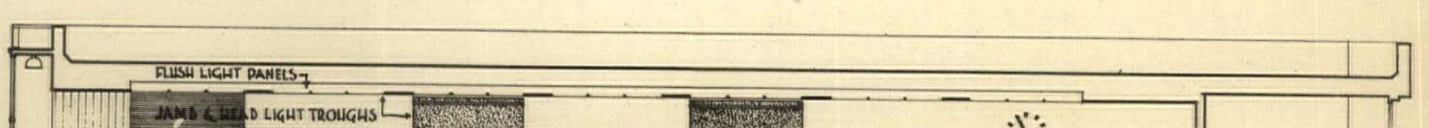




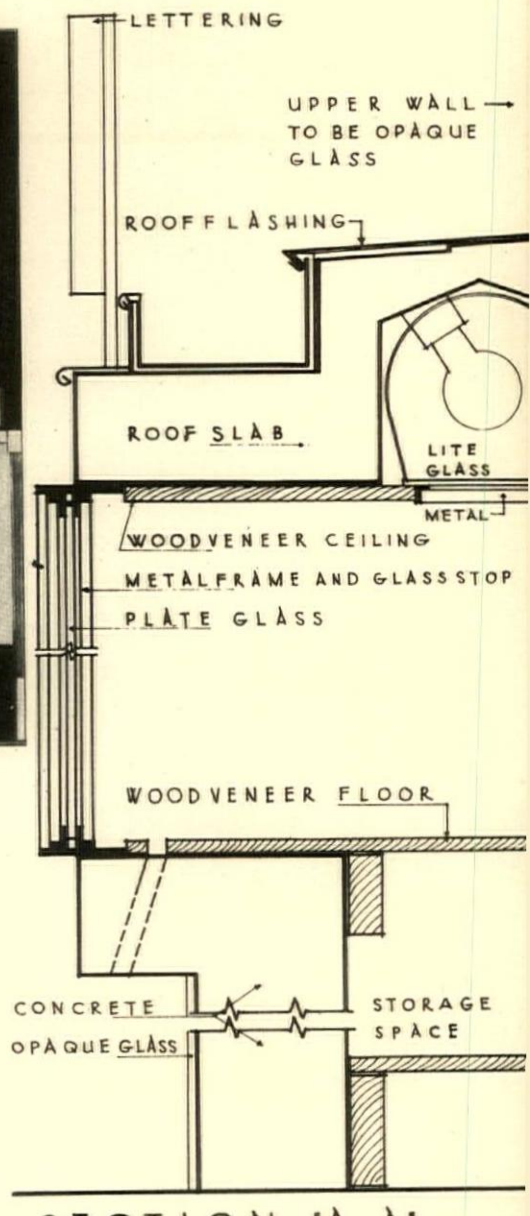
DESIGNING FOR SALES PROMOTION

- MAXIMUM DISPLAY AND VISIBILITY
  EXTERIOR & INTERIOR
- INCREASED REVENUE
  SIDEWALK LUNCHEON

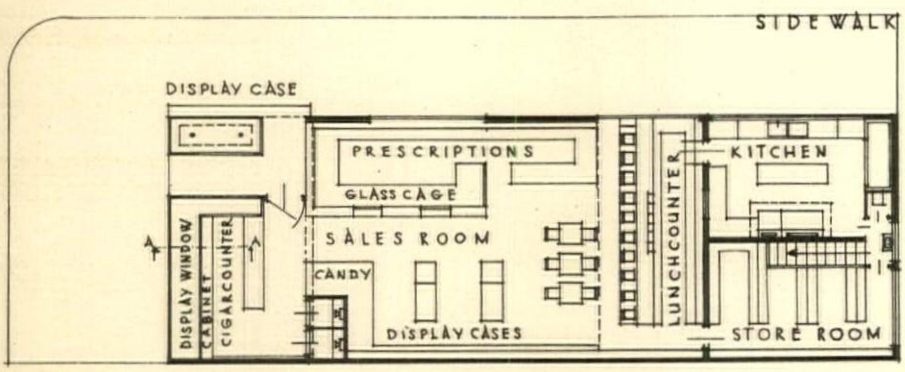




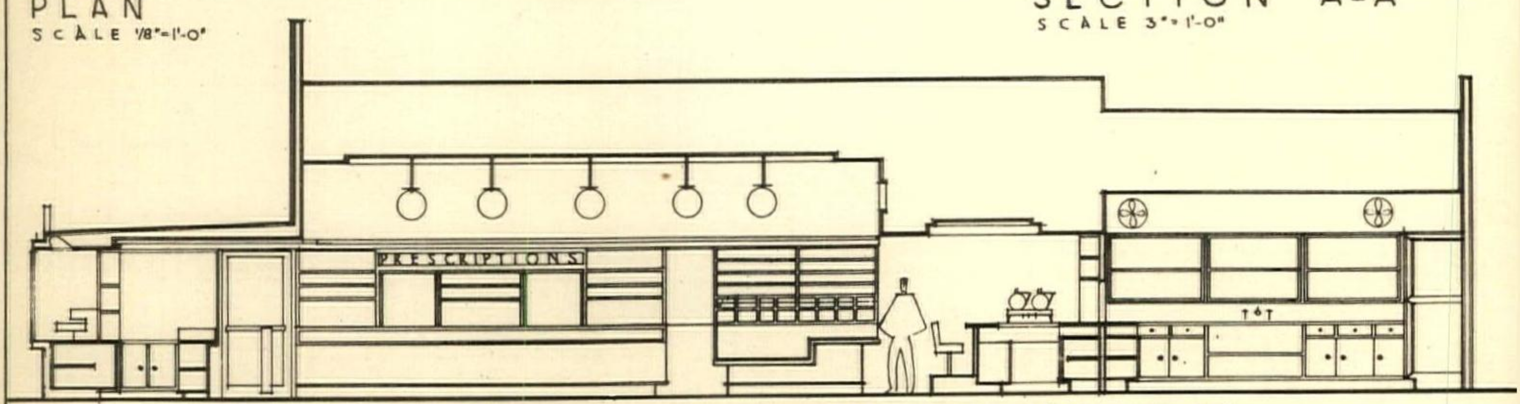
ELEVATION
SCALE 1/2"=1'-0"



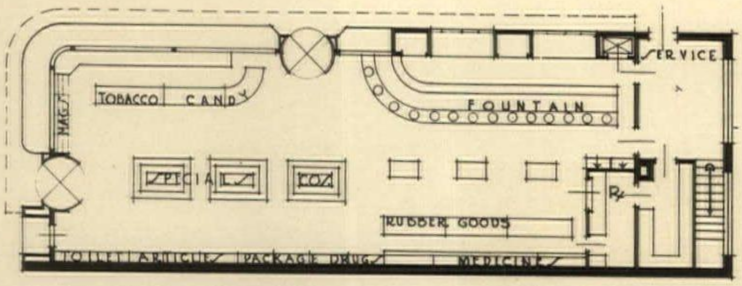
SECTION "A-A"
SCALE 3"=1'-0"



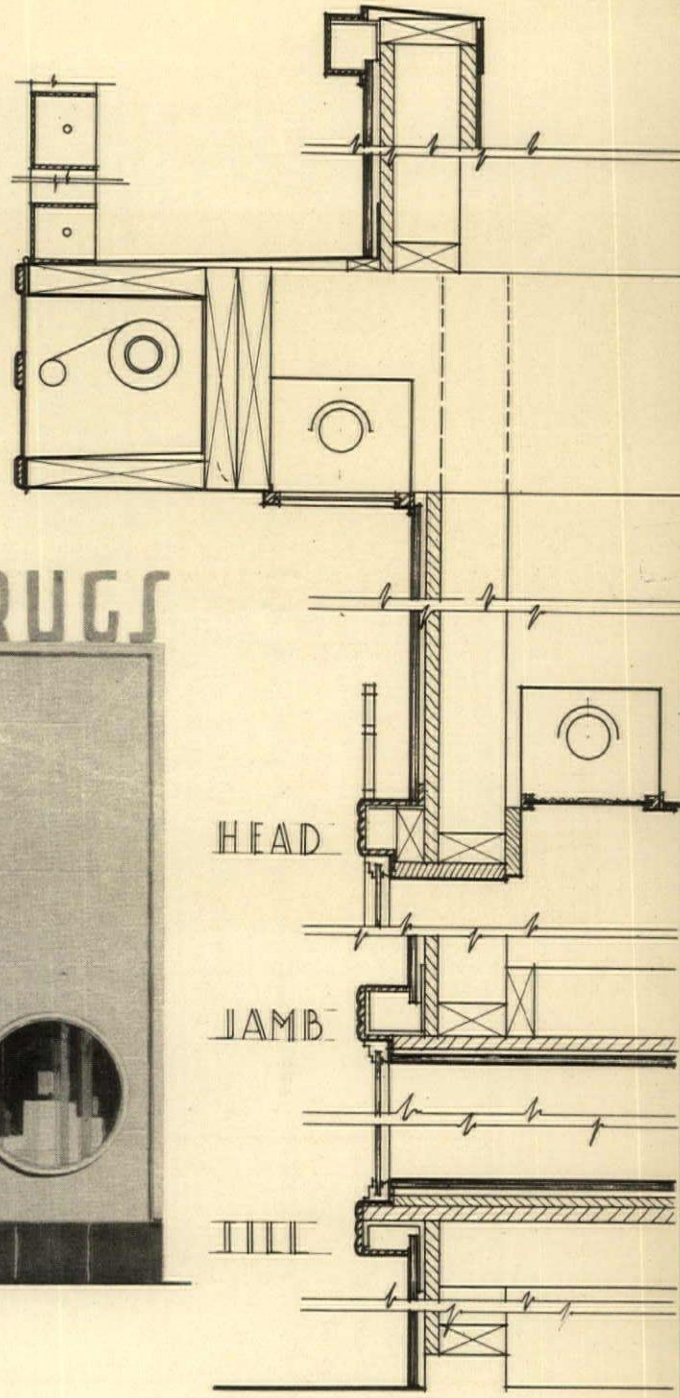
PLAN
SCALE 1/8"=1'-0"



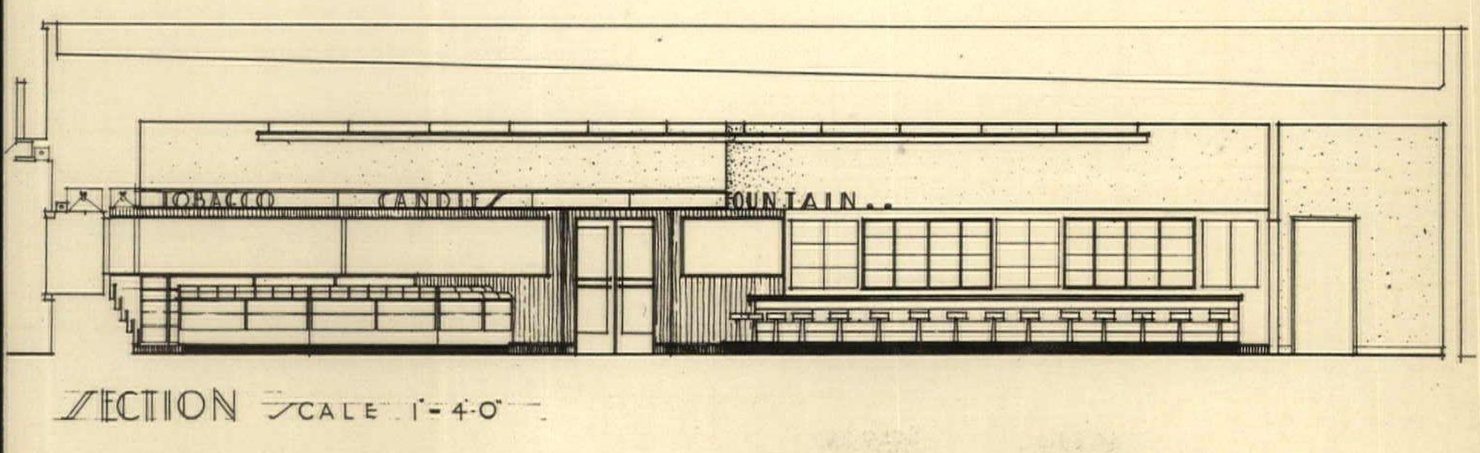
LONGITUDINAL ELEVATION



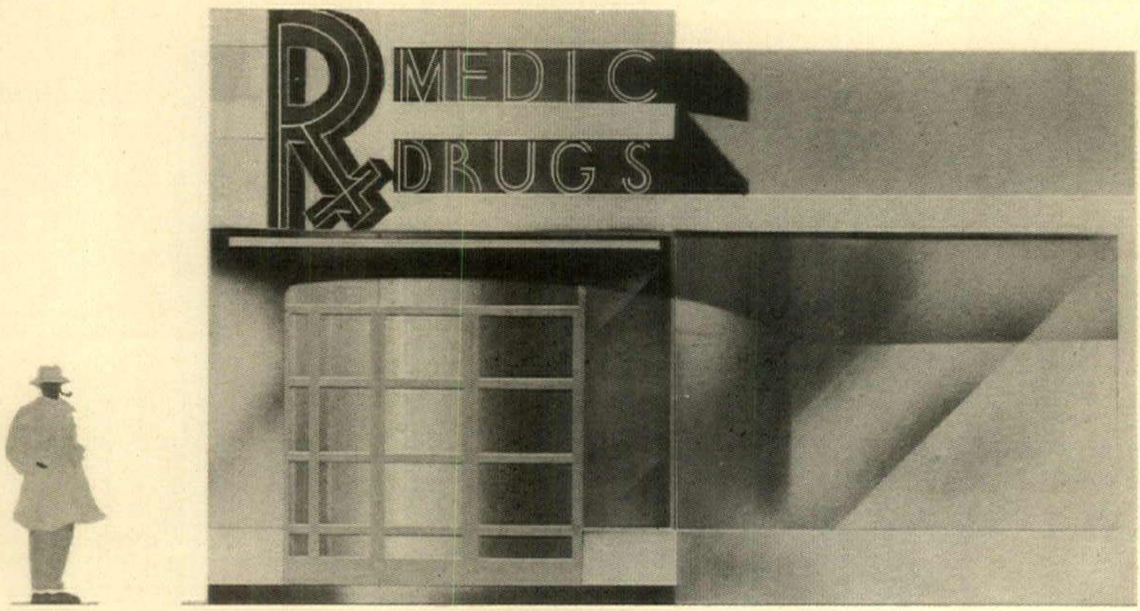
PLAN SCALE 1" - 8'-0"



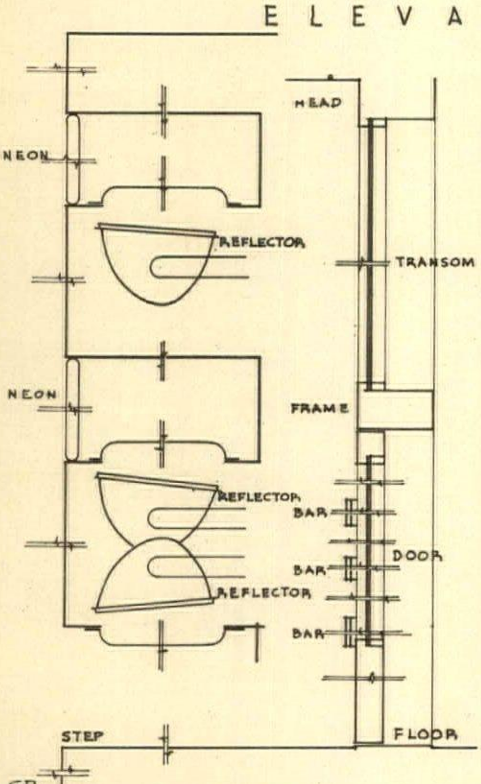
ELEVATION SCALE 1"-2'-0"



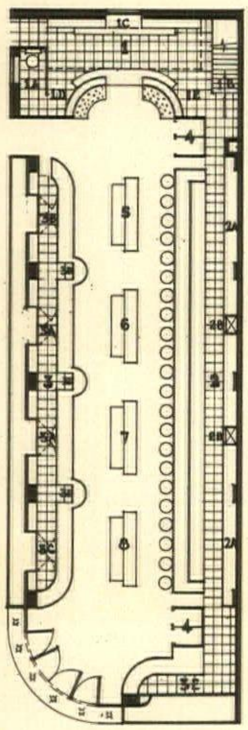
SECTION SCALE 1"-4'-0"



ELEVATION · SCALE 1/2" = 1 · FT·



MAIN·ENTRANCE·DETAIL·



PLAN · SCALE · 1/8" = 1 · FT·

1·PRESCRIPTION·DEPARTMENT
- 1A·COAT·CLOS: AND·TOILET·
- 1B·SERVICE·STAIR·TO·BASEMENT·
- 1C·WORK·TABLE·SINK·SHELVING
- 1D·TRANSPARENT·GLASS·PARTITION
- 1E·LEATHER·SEATS·WAIT·FOR·Rx·

2·FOUNTAIN·SERVICE·AND·LUNCH·
- 2A·BACKBAR·SERVICE·&·DISPLAY
- 2B·DUMBWAITER·SERVICE·BELOW
- 2C·FLUE·FROM·KITCHEN·BELOW

3·SALES·SERVICE·COUNTER·
- 3A·PATENT MED; PACKAGED·DRUG
- 3B·RUBBER·GOODS·SICK·RM·SUPPLIES
- 3C·TOILET·ARTICLES; PERFUME, COSMETICS
- 3D·DISPLAY·BOOTH·WRAPPING·BEHIND
- 3E·CANDY·CIGARS·CASH SPACE

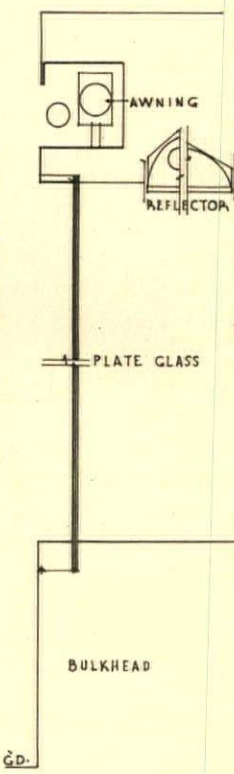
4·TELEPHONE BOOTH SERVICE

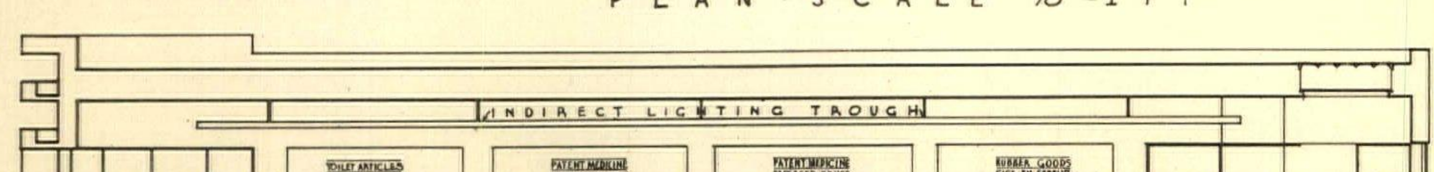
5·MERCHANDISE DISPLAY TABLES

6· " " "

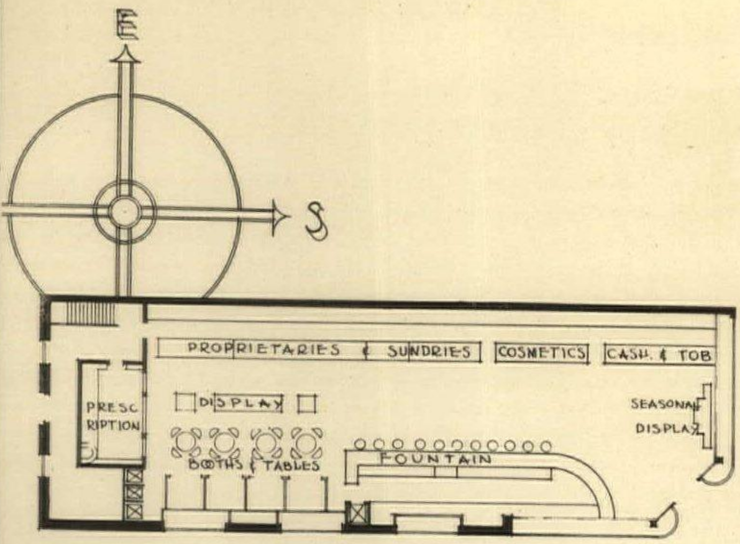
7· " " "

8· " " "

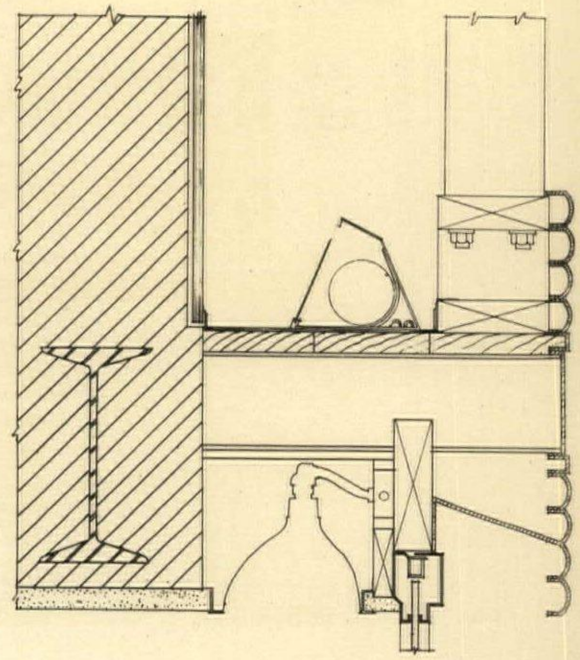




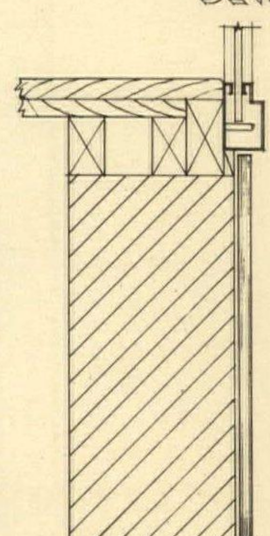
LONGITUDINAL · SECTION · SCALE · 1/4" = 1 FT·

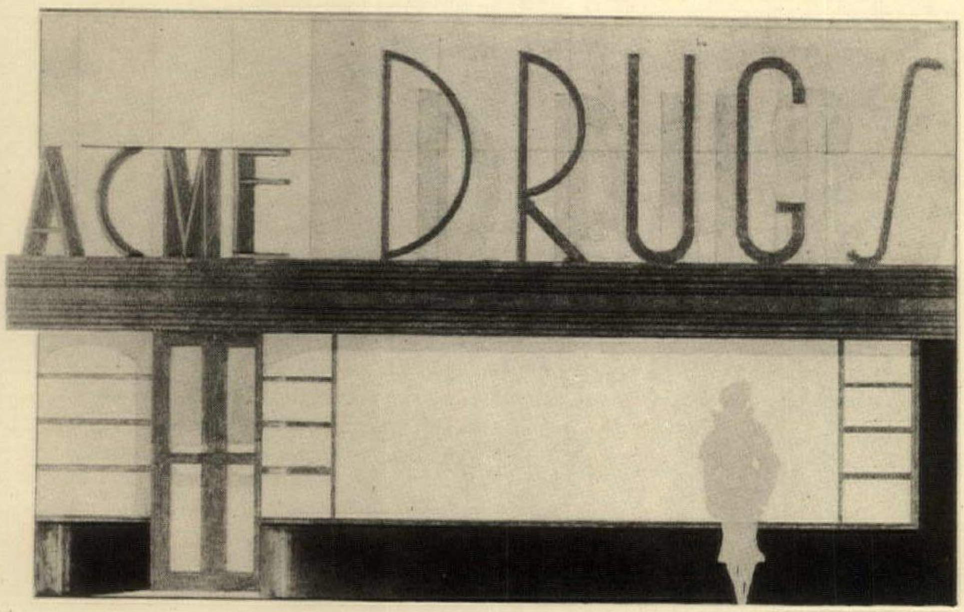


PLAN

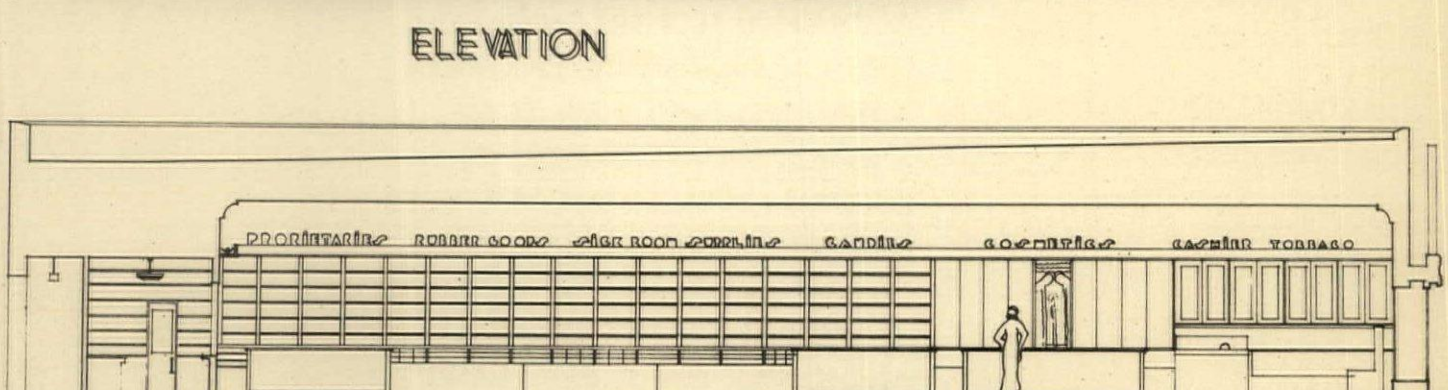


SHOW WINDOW DETAIL





ELEVATION



SECTION

PROBLEM B
APPAREL SHOP

Requirements: The modernized apparel shop is to be devoted to the merchandising of women's wear, suits, dresses, hats, ensembles, gowns, lingerie and underthings, corsets, hose and accessories. The sale of shoes in this store is not contemplated. Among other things customer dressing rooms will be necessary . . . Dimensions: The building covers a level inside lot (not a corner lot), 25'-0" x 75'-0" on the north side of Main Street. There is a service alley at the rear. The clear width between party walls is 24'-0". Party walls ar 12" thick. The present clear height, floor to ceiling, is 12'-0"

FIRST PRIZE: SUREN PILAFIAN, MAURICE LUBIN, NEW YORK 225

This shop successfully gives a maximum of window display, arranged to attract customers approaching from either direction. The smaller high windows at the sides would catch the attention of the passer by and would be useful for the display of accessories—bags, hats, and other small objects. The semicircular form of the larger display windows naturally pulls the customer toward the entrance. In addition, it makes an awning practically unnecessary, as the recessed front provides shadow which prevents sun glare and reflection. It provides shelter on rainy days. It also allows patrons to view the displays without being jostled by others passing by. ¶ Although the elevation is shown a black glass, the design would be equally effective in color, depending upon the adjacent buildings. The sign might be more effective if larger, though its brilliance through the use of Neon tubes and its location might compensate for its lack of size. ¶ The plan is simple and straightforward, providing circulation for the ready-to-wear section without interfering with purchase of accessories. The design is economic because of its simplicity. It also centers attention on the merchandise rather than on the structure itself.

SECOND PRIZE: LESTER COHN, CHICAGO 226

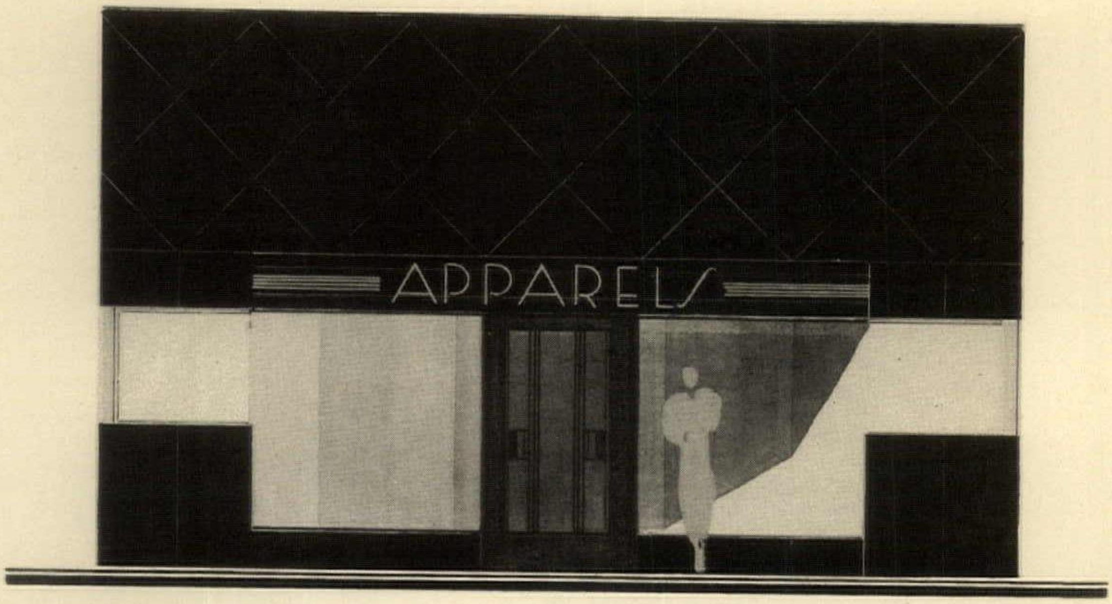
The design is attractive. The larger shop window is useful for ready-to-wear merchandise and the smaller window at the right of the door attracts the eye to the display of accessories. ¶ The arrangement of the sign and lettering leads to the entrance. The display arrangements are well related to the entrance. The splayed window likewise serves to draw in customers. ¶ The display and sign would undoubtedly be effective at night since the lighting of both the sign and the show window have been ingeniously integrated. ¶The plan is workable and provides adequate circulation with an interesting subdivision of departments for various types of merchandise.

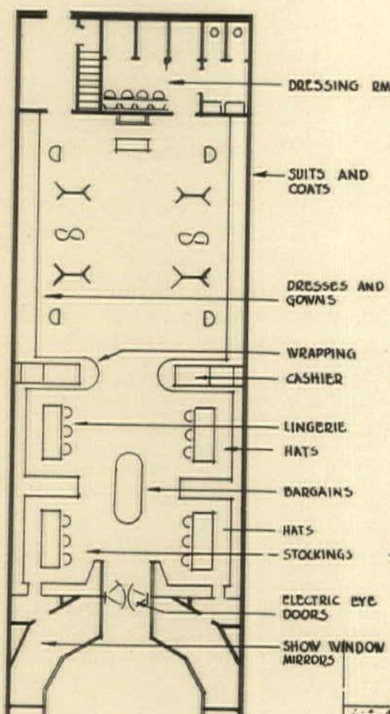
THIRD PRIZE: RAOUL L. Du BRUL, HARRY J. TRIVISONNO, NEW YORK . . 227

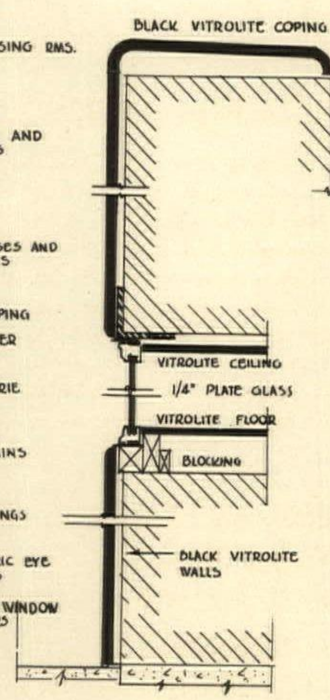
This store is undoubtedly smart and feminine. The bright colors and the well-placed and illuminated sign are obviously designed to attract customers. ¶ The door is well-studied, but might focus too much attention on itself rather than on the displays. The horizontal "keyhole" motif of the window does emphasize the display of ready-to-wear merchandise by providing an almost circular glass area which automatically makes it the center of interest. ¶ The plan is not fully satisfactory. There is not enough ready-to-wear stock available and the stair is not properly located for convenience. The interior design would be satisfactory for display of small quantities of merchandise, but this is perhaps more characteristic of the city specialty shop than the apparel shop of an average community. ¶ A rise of a single step in plan is always objectionable and dangerous. It might be very difficult to provide an awning for this store.

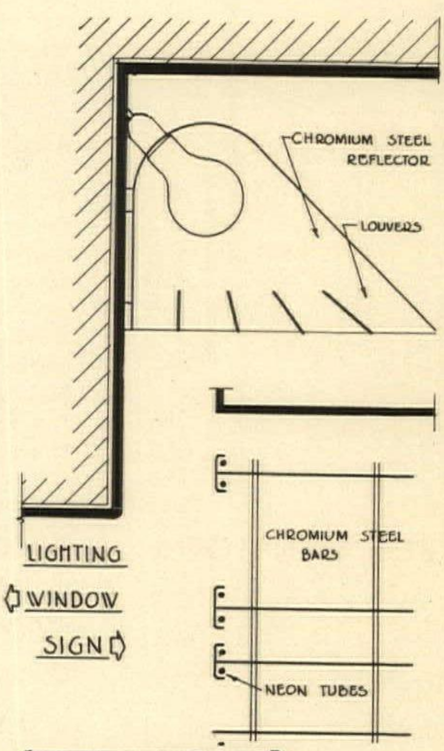
HONORABLE MENTIONS:

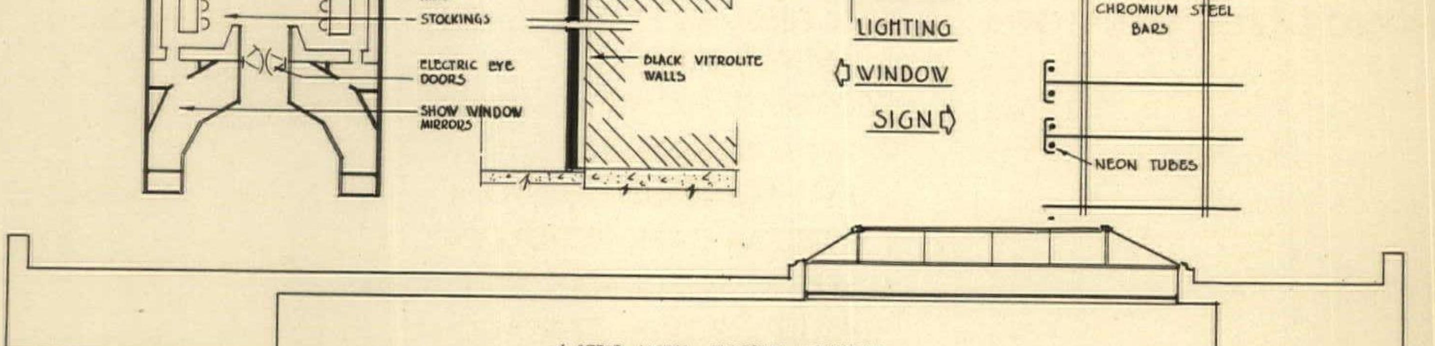
MAX FELDMAN, RALPH E. LEFF, HARRY GOTTESMAN, NEW YORK 22
GEORGE D. RECHER, CHICAGO 22
IRWIN A. SUGARMAN, CHICAGO 23
JOHN HIRONIMUS, NEW YORK 23
J. GORDON CARR, BROOKLYN 23
JOSEPH M. HIRSCHMAN, NEW YORK 23
HERBERT L. RODDE, CHICAGO 23
LEWIS EUGENE WILSON, EDWIN ELLISON MERRILL, ROBERT EVANS ALEXANDER, LOS ANGELES 23
ANTHONY S. CIRESI, CLEVELAND 23
ORLO HELLER, NEW YORK 23
J. R. SPROULE, SEATTLE, WASH. 23
DONALD M. DOUGLASS, GEORGETOWN, CONN. 23


APPARELS

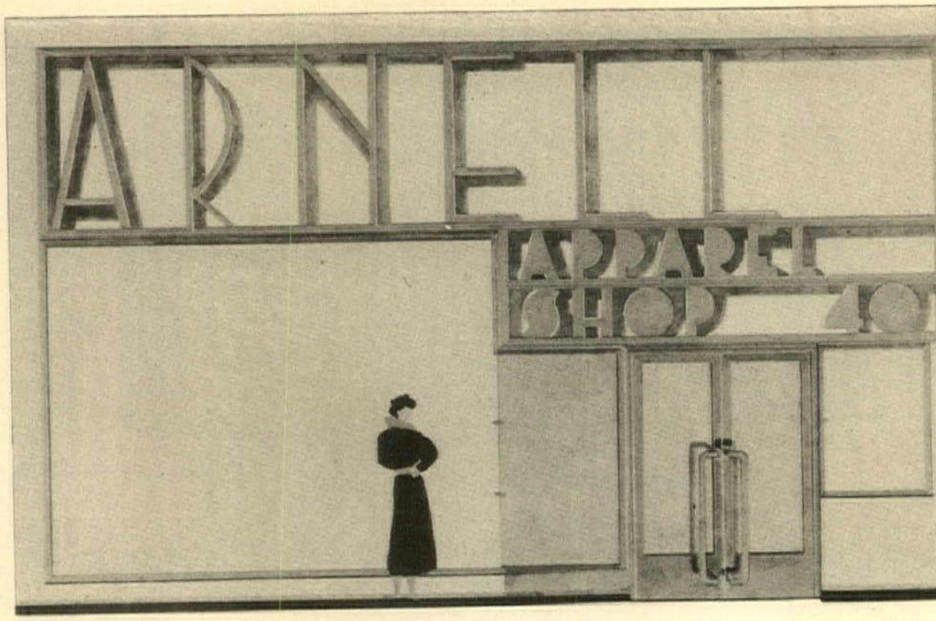

DRESSING RMS.
SUITS AND COATS
DRESSES AND GOWNS
WRAPPING
CASHIER
LINGERIE
HATS
BARGAINS
HATS
STOCKINGS
ELECTRIC EYE DOORS
SHOW WINDOW MIRRORS


BLACK VITROLITE COPING
VITROLITE CEILING
1/4" PLATE GLASS
VITROLITE FLOOR
BLOCKING
BLACK VITROLITE WALLS

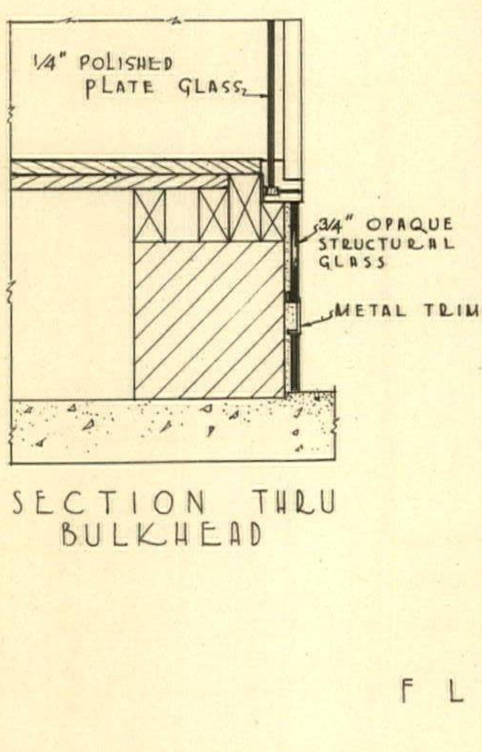

CHROMIUM STEEL REFLECTOR
LOUVERS
LIGHTING
WINDOW
SIGN
CHROMIUM STEEL BARS
NEON TUBES


STRIP LIGHTS FLOODING CEILING
MIRROR
MIRROR
MIRROR
MIRROR
SECTION

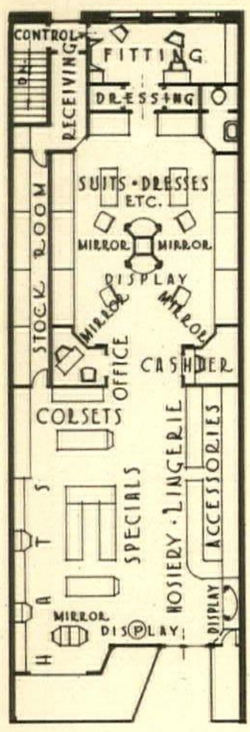
LESTER COHN



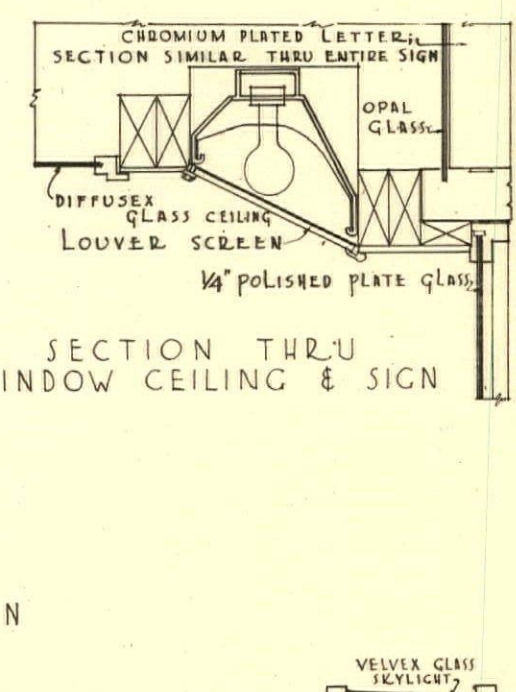
FRONT ELEVATION



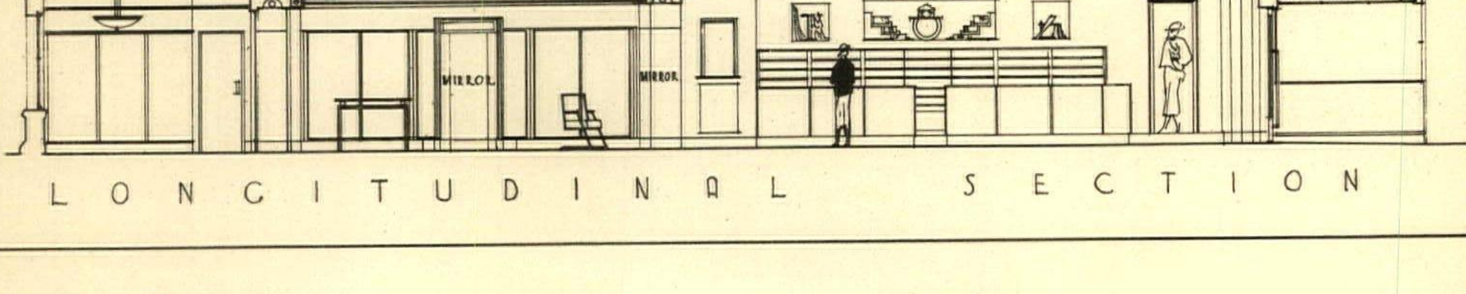
SECTION THRU BULKHEAD



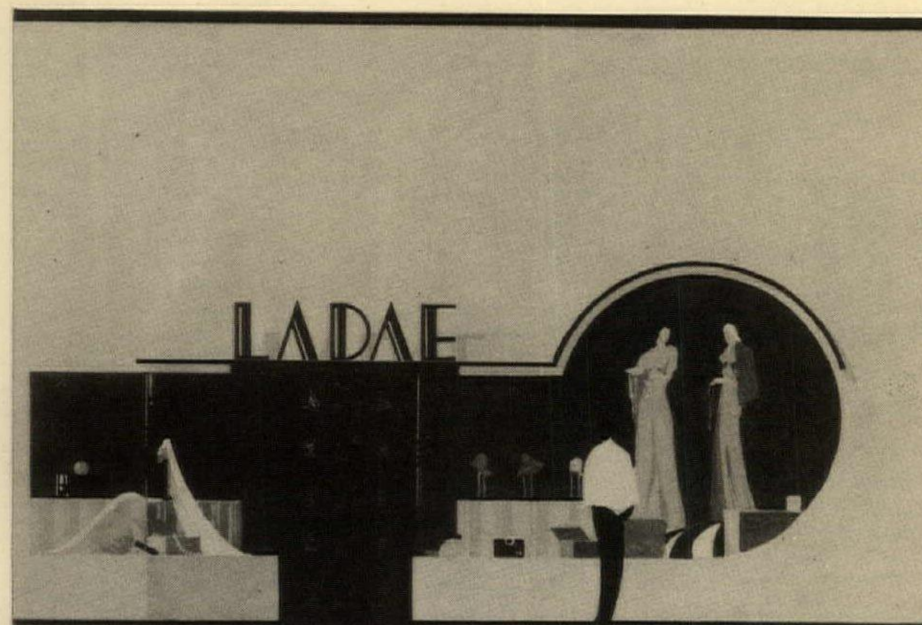
FLOOR PLAN



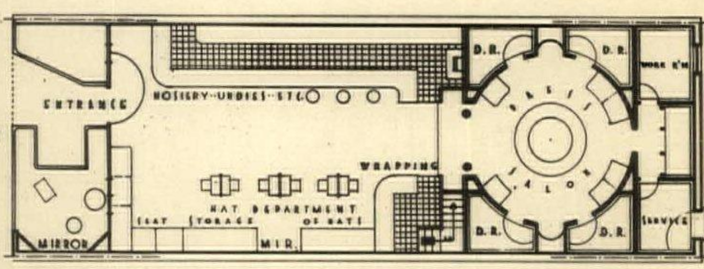
SECTION THRU WINDOW CEILING & SIGN

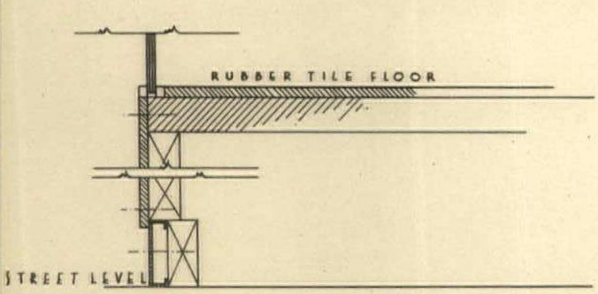


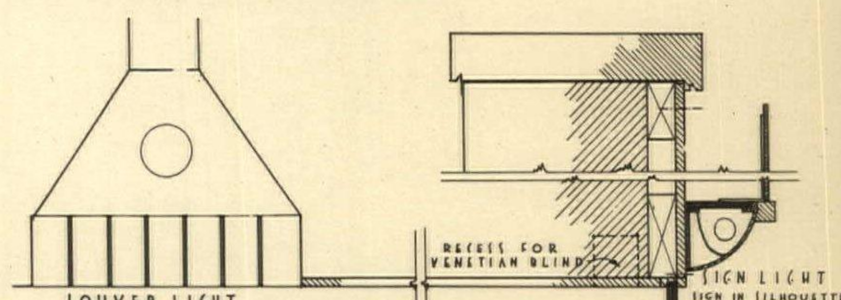
LONGITUDINAL SECTION



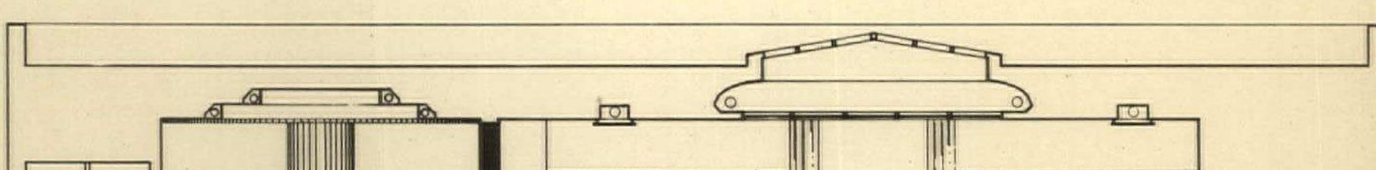
VITROLITE FACE -- BRONZE TRIM -- ETCHED GLASS DOOR -- L.O.F. PLATE GLASS SHOW WINDOWS.





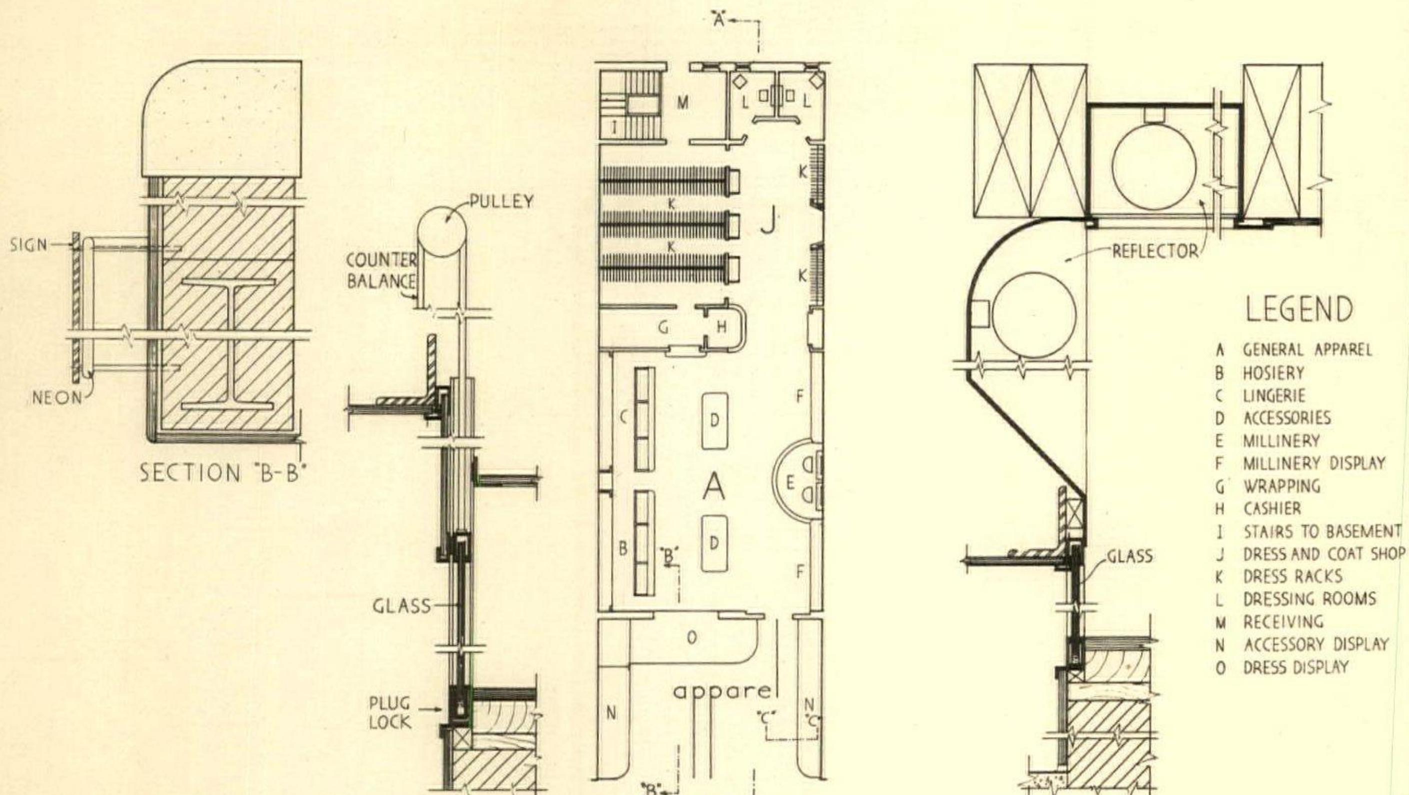


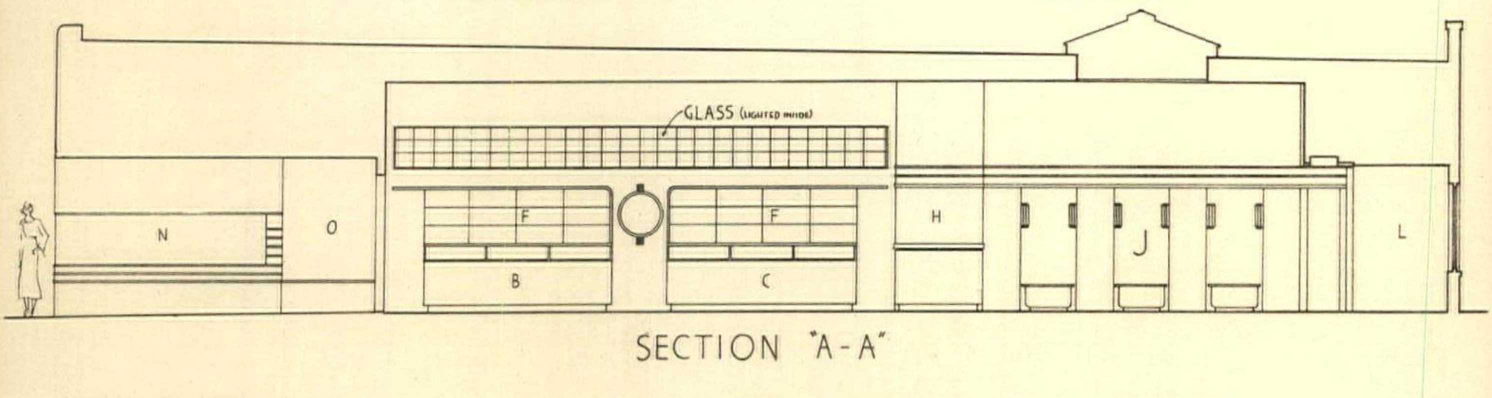
SHOW WINDOW BASE - - - DETAIL OF SHOW WINDOW HEAD



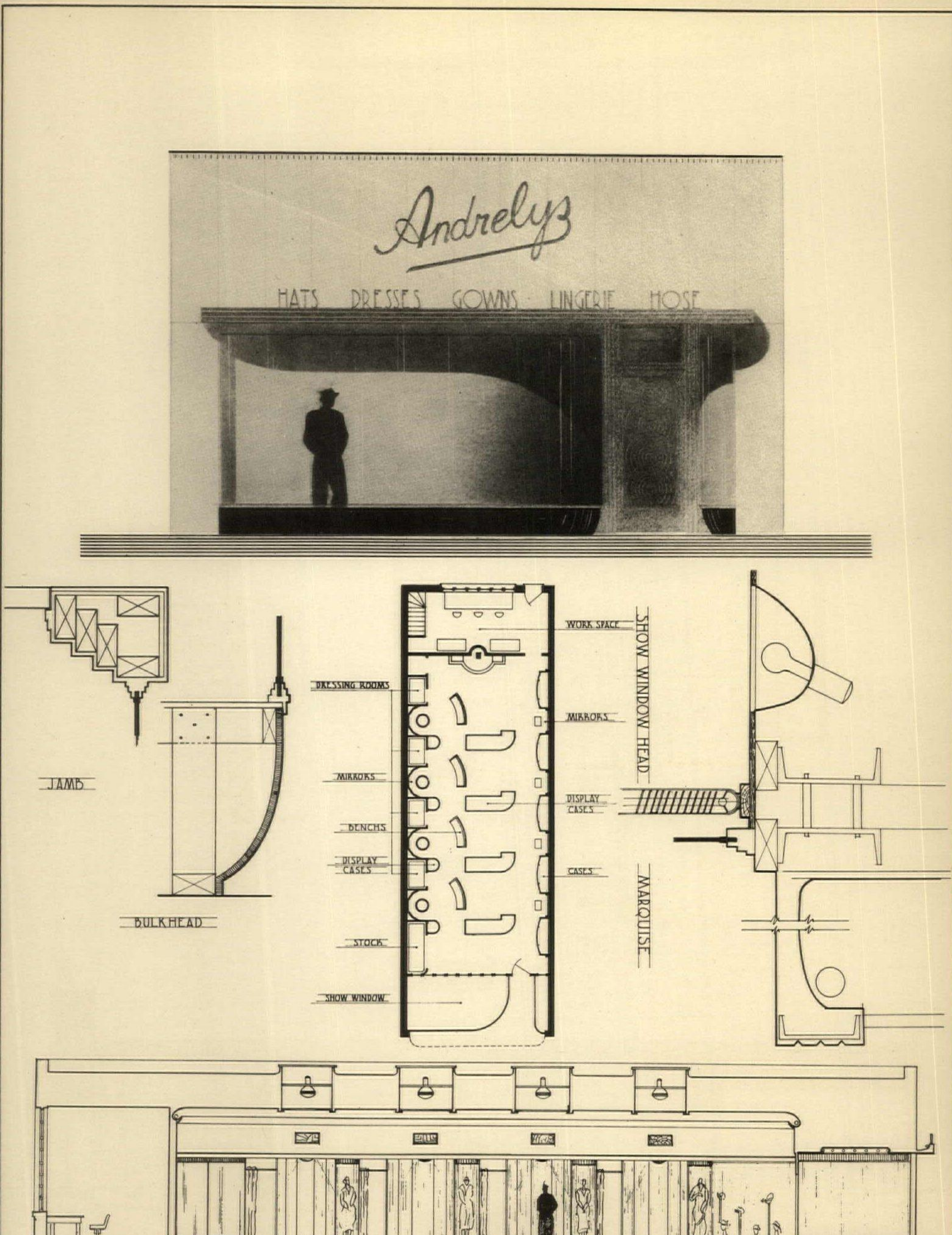
SERVICE DEPT. - DRESS SALON AND DRESSING ROOMS - - STAIR AND WRAPPING - - HATS - - TRYON TABLES - MIRROR CABINETS - WALL SEAT - SHOW WINDOWS ETC.

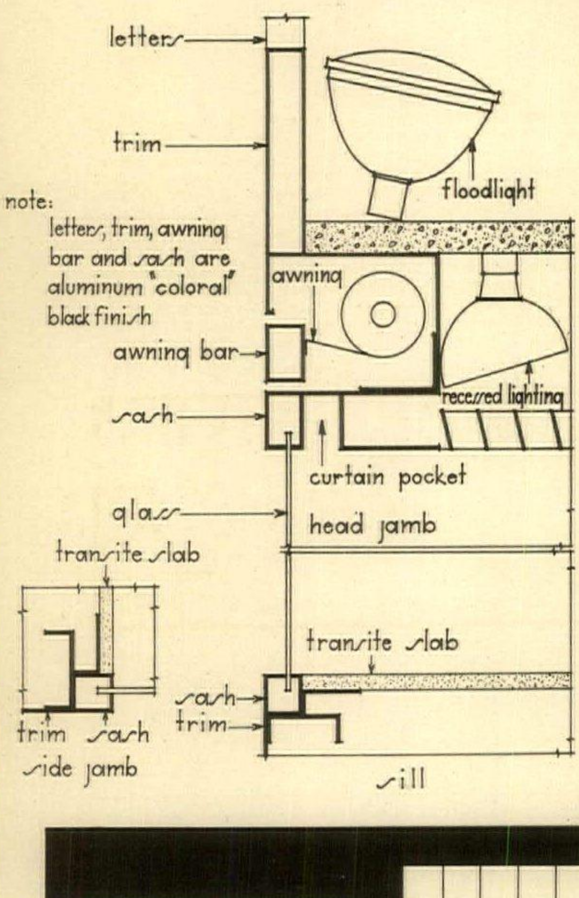
MAX FELDMAN, RALPH E. LEFF, HARRY GOTTESMAN

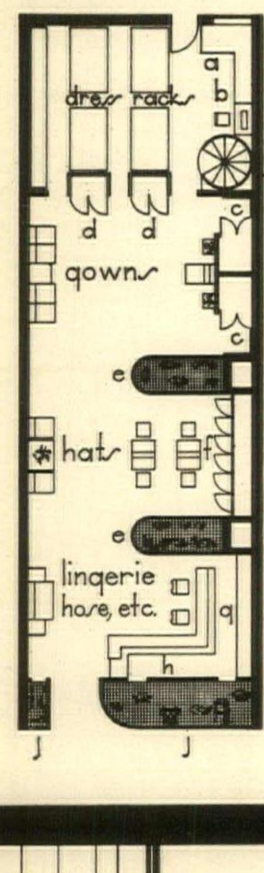




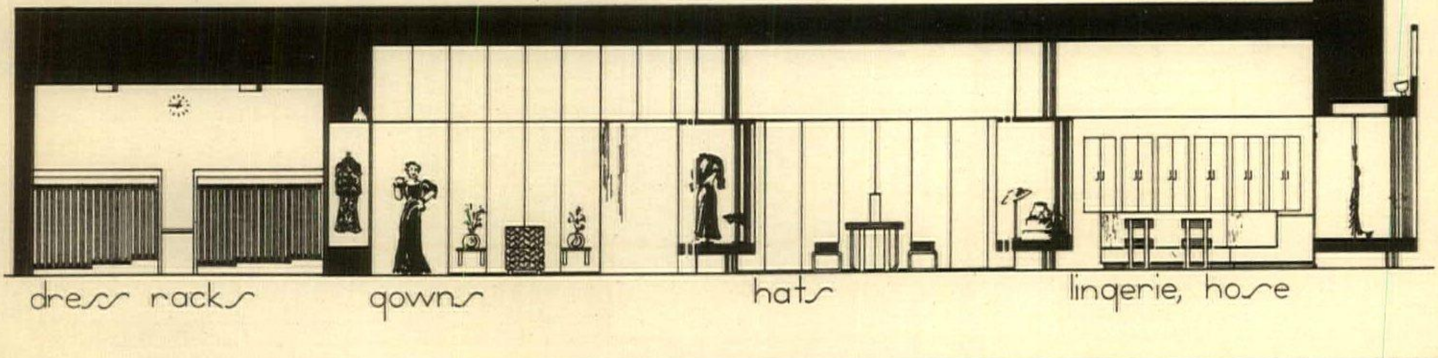
SECTION "A-A"

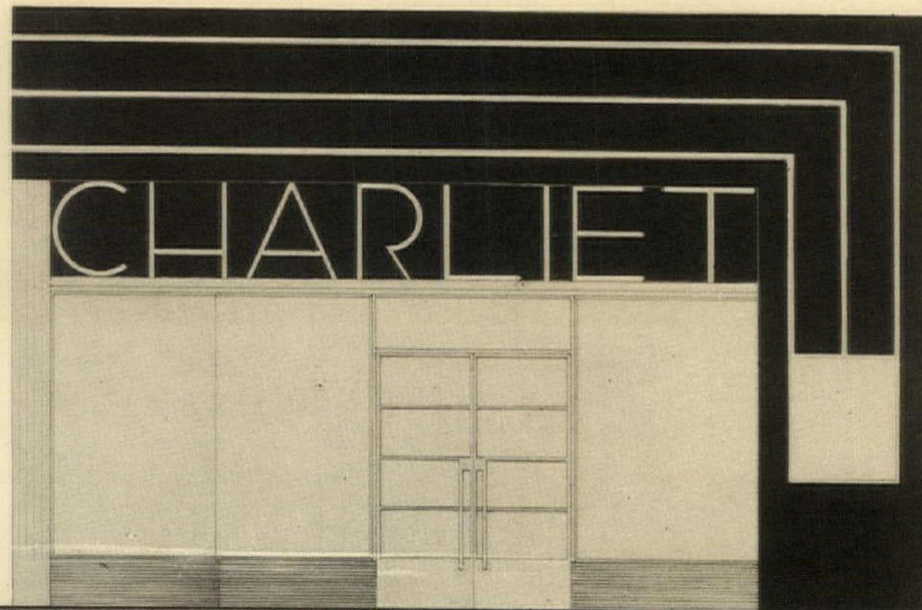

Andrelys
HATS DRESSES GOWNS LINGERIE HOSE
JAMB
BULKHEAD
WORK SPACE
DRESSING ROOMS
MIRRORS
MIRRORS
BENCHS
DISPLAY CASES
DISPLAY CASES
CASES
STOCK
SHOW WINDOW
SHOW WINDOW HEAD
MARQUISE

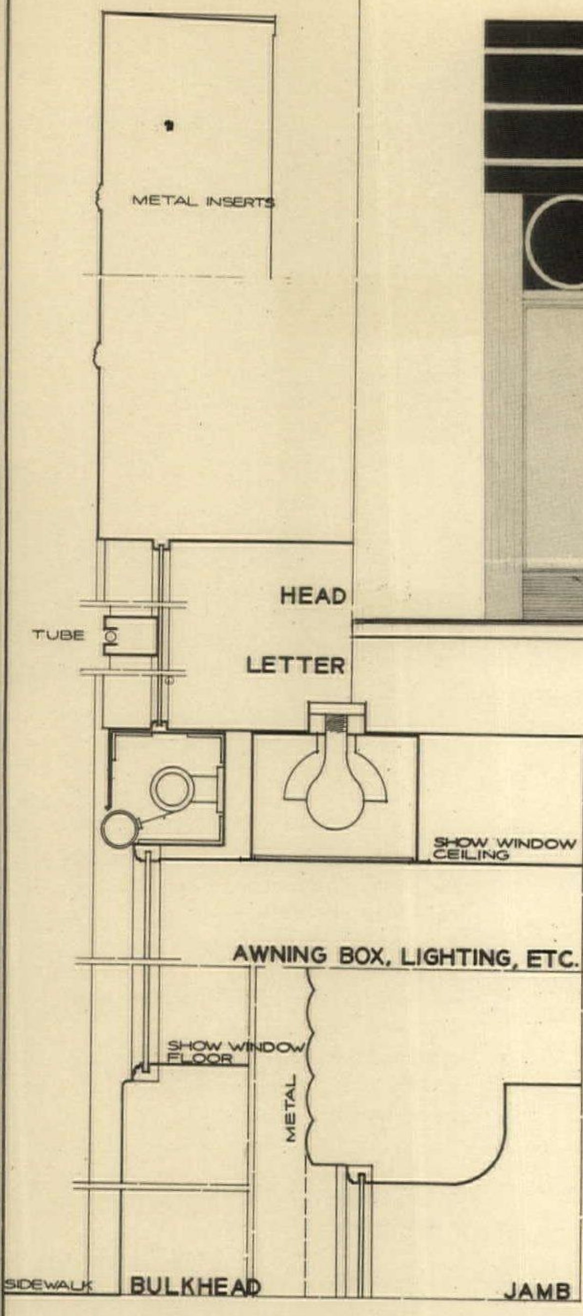




a receiving
b alterations
c dressing rooms with mirrors in front of room
d dress cabinet
e glass display case
f millinery case with satin finished mirrored doors
g lingerie, hose, etc. wall case
h gloves, accessories counter
j show window



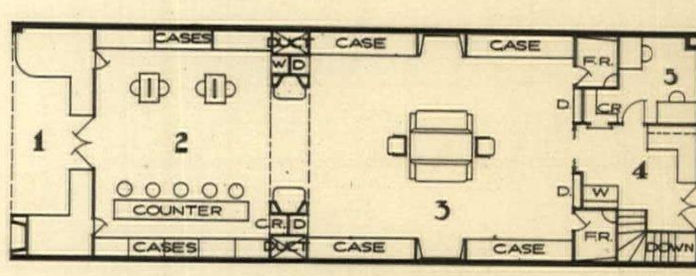




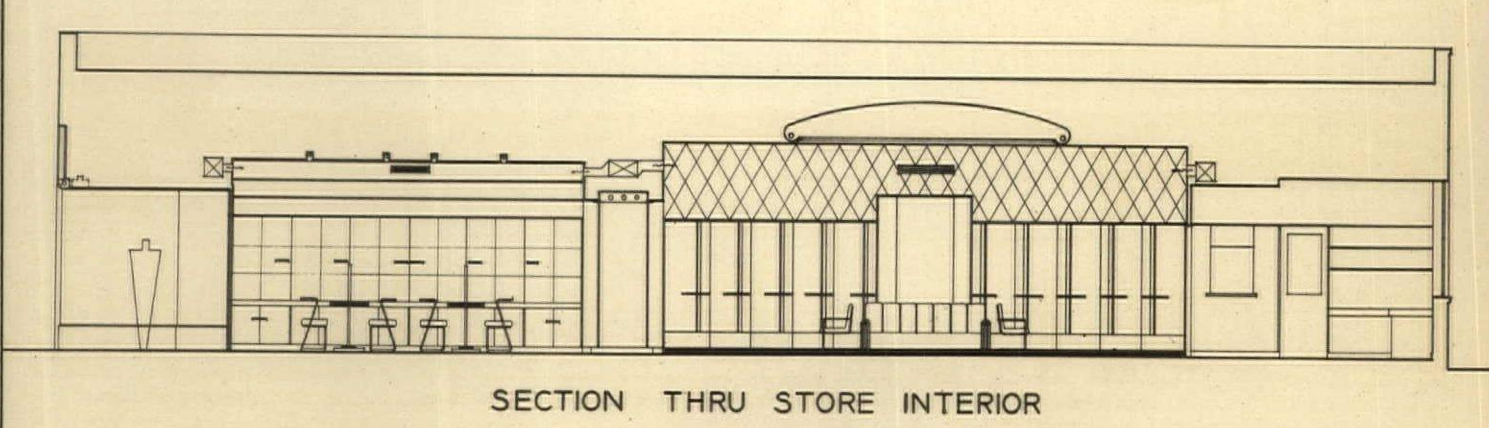
SECTION THRU SHOW WINDOW

THE APPAREL SHOP

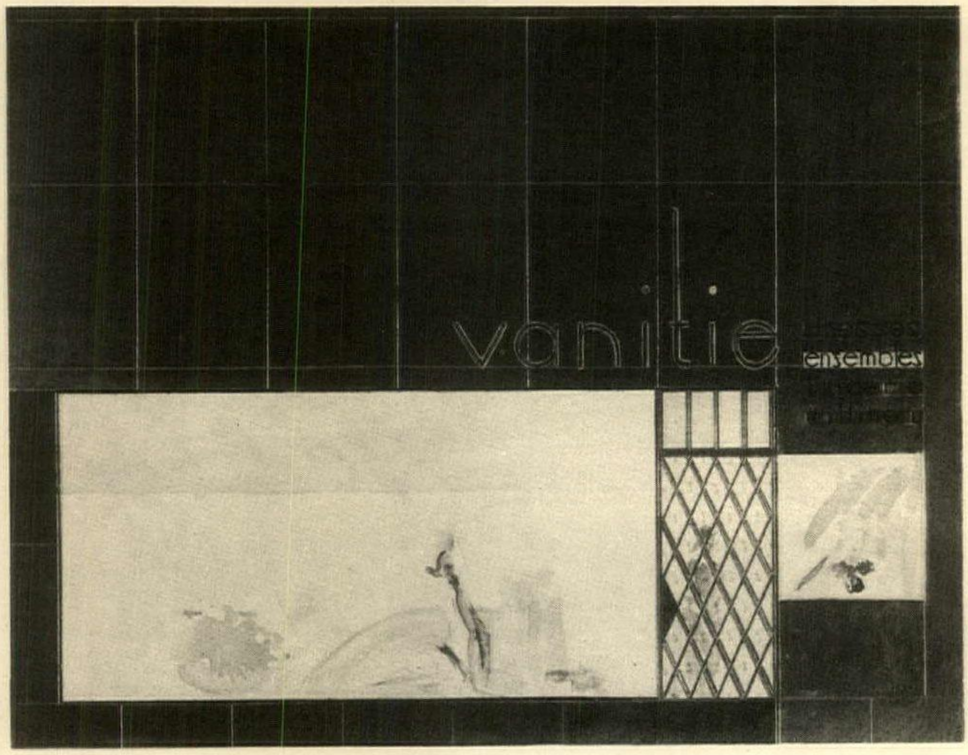
1 THIS SPACE USED FOR STREET DISPLAY PURPOSES ◻ SMALL CASE ON EAST WALL TO BE USED FOR DISLAY OF LARGE PROFIT ITEMS SUCH AS NEW NOVELTIES 2 USED FOR SELLING AND DISPLAY OF MILLINERY, HOSE, UNDERTHINGS, CORSETS, ETC 3 USED FOR DISPLAY AND SELLING OF COATS, SUITS, DRESSES, GOWNS, ETC 4 THIS SPACE TO BE USED FOR RECEIVING MERCHANDISE, MARKING, WRAPPING FROM SPACE 3, STAIRWAY-TO BASEMENT FOR LOCKERS, TOILETS, EMPLOYES DRESSING ROOMS, STORAGE FOR BULK MERCHANDISE, BOILER ROOM, ETC 5 OFFICE TO BE USED FOR OWNER OR MANAGER, ACCOUNTING, RECORDING, CASHIER, AND SECRETARY. D—INDICATES INTERIOR DISPLAY CASE. ◻ WALLS ABOVE CASES FURRED FLUSH FOR AIR CONDITIONING DUCTS. ◻ C.R—INDICATES CASH REGISTER ◻ W—INDICATES WRAPPING DESK. ◻ F.R—INDICATES FITTING ROOM.

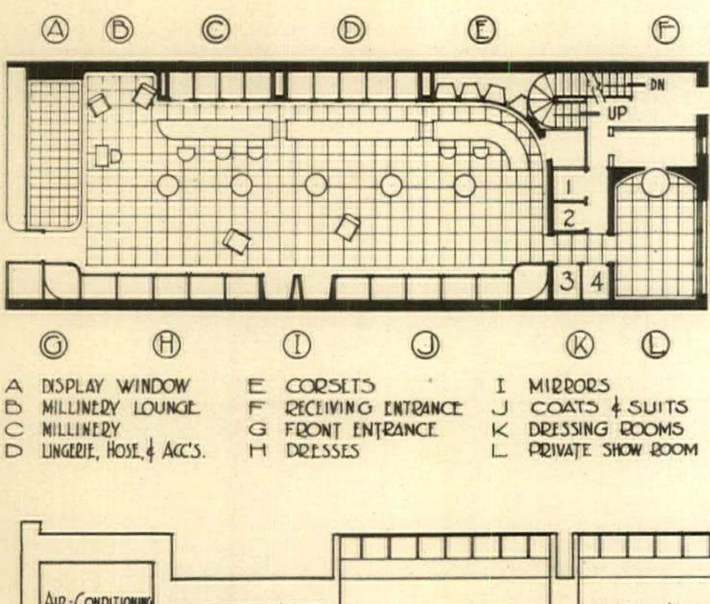


PLAN

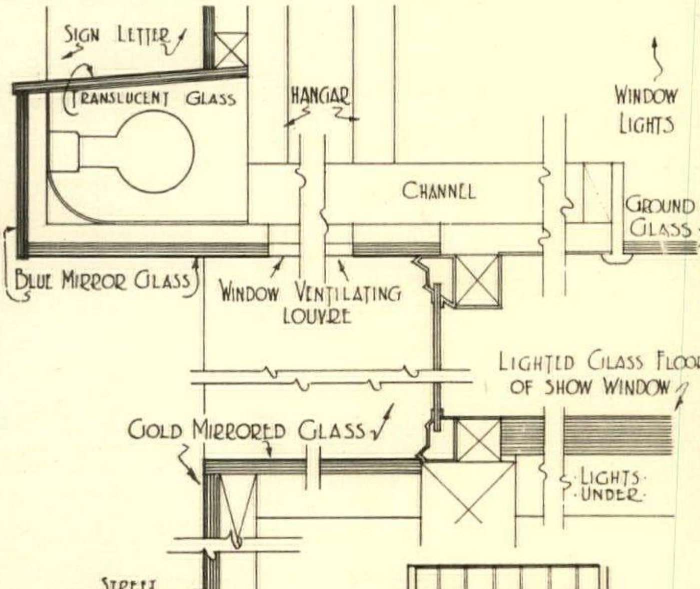


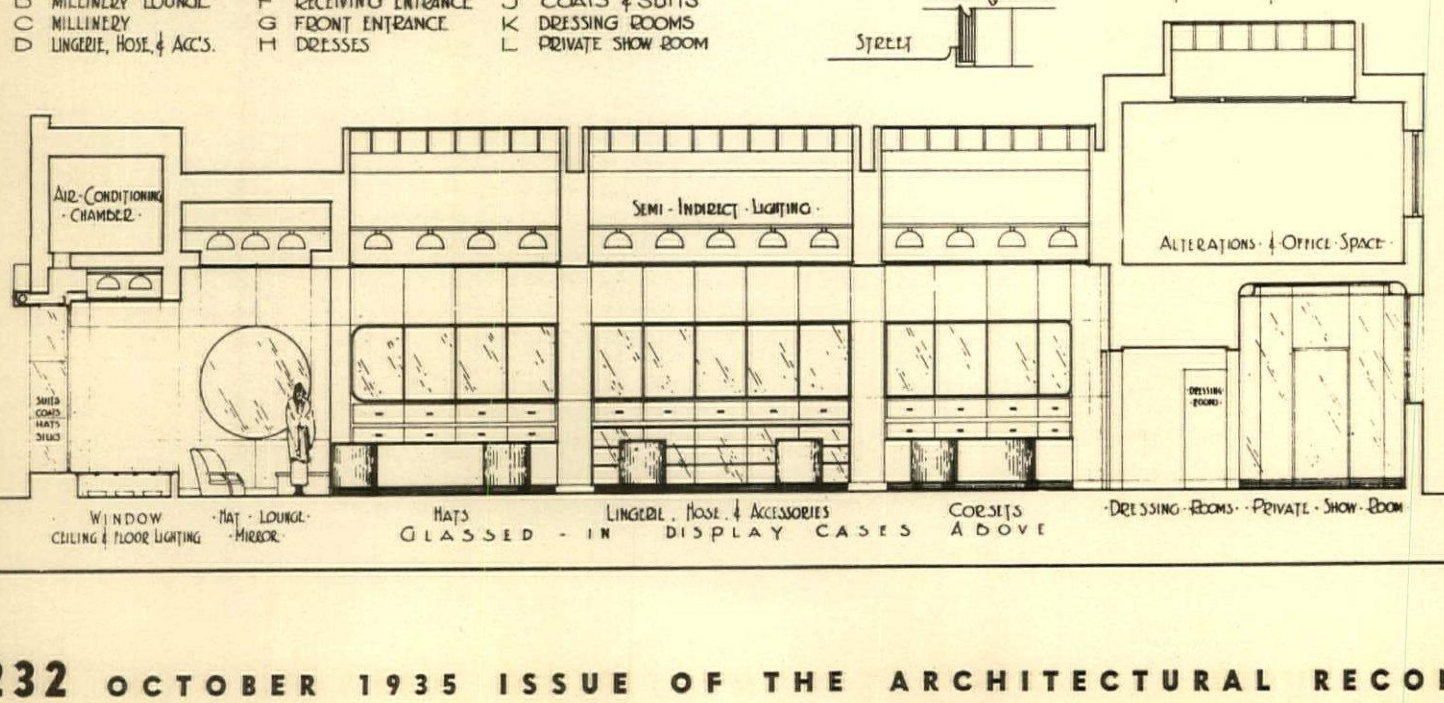
SECTION THRU STORE INTERIOR

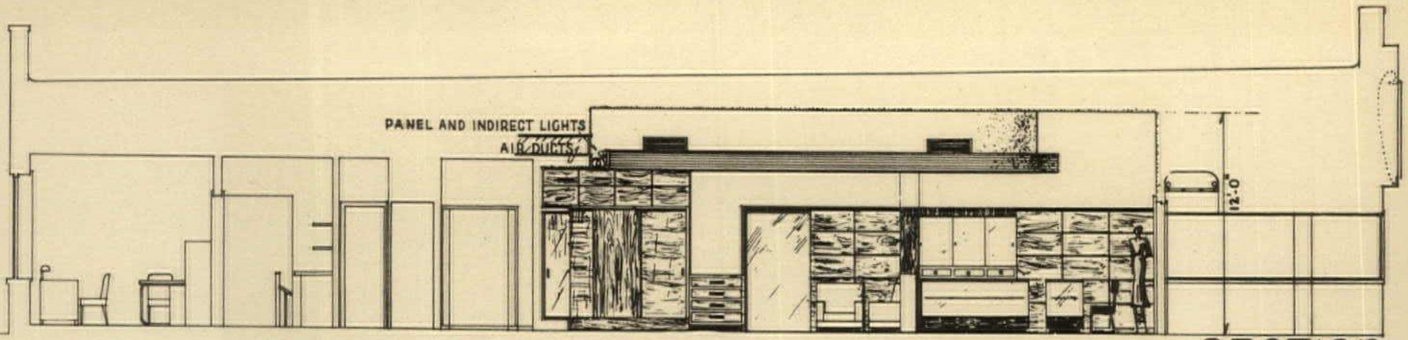




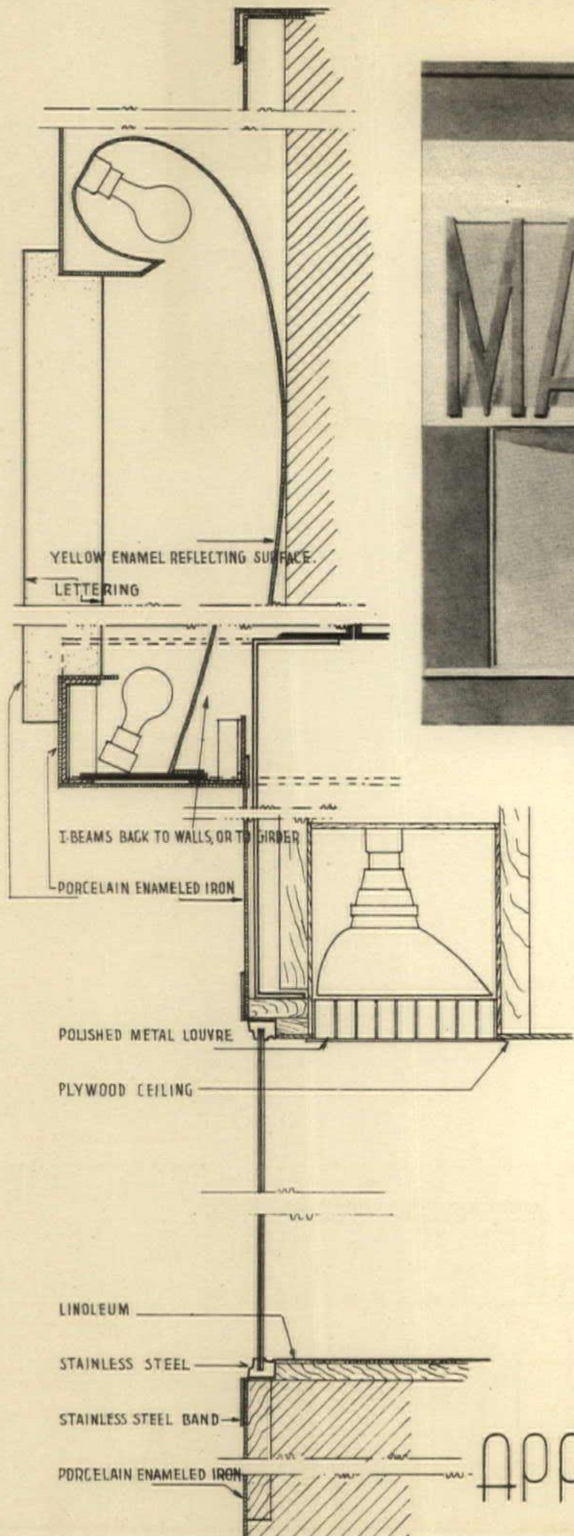
A DISPLAY WINDOW
B MILLINERY LOUNGE
C MILLINERY
D LINGERIE, HOSE, & ACC'S.
E CORSETS
F RECEIVING ENTRANCE
G FRONT ENTRANCE
H DRESSES
I MIRRORS
J COATS & SUITS
K DRESSING ROOMS
L PRIVATE SHOW ROOM



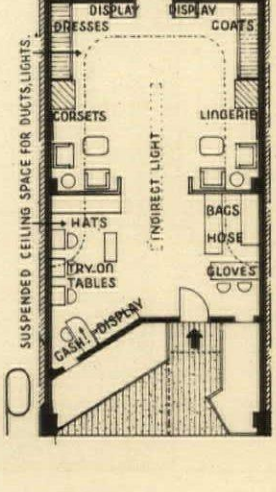




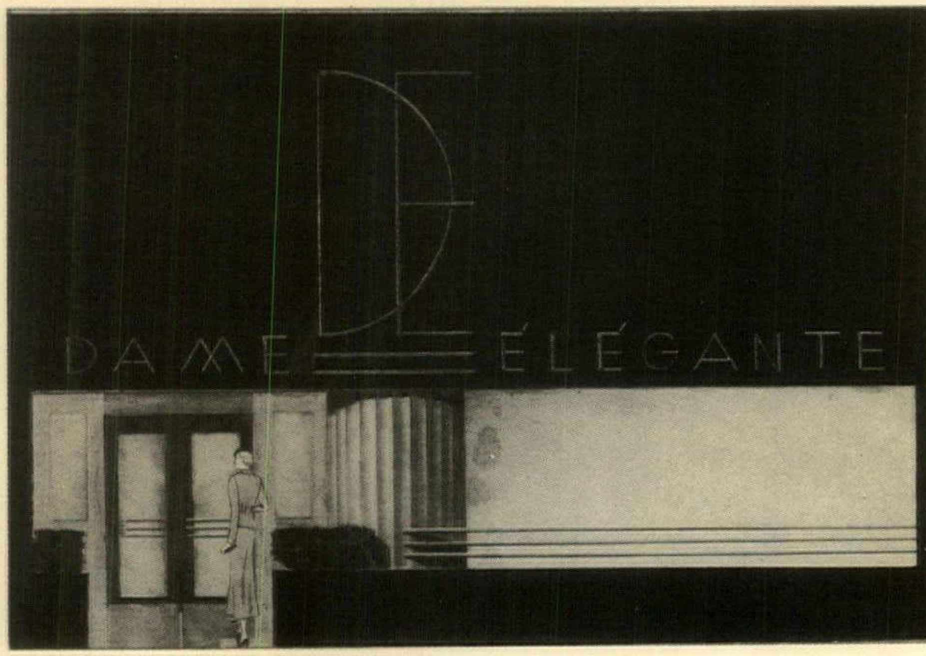
SECTION

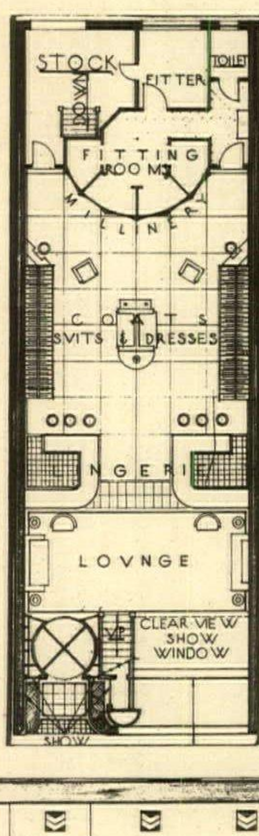


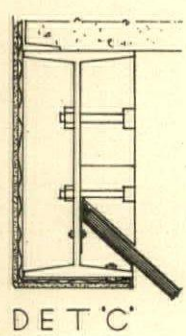
ELEVATION



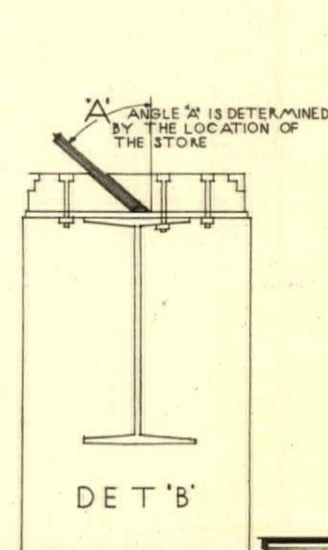
APPAREL SHOP PLAN

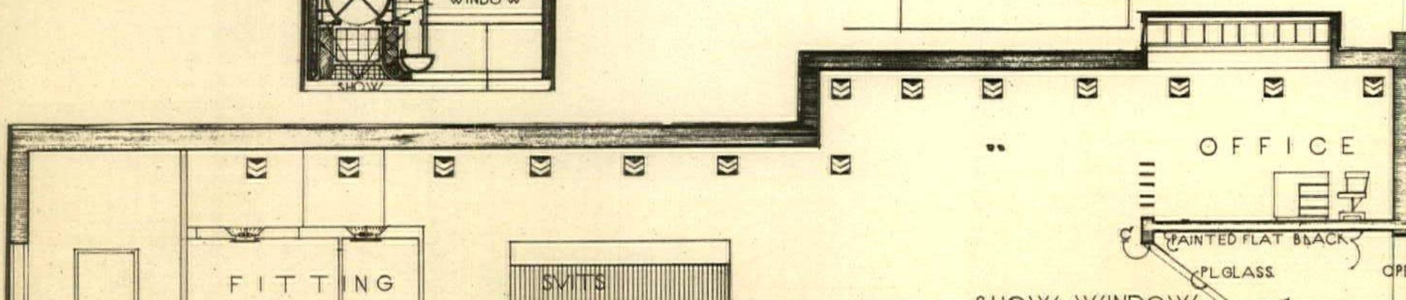


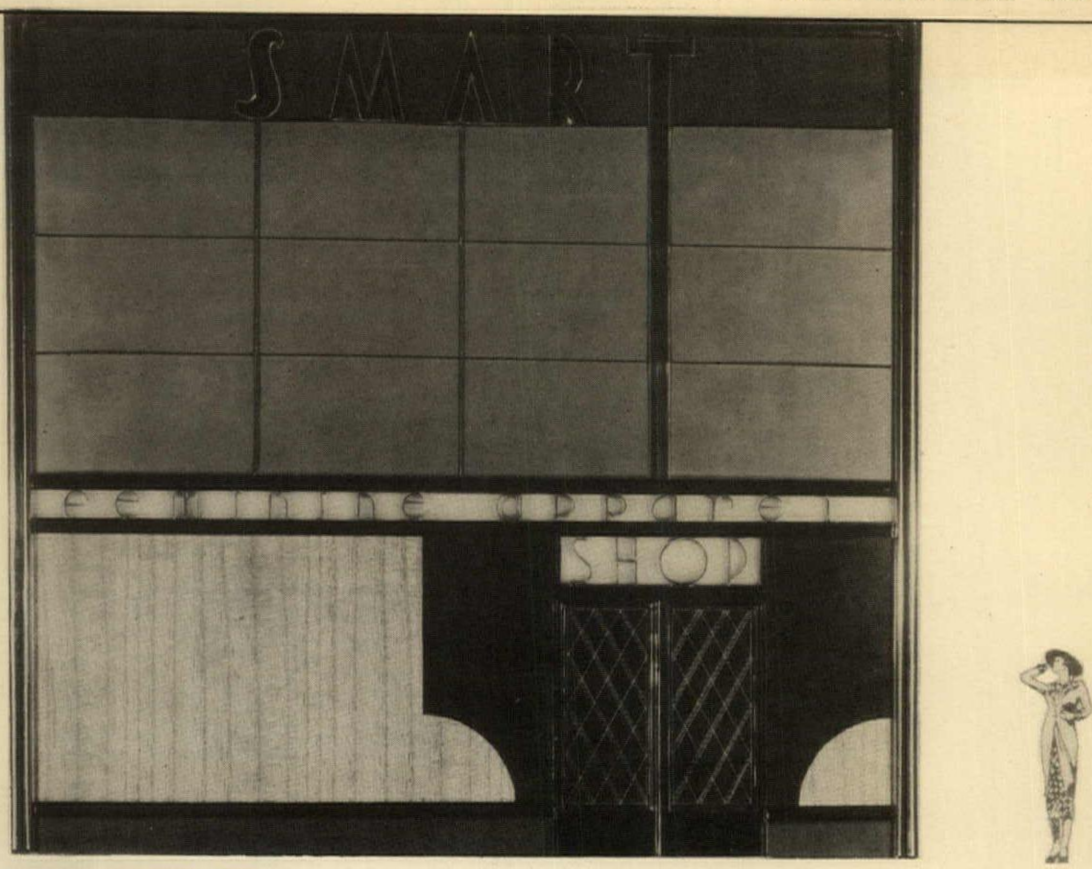




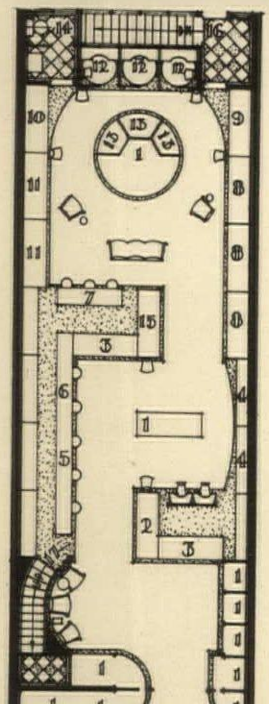
NOTE
ANGLE 'A' WILL AVOID MIRROR REFLECTION "SEE" BACK OF DRAWING

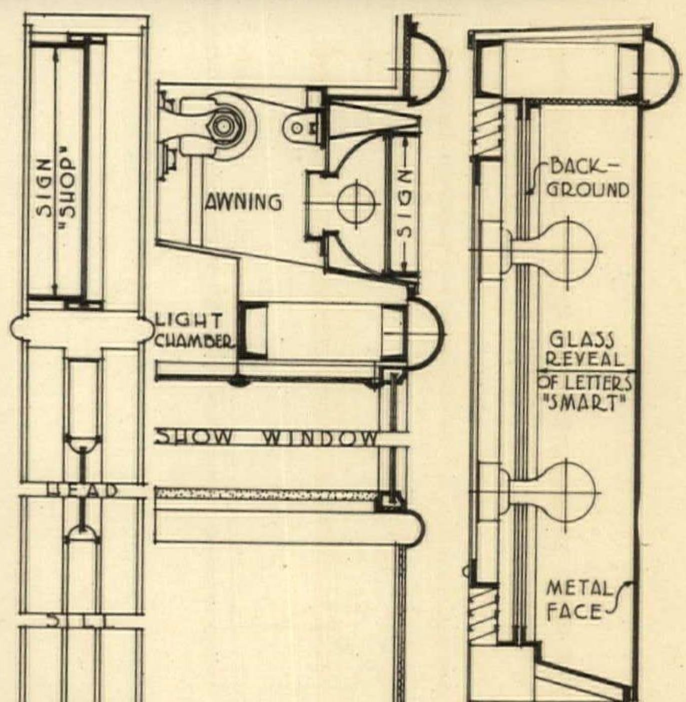


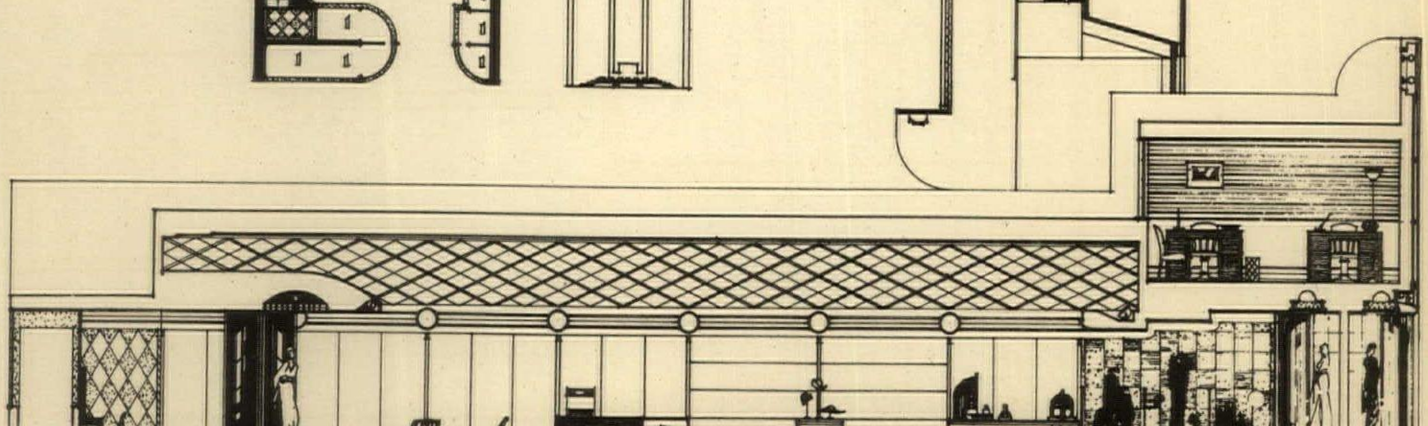




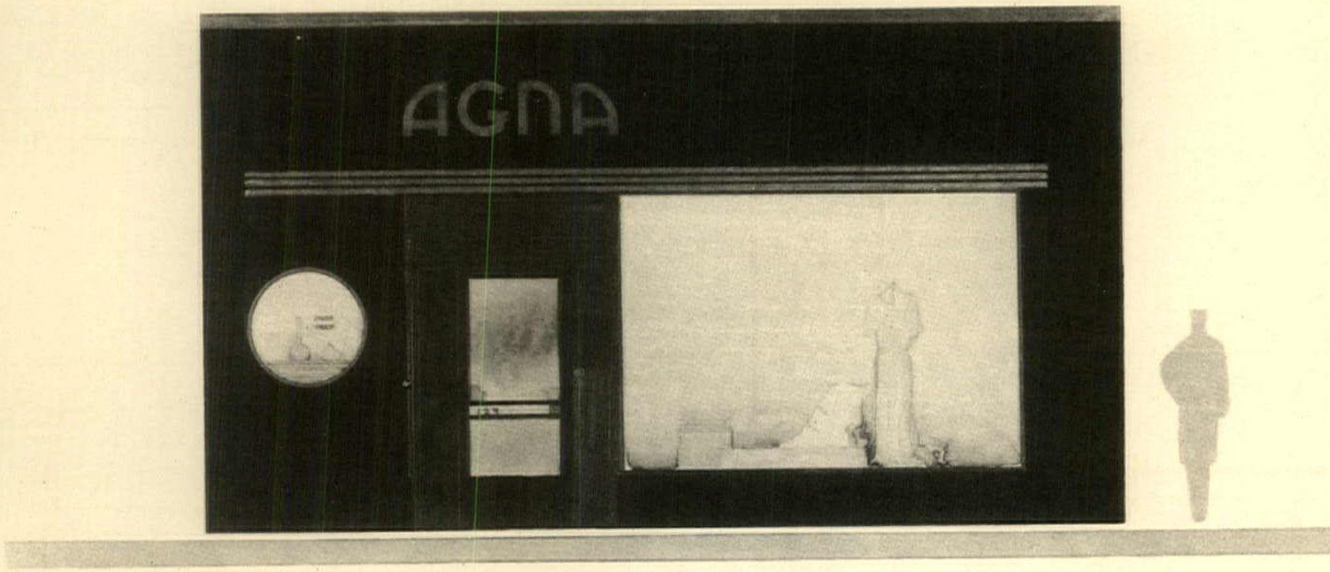
1 DISPLAY
2 COSMETICS
3 ACCESSORIES
4 MILLINERY
5 HOSE
6 LINGERIE
7 FOUNDATIONS
8 DRESSES
9 SUITS
10 ENSEMBLES
11 GOWNS
12 DRESSING RMS.
13 MIRRORS
14 TOILET
15 CASH & WRAP
16 EMPLOYEES
& STORAGE
& AIR CONDITION
17 OFFICE
& TELEPHONE



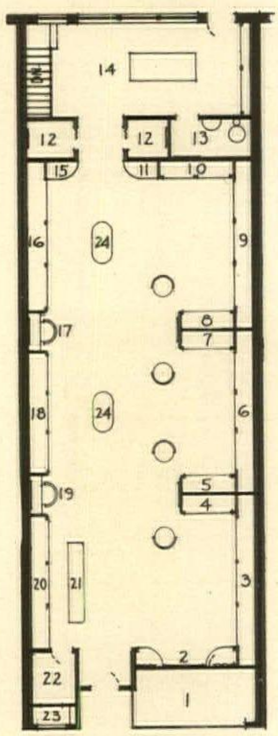


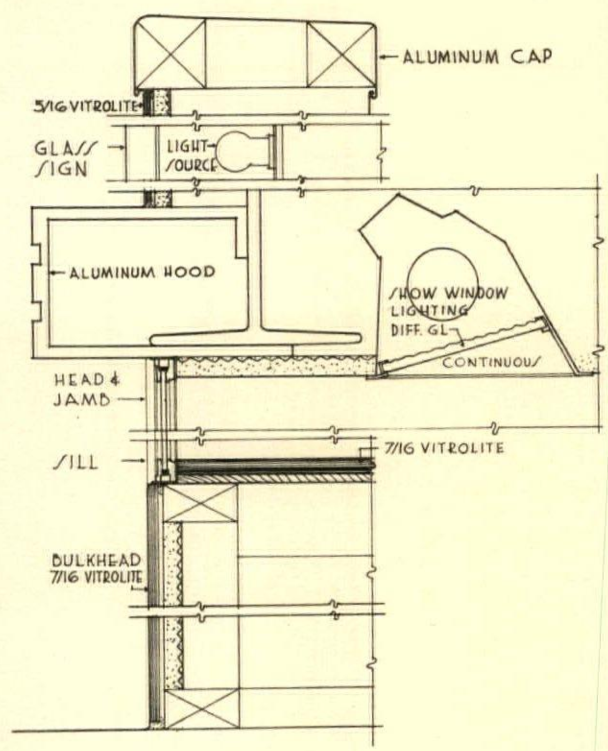


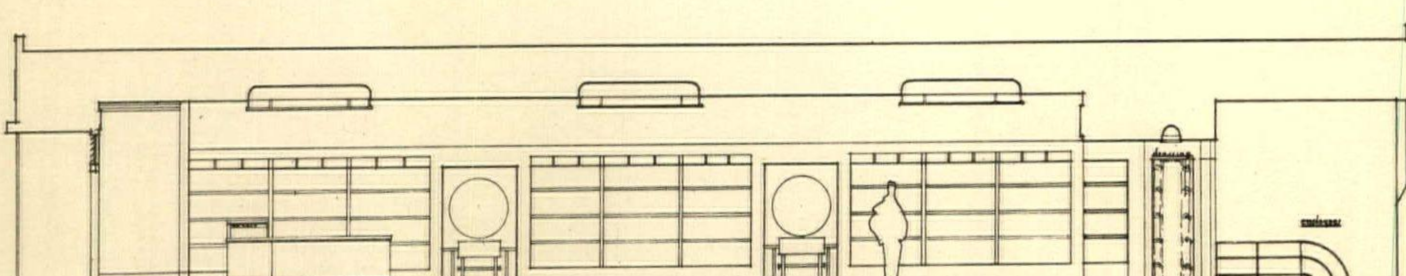
ANTHONY S. CIRESI

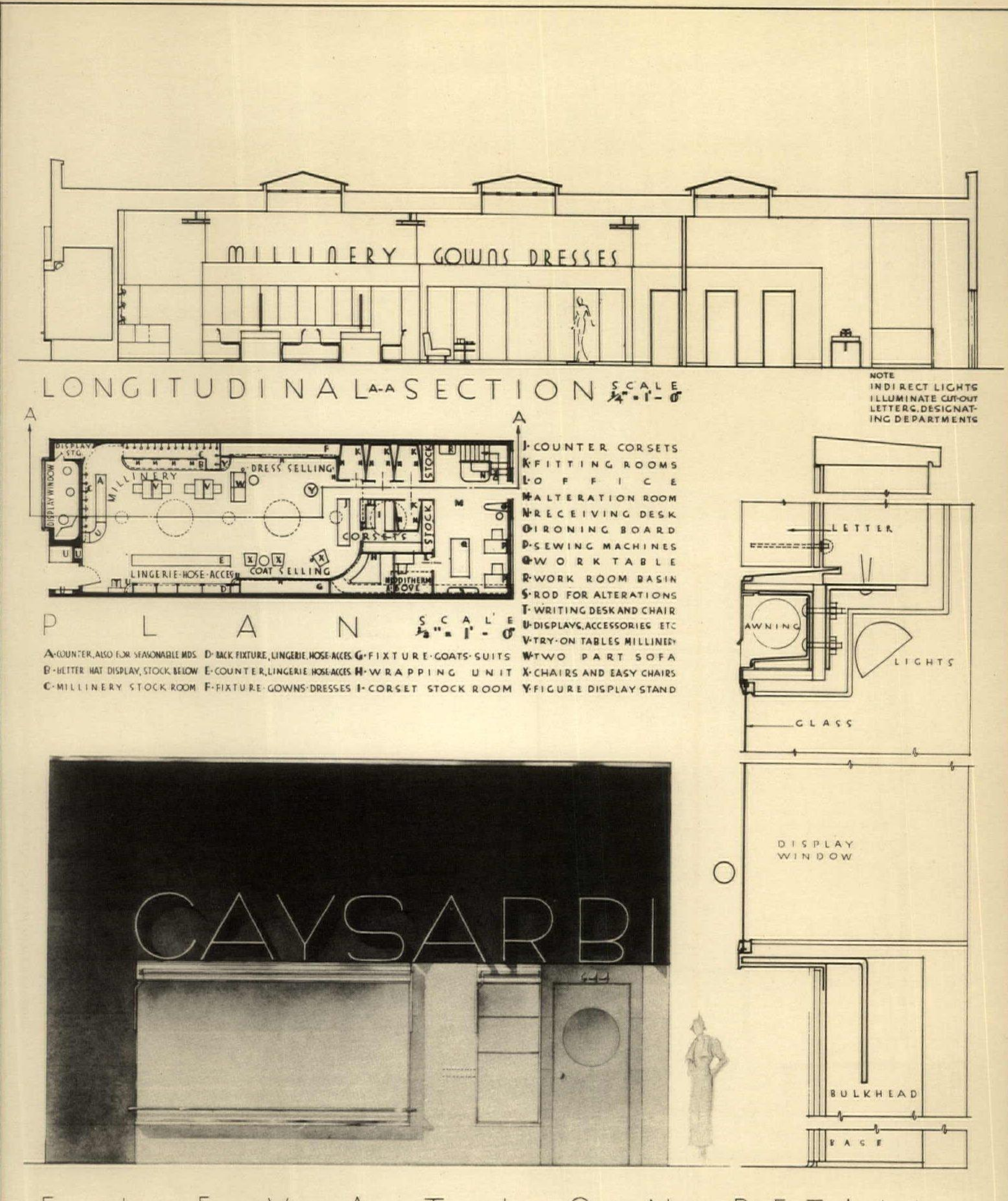


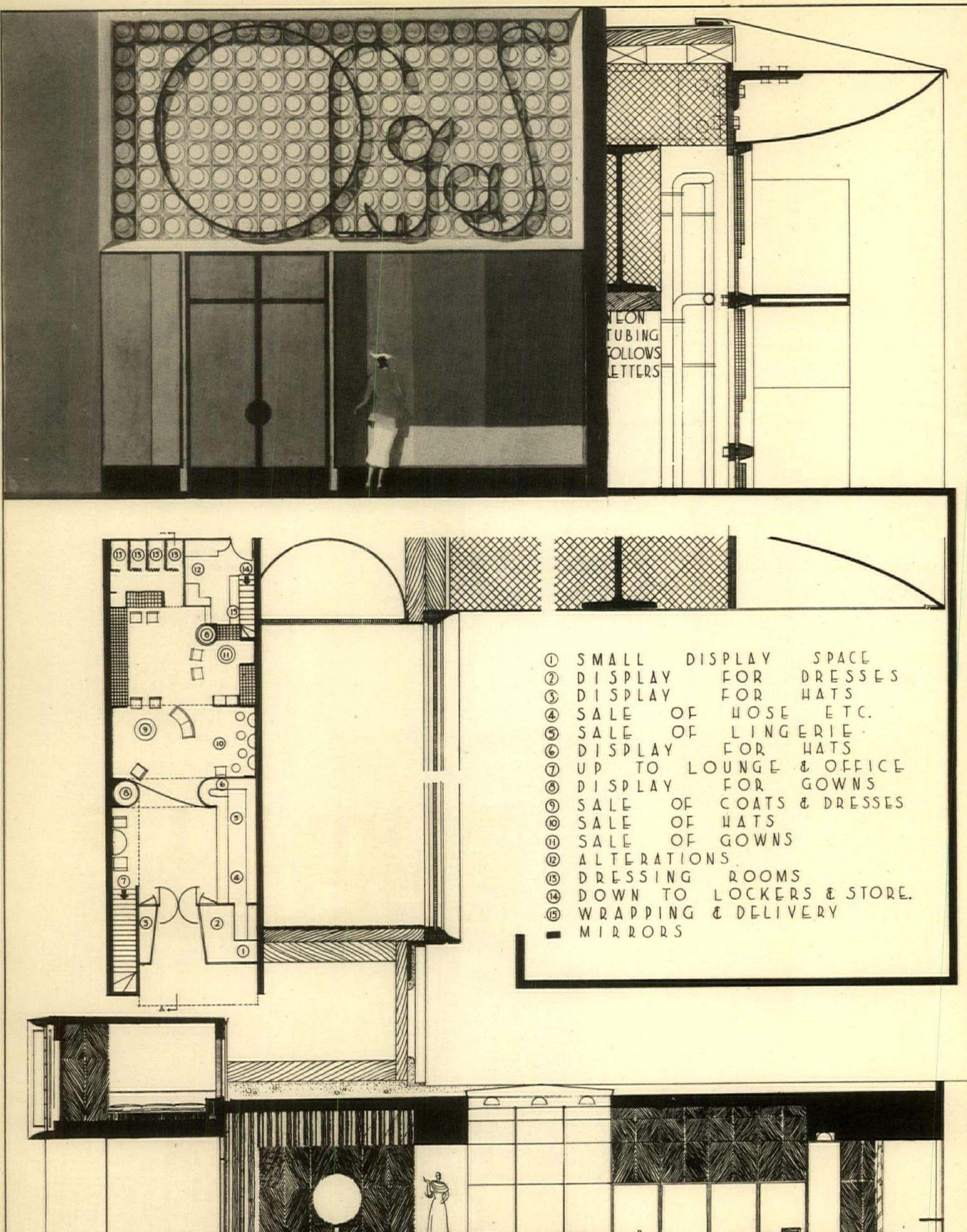
1 DISPLAY WINDOW
2 FITTING & ENTRY TO •1
3 ENSEMBLES & COATS
4 COATS } MIRROR
5 DRESSES
6 DRESSES
7 DRESSES } MIRROR
8 GOWNS
9 GOWNS
10 FORMALS
11 DISPLAY
12 DRESSING RMS & MIRROR
13 TOILET
14 SEAMSTRESS & DELIVERY
15 DISPLAY
16 LINGERIE & CORSETS
17 FITTING & MIRROR
18 HATS
19 FITTING & MIRROR
20 HOSE & ACCESSORIES
21 COUNTER & CASH
22 SWITCHES & ENTRY TO 23
23 DISPLAY WINDOW
24 DISPLAY RACKS

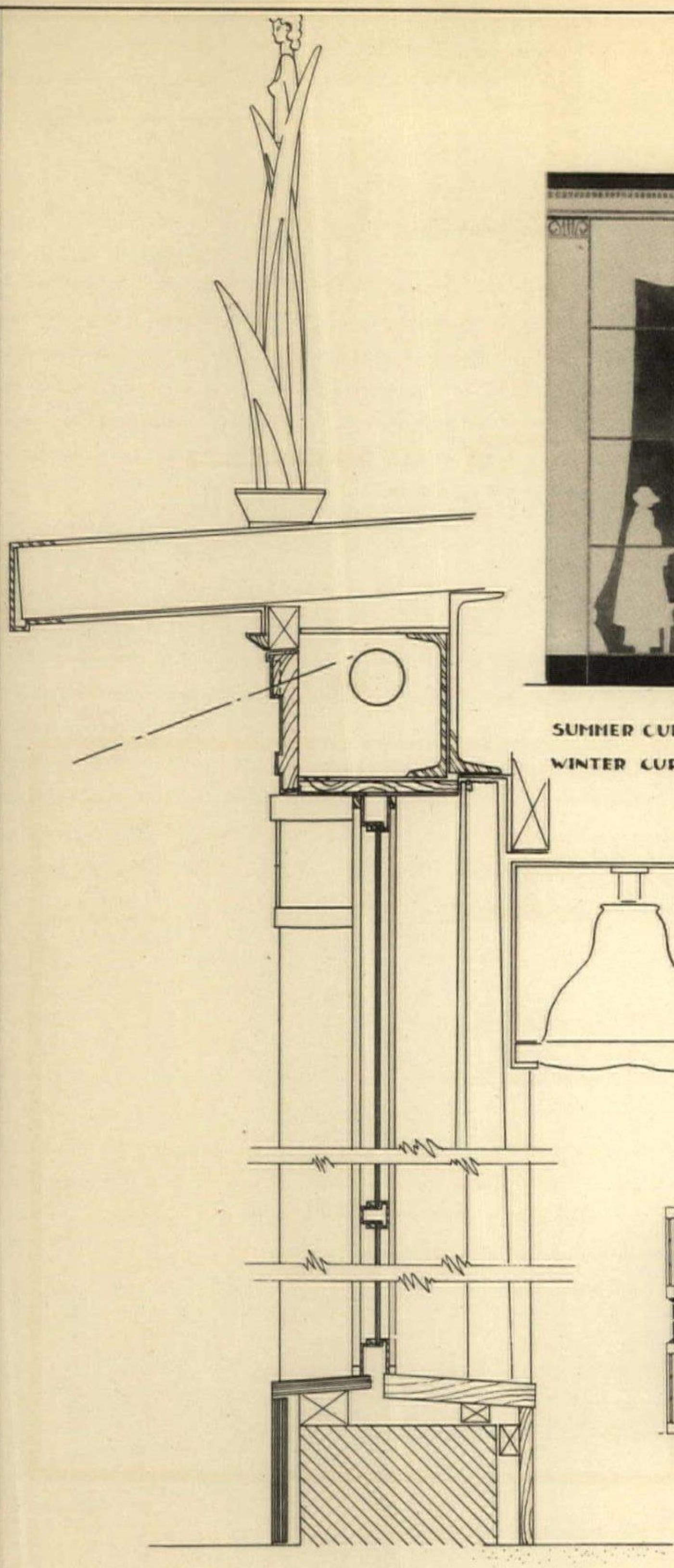


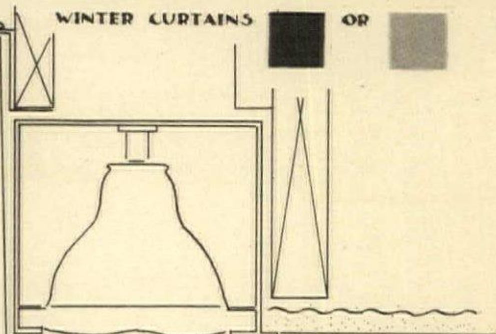





MILLINERY
GOWNS DRESSES
LONGITUDINAL A-A SECTION SCALE 1/4" = 1' - 0"
NOTE
INDIRECT LIGHTS ILLUMINATE CUT-OUT LETTERS, DESIGNATING DEPARTMENTS
DISPLAY STG.
DISPLAY WINDOW
MILLINERY
DRESS SELLING
STOCK
CORSETS
LINGERIE-HOSE-ACCES
COAT SELLING
HYDOTHERM ABOVE
PLAN SCALE 1/8" = 1' - 0"
A-COUNTER, ALSO FOR SEASONABLE MDS
B-BETTER HAT DISPLAY, STOCK BELOW
C-MILLINERY STOCK ROOM
D-BACK FIXTURE, LINGERIE, HOSE-ACCES
E-COUNTER, LINGERIE, HOSE-ACCES
F-FIXTURE-GOWNS-DRESSES
G-FIXTURE-COATS-SUITS
H-WRAPPING UNIT
I-CORSET STOCK ROOM
J-COUNTER CORSETS
K-FITTING ROOMS
L-OFFICE
M-ALTERATION ROOM
N-RECEIVING DESK
O-IRONING BOARD
P-SEWING MACHINES
Q-WORK TABLE
R-WORK ROOM BASIN
S-ROD FOR ALTERATIONS
T-WRITING DESK AND CHAIR
U-DISPLAYS, ACCESSORIES ETC
V-TRY-ON TABLES MILLINERY
W-TWO PART SOFA
X-CHAIRS AND EASY CHAIRS
Y-FIGURE DISPLAY STAND
LETTER
AWNING
LIGHTS
GLASS
DISPLAY WINDOW
BULKHEAD
BASE
CAYSARBI
ELEVATION SCALE 1/2" = 1' - 0"
DETAIL SCALE 3" = 1'-0"


NEON
TUBING
FOLLOWS
LETTERS
① SMALL DISPLAY SPACE
② DISPLAY FOR DRESSES
③ DISPLAY FOR HATS
④ SALE OF HOSE ETC.
⑤ SALE OF LINGERIE
⑥ DISPLAY FOR HATS
⑦ UP TO LOUNGE & OFFICE
⑧ DISPLAY FOR GOWNS
⑨ SALE OF COATS & DRESSES
⑩ SALE OF HATS
⑪ SALE OF GOWNS
⑫ ALTERATIONS
⑬ DRESSING ROOMS
⑭ DOWN TO LOCKERS & STORE.
⑮ WRAPPING & DELIVERY
MIRRORS
A – A

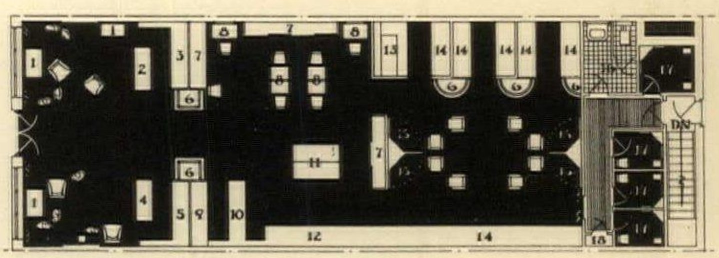


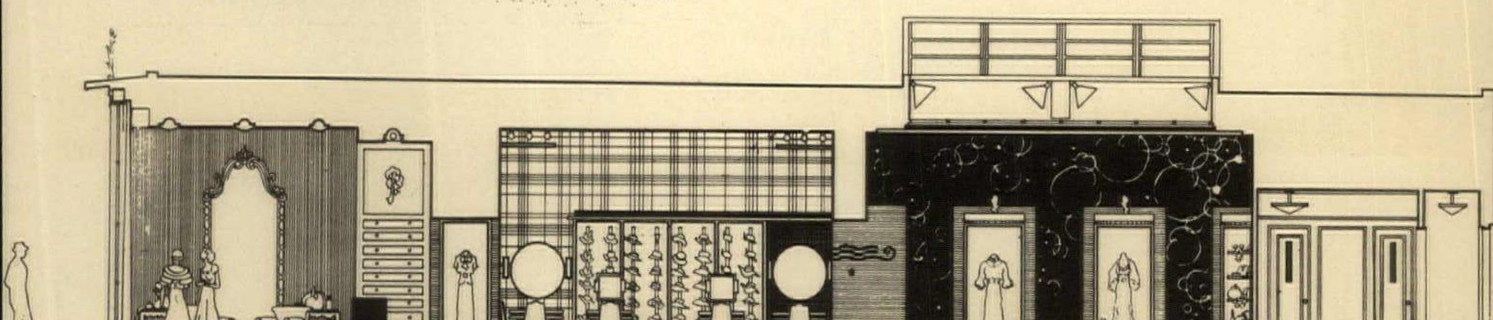


SUMMER CURTAINS WHITE AS SHOWN OR

WINTER CURTAINS OR

1 DISPLAY TABLE
2 ACCESSORIES COUNTER
3 ACCESSORIES
4 GLOVE COUNTER
5 GLOVES AND STOCKINGS
6 SHOW CASE
7 HATS
8 MIRROR TABLE
9 LINGERIE
10 LINGERIE COUNTER
11 BARGAIN DISPLAY
12 NEGLIGEE
13 CASH AND PACKAGING
14 COATS, SUITS, DRESSES
15 TRIPLE MIRROR
16 TOILET
17 DRESSING ROOM
18 CLEANING CLOSET





PROBLEM C
FOOD STORE

Requirements: This store is to provide for the merchandising of groceries, packages and cannec foods, fresh fruits and vegetables, meats, fish and frozen foods . . . Dimensions: The building covers a level inside lot (not a corner lot), 25'-0" x 75'-0" on the north side of Main Street. There is a service alley at the rear. The clear width between the party walls is 24'-0". The present clear height floor to ceiling, is 12'-0".

FIRST PRIZE:

G. FOSTER HARRELL, JR., NEW YORK 241

The shop front attracts attention through the pleasing division of surfaces and the contrast i colors. The design is characterized by simplicity throughout. The lettering of the sign is large and wel disposed. In character the design would be suitable for almost any neighborhood and is interestin in texture, surface, undulations and color. ¶ The plan is straightforward in arrangement and th circulation of customers is adequately provided for. The interior is spacious, providing well-arrange display and wall shelves. Show windows are wisely arranged without crowding corner. ¶ It is altogethe a commendable solution of the problem of the food store.

SECOND PRIZE:

A. WALDORF, S. L. KATZ, BROOKLYN 242

A store, so located that the produce does not need protection from the elements a large part of th year, can be effectively planned with an open front. The display of fruits and vegetables in th center can be a most attractive feature. ¶ The circulation is well arranged and the various depart ments are convenient. The proportion of storage and work space indicated at the rear of the stor might be required in some communities, or could be smaller in others, depending upon the "telephon trade" and the buying habits of the community. ¶ The skylighting might provide a temperatur difficulty in a southern climate. ¶ The front with its Neon sign would be visible from some distance The use of lettering for the narrow side piers is both good design and good merchandising.

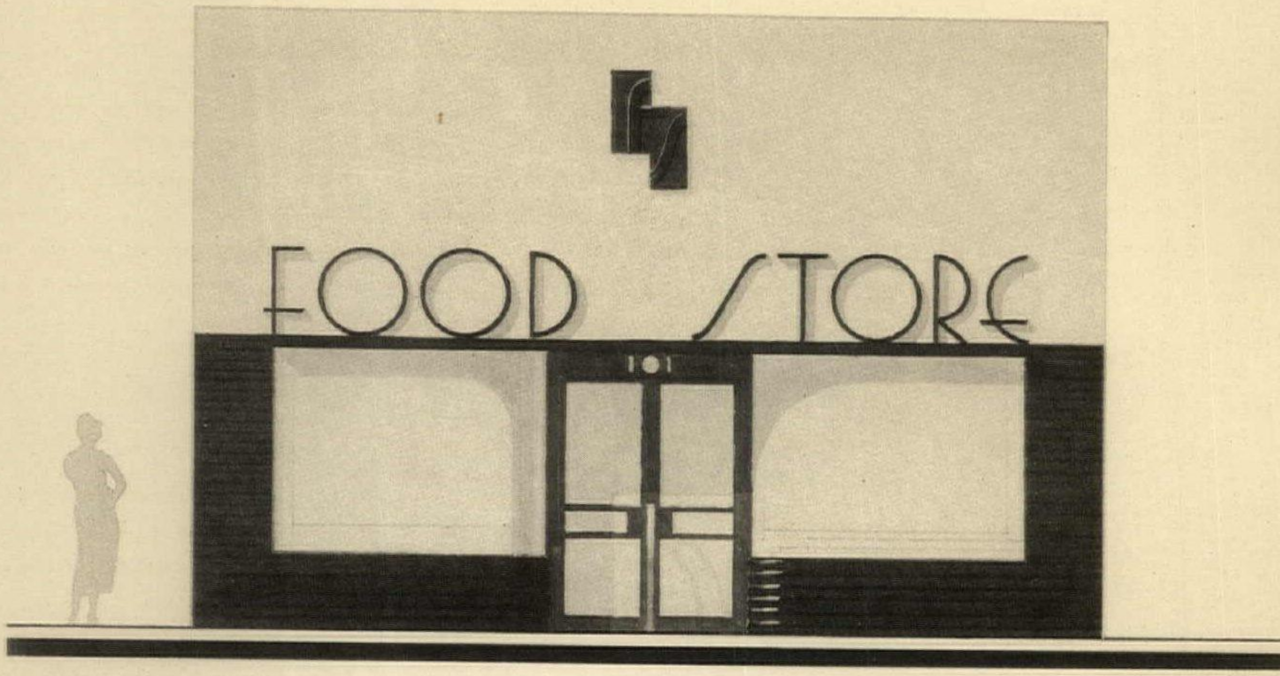
THIRD PRIZE:

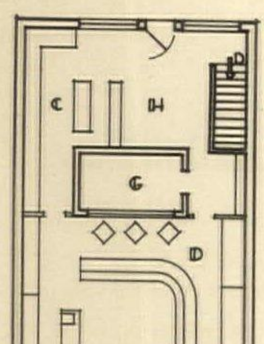
J. R. SPROULE, SEATTLE, WASH. 243

This design is bold and simple. The name of the store necessarily might be large because of loca competition. ¶ The ingenious use of shadow in creating design is pleasing. In plan the arrangemen is simple. ¶ The overhead lighting panel in the center of the store would undoubtedly be effective i creating a bright atmosphere and in lighting the displays. ¶ It is doubtful if two sets of double door would be necessary on a store of this size. If smaller doors were employed, a larger area for th display of merchandise in the show windows would be available.

HONORABLE MENTIONS:

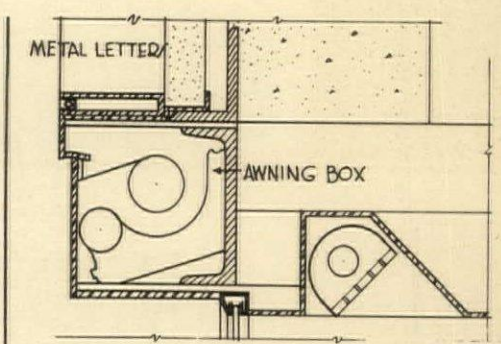
MAURICE LUBIN, SUREN PILAFIAN, NEW YORK 244
THEO. B. VOYVODICK, J. J. PANKUCH, NEW YORK 245
CHARLES Du BOSE, NEW YORK 246
SIGISMUND J. V. Von ROSEN, NEW YORK 247
ROYAL BARRY WILLS, HUGH A. STUBBINS, JR., BOSTON . 248
H. K. BIEG, CHICAGO 249
J. GORDON CARR, BROOKLYN 250
CARL MAAS, NEW YORK 251
NOWLAND VAN POWELL, ST. LOUIS 252
EDWARD HEDBERG, HOMEWOOD, ILL. 253
MAITLAND C. HARPER, WOODSIDE, N. Y. 254

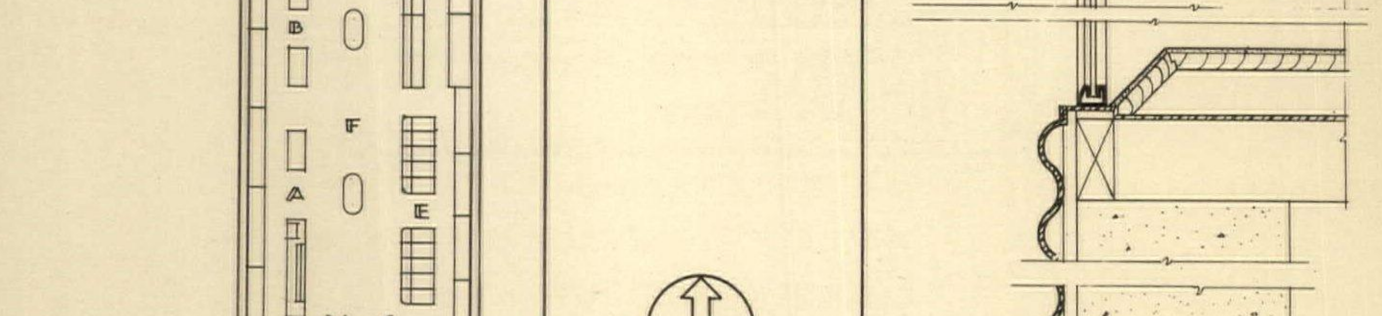




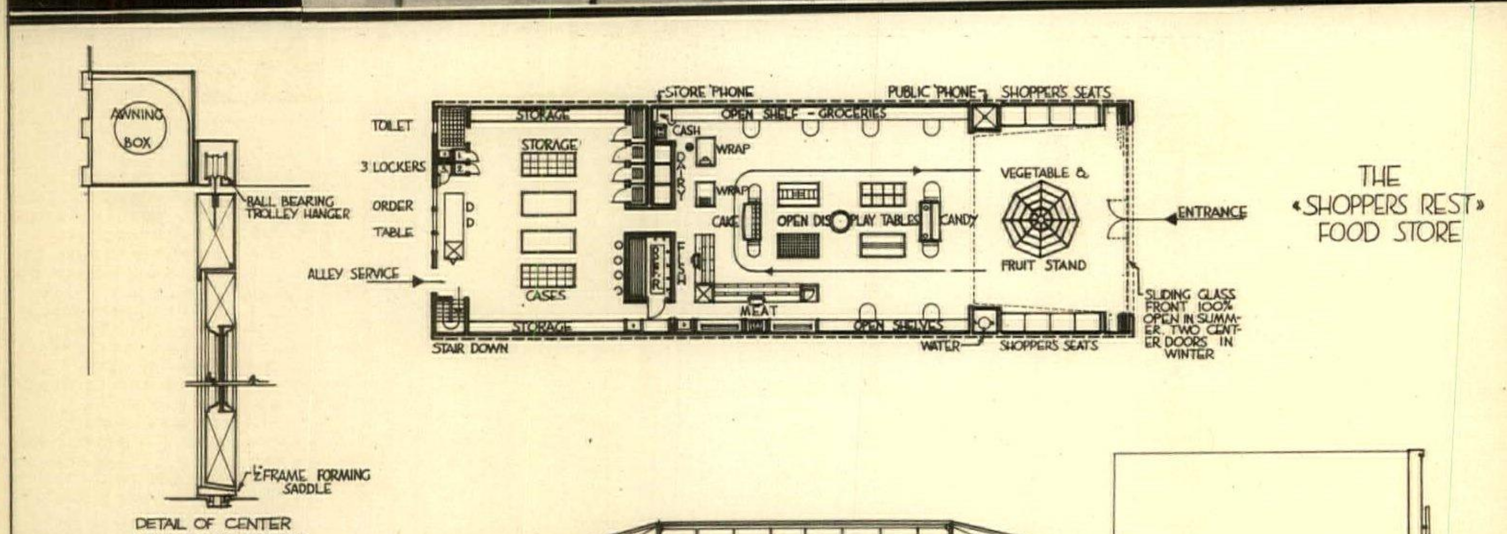
LEGEND

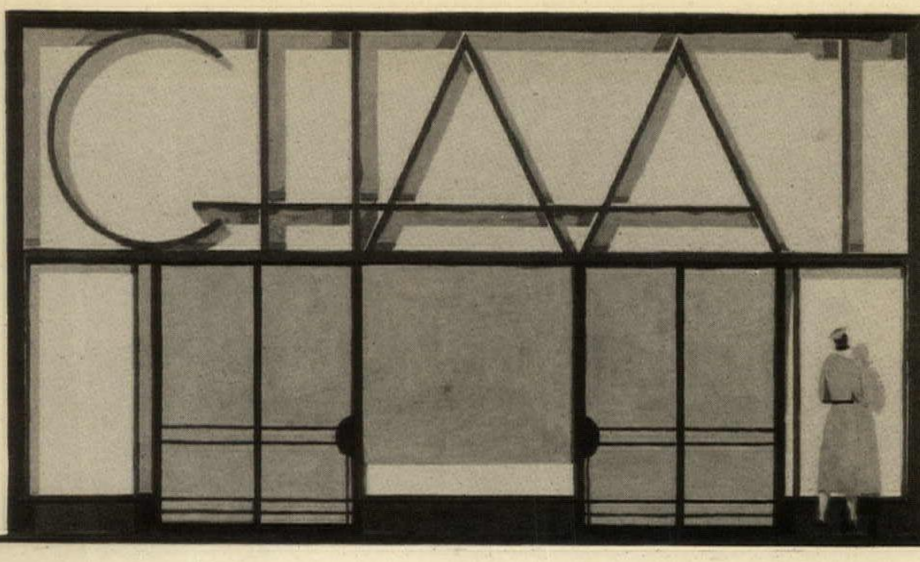
A. FANCY GROCERIES
B. STAPLE GROCERIES
C. ORDER ROOM
D. MEAT, FISH, FOWL
E. VEGETABLES
F. SALES TABLES
G. REFRIGERATOR
H. BREAKING UP ROOM

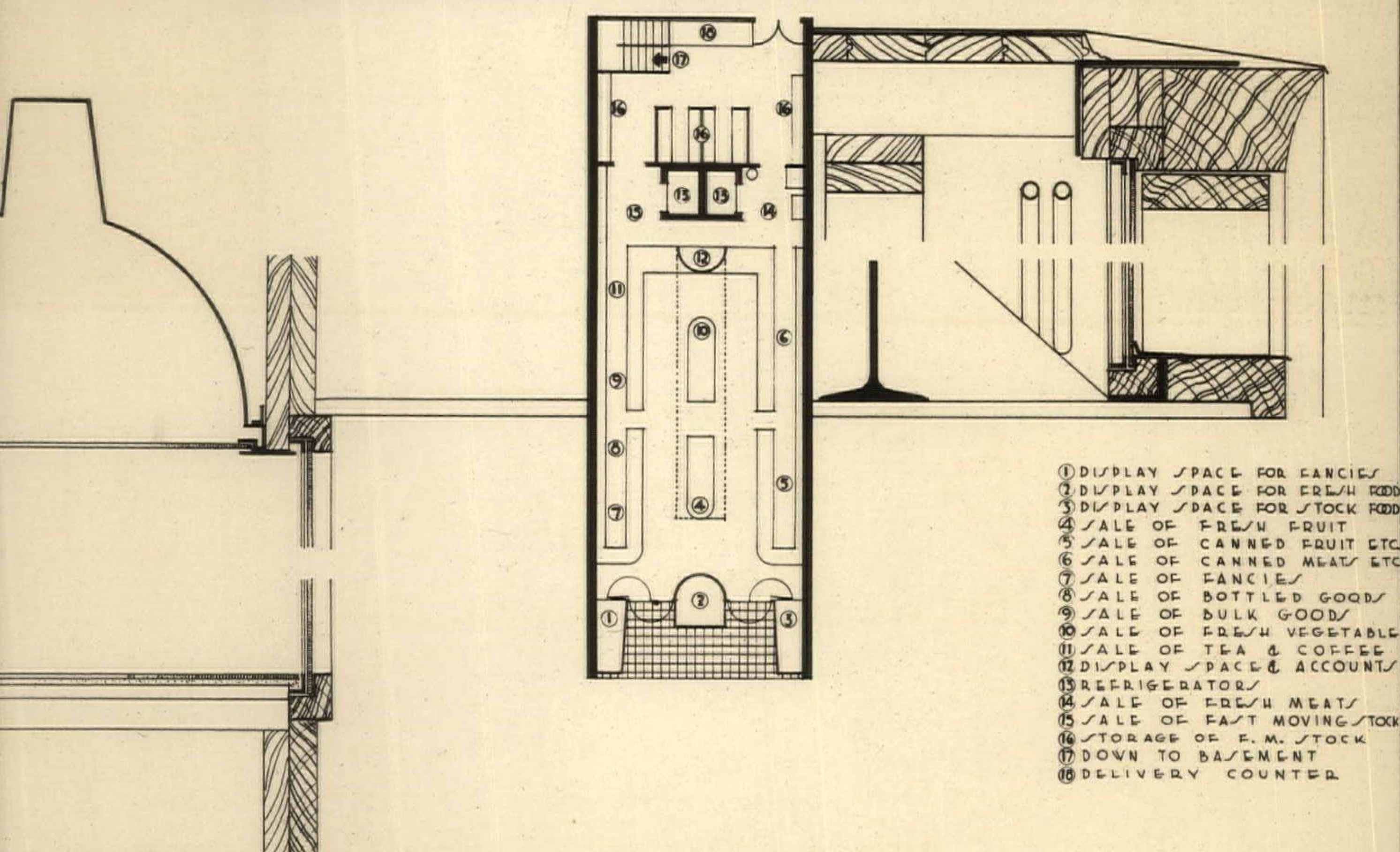


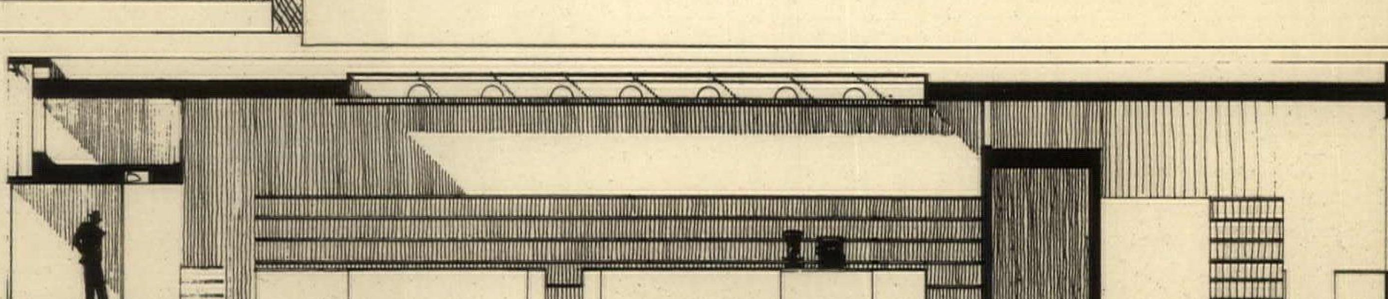


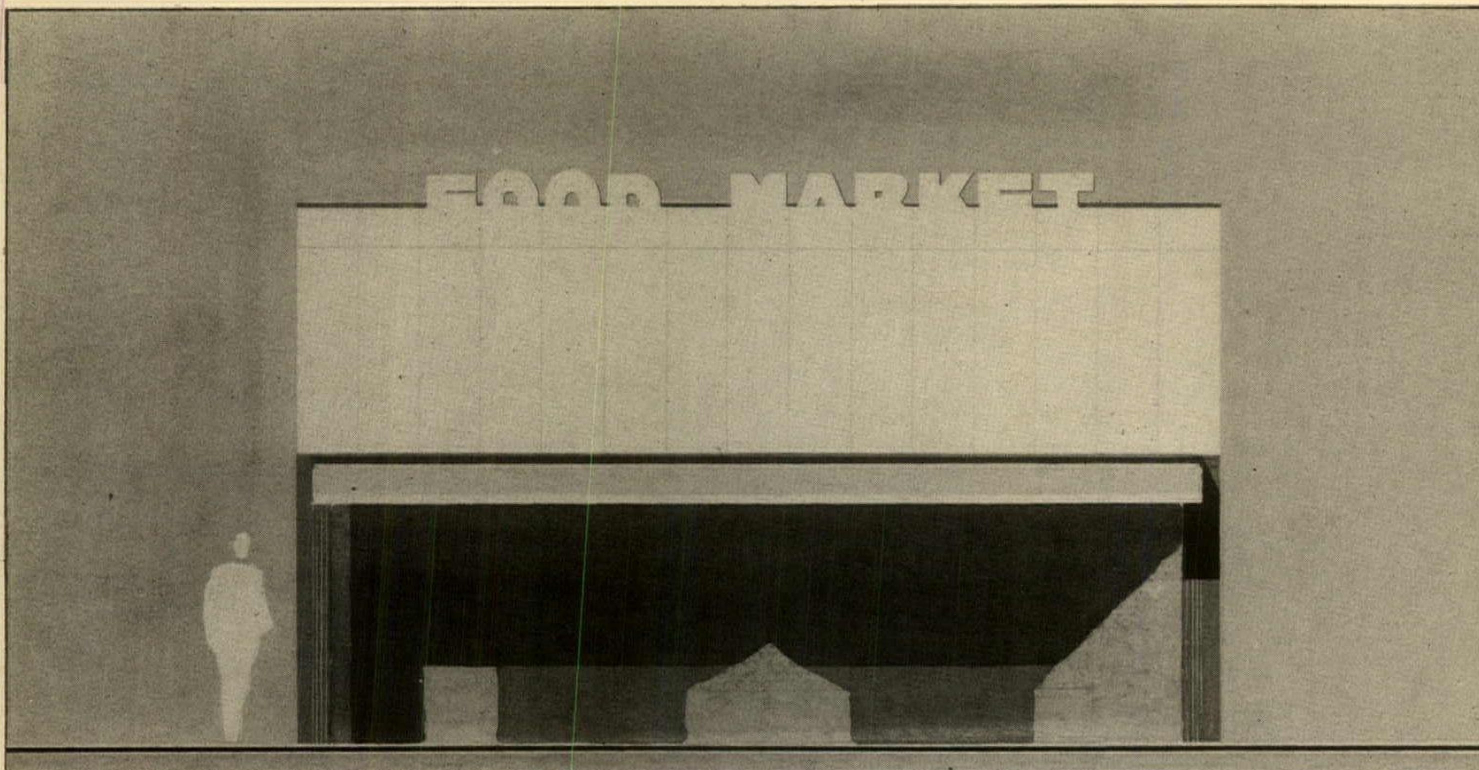
A. WALDORF, S. L. KATZ

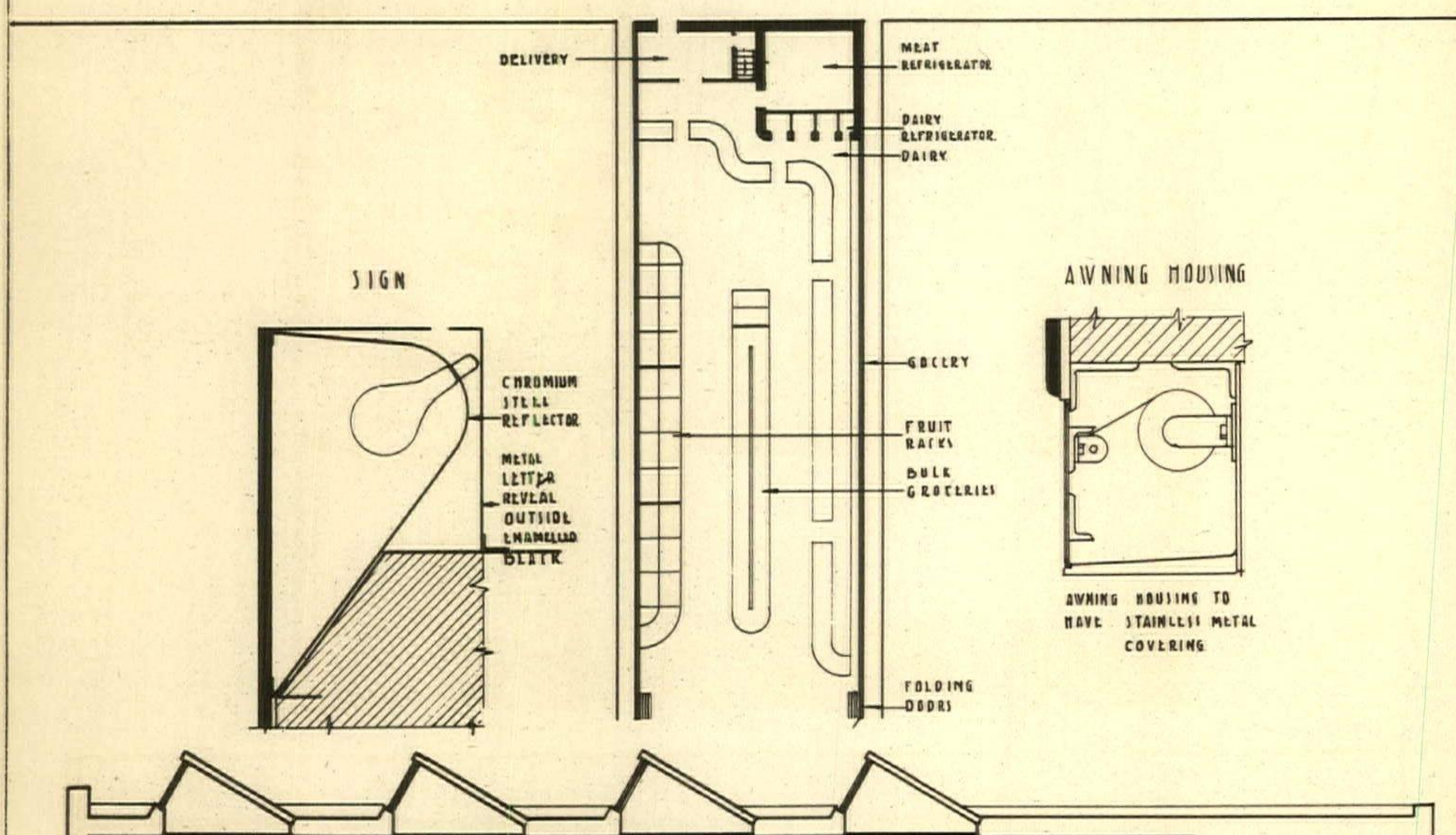


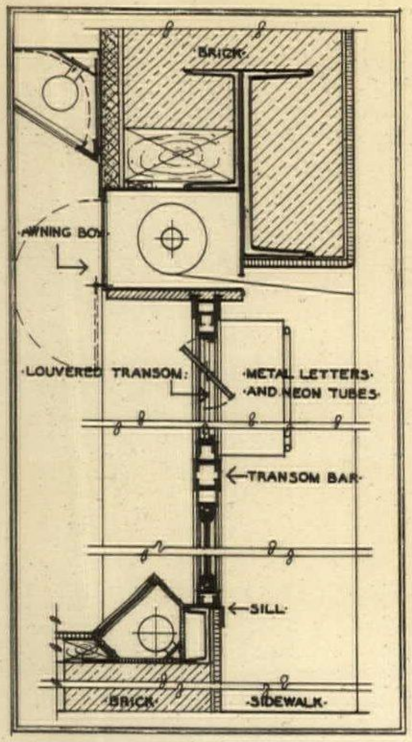


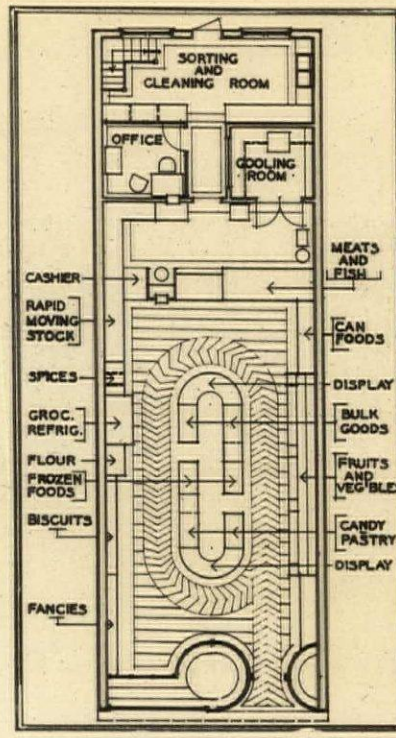

1 DISPLAY SPACE FOR FANCIES
2 DISPLAY SPACE FOR FRESH FOOD
3 DISPLAY SPACE FOR STOCK FOOD
4 SALE OF FRESH FRUIT
5 SALE OF CANNED FRUIT ETC
6 SALE OF CANNED MEATS ETC
7 SALE OF FANCIES
8 SALE OF BOTTLED GOODS
9 SALE OF BULK GOODS
10 SALE OF FRESH VEGETABLE
11 SALE OF TEA & COFFEE
12 DISPLAY SPACE & ACCOUNTS
13 REFRIGERATORS
14 SALE OF FRESH MEATS
15 SALE OF FAST MOVING STOCK
16 STORAGE OF F. M. STOCK
17 DOWN TO BASEMENT
18 DELIVERY COUNTER

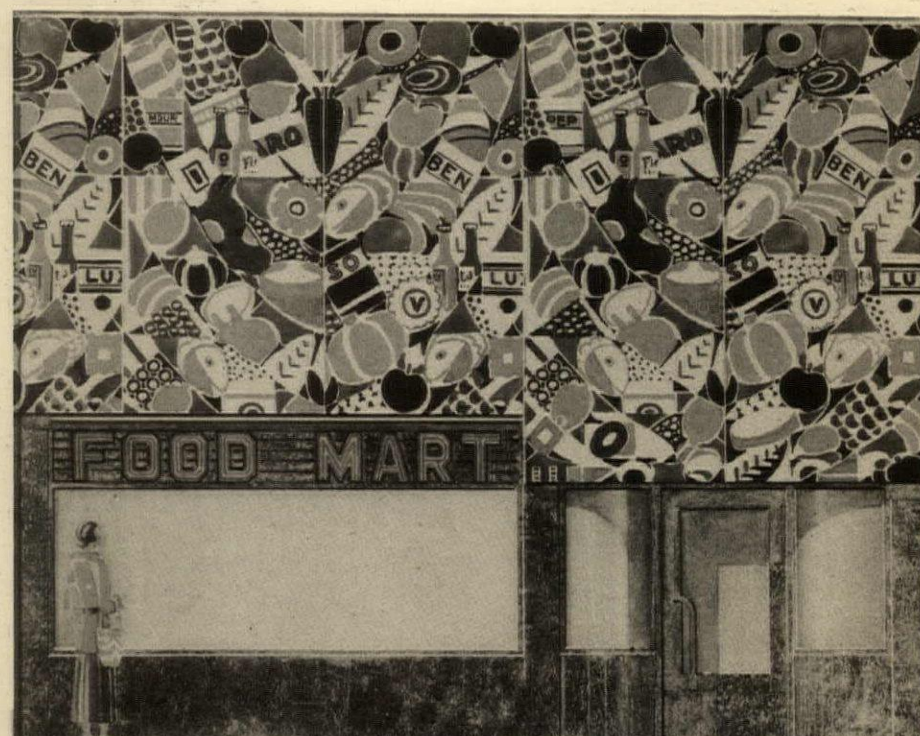


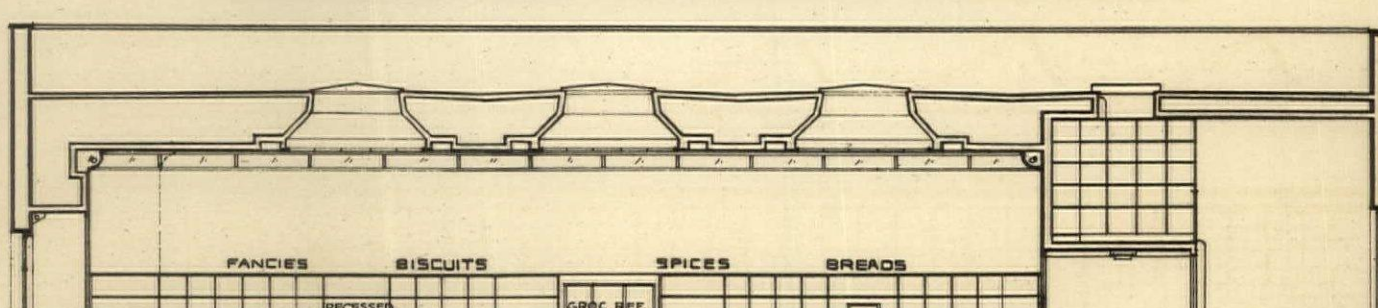

FOOD MARKET

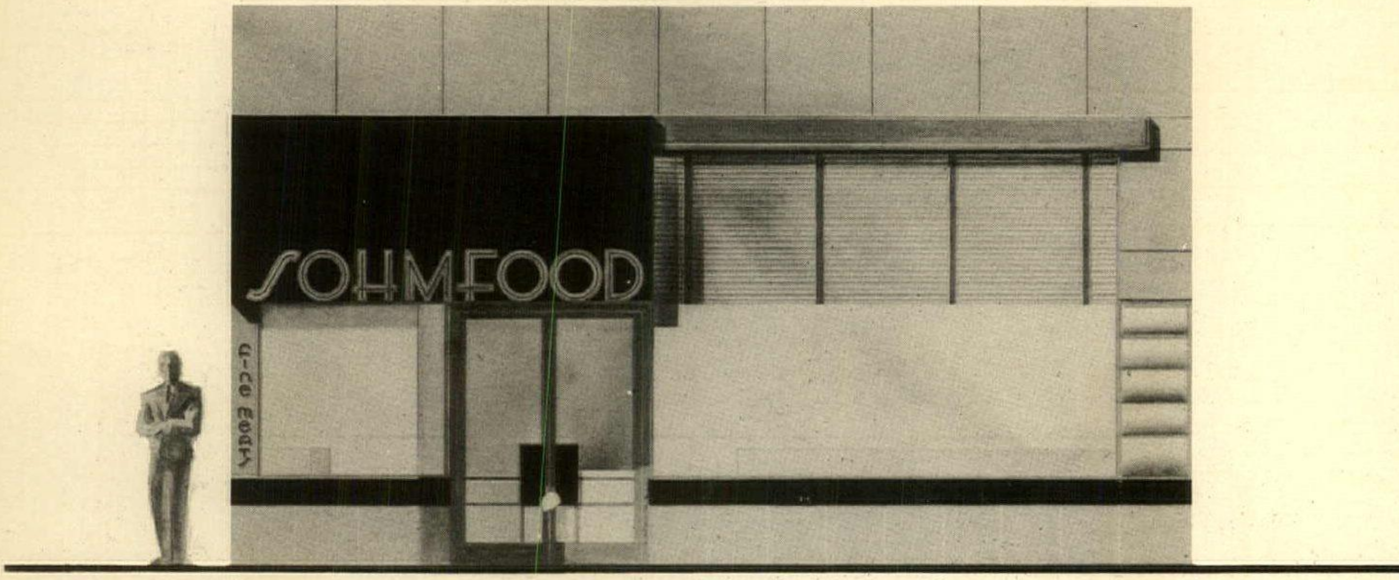

DELIVERY
MEAT REFRIGERATOR
DAIRY REFRIGERATOR
DAIRY
SIGN
CHROMIUM STEEL REFLECTOR
METAL LETTER REVEAL OUTSIDE ENAMELLED BLACK
GROCERY
FRUIT RACKS
BULK GROCERIES
AWNING HOUSING
AWNING HOUSING TO HAVE STAINLESS METAL COVERING
FOLDING DOORS
FLOOD LIGHTS FOR CEILING
REFRIGERATOR
SECTION

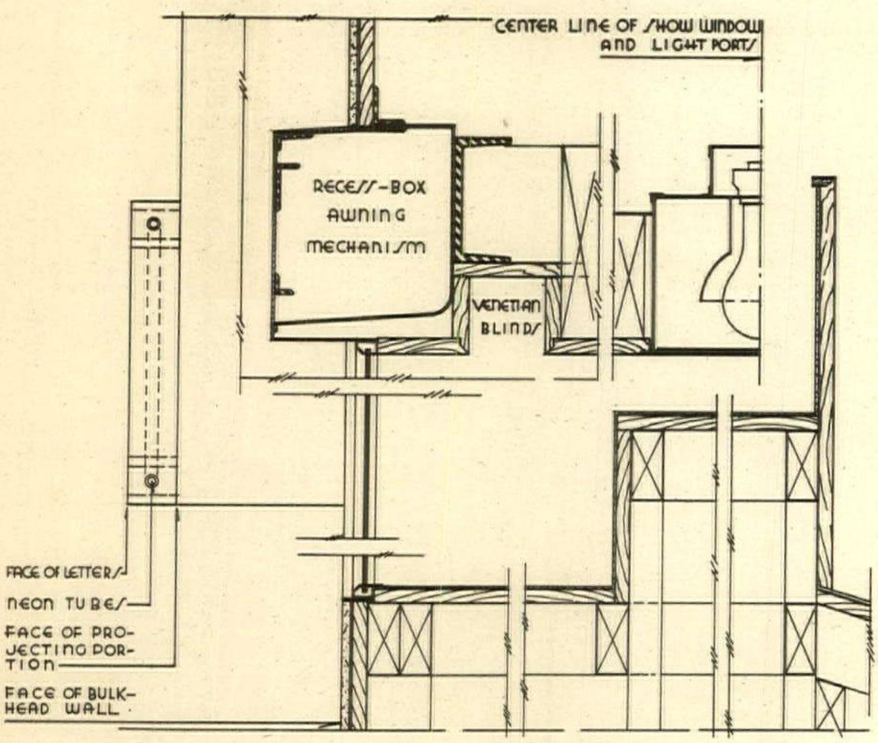

BRICK
AWNING BOX
LOUVERED TRANSOM
METAL LETTERS AND NEON TUBES
TRANSOM BAR
SILL
BRICK
SIDEWALK


SORTING AND CLEANING ROOM
OFFICE
COOLING ROOM
MEATS AND FISH
CASHIER
RAPID MOVING STOCK
CAN FOODS
SPICES
DISPLAY
GROC. REFRIG.
BULK GOODS
FLOUR
FROZEN FOODS
FRUITS AND VEG'BLES
BISCUITS
CANDY PASTRY
DISPLAY
FANCIES

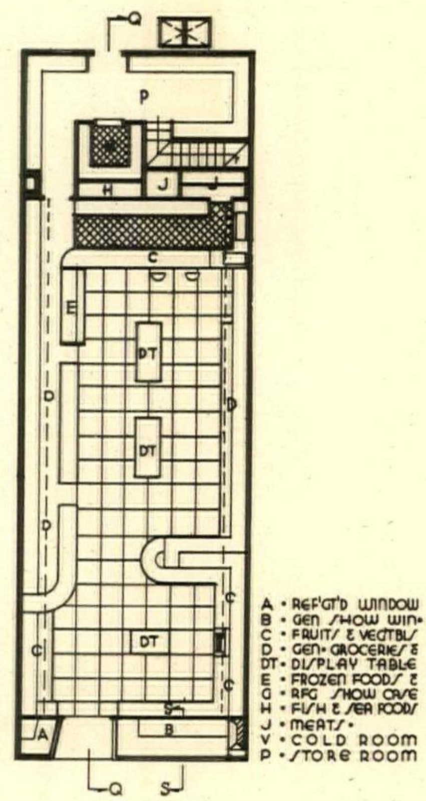

BEN
LUX
FOOD MART

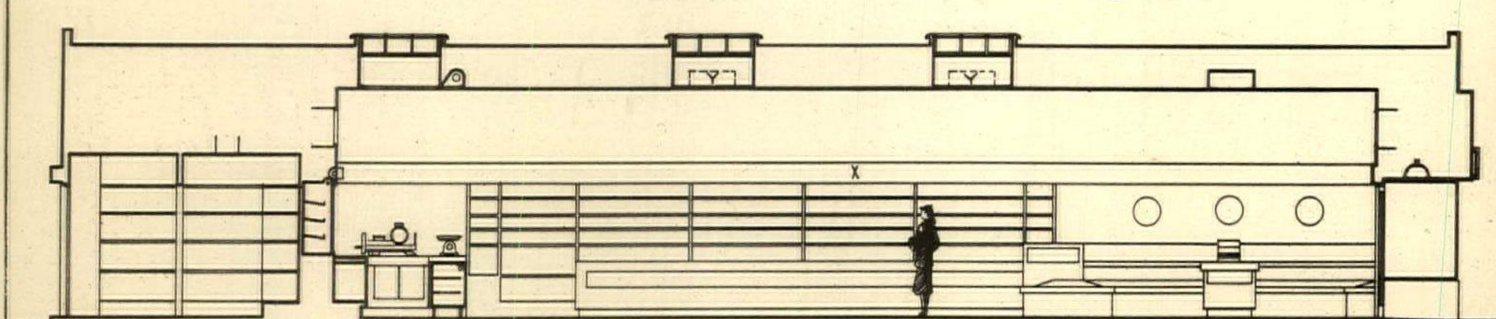

FANCIES
BISCUITS
SPICES
BREADS
RECESSED SHELVING
GROC. REF.





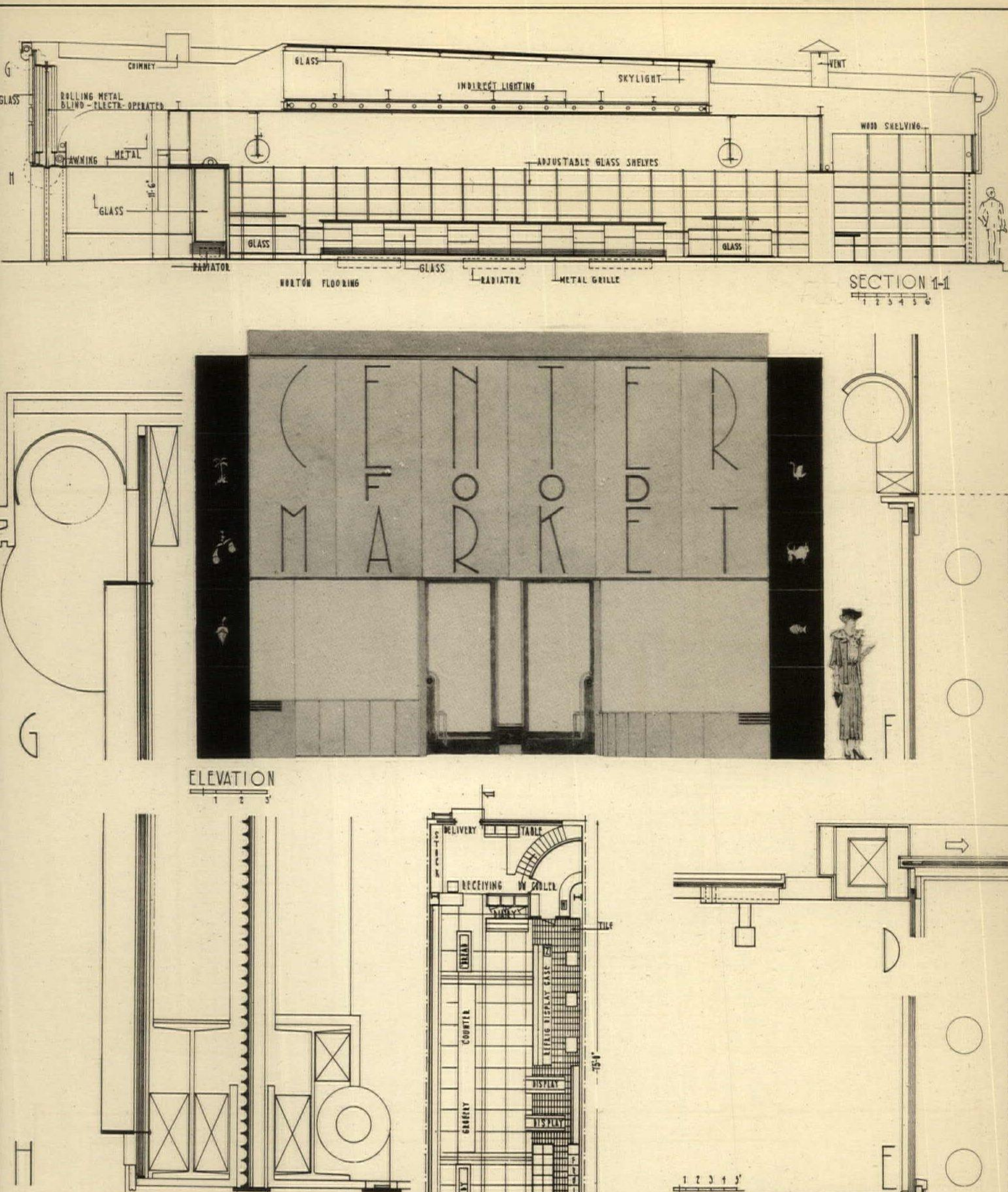
·SECT·S-S·



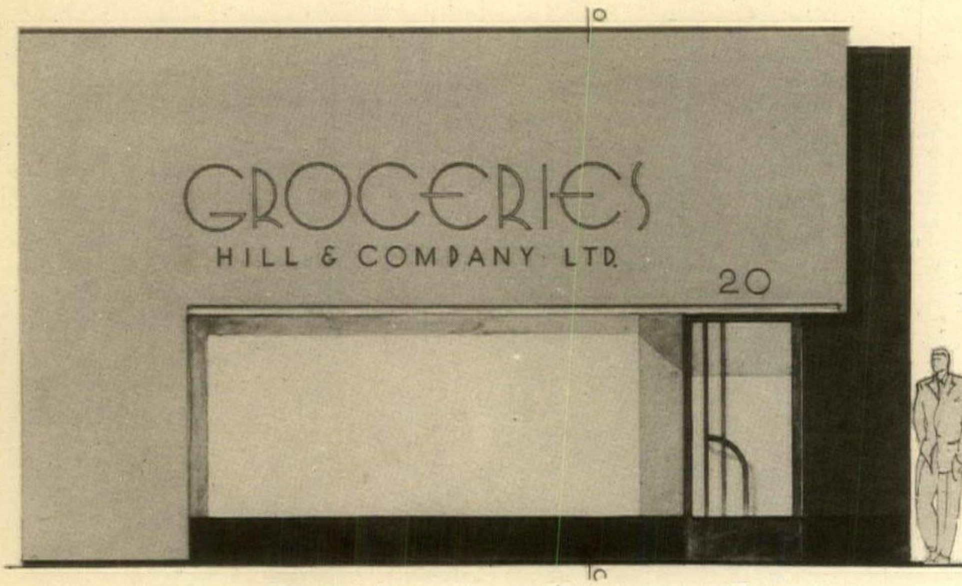


"X"· PROJECTING LIGHT TROUGH· "Y"· LIGHT PORTS-BOTH SIDES OF SKY-LIGHTS·

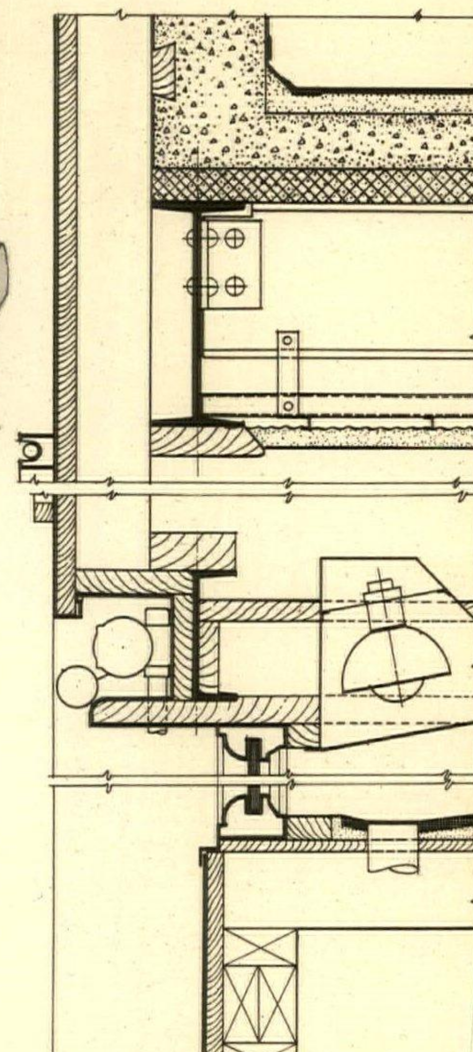
·SECT·"Q-Q"·

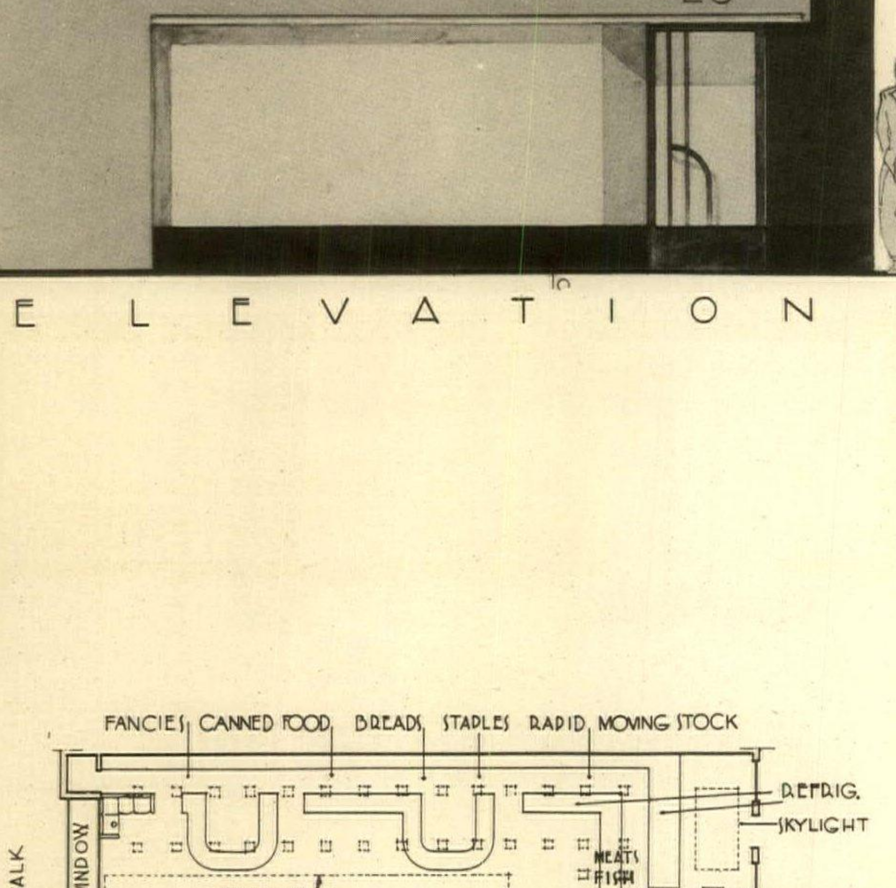

CHIMNEY
GLASS
ROLLING METAL BLIND - ELECTR- OPERATED
AWNING
METAL
INDIRECT LIGHTING
SKYLIGHT
VENT
WOOD SHELVING
ADJUSTABLE GLASS SHELVES
GLASS
RADIATOR
NORTON FLOORING
GLASS
RADIATOR
METAL GRILLE
SECTION 1-1
CENTER
FOOD
MARKET
ELEVATION
DELIVERY
TABLE
STOCK
RECEIVING
TILE
COUNTER
GROCERY
CANDY
DISPLAY
DISPLAY
WINDOW
WINDOW
GLASS FLOOR
PLAN
25'-0"
75'-0"

ROYAL BARRY WILLS, HUGH A. STUBBINS, JR.



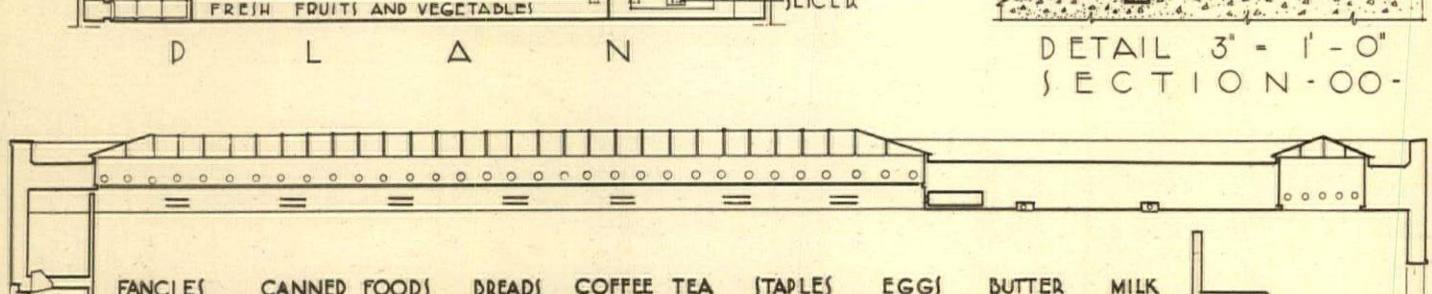
E L E V A T I O N



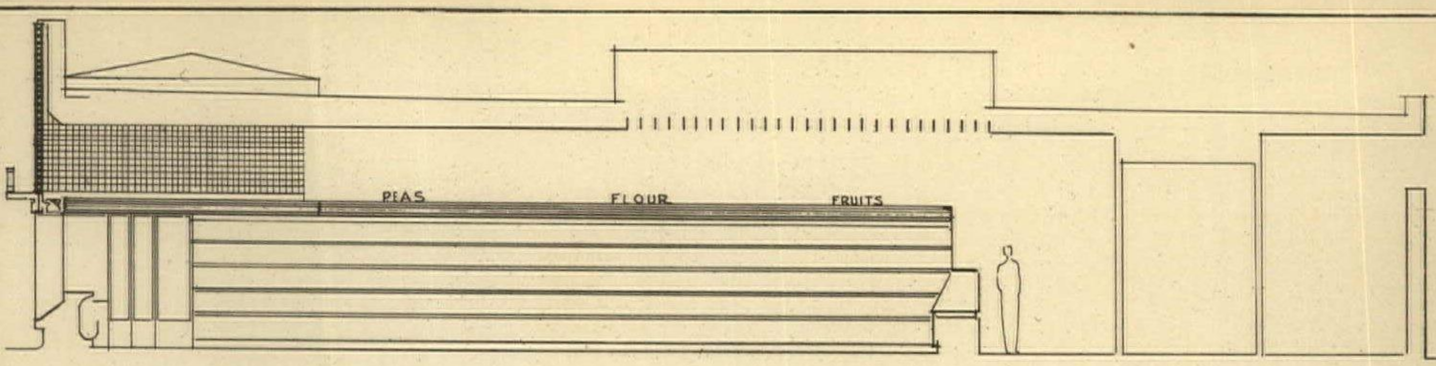


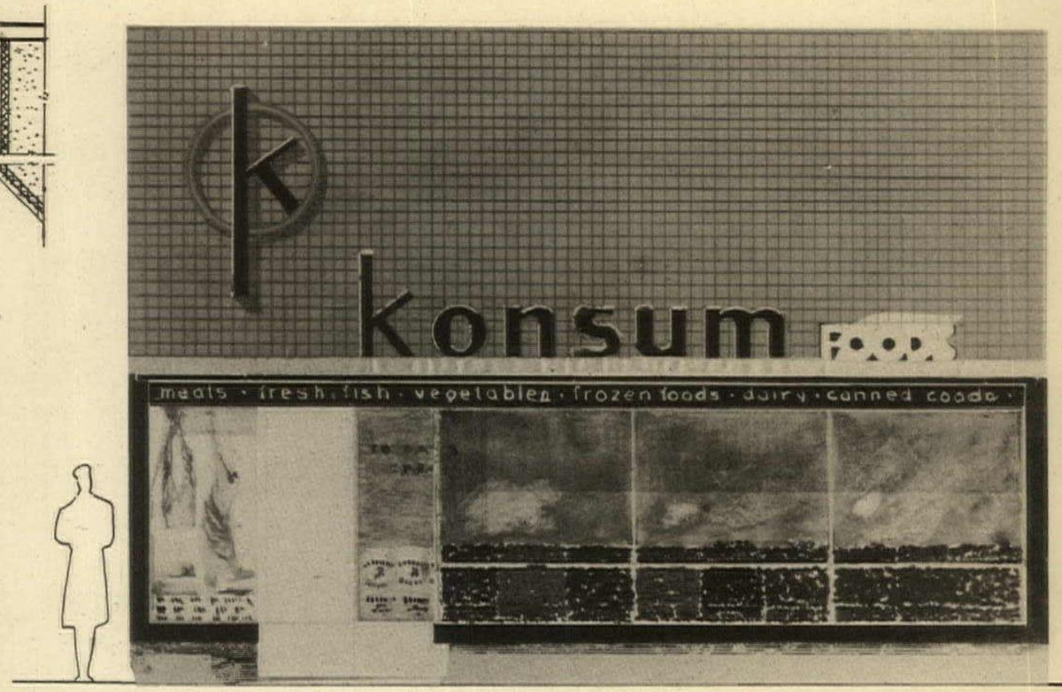
P L A N

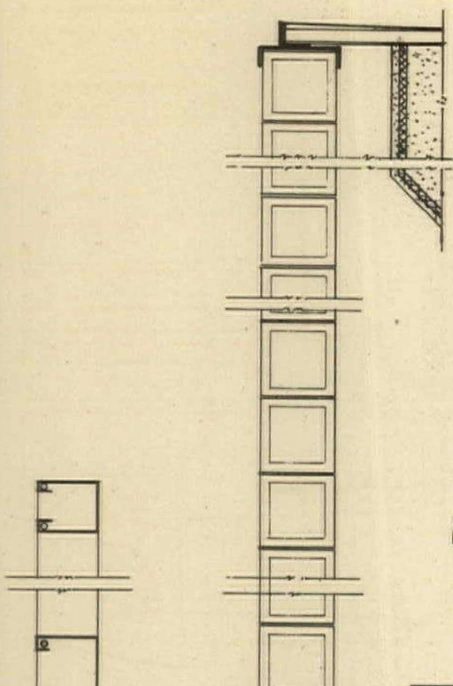
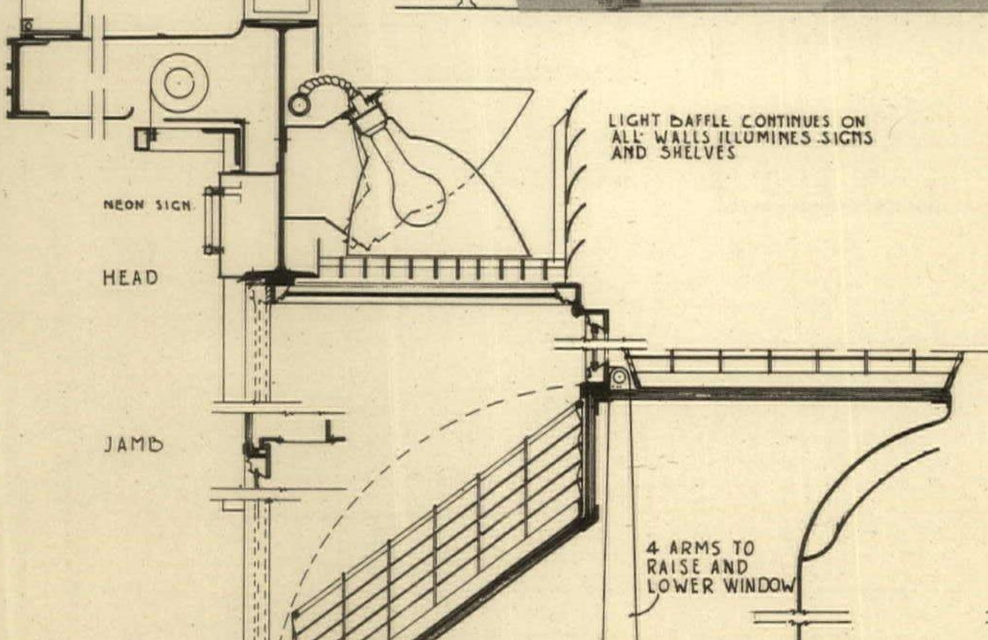
DETAIL 3" = 1'-0"
SECTION-OO-

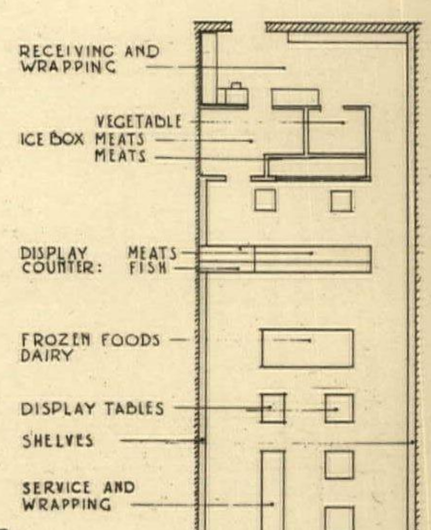


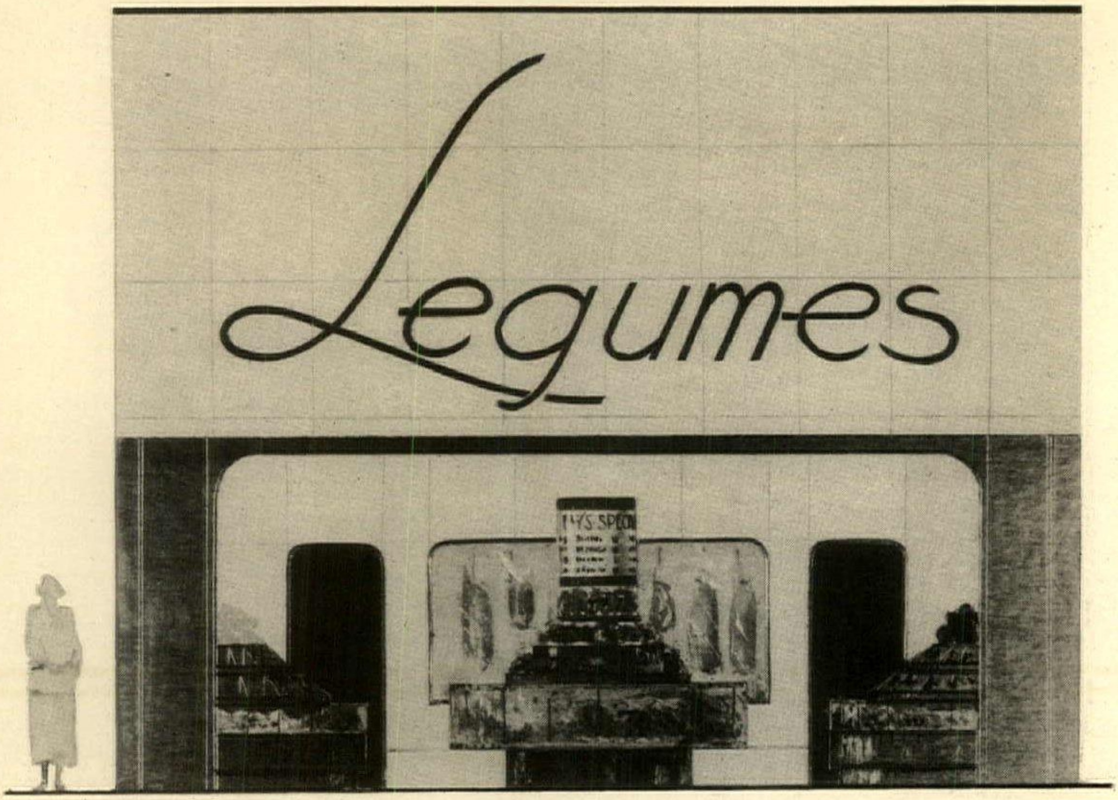
L O N G I T U D I N A L S E C T I O N

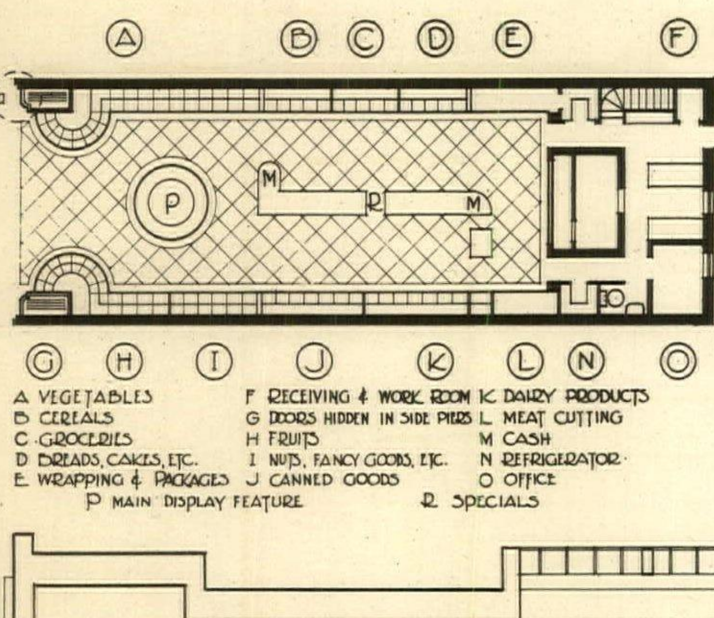

PEAS
FLOUR
FRUITS

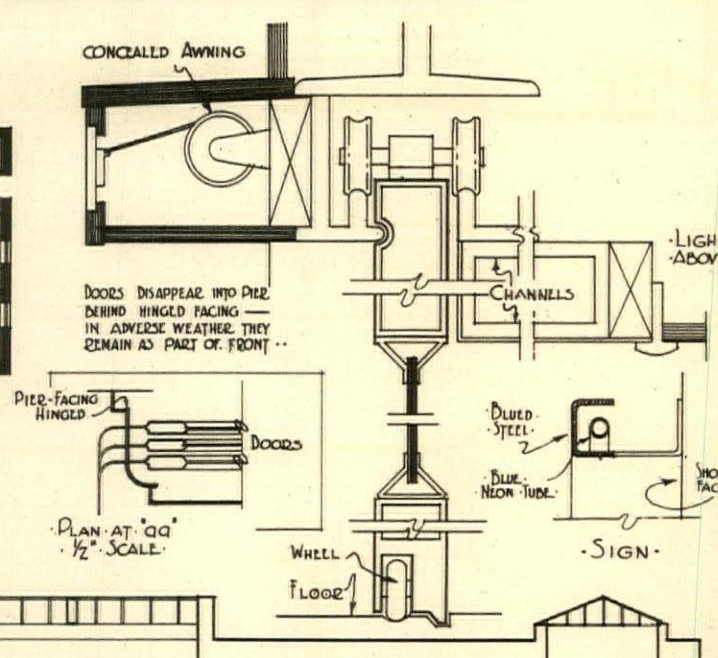

konsum FOODS
meats · fresh fish · vegetables · frozen foods · dairy · canned goods

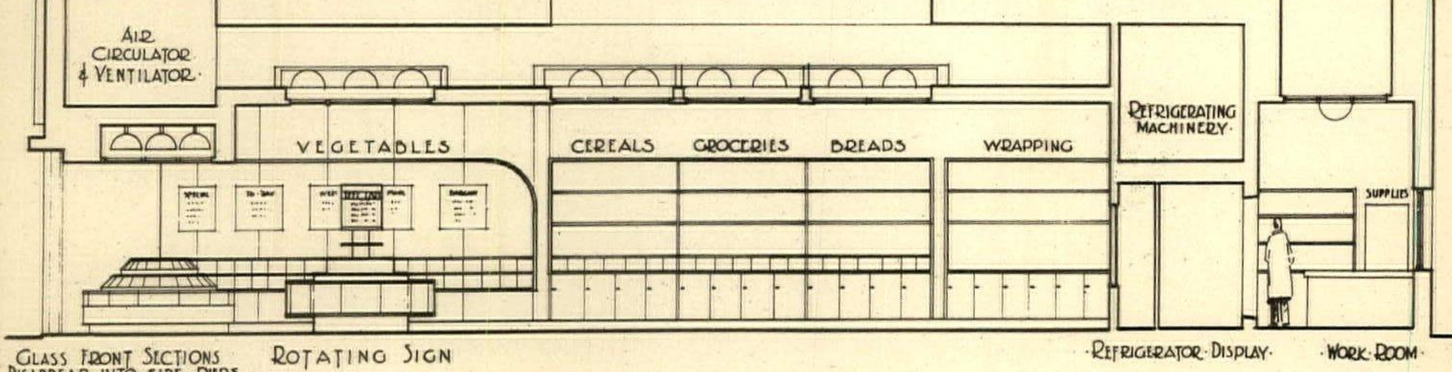


LIGHT BAFFLE CONTINUES ON ALL WALLS ILLUMINES SIGNS AND SHELVES
NEON SIGN
HEAD
JAMB
BASE
4 ARMS TO RAISE AND LOWER WINDOW

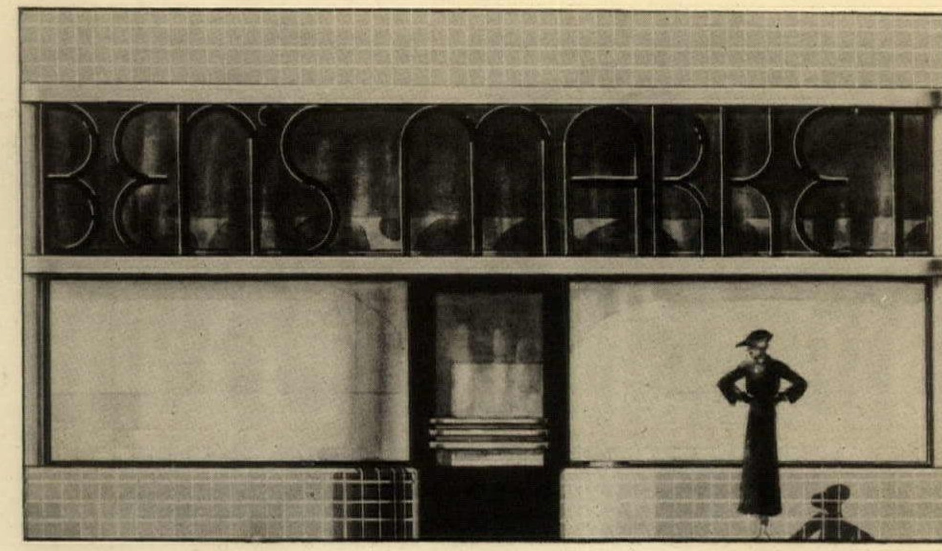

RECEIVING AND WRAPPING
VEGETABLE
ICE BOX MEATS
MEATS
DISPLAY COUNTER: MEATS
FISH
FROZEN FOODS
DAIRY
DISPLAY TABLES
SHELVES
SERVICE AND WRAPPING
BASKETS
SKYLIGHT OVER WELL FORMED BY GLASS BRICK
DAY SPECIAL
DISPLAY MEATS, FISH
WINDOW VEGETABLE
DOORS OPERATED BY ELECTRIC EYE

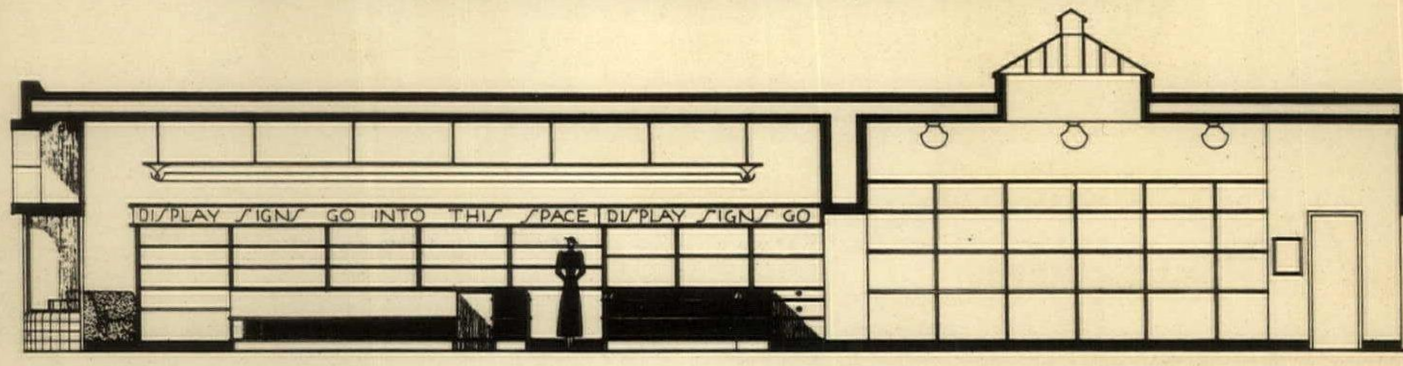

Legumes

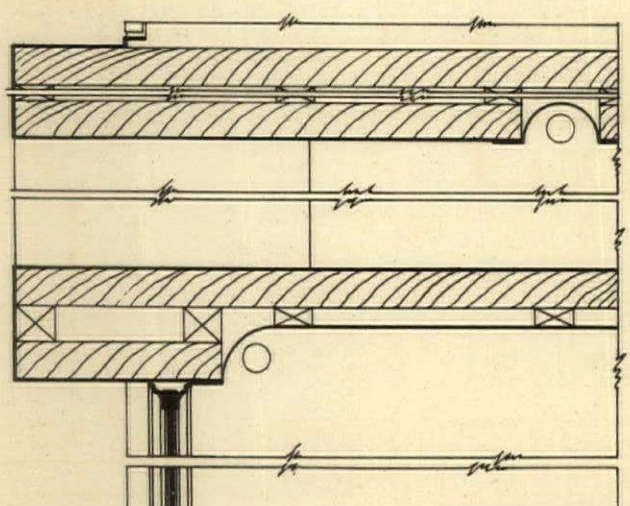

A B C D E F
aa
M R M P
G H I J K L N O
A VEGETABLES
B CEREALS
C GROCERIES
D BREADS, CAKES, ETC.
E WRAPPING & PACKAGES
F RECEIVING & WORK ROOM
G DOORS HIDDEN IN SIDE PIERS
H FRUITS
I NUTS, FANCY GOODS, ETC.
J CANNED GOODS
K DAIRY PRODUCTS
L MEAT CUTTING
M CASH
N REFRIGERATOR
O OFFICE
P MAIN DISPLAY FEATURE
R SPECIALS

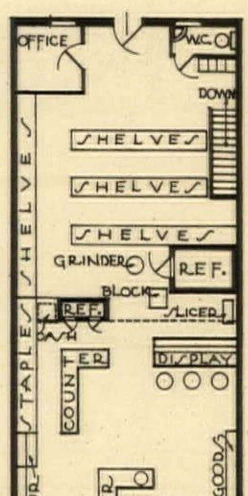

CONCEALED AWNING
DOORS DISAPPEAR INTO PIER BEHIND HINGED FACING — IN ADVERSE WEATHER THEY REMAIN AS PART OF FRONT
LIGHTS ABOVE
CHANNELS
PIER-FACING HINGED
DOORS
PLAN AT "aa" 1/2" SCALE
BLUED STEEL
BLUE NEON TUBE
SHOP FACE
SIGN
WHEEL
FLOOR


AIR CIRCULATOR & VENTILATOR
VEGETABLES
CEREALS
GROCERIES
BREADS
WRAPPING
REFRIGERATING MACHINERY
SUPPLIES
GLASS FRONT SECTIONS DISAPPEAR INTO SIDE PIERS LEAVING SHOP OPEN TO STREET
ROTATING SIGN
REFRIGERATOR DISPLAY
WORK ROOM

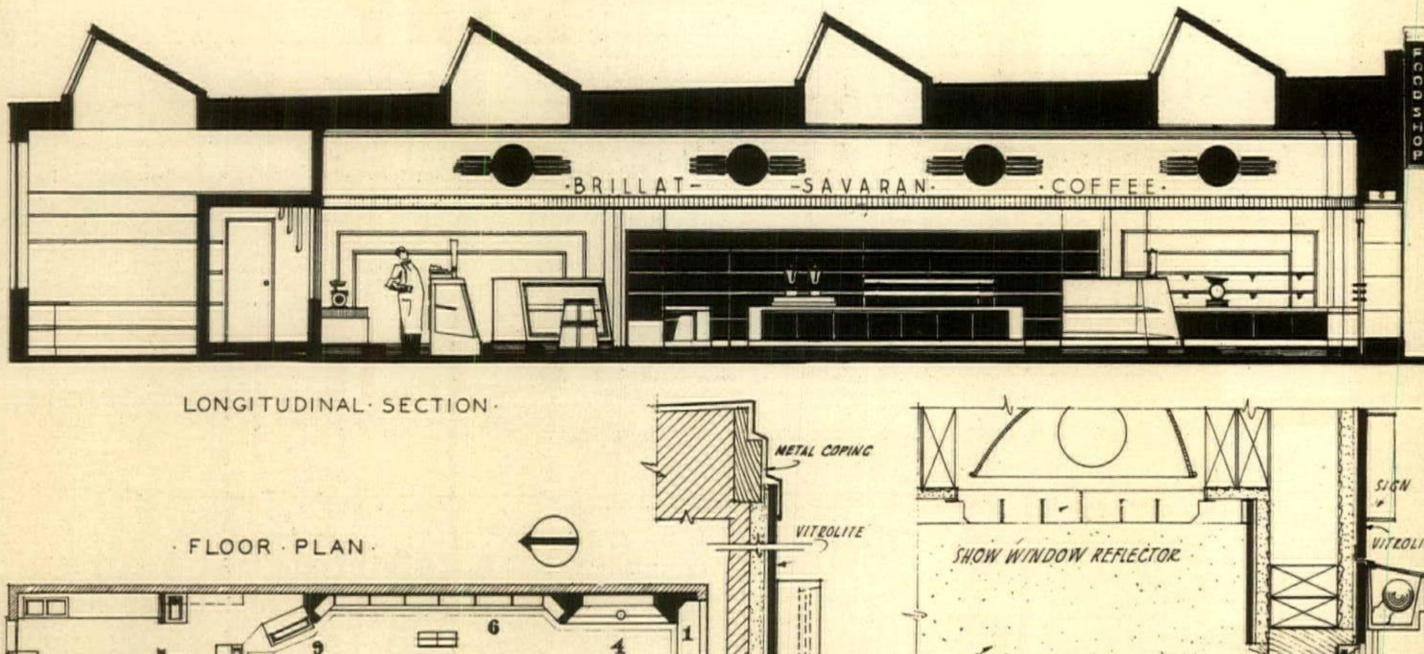



DISPLAY SIGNS GO INTO THIS SPACE DISPLAY SIGNS GO



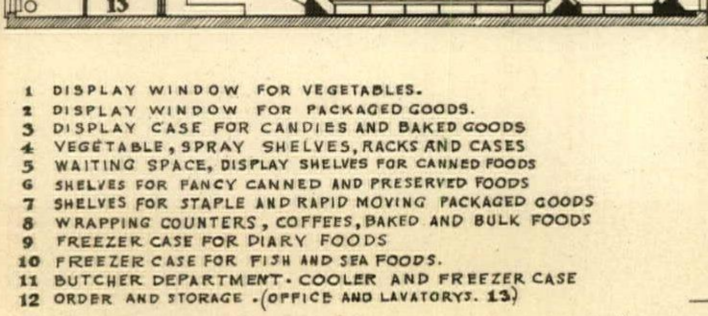

OFFICE
W.C.
DOWN
SHELVES
SHELVES
SHELVES
SHELVES
GRINDER
REF.
BLOCK
REF.
SLICER
COUNTER
DISPLAY
STAPLES
FLOUR
COUNTER
DISPLAY
CANNED GOODS
FRUIT & VEG.
FANCIES
SEAT

ELEVATION ON MAIN STREET

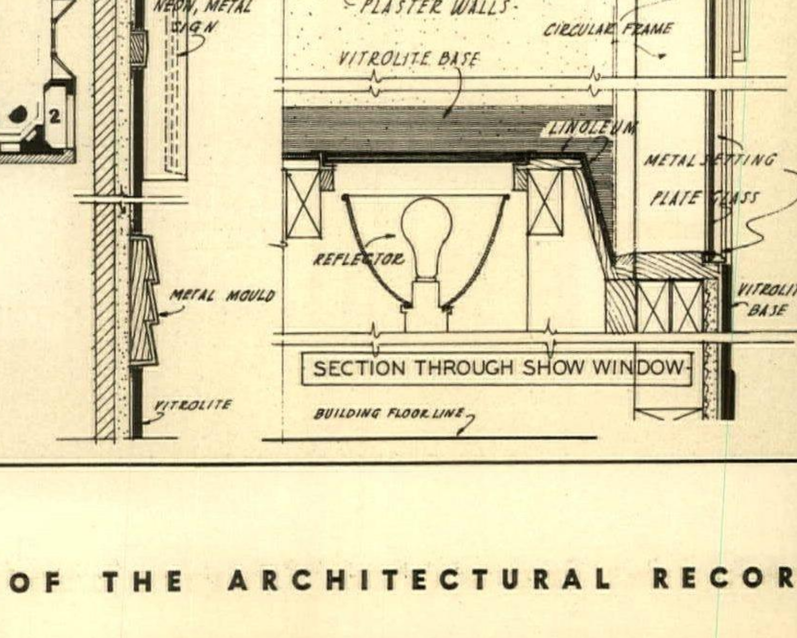


LONGITUDINAL · SECTION ·

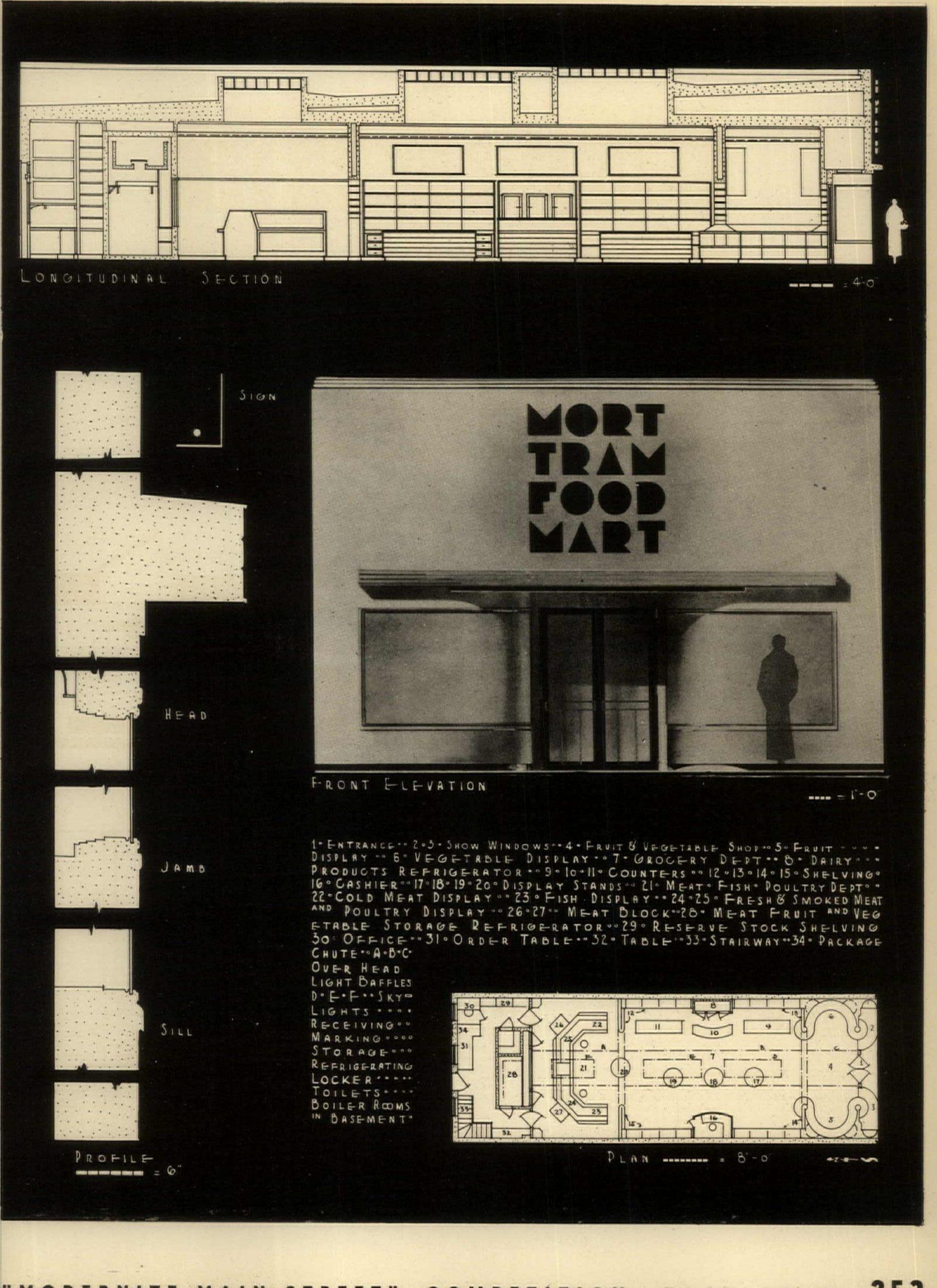
· FLOOR · PLAN ·

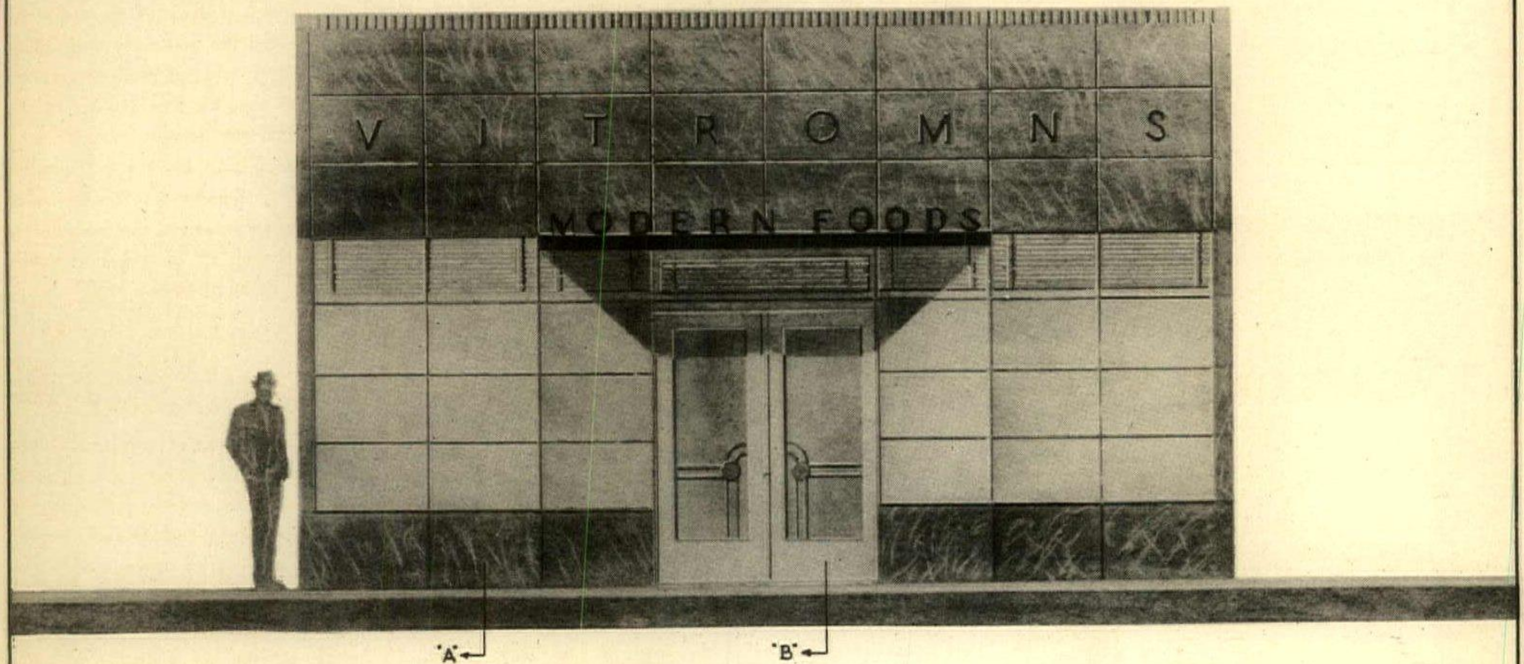


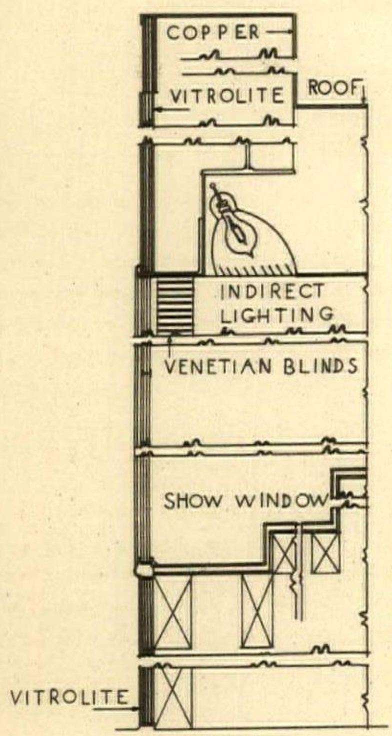
1 DISPLAY WINDOW FOR VEGETABLES.
2 DISPLAY WINDOW FOR PACKAGED GOODS.
3 DISPLAY CASE FOR CANDIES AND BAKED GOODS
4 VEGETABLE, SPRAY SHELVES, RACKS AND CASES
5 WAITING SPACE, DISPLAY SHELVES FOR CANNED FOODS
6 SHELVES FOR FANCY CANNED AND PRESERVED FOODS
7 SHELVES FOR STAPLE AND RAPID MOVING PACKAGED GOODS
8 WRAPPING COUNTERS, COFFEES, BAKED AND BULK FOODS
9 FREEZER CASE FOR DIARY FOODS
10 FREEZER CASE FOR FISH AND SEA FOODS.
11 BUTCHER DEPARTMENT · COOLER AND FREEZER CASE
12 ORDER AND STORAGE · (OFFICE AND LAVATORYS. 13)



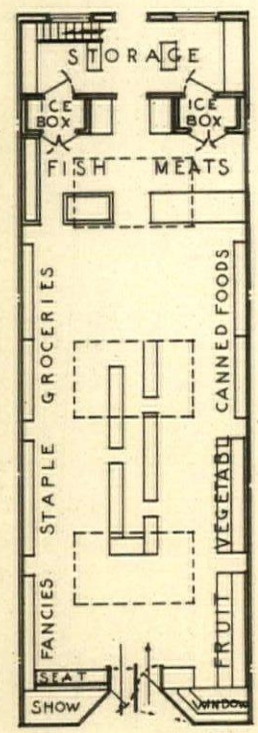
SECTION THROUGH SHOW WINDOW


LONGITUDINAL SECTION
= 4'-0"
SIGN
MORT
TRAM
FOOD
MART
HEAD
JAMB
SILL
PROFILE
= 6"
FRONT ELEVATION
= 1'-0"
1 · ENTRANCE · · 2 · 3 · SHOW WINDOWS · · 4 · FRUIT & VEGETABLE SHOP · · 5 · FRUIT DISPLAY · · 6 · VEGETABLE DISPLAY · · 7 · GROCERY DEPT · · 8 · DAIRY PRODUCTS REFRIGERATOR · · 9 · 10 · 11 · COUNTERS · · 12 · 13 · 14 · 15 · SHELVING · 16 · CASHIER · · 17 · 18 · 19 · 20 · DISPLAY STANDS · · 21 · MEAT · FISH · POULTRY DEPT · · 22 · COLD MEAT DISPLAY · · 23 · FISH DISPLAY · · 24 · 25 · FRESH & SMOKED MEAT AND POULTRY DISPLAY · · 26 · 27 · · MEAT BLOCK · · 28 · MEAT FRUIT AND VEGETABLE STORAGE REFRIGERATOR · · 29 · RESERVE STOCK SHELVING 30 · OFFICE · · 31 · ORDER TABLE · · 32 · TABLE · · 33 · STAIRWAY · · 34 · PACKAGE CHUTE · · A · B · C · OVER HEAD LIGHT BAFFLES D · E · F · · SKY LIGHTS · · · · RECEIVING · · MARKING · · · · STORAGE · · · REFRIGERATING LOCKER · · · · TOILETS · · · · BOILER ROOMS IN BASEMENT ·
PLAN = 8'-0"

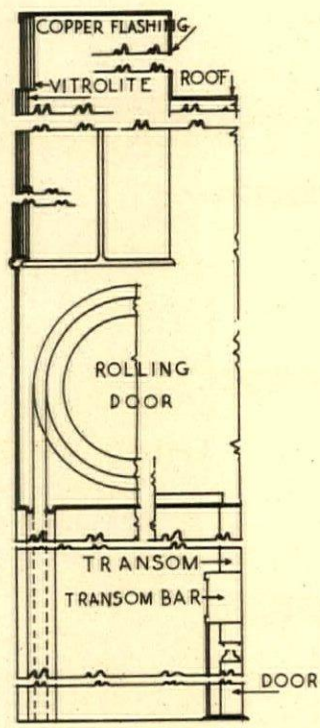




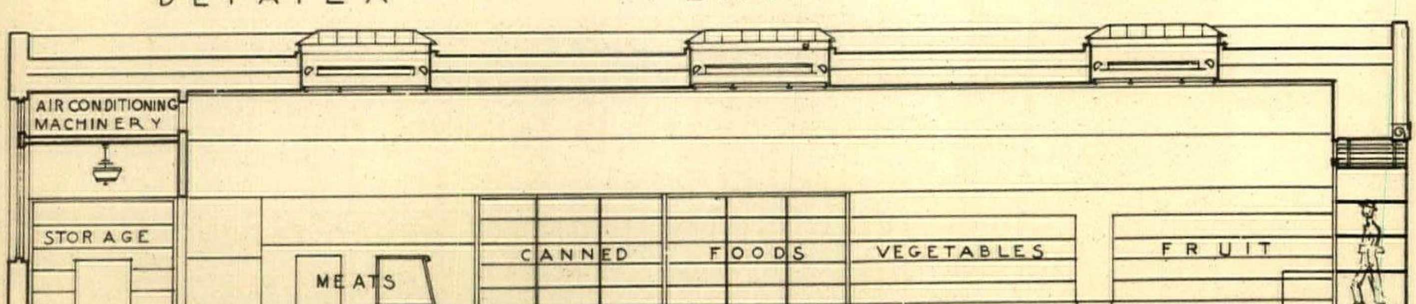
DETAIL "A"



PLAN



DETAIL "B"



PROBLEM D
AUTOMOTIVE SALES & SERVICE STATION

Requirements: The gas station, presumably, is to be modernized by an automobile dealer as a "feeder" for his main showroom, as well as to produce a profit through the sale of gasoline, oil, tires, accessories and parts. Servicing, such as greasing, washing and minor repairs on all makes of cars, will return a profit in addition to creating good-will which may lead to a car sale. ¶ The plan shall provide a showroom for two low-priced passenger automobiles; space for the display and sale of tires, parts and accessories; cash and record space; "rest-room" toilets; one car-washing space; two greasing pits, hoists or lifts; work bench and tool racks for minor repairs, with inclosure for repairing one car at a time; gasoline pumps and oil dispensers shall be located within the building lines (no pumps or other structure are permitted at the curb of street). As customers drive in the travel of cars must be considered carefully to prevent traffic congestion and to provide maximum availability of the pumps. ¶ The basement is not to be shown on the drawings. It is assumed that employees' lockers, the heating plant, air compressors, etc., and extra storage space may be provided for in the basement, providing a stairway is shown on the plan. ¶ It is assumed that the present structure may be moved, enlarged, altered, or torn down so that the most efficient design for the lot can be realized. Gasoline pumps, also, may be added, changed or relocated . . . Dimensions: The level lot is on the northeast corner of intersection of Main Street and a through traffic artery. The wide Main Street runs east and west. The rectangular lot measures 100' on Main Street, 75' on the intersecting street. Both are two-way traffic streets. From building line (lot line) to curbs of streets is 12'.

FIRST PRIZE: ALFRED CLAUSS, KNOXVILLE, TENN. 256

The problem of car traffic to the gasoline pumps with exits to either street and of entrance to the repair and washing has been well solved. ¶ The plan is compact, the different operations are in good relation to each other and are under easy control. ¶ The large showroom with its front following the line of traffic is easily seen from the cars while refilling. ¶ A car, rather than a cashier desk, should occupy the center of the circular showroom and the spare parts should be located convenient to the repairing. ¶ The design is simple yet striking. The show front terminating in the large plain wall surface attracts attention. This wall might serve as a screen to block out an unattractive neighbor. ¶ The sign relamping and other details have been well studied. The whole scheme has a quality of unity and simplicity. It should therefore be economical of construction and operation which would appeal to the dealer.

SECOND PRIZE: SUREN PILAFIAN, MAURICE LUBIN, NEW YORK 257

The design is attractive from any elevation and the salesroom is well located so that all cars stopping for gas must see the display which can also be seen from the sidewalk. The traffic is well studied to bring the show windows as near the cars as possible without interference to convenience or safety. The separation of the showroom and sales from the repair, lubricating and washing means a more difficult control and a more expensive operation. Space around the cars for repairing or washing seems insufficient. ¶ The feature outside lighting and the sign are effective and dignified.

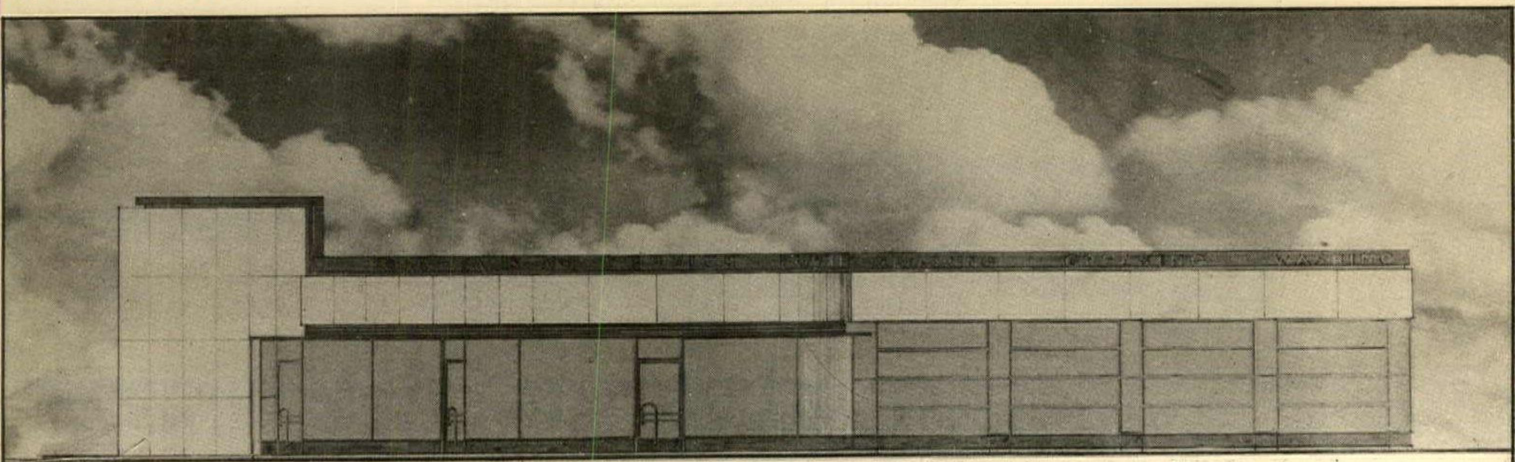
THIRD PRIZE: ISADORE SHANK, ST. LOUIS 258

This design is especially striking in exterior color. The elevation would attract more than local motorists, since the signs are prominent and well placed. ¶ The showroom provides a display of new cars which must be seen by any one stopping at the gas pumps. ¶ The plan of the service department is not particularly well studied as there is congestion. The location of the repair department with respect to the car wash, or grease hoists, is unfortunate.

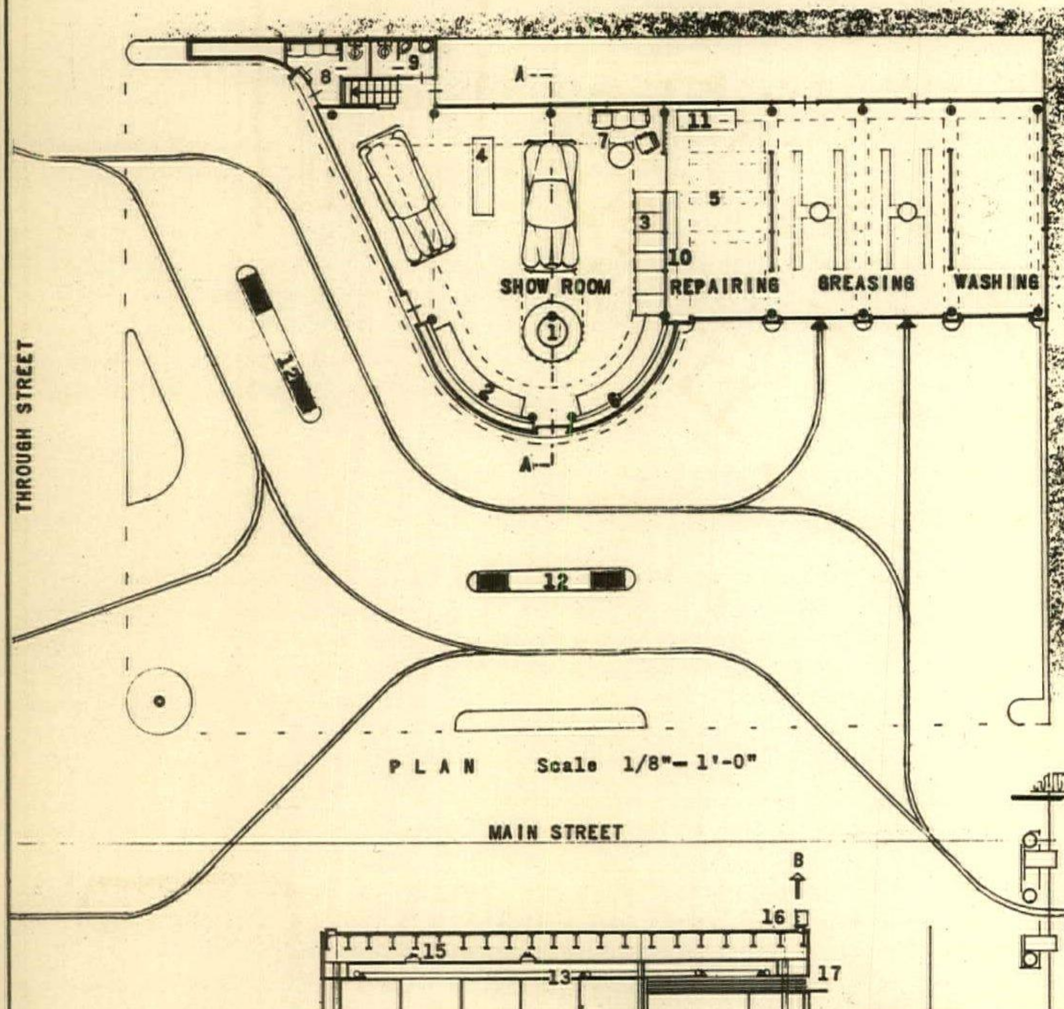
HONORABLE MENTIONS:

J. R. SPROULE, SEATTLE, WASH. 259
CHARLES Du BOSE, NEW YORK 260
VICTOR SPECTOR, CHICAGO 261
THOMAS D. TARO, EAST ORANGE, N. J. 262
A. ALBERT COOLING, LOS ANGELES 263
HORACE HARTMAN, GEORGE WRIGHT, DETROIT 264
HENRY T. ASPINWALL, PAUL F. SIMPSON, GREAT NECK, N. Y. 265
G. McLAUGHLIN, S. C. REESE, L. BERZ, KNOXVILLE, TENN. . . 266

ALFRED CLAUSS

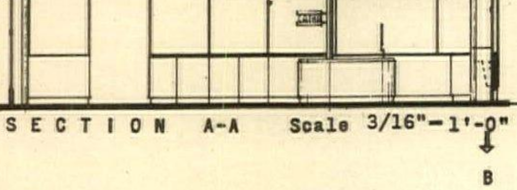


MAIN STREET ELEVATION Scale 3/16"=1'-0" 14

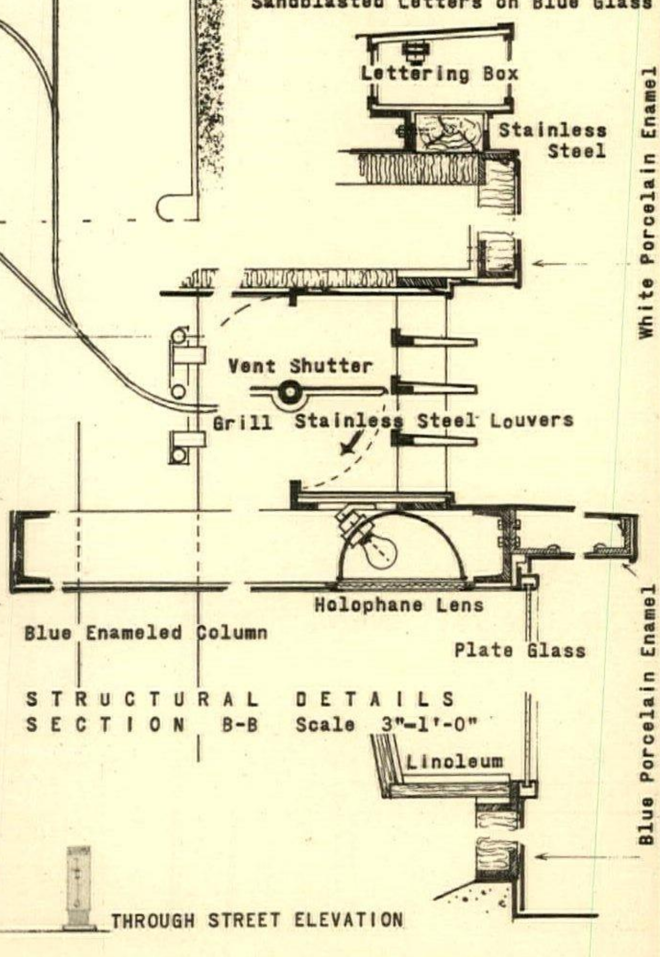


PLAN Scale 1/8"- 1'-0"

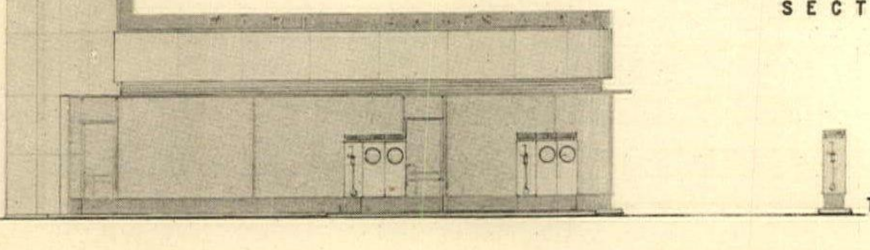
1. Cashier's Desk
2. Accesories and Parts
3. Oil 4.Tires
5.Tire Racks from Ceiling
6. Window Display
7.Customers Waiting Space Radio-Magazine Stand
8. Ladies Rest Room
9. Mens Rest Room
10.Tool Racks 11.Work Bench
12. Gasoline Pumps
13. Light Trough
14. Overhead Doors
15. Ceiling Reflector
16. Lettering Light Box
17. Ventilation Louvers



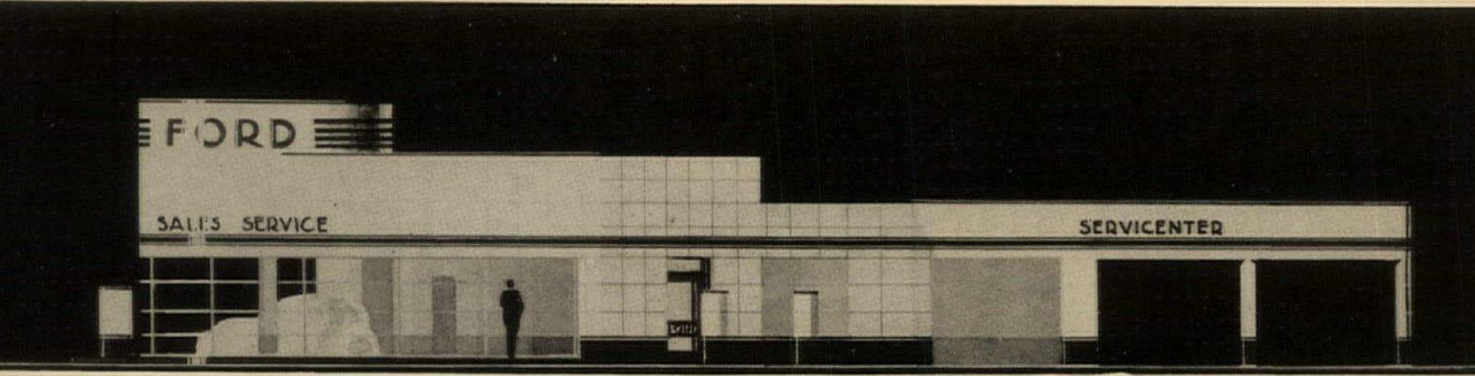
SECTION A-A Scale 3/16"-1'-0"

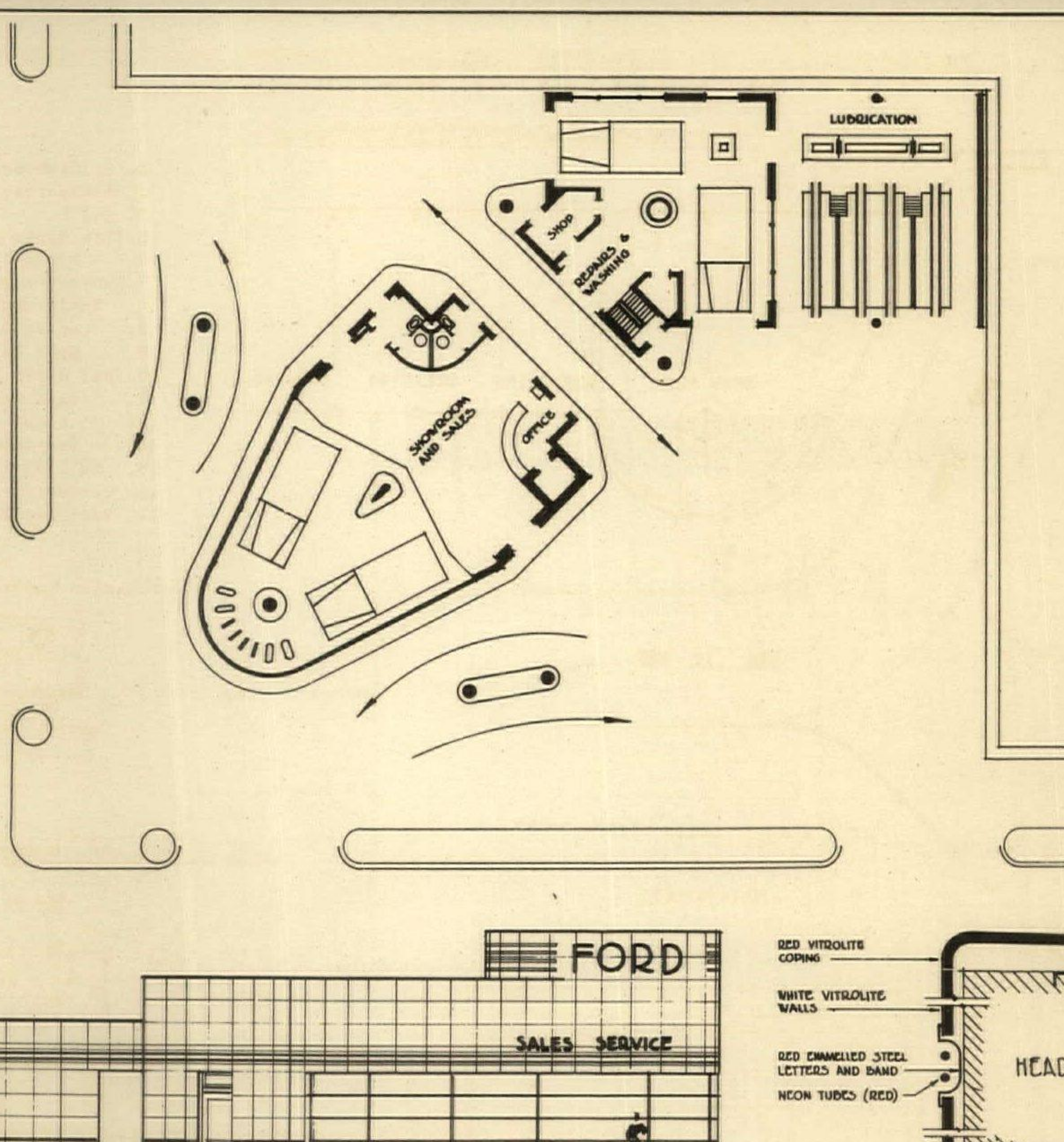


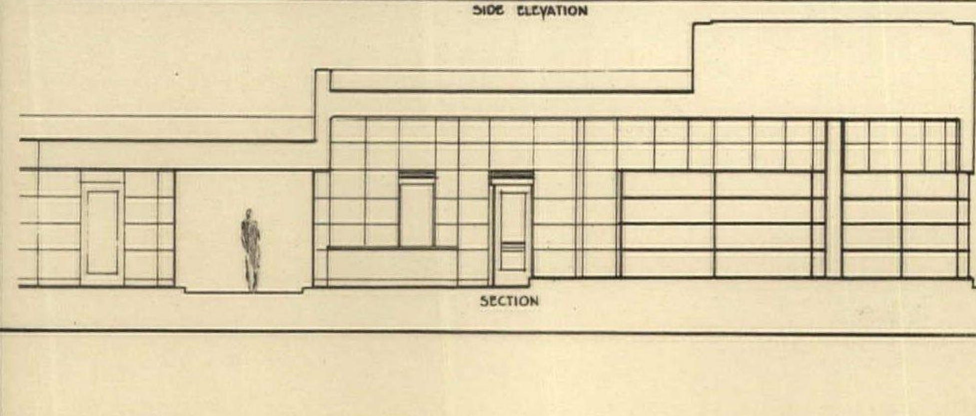
STRUCTURAL DETAILS
SECTION B-B Scale 3"-1'-0"

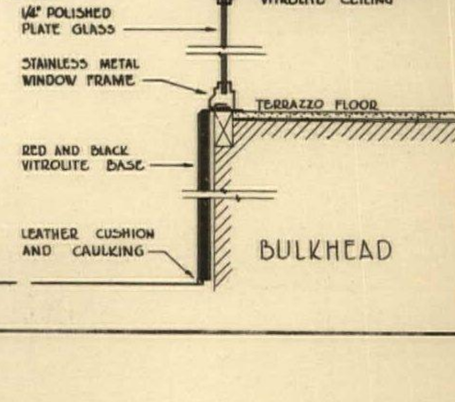


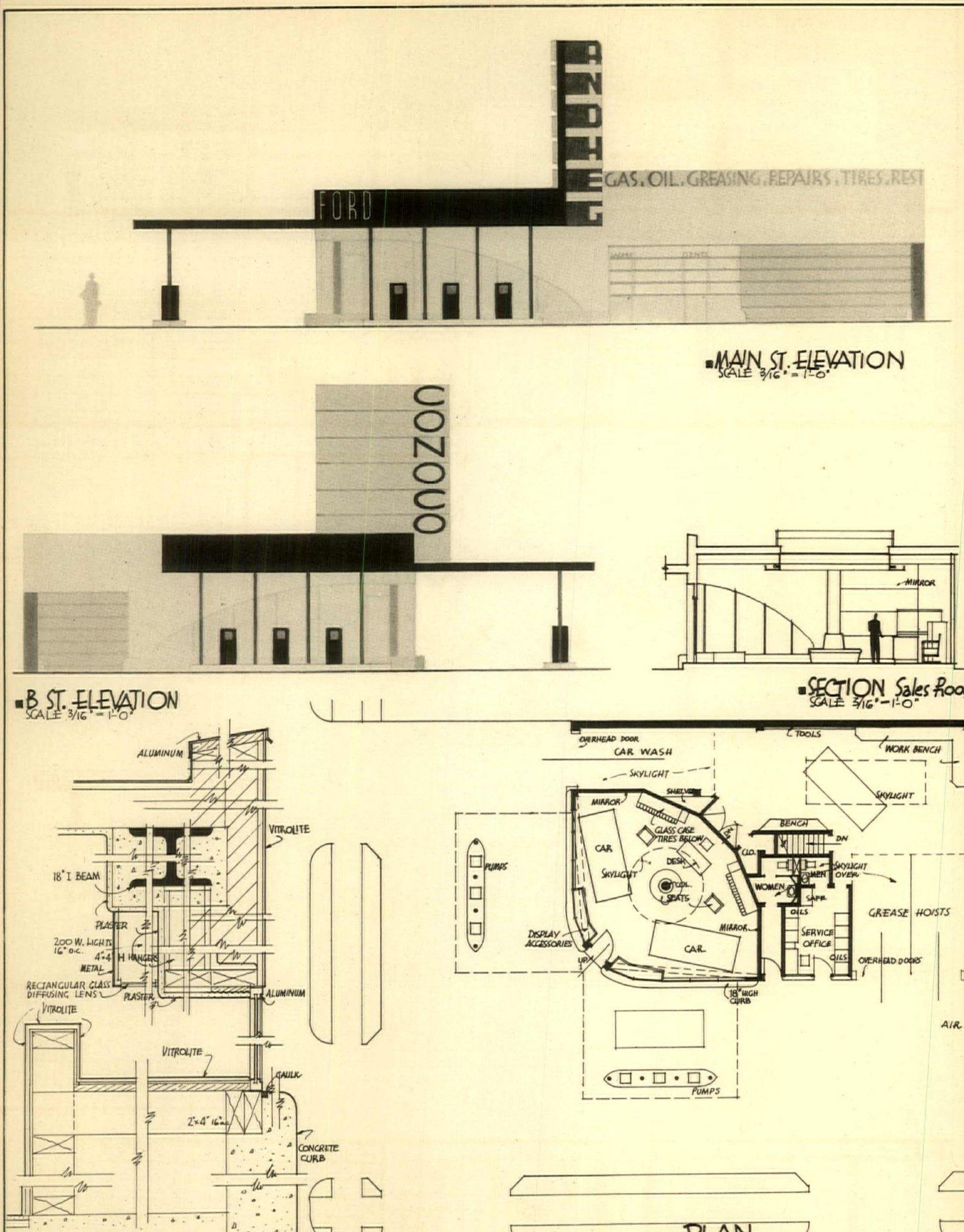
THROUGH STREET ELEVATION

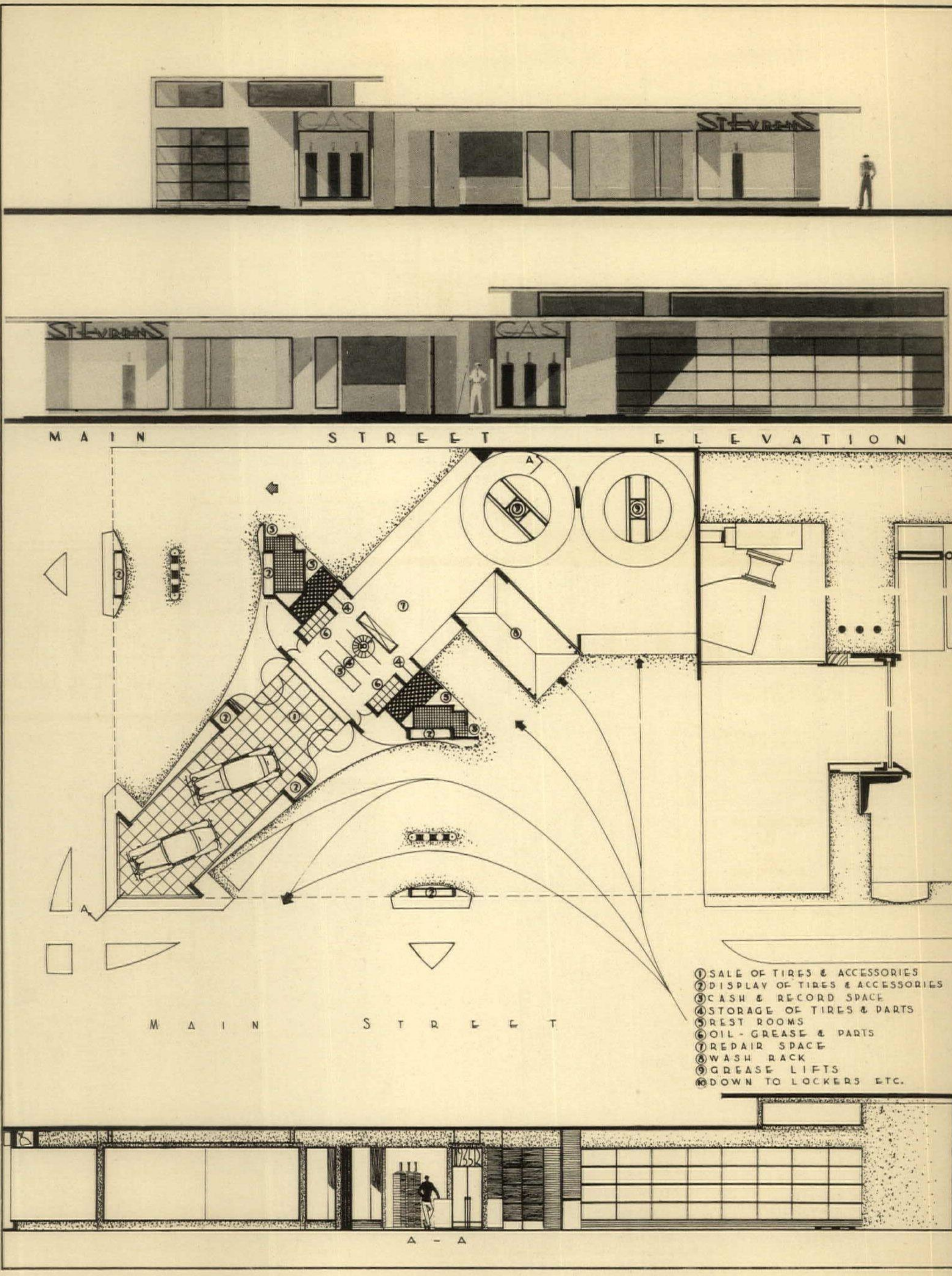

FORD
SALES SERVICE
SERVICENTER

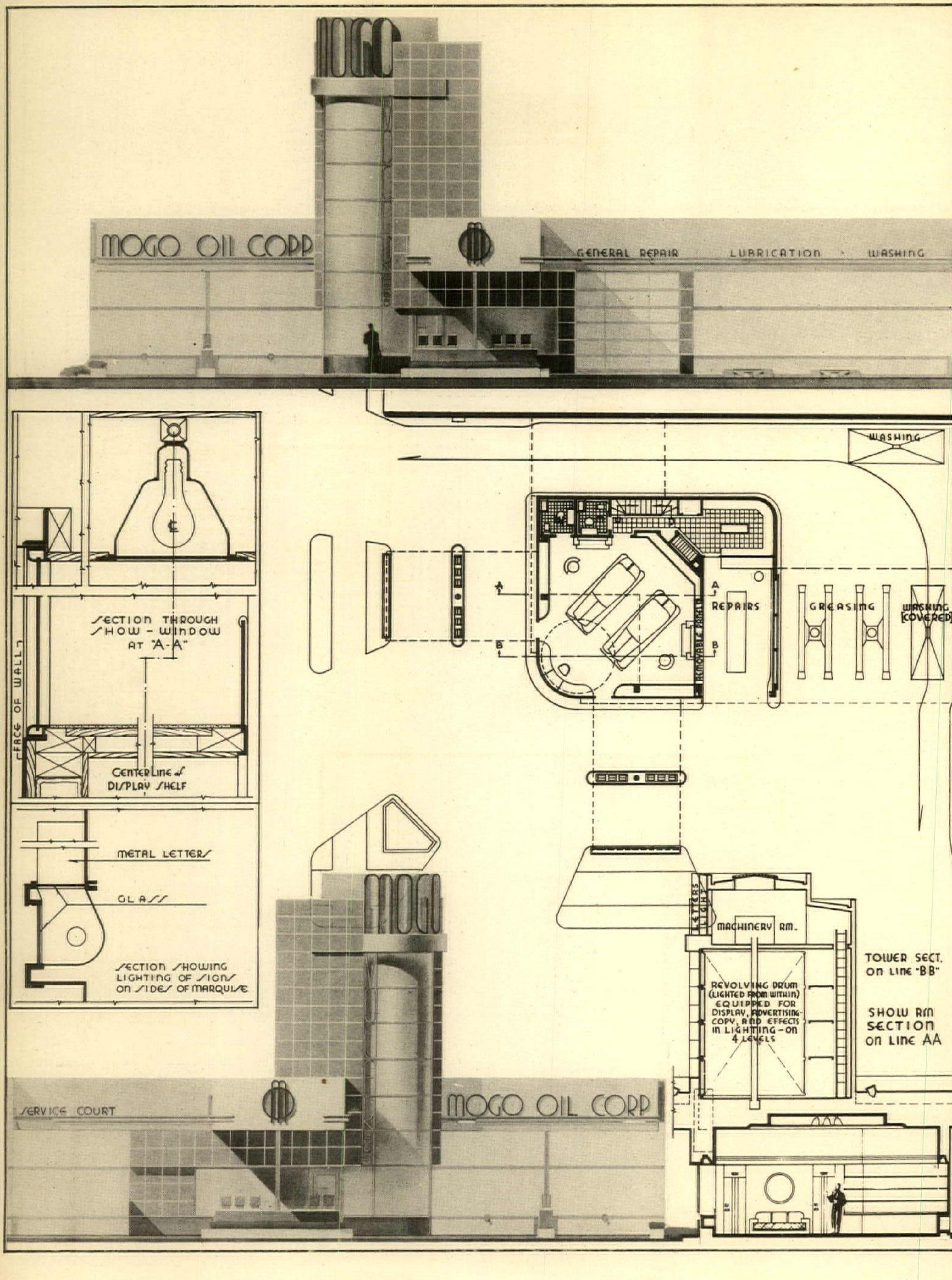

LUBRICATION
SHOP
REPAIRS & WASHING
SHOWROOM AND SALES
OFFICE

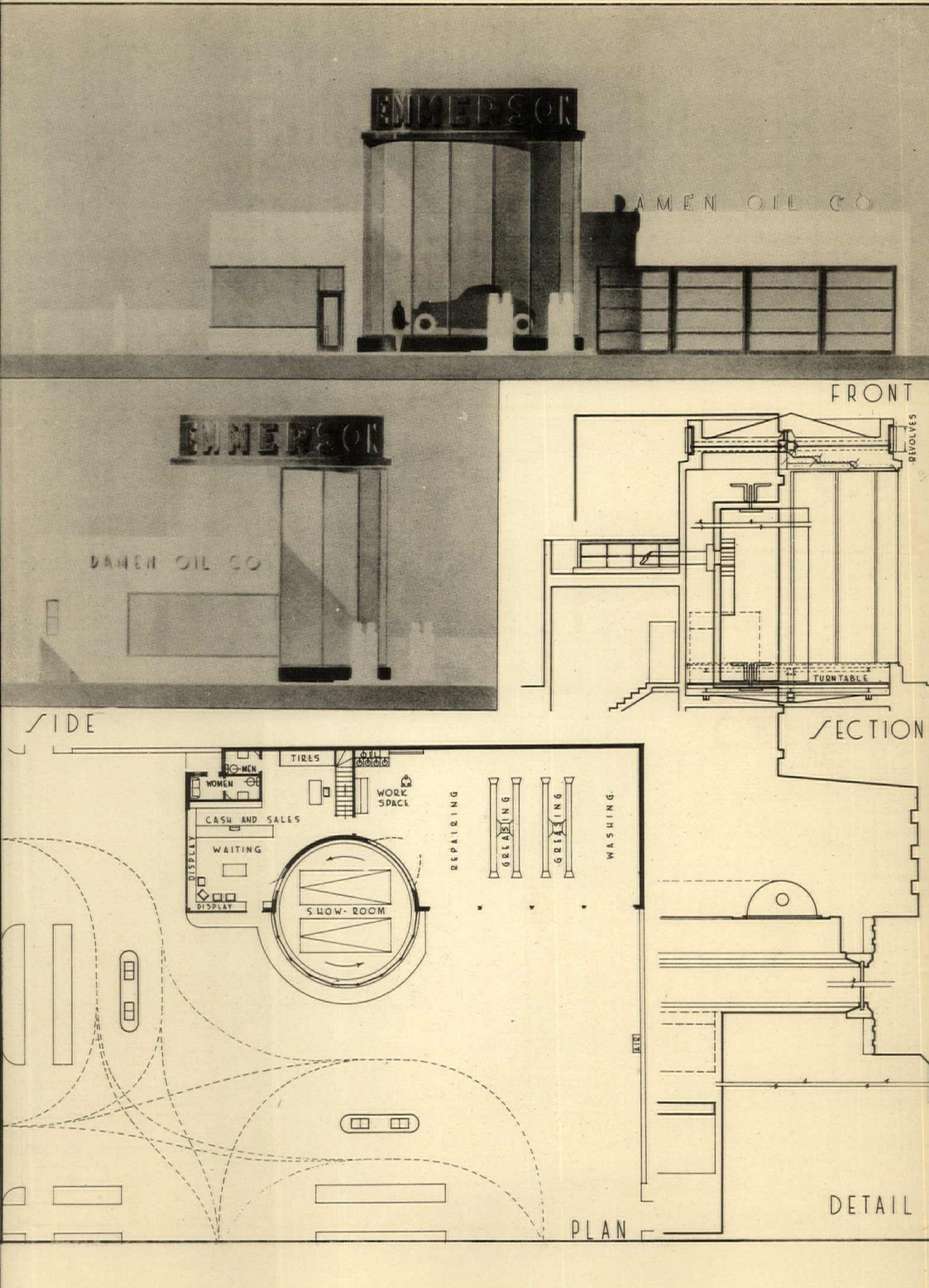

FORD
SALES SERVICE
SIDE ELEVATION
SECTION


RED VITROLITE COPING
WHITE VITROLITE WALLS
RED ENAMELLED STEEL LETTERS AND BAND
NEON TUBES (RED)
HEAD
VITROLITE CEILING
1/4" POLISHED PLATE GLASS
STAINLESS METAL WINDOW FRAME
TERRAZZO FLOOR
RED AND BLACK VITROLITE BASE
LEATHER CUSHION AND CAULKING
BULKHEAD

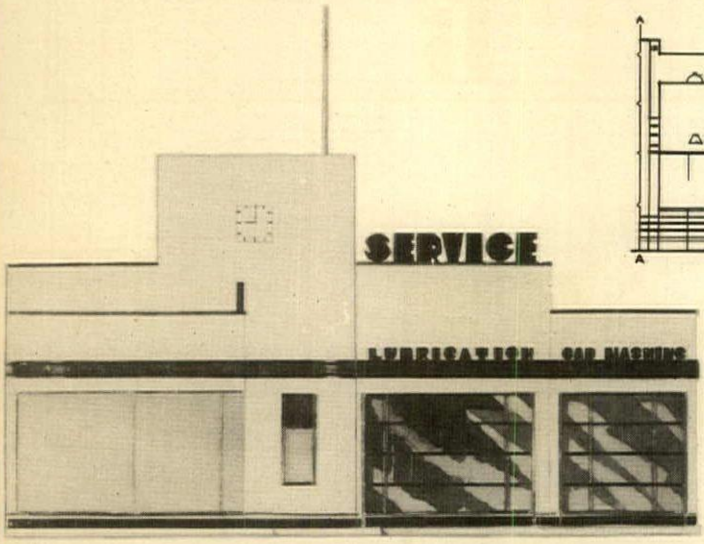

FORD
GAS. OIL. GREASING. REPAIRS. TIRES. REST
MAIN ST. ELEVATION
SCALE 3/16" = 1'-0"
CONOCO
B ST. ELEVATION
SCALE 3/16" = 1'-0"
MIRROR
SECTION Sales Roo
SCALE 3/16" = 1'-0"
ALUMINUM
VITROLITE
18" I BEAM
PLASTER
200 W. LIGHTS 16" O.C.
4"x4" H HANGERS
METAL
RECTANGULAR GLASS DIFFUSING LENS
PLASTER
ALUMINUM
VITROLITE
VITROLITE
CAULK
2"x4" 16" o.c.
CONCRETE CURB
DETAIL
SCALE 3" = 1'-0"
MAIN STREET
OVERHEAD DOOR
CAR WASH
SKYLIGHT
TOOLS
WORK BENCH
SKYLIGHT
SHELVES
MIRROR
GLASS CASE TIRES BELOW
CAR
SKYLIGHT
DESK
COL.
SEATS
PUMPS
BENCH
DN
CLO.
SKYLIGHT OVER
MEN
WOMEN
SAFE
OILS
GREASE HOISTS
MIRROR
SERVICE OFFICE
DISPLAY ACCESSORIES
CAR
OILS
OVERHEAD DOORS
UP
18" HIGH CURB
AIR
PUMPS
PLAN
SCALE 1/8" = 1'-0"

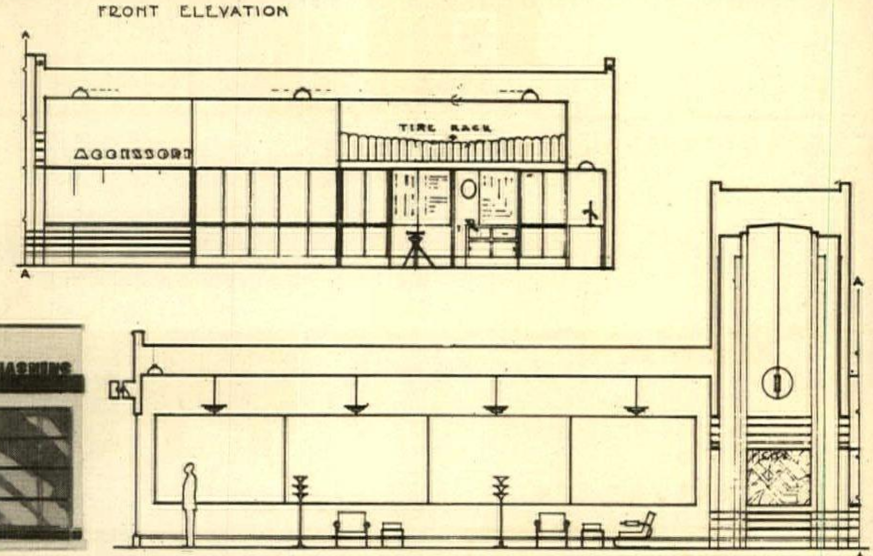

GAS
MAIN STREET ELEVATION
1 SALE OF TIRES & ACCESSORIES
2 DISPLAY OF TIRES & ACCESSORIES
3 CASH & RECORD SPACE
4 STORAGE OF TIRES & PARTS
5 REST ROOMS
6 OIL - GREASE & PARTS
7 REPAIR SPACE
8 WASH RACK
9 GREASE LIFTS
10 DOWN TO LOCKERS ETC.
MAIN STREET
A - A


MOGO
MOGO OIL CORP
GENERAL REPAIR
LUBRICATION
WASHING
SECTION THROUGH SHOW-WINDOW AT "A-A"
FACE OF WALL
CENTER LINE of DISPLAY SHELF
METAL LETTERS
GLASS
SECTION SHOWING LIGHTING OF SIGNS ON SIDES OF MARQUISE
REPAIRS
REMOVABLE PANELS
GREASING
WASHING [COVERED]
MACHINERY RM.
LETTERS LIGHT
REVOLVING DRUM (LIGHTED FROM WITHIN) EQUIPPED FOR DISPLAY, ADVERTISING-COPY, AND EFFECTS IN LIGHTING - ON 4 LEVELS
TOWER SECT. ON LINE "BB"
SHOW RM SECTION ON LINE AA
SERVICE COURT
MOGO OIL CORP

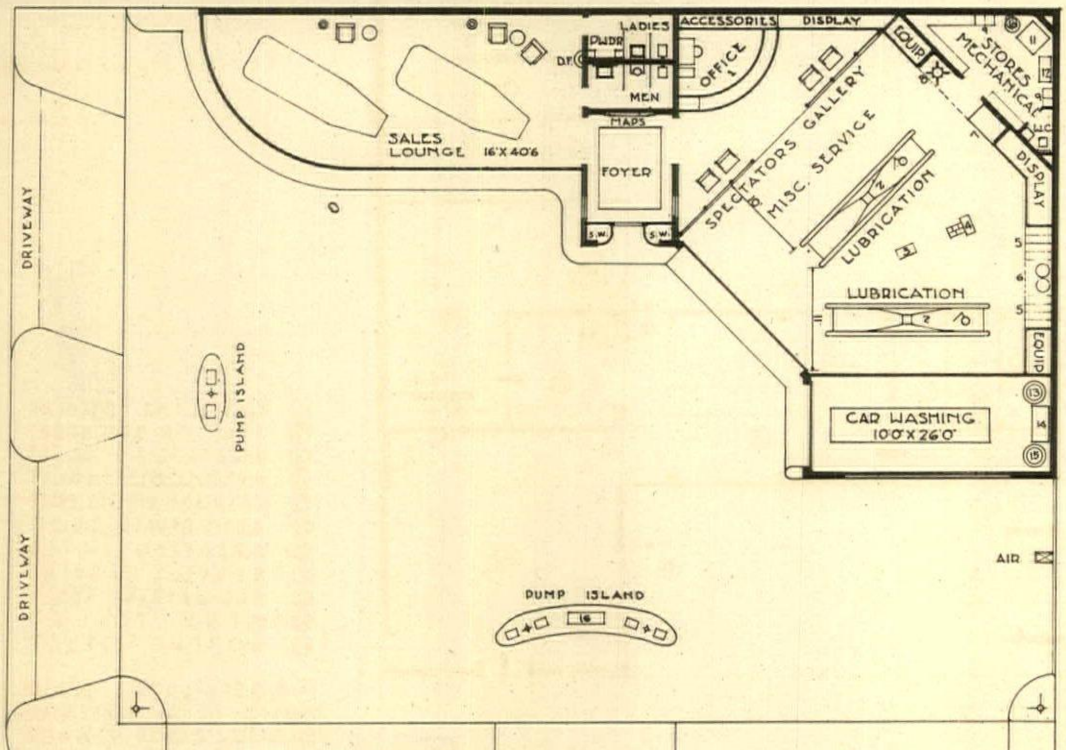

EMMERSON
DAMEN OIL CO
FRONT
REVOLVES
TURNTABLE
SECTION
SIDE
TIRES
MEN
WOMEN
WORK SPACE
CASH AND SALES
WAITING
DISPLAY
DISPLAY
SHOW·ROOM
REPAIRING
GREASING
GREASING
WASHING
AIR
PLAN
DETAIL

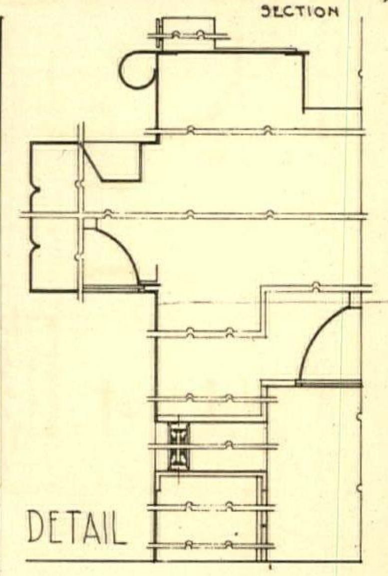
FRONT ELEVATION





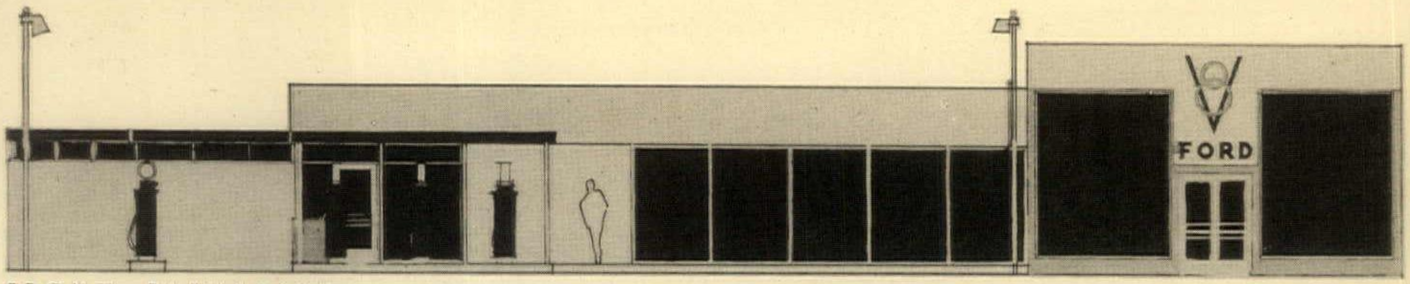
SECTION



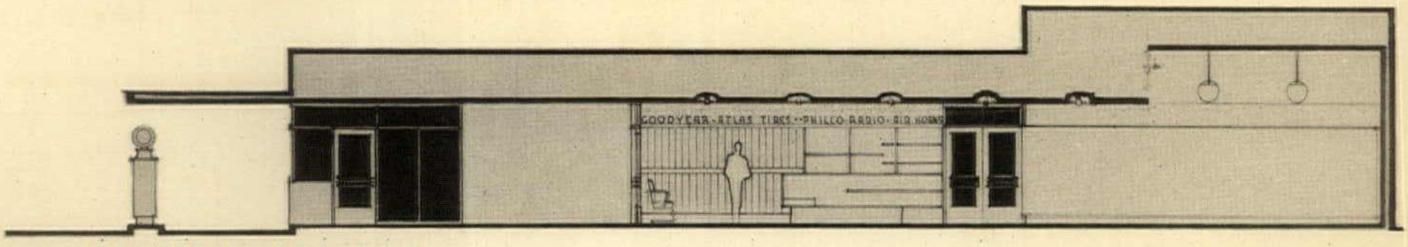


DETAIL

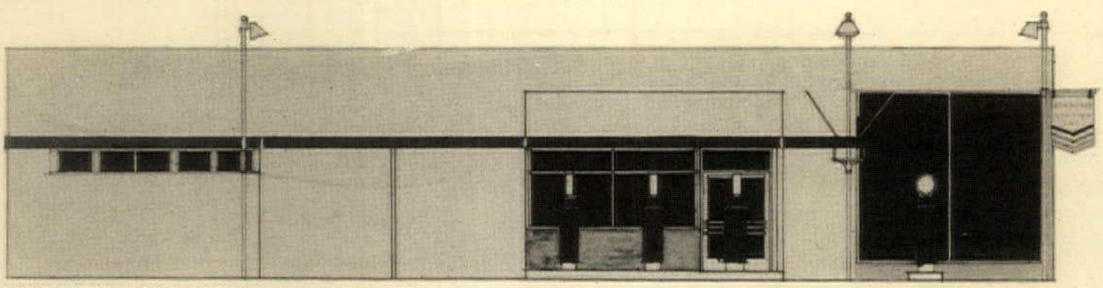
1 DESK & FILE CASE, SHOWCASE COUNTER
2 HYDRAULIC ROTATING LIFTS
3 SPARK PLUG TESTER & CLEANER
4 BATTERY CHARGER & RACK
5 LUBE OIL MACHINES
6 SLOP OIL & WASTE BBLS.
7 WORK BENCH
8 TIRE CHANGING MACHINE
9 LOCKERS
10 WATER HEATER
11 HEATER
12 AIR COMPRESSOR
13 VACUUM CLEANER
14 CAR WASHING MACHINE
15 STEAMER
16 ISLAND SHOW CASE



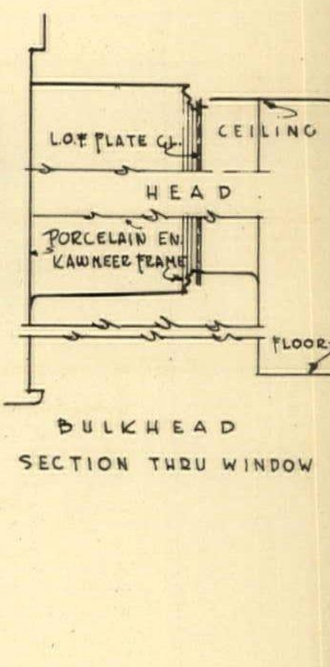
FRONT ELEVATION



LONGITUDINAL SECTION

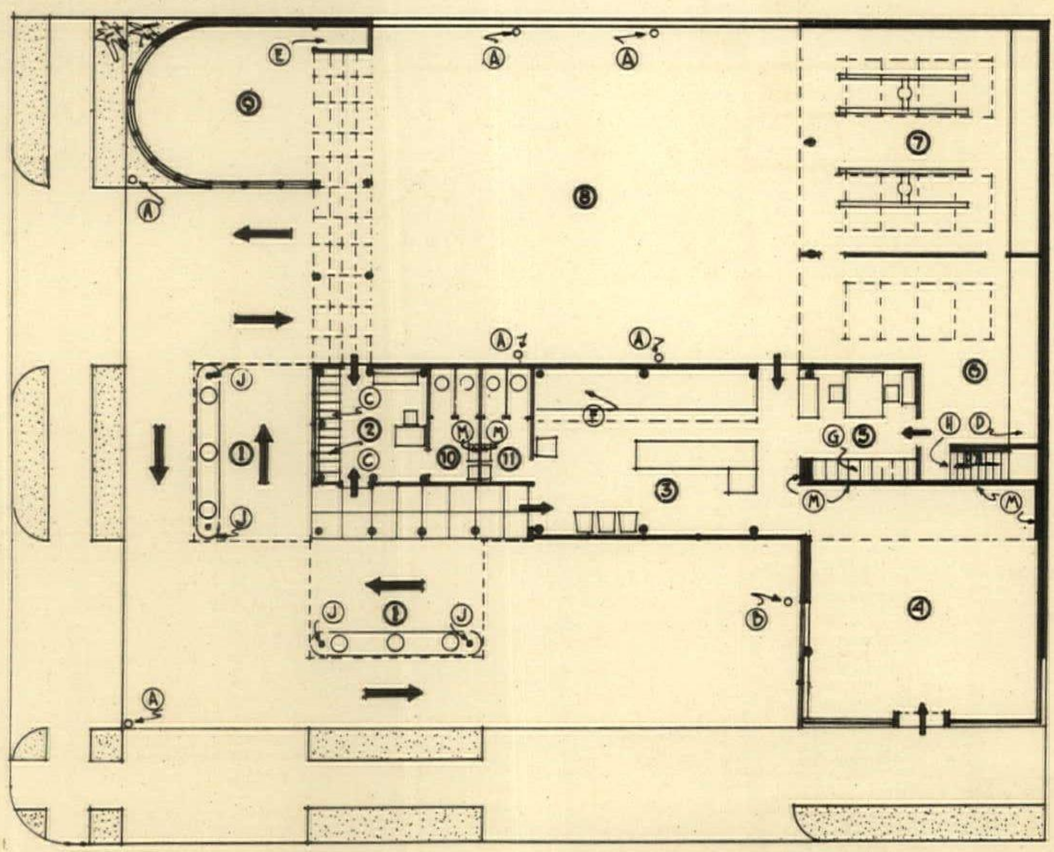


SIDE ELEVATION



BULKHEAD

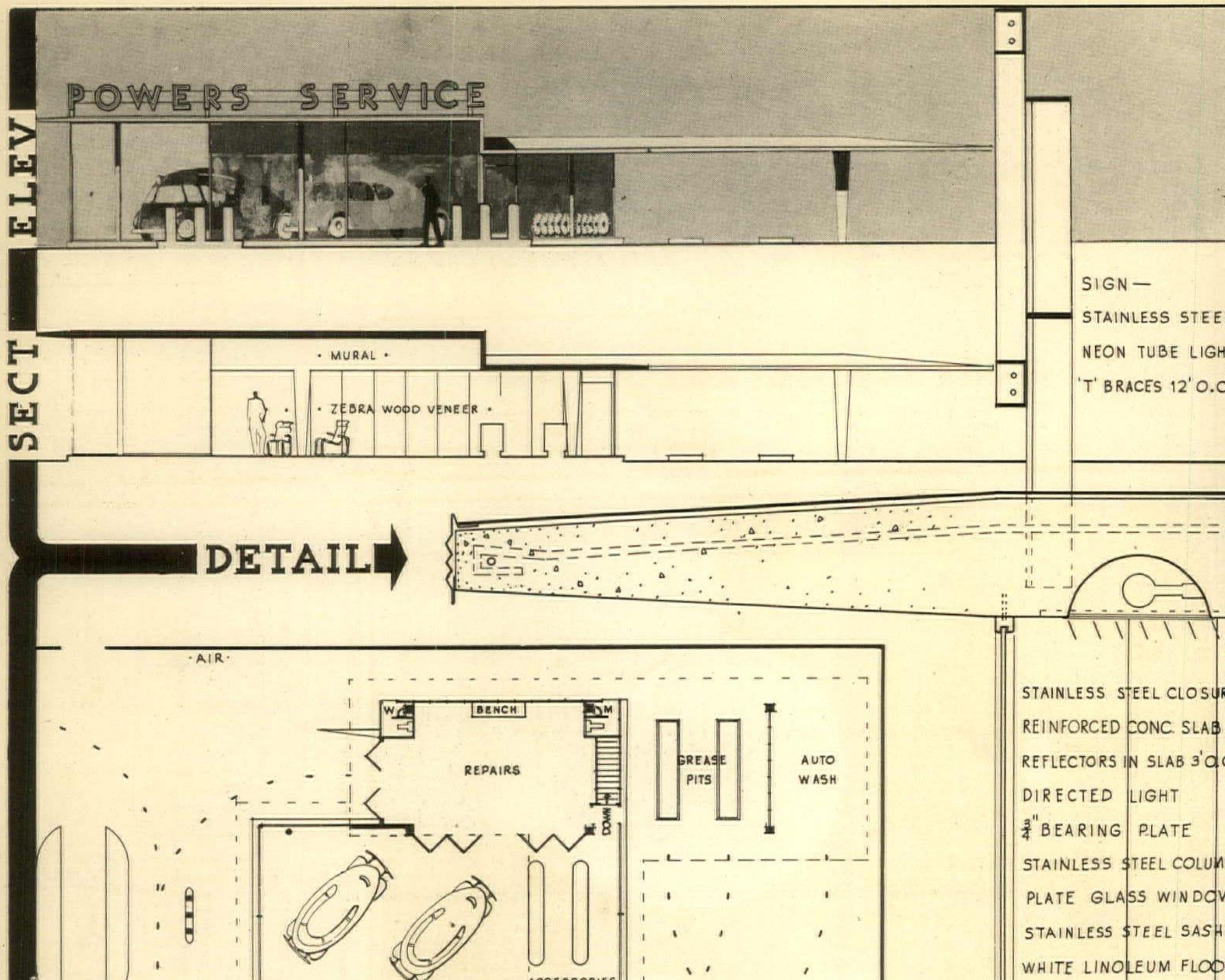
SECTION THRU WINDOW

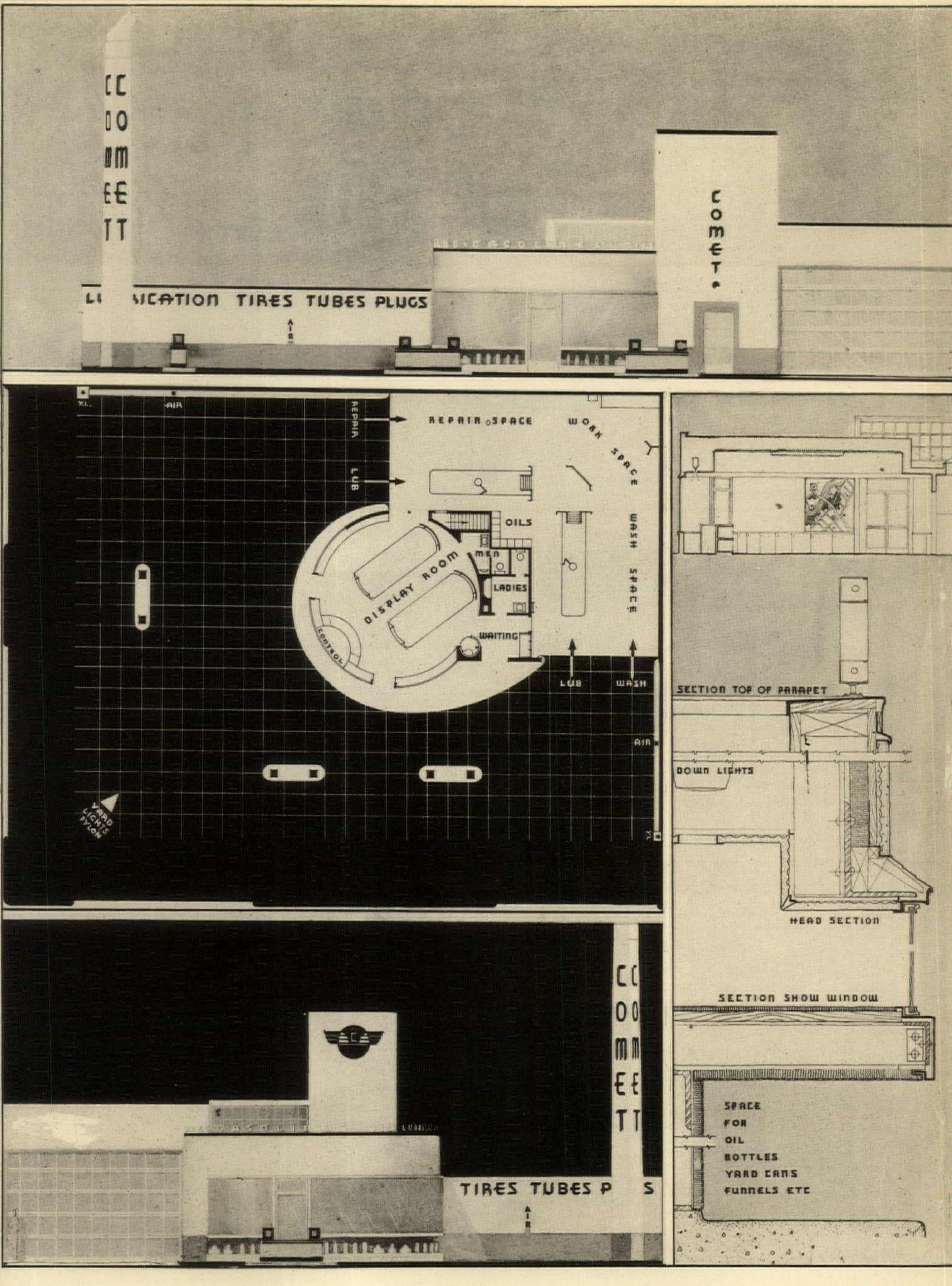


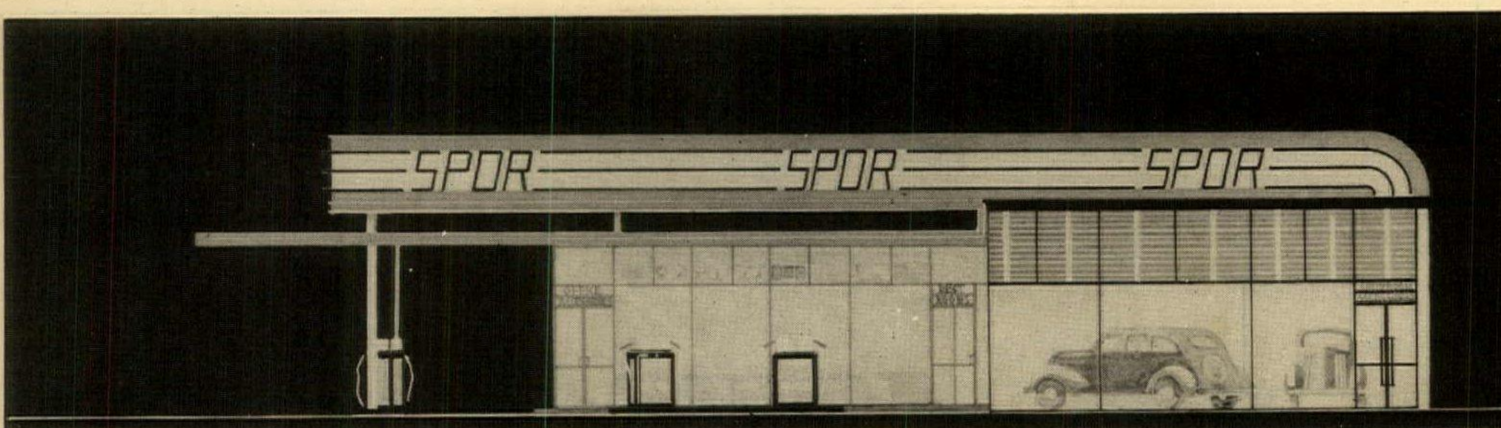
① GASOLINE PUMPS
② STATION ATTENDANT
③ ACCESSORIES SALES
④ AUTOMOBILE SALES
⑤ CASH AND RECORD SPACE
⑥ AUTO REPAIR SHOP
⑦ GREASING LIFTS
⑧ SERVICE PARKING
⑨ CAR-WASHING SPACE
⑩ MENS' TOILET
⑪ WOMENS' TOILET

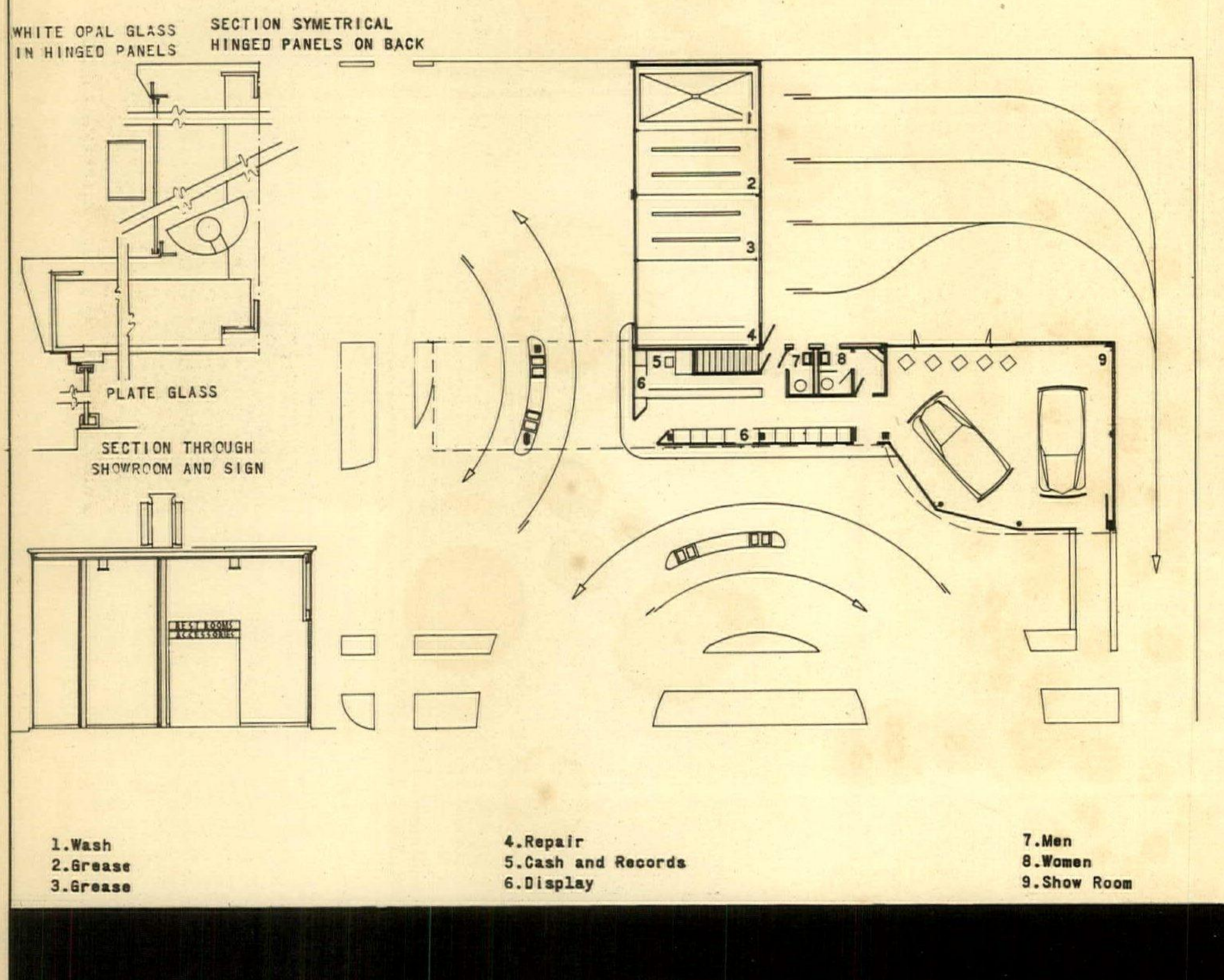
Ⓐ FLOODLIGHTS Ⓑ AIR PUMPS Ⓒ OIL DISPENSER Ⓓ WORK BENCH Ⓔ WATER PUMP Ⓕ TIRE SALES Ⓖ RECORD FILES Ⓗ STAIRS Ⓙ WATER Ⓜ MIRRORS

PLAN


ELEV
POWERS SERVICE
SECT
MURAL
ZEBRA WOOD VENEER
DETAIL
SIGN—
STAINLESS STEE
NEON TUBE LIGH
'T' BRACES 12' O.C
STAINLESS STEEL CLOSUR
REINFORCED CONC. SLAB
REFLECTORS IN SLAB 3' O.C
DIRECTED LIGHT
$\frac{3}{4}$" BEARING PLATE
STAINLESS STEEL COLUM
PLATE GLASS WINDOW
STAINLESS STEEL SASH
WHITE LINOLEUM FLOO
FERALUN CURB EDG
PLAN
AIR
W
BENCH
M
REPAIRS
DOWN
GREASE PITS
AUTO WASH
ACCESSORIES
AIR
MAIN STREET
ELEV
SERVICE


COMET
TIRES TUBES PLUGS
AIR
REPAIR
REPAIR SPACE
WORK SPACE
LUB
OILS
MEN
LADIES
DISPLAY ROOM
WASH SPACE
CONTROL
WAITING
LUB
WASH
AIR
YARD LIGHTS PYLON
SECTION TOP OF PARAPET
DOWN LIGHTS
HEAD SECTION
SECTION SHOW WINDOW
SPACE
FOR
OIL
BOTTLES
YARD CANS
FUNNELS ETC
TIRES TUBES P S

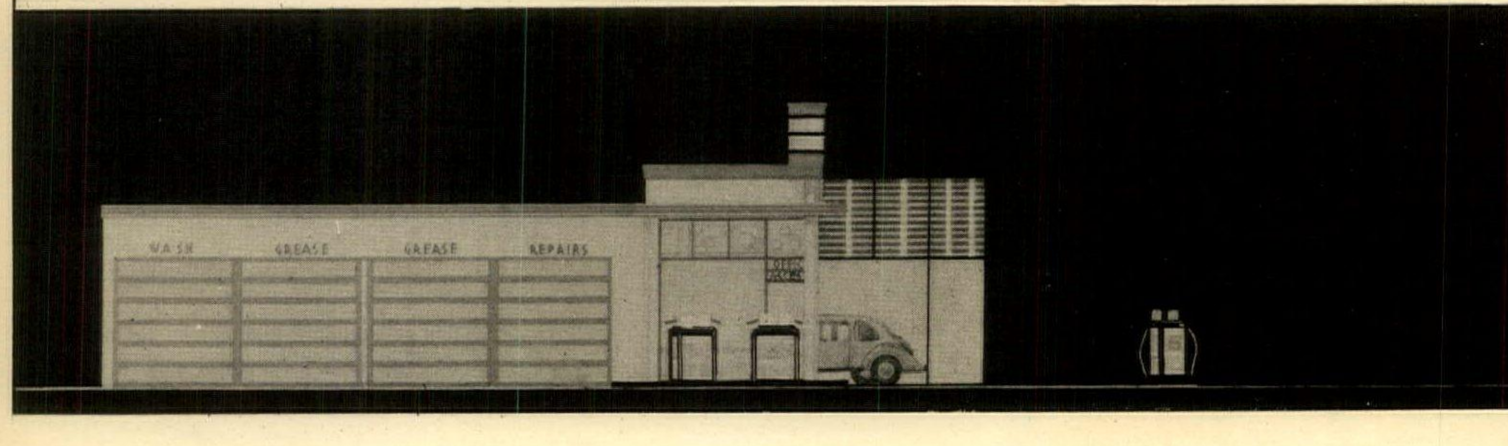




1.Wash
2.Grease
3.Grease

4.Repair
5.Cash and Records
6.Display

7.Men
8.Women
9.Show Room



REAL ESTATE OFFICE BUILDING AT PALM SPRINGS, CALIFORNIA

FOR DR. J. J. KOCHER

BY A. LAWRENCE KOCHER AND ALBERT FREY

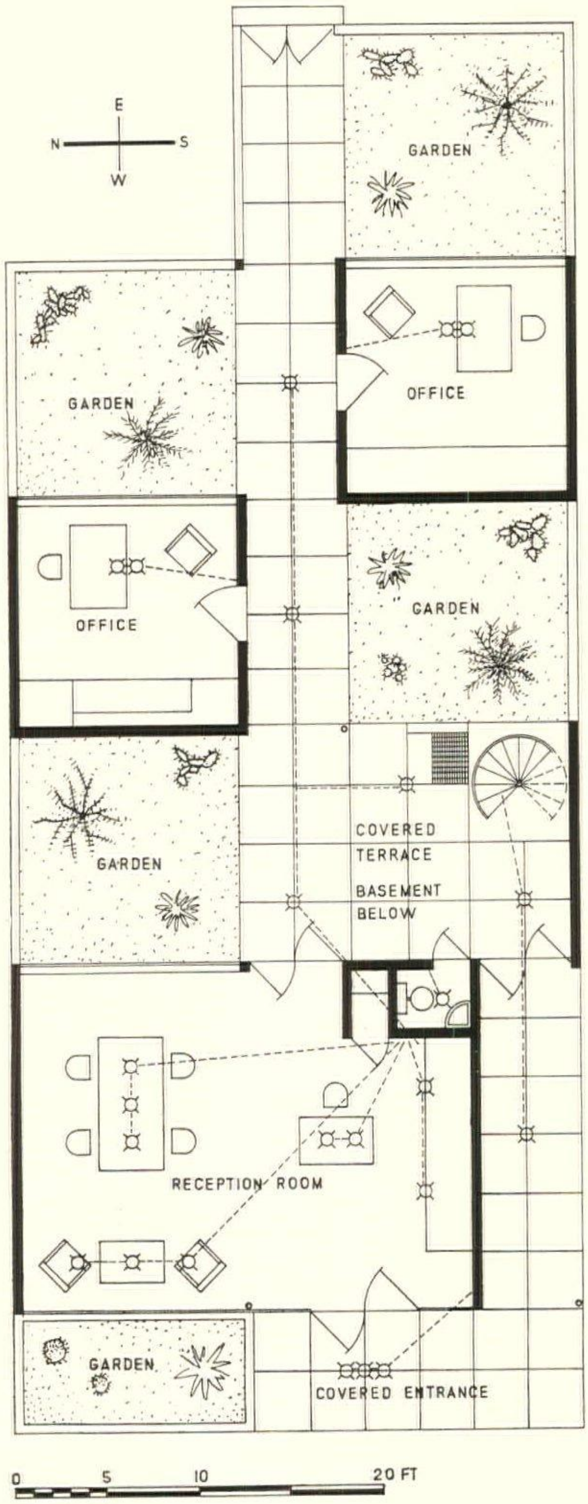
Photograph by Willard

REAL ESTATE OFFICE BUILDING from northeast (side view). Ground floor of building is used for real estate and insurance offices. Car shelter at left. There is an apartment on the second floor with roof terraces on shaded sides, east and north. Walls are warm white; window and door frames, Indian red; railings and columns, jade green.

Nature of Building: Real estate and insurance offices situated on a main Palm Springs boulevard, an extension of the highway from Los Angeles. The site is a typical business plot of narrow but deep dimensions. Because of this narrow lot shape, it was decided to have an arrangement of rooms that open internally. The two limiting sides of the property have blank inclosing walls where, later on, adjoining buildings may cut off view, light and air.

Varied Use: A second story was considered essential, as adding to the vertical size of building (advertising value) and to insulate and shade the rooms below. It was considered desirable to have all required offices on the ground floor. A small apartment with a side entrance was decided on for the second floor. There is an independent car shelter for the use of building occupants, located at the rear of plot. The real estate-insurance office consists of a spacious reception room and separate consultation rooms reached by a central covered corridor. These consultation rooms have completely glazed walls facing north, with a view of an adjoining garden.

Climate: At the beginning and end of the season, September, October and April, May, the temperature varies from warm to hot. 115 degrees Fahrenheit is not unusual at noon during summer months. From November on, until March, the days are warm (through sun radiation) and nights are cool. Complete absence of frost and little rain simplified the problem of footings and minimized precautions such as dampproofing, both a major concern of the builder in a cold climate. The building is designed and equipped with a heating system so as to provide comfortable warmth on cold days. There is likewise insulation and ventilation to insure coolness during hot weather. The latter is attained by excessive insulation and by creation of shaded areas which keep cool and assist air circulation.



GROUND FLOOR PLAN. Reception room is connected with private offices by means of a covered passage. All rooms have a glazed and ventilated wall in the direction of an adjoining garden patio. The side entrance leads to stairway and apartment above. Each garden plot has a sprinkler at pavement edge to produce a desired humidity and coolness, by evaporation.

Site: At entrance of town; on main street; near subdivisions and resi dential areas.

Soil: Dry sand of uniform density; desirable ground for foundations There is no quicksand nor danger of washing out; no piling necessary satisfactory for septic tank sewage disposal.

Winds: North and northwest prevailing; cool breezes almost daily During December and to February, sheltered areas are preferable be cause of the coolness of winds. In warm weather it is desirable to tak advantage of breezes by cross ventilation.

Kitchen location in apartment on second floor is at side where wind escape, so cooking odors do not enter other rooms.

At times wind develops into a sand storm which sweeps fine san through every crevice and into the house. Tight construction is essen tial and all sash weatherstripped with felt.

Sudden gusts of wind occasionally play havoc with large awning, ma ing more sturdy shade imperative.

Construction: Fireproof construction was regarded as an asset to th occupants' business of selling insurance. Footings are of reinforce concrete, 18" wide; 12" to 18" deep. There is a 4" integrally colore concrete slab at first floor.

Floor covering throughout the building interior is linoleum.

First story walls are of concrete blocks with vertical steel rods ever six feet, tied to footing and lintels. All wall corners are poured rei forced concrete. There is a continuous bonding beam or lintel at pla line of exact thickness of wall and 8 to 12 inches in height. This occu over all walls, door openings and windows and forms, together with a reinforcements and footings, a completely rigid frame. This speci concrete framing is intended as precaution against twisting and inju by earthquakes.

Second floor walls are of lightweight pressed steel frame welded sections at factory and electrically welded on site at erection. Facto sections were a maximum size for transportation by trucks.

The outside of frame is faced with expanded metal lath and (Gunit cement stucco. The interior is cement plastered on a metal lath th has an aluminum-faced building paper as backing (insulation).

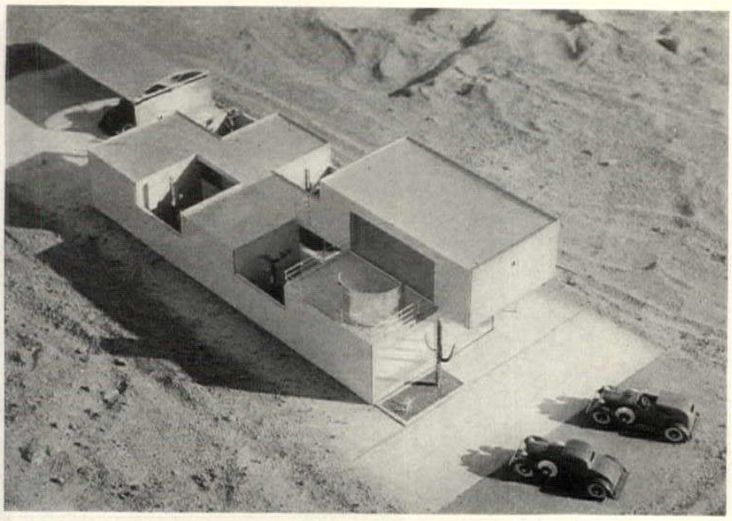
All floors and roofs are of Robertson Keystone beam units of 18-gau steel. These beams are exposed at ceilings. Floors are supported b bond-beams over walls and anchored or welded to I-beams, whic in turn are for bearing. In some cases steel pipe columns serve f supports.

Roofs have $1\frac{1}{2}$" insulation board, mopped to steel deck of Roberts units. A three-ply built-up roofing is applied over insulation board a finally, a graveled surface.

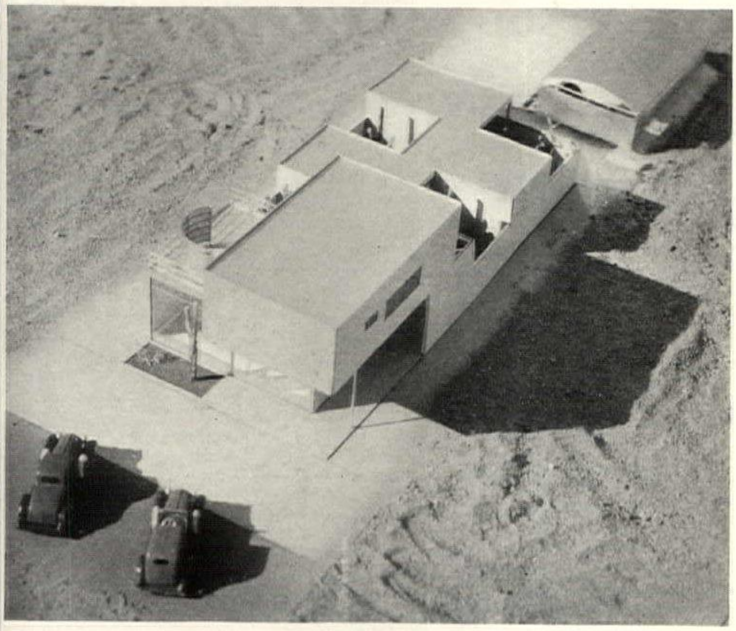
Heating: Warm air, single duct, for reception room and apartme Gas furnace in basement, below garden terrace. Individual, vente gas heaters circulating warm air, in private offices.

Lighting: Lumiline lamps (30 and 60 watts) recessed in ceiling bea Lamps are located over working areas to provide a minimum of fifte foot-candles intensity.

Plumbing: 30 gallon, electric, automatic hot-water tank; flat top G. refrigerator and range in combination.



1



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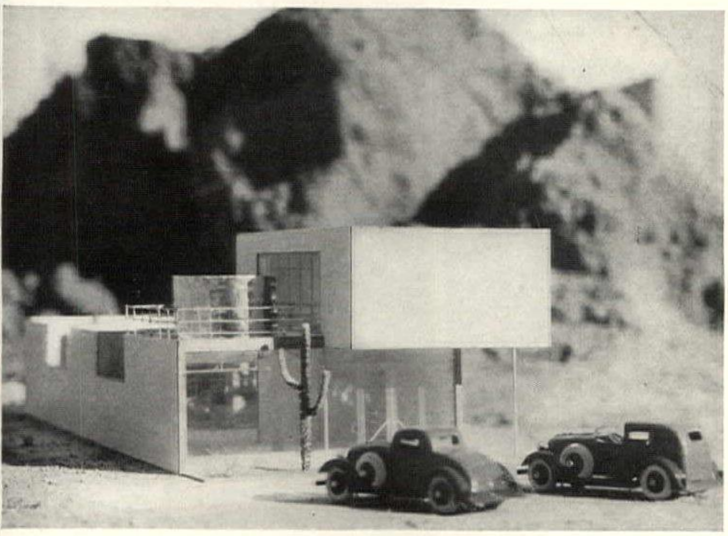

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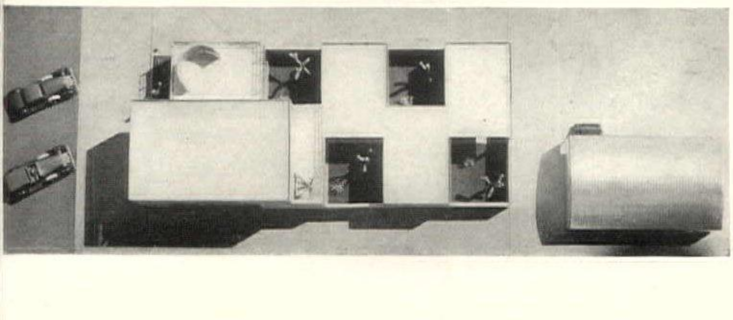
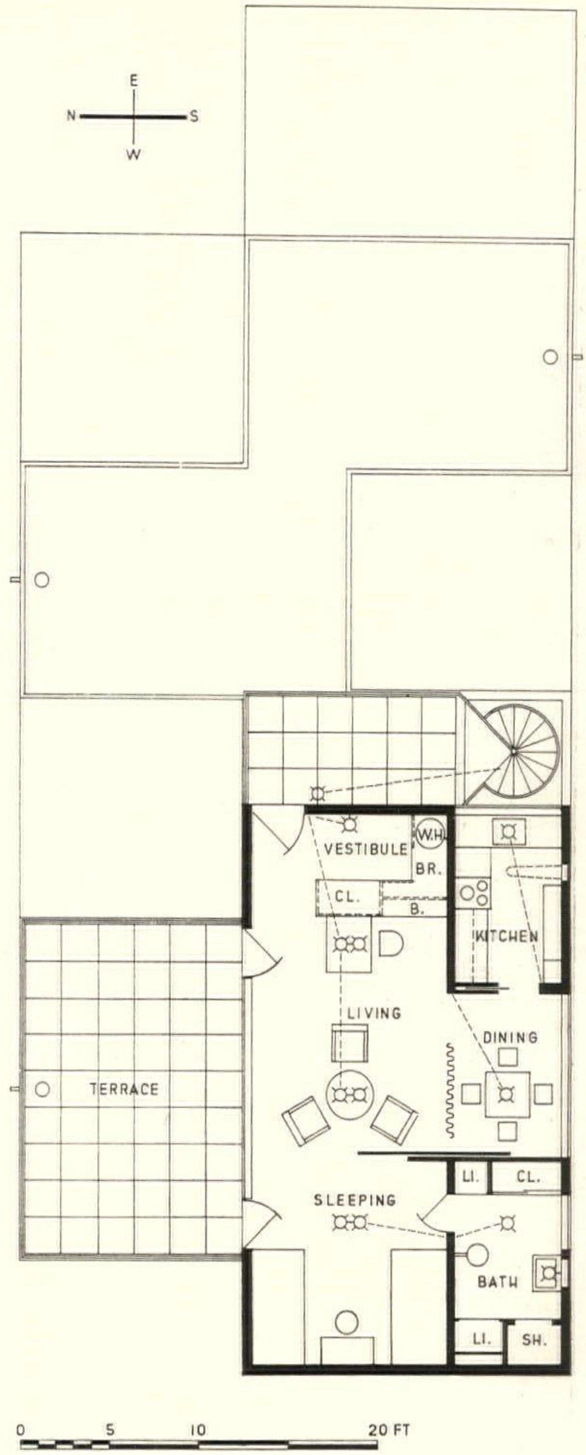
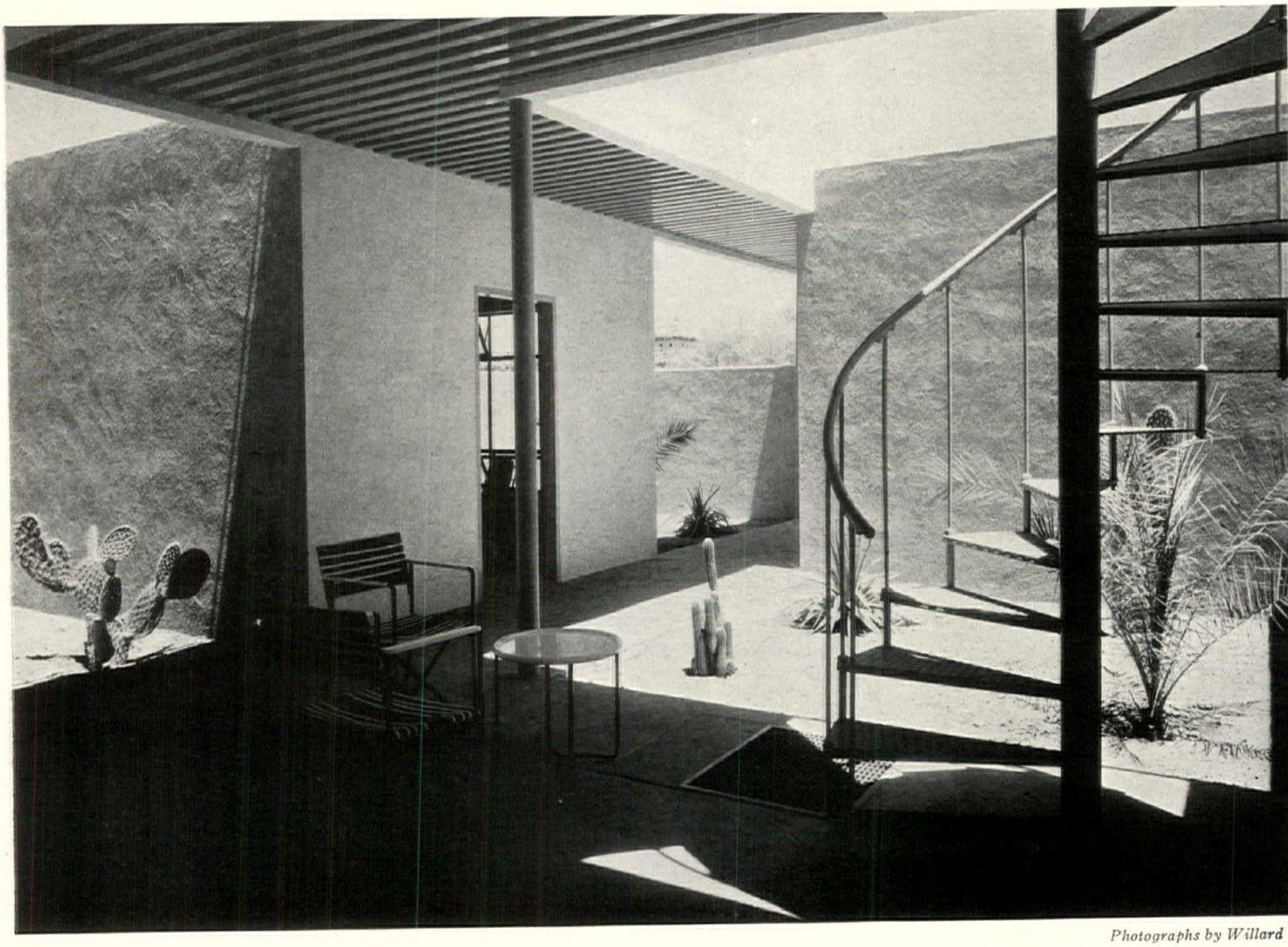


4



SECOND FLOOR PLAN (APARTMENT FLOOR). The large single-room apartment has provision for separating sleeping alcove by a sliding partition and for giving privacy to dining space by a floor to ceiling curtain of oiled silk.

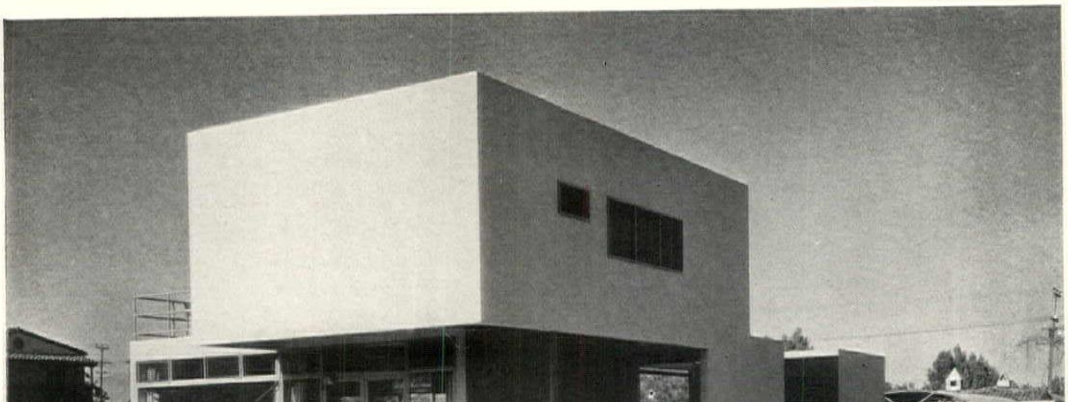
STUDY MODELS of Real Estate Office Building at left. (1) View from northwest showing alternate placing of offices and garden courts. All large window openings are to north or east. A semicircular solar screen is used to concentrate sunlight within screen inclosure. This is used during sunny days of winter. (2) View from southwest. (3) Street façade. (4) View from above showing disposition of plan and relation to car shelter.



Photographs by Willard

1

2



(1) COVERED TERRACE adjoining reception room is connected with private offices by a covered passage. The offices alternate with garden patios.

(2) VIEW OF BUILDING FROM SOUTHWEST. In the direction of strong sun, windows for apartment are eliminated or reduced to small size. There is a separate entrance to apartment at right. The site is a typical business plot of narrow but deep dimensions. All rooms face toward interior garden patios. Concrete walls finished with cream color; metal trim in Indian red.

STAIRWAY TO SECOND FLOOR APARTMENT
Open arrangement of building parts aids air circulation and obtains coolness. Over half of ground area is shaded. All rooms face toward interior garden patios.

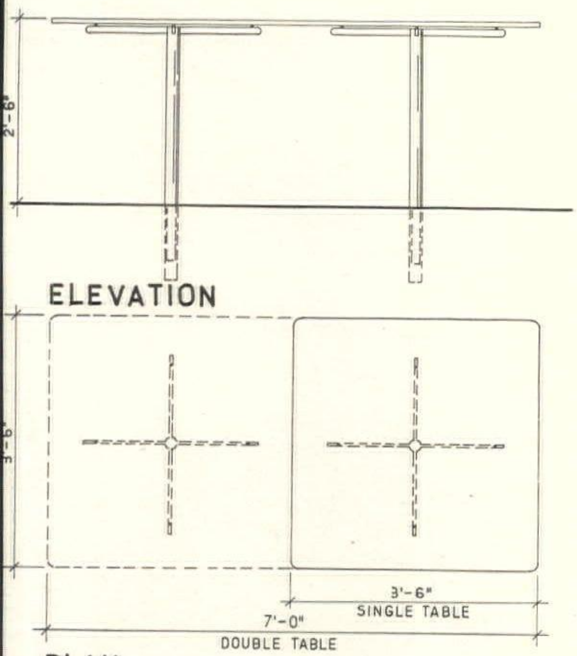
1

Photographs by Willard

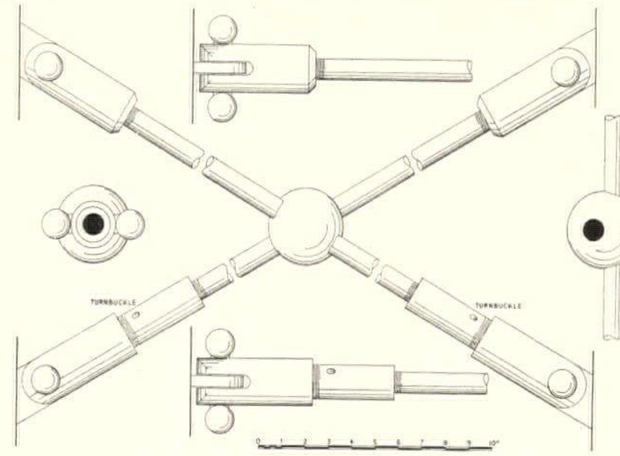
(1) RECEPTION ROOM. Exposed steel beam ceiling with tube lighting in recesses over working spaces (see plan). Reception room table, at right, is of plate glass with fixed supports. Ceiling of jade green; linoleum floor, sand color. Curtains are "Revolite," aluminum surfaced.

2

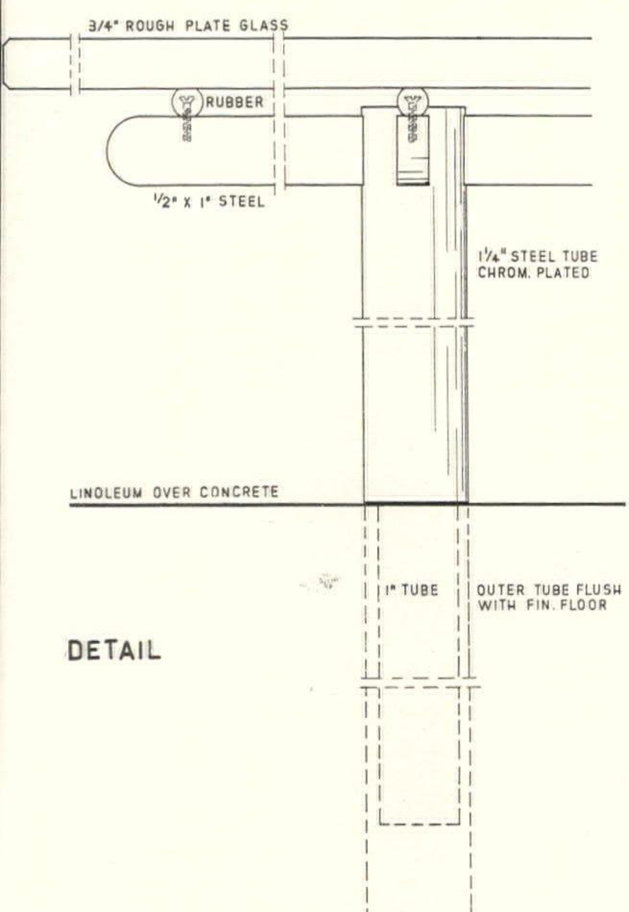
(2) INTERIOR OF APARTMENT. Sliding partition separates living and sleeping areas. Oiled silk curtain divides dining and living when desired. Partitions are faced with mahogany plywood. These operate by track in beam recess. Flooring, sand colored linoleum. Sash curtains, "Revolite."



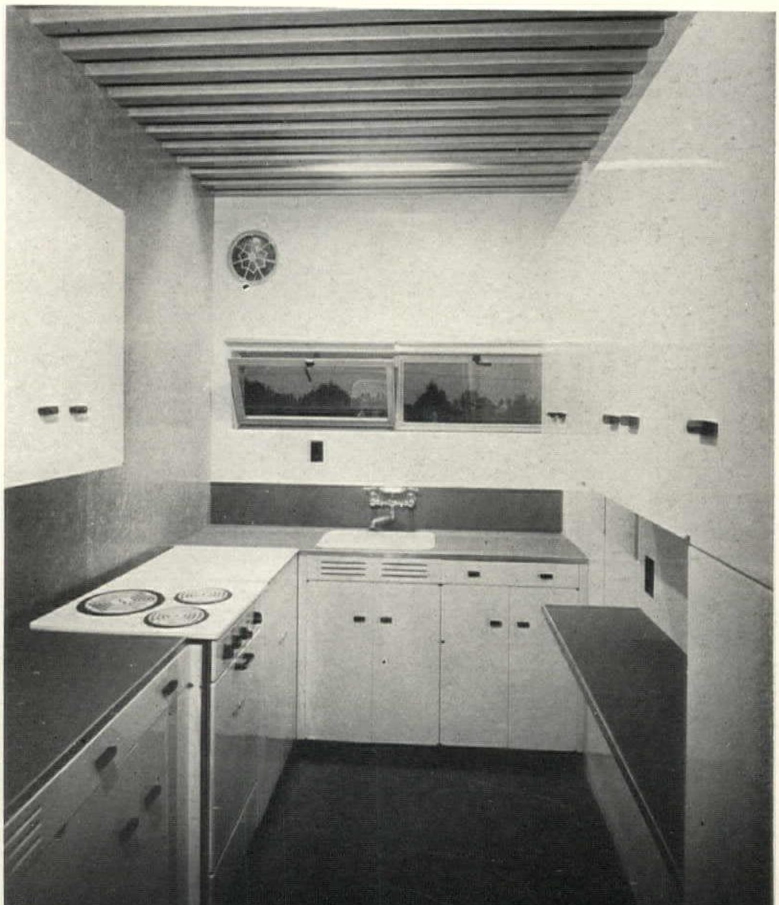
SINGLE AND DOUBLE TABLES for fixed location (see plans). Table top, plate glass. Detail below.

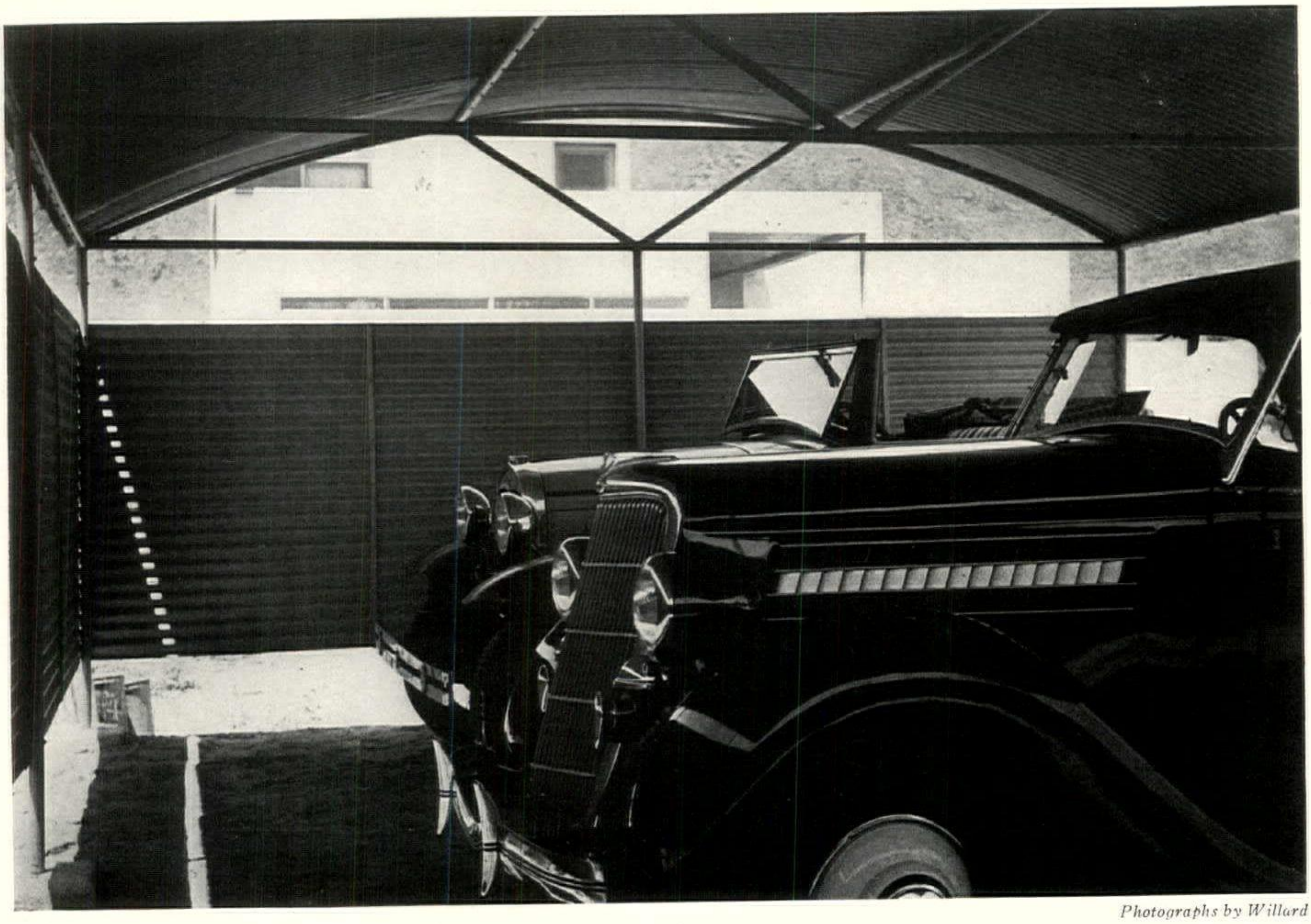


TIE RODS for first floor bracing at glass façade toward street; steel, chromium-plated.



KITCHEN. Built-in flush surface steel cabinets. There is a combined G. E. range and refrigerator to counter height; electric fan for air circulation. Colors: cabinets, white; counters, jade green; plastered walls, white enamel; flexboard partition, jade green; window frames, green; shades, aluminum.

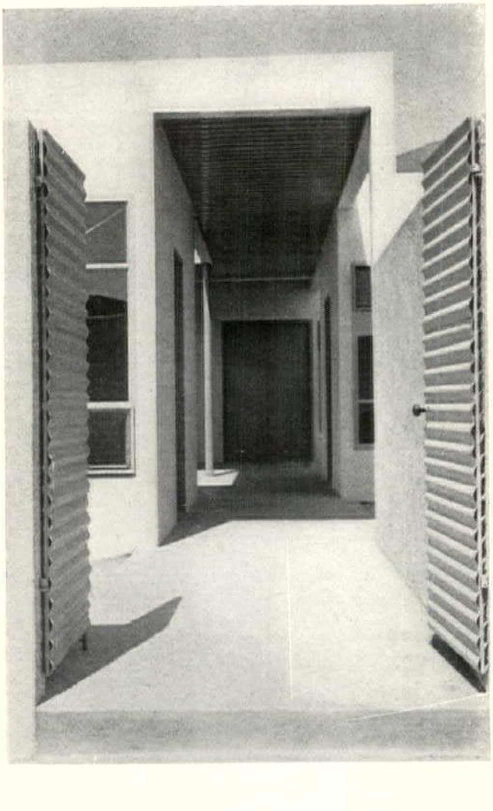




Photographs by Willard

1

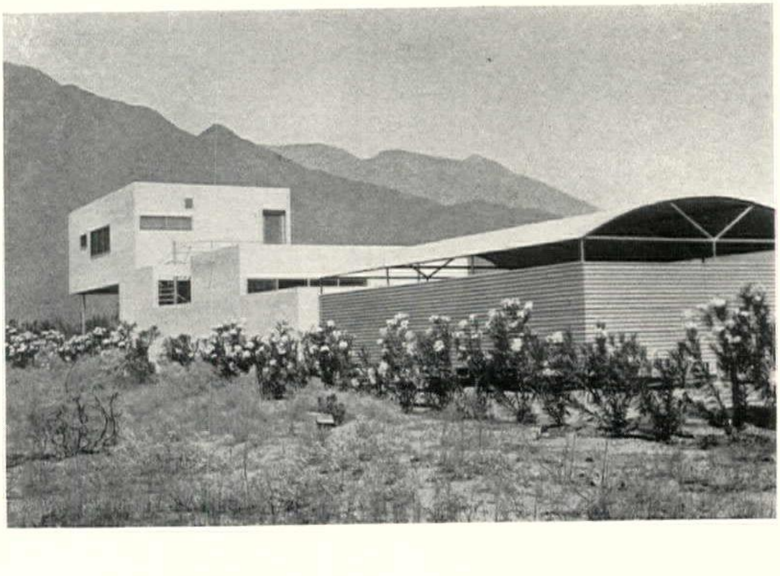
2



(1) CAR SHELTER, to accommodate 3 cars. Framework of $1\frac{1}{2}''$ section steel pipes, welded. Roof and side walls of 24-gauge corrugated steel. Interior, painted jade green; exterior, aluminum.

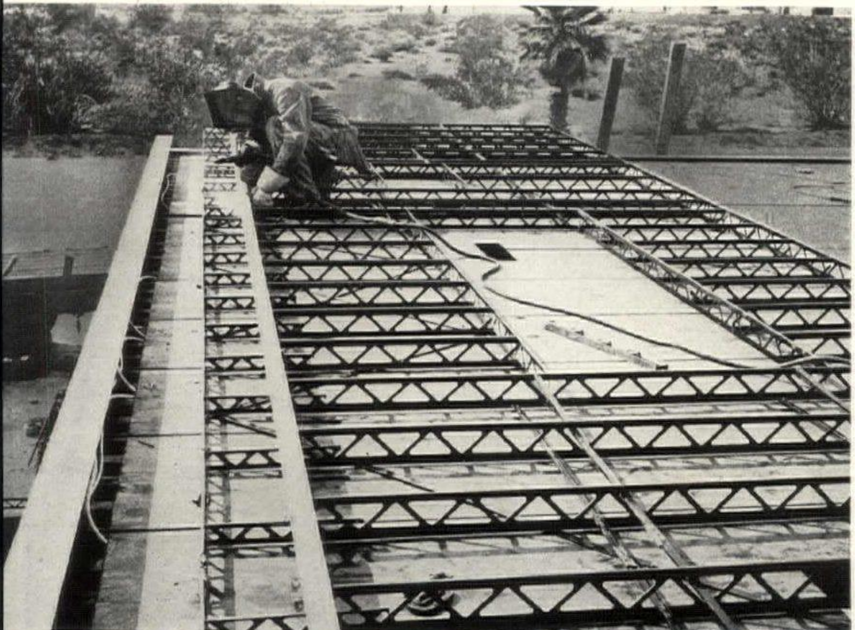
(2) ENTRANCE GATE from car shelter to covered passage. This passage leads to private offices and to reception room.

(3) VIEW FROM SOUTHEAST showing relation of garage to office building.

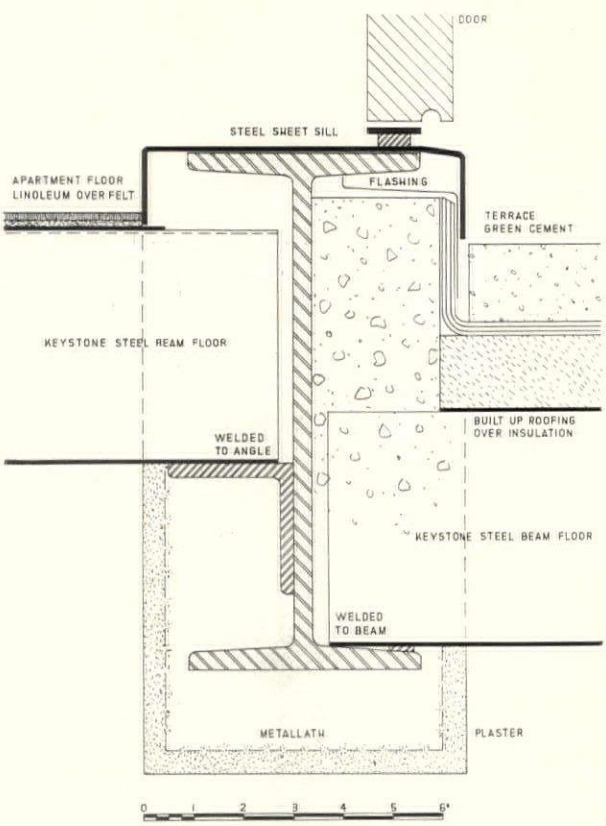


3

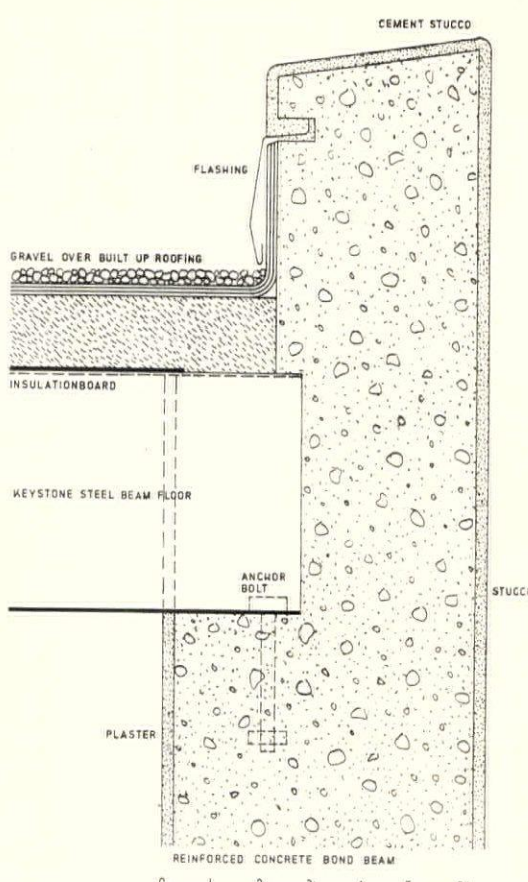
CONSTRUCTION DETAILS



SECOND FLOOR WALL FRAMING. Stamped steel wall units are welded together and to rolled steel beams. All walls have diagonal bracing.



DETAIL OF FLOOR SECTION, showing apartment floor and roof terrace construction. Floors and roof above ground floor have Robertson Keystone stamped steel beams. Sills and trim of sheet steel.



DETAIL OF COPING AT ROOF EDGE.

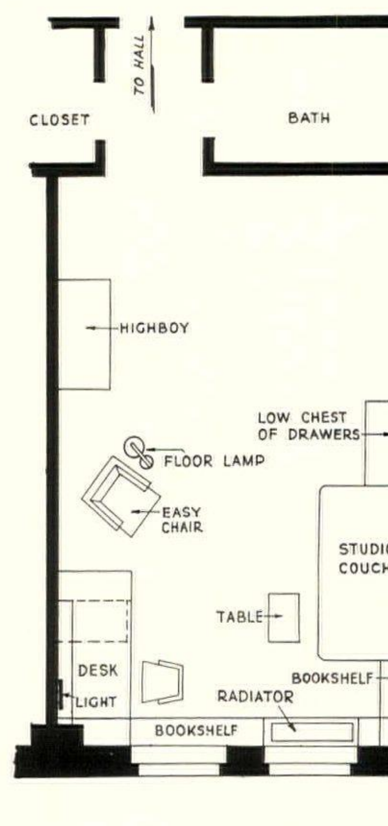
TYPICAL BEDROOM AFTER REMODELING. Walls are pearl gray with off-white trim. Hardware is white Catalin and chromium. Factory stock lamps. Carpet is deep mulberry color.

BEDROOM BEFORE REMODELING.

MODERNIZED ROOMS IN A CHICAGO HOTEL

A demand for smaller quarters in residential hotels has resulted in combining living and sleeping facilities in one room. The furnishings of these single rooms, planned originally as bedrooms, were not appropriate for this new demand, but were too valuable and well constructed to be replaced entirely by new pieces. In **Room Type 1,** the highboy, chest of drawers, easy-chair and desk chair were remodeled. The studio couch utilizes existing box spring and mattress; cover and slip covers for pillows to match are especially tailored. Bookshelves and radiator cover are new. Desk is new, specially designed, with top of black Formica. In **Room Type 2,** the furnishings are treated similarly, but lacquered a deep red; the hardware is white Catalin.

ROOM TYPE NO. 1



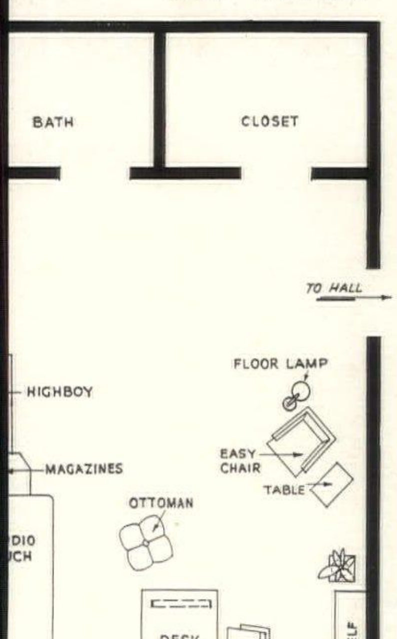
Photographs by Hedrich-Blessing Studio

HIGHBOY BEFORE REMODELING in Room Type No. 2.

ROOM TYPE NO. 2. Living-bedroom combination.

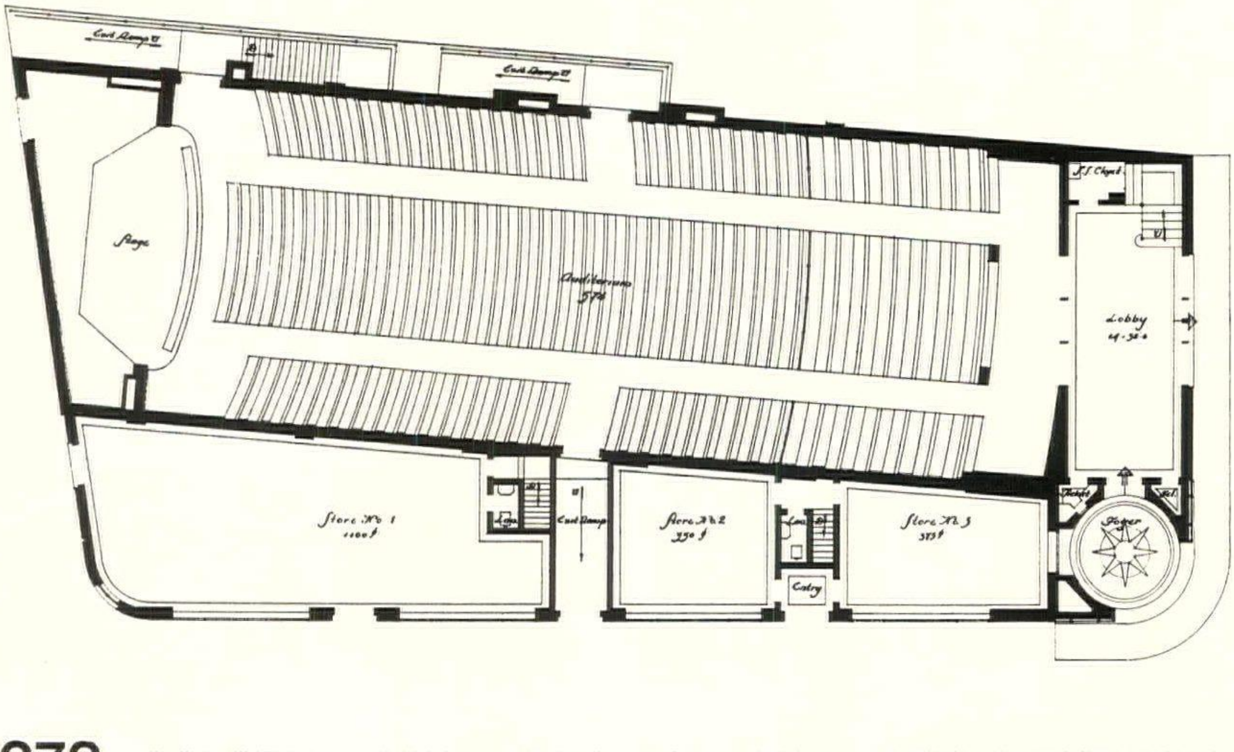
J. R. DAVIDSON, DESIGNER

ROOM TYPE NO. 2



Photographs by Richard Garrison

STORM KING THEATER AND SHOP



;ORNWALL - ON - HUDSON, N. Y. — ERARD A. MATTHIESSEN, ARCHITECT

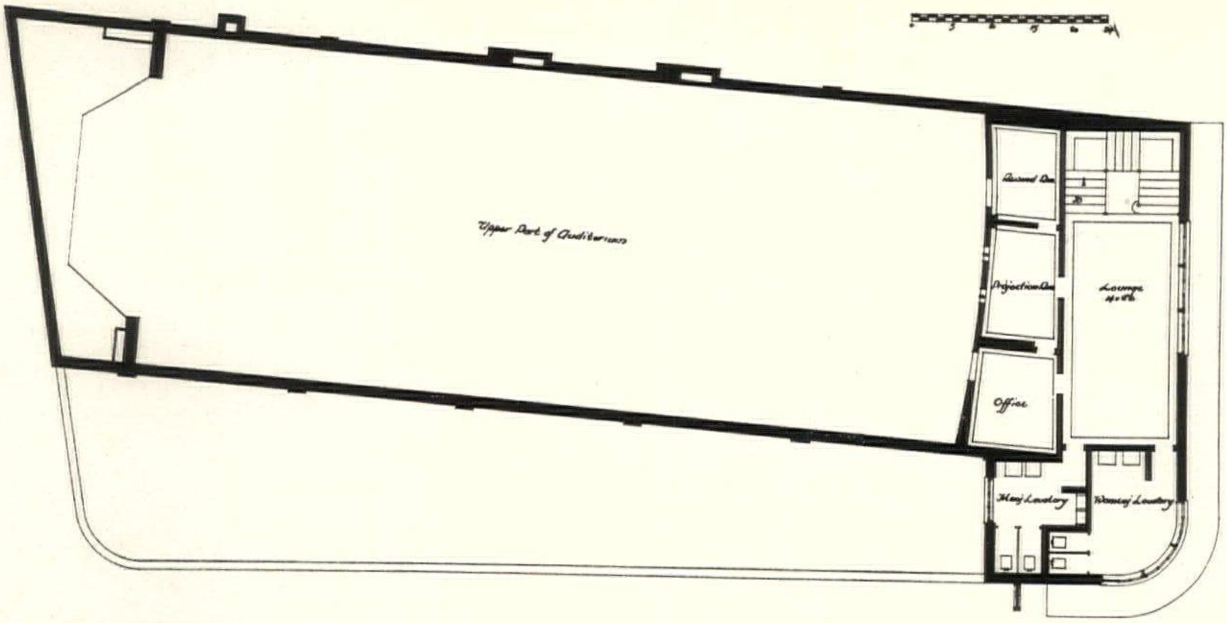
iis building was designed as a theater for motion pictures only, with several small stores on the ground floor. It is located ı an irregular plot of ground, one corner of which borders on the main square of the town. The problem was to place e theater entrance on this prominent corner, allowing easy access to the auditorium without using up the valuable store ›ace on the long front of the plot. A solution was reached by placing a circular entrance foyer at the corner and opening irectly upon the square. A single pair of entrance doors leads to the lobby, while the exit doors open upon the less impor- ınt side of the street. This left the entire long side free for the stores, and put the auditorium at the rear of the plot.

ıe entire building is brick and steel construction. The outside is finished in white stucco with only a slight amount of texture. he cornice is cast stone of a slightly darker shade than the stucco, with the base of glossy black terra cotta. All exterior im is satin-finished aluminum; the exterior doors, transoms and panels are black Formica. The metal sash are red. The face f the marquee is finished with red Formica, and the soffit is divided into panels of black Formica with an illuminated row f ground glass panels in the center. The metal trim is aluminum.

Photographs by Richard Garrison

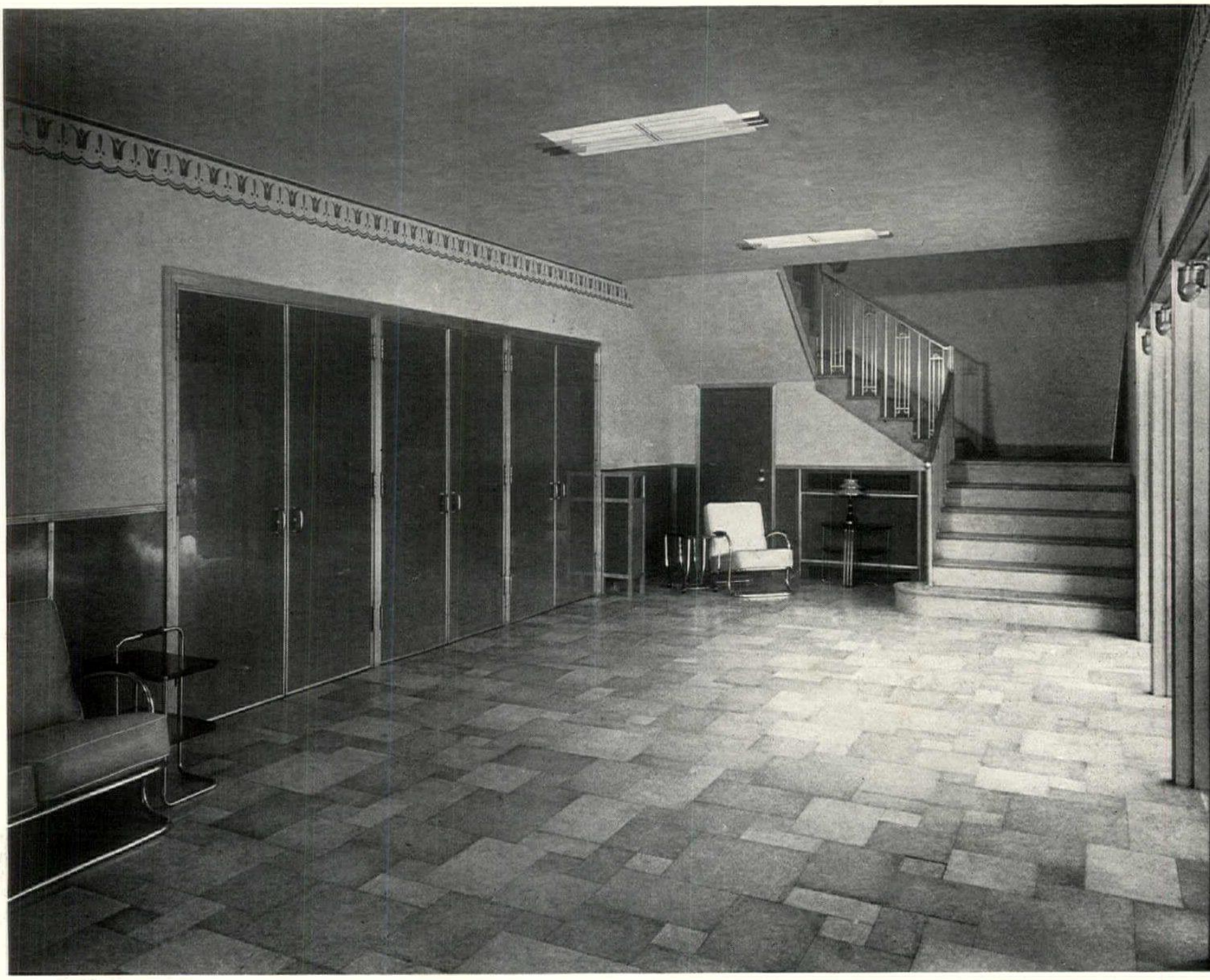
STORM KING THEATER AND SHOPS AT CORNWALL-ON-HUDSON, N. Y.

Black porcelain enamel is used as the field for the theater sign; the letters and frame are aluminum, illuminated with red Neon tubes.



RARD A. MATTHIESSEN, ARCHITECT

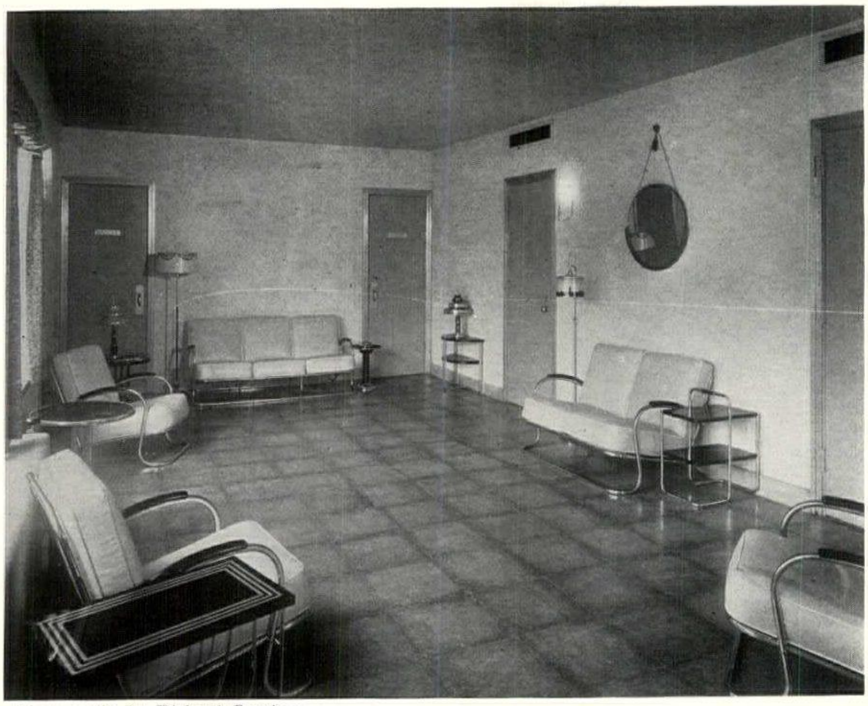
eating capacity for 574 persons is provided in the auditorium. The walls are finished with buff-colored acoustical plaster pove a wainscot of tangerine-colored Zenitherm. The cornice band is designed in tangerine, blue and silver. A deep blue elour has been used on the seats and on the main curtain and side drapes. The screen curtain is tangerine in color. All in- rior doors and trim are satin-finished aluminum.



1

STORM KING THEATRE and SHOPS at CORNWALL-ON-HUDSON, N. Y.

2



Photographs by Richard Garrison

ERARD A. MATTHIESSEN ARCHITECT

(1) In the main lobby a pattern floor of gold Zenitherm has been used, with a wainscot of blue green Formica, trimmed with aluminum, and sand finished plaster walls. (2) The second floor lounge is finished in a combination of greens and silver, the dominant color in the furniture being a deep yellow.

NEXT MONTH . . . In December there will be a special issue covering in detail the restoration of Colonial Williamsburg. The work of restoring the old Virginia buildings to their original condition was done by Perry, Shaw and Hepburn, architects, with funds supplied by the Rockefeller Holding Corporation. The historical significance of this project is analyzed in an article by Fiske Kimball, the architectural development of the general restoration by William G. Perry, the town planning and landscaping aspects by Arthur A. Shurcliff, and the color decorations and interior furnishings by Mrs. Susan Higginson Nash. The Portfolio of Williamsburg Buildings is made up of a large number of photographs by F. S. Lincoln.

INSULATION . . . In the Portfolio illustrations of the house designed and owned by Robert M. Brown in Chestnut Hill, Philadelphia, which appeared in the April 1935 issue (pages 272-278) of The Record, the thermal conductance of the wall construction was given as .07 B.t.u. This value is criticized by A. S. Bull, manager of sales engineering and development, The Insulite Company, who writes:

"According to the methods of computation recommended by the American Society of Heating and Ventilating Engineers in their official guide for 1935, we calculate the thermal efficiency of the wall to be .166 B.t.u. per square foot per hour per degree Fahrenheit. This is the over-all thermal transmission coefficient and is to be contrasted with the value of .07 B.t.u.'s as shown in the sketch appearing on page 278 of The Record.

"Our calculations are based on the following total of resistance values offered by the different parts of the structure:

Exterior surface	.17
3/4" Redwood siding	.94
3/4" Sheathing	.94
Double foil faced air space	2.44
3/4" Redwood interior lining	.94
Inside surface felt	.61
Total	6.04

"The reciprocal of 6.04 is 0.166, representing over-all thermal transmission in B.t.u.'s per square foot per hour per degree Fahrenheit temperature difference."

Photograph by F. S. Lincoln

THE CARL MACKLEY HOUSES—A PWA PROJECT IN PHILADELPHIA

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NOVEMBER

THE

ARCHITECTURAL RECORD

THE FEDERAL HOUSING ADMINISTRATION ARCHITECT

By FREDERICK M. BABCOCK, Chief, Underwriting Section, Federal Housing Administration

One hundred and seventy-two Staff Architects and eight hundred and seventy-one Fee Architects are now employed by the Federal Housing Administration. Why? What do they do? The answers to these questions constitute one of the most significant stories to be found in the current world of architecture. The architectural fraternity is examining a new field of activity.

Title II of the National Housing Act established a system of Mutual Mortgage Insurance applicable to residential properties containing not more than four livable family units. Lenders of mortgage funds are insured against losses which may result from investments in this type of mortgage. The Federal Housing Administration does not operate on public funds but on premiums it collects. It safeguards the interests of private investors and the risks which it underwrites must be carefully selected. Furthermore, the Act requires that "Mortgages accepted for insurance........ shall be so classified into groups that the mortgages in any group shall involve substantially similar risk characteristics."

Classification of dwelling mortgages in accordance with risk characteristics has been accomplished by means of a risk rating procedure. This system is based on the idea that mortgage risk is an entity and capable of being measured. When a mortgage is submitted for consideration there is a substantial list of risk elements which require analysis. The Federal Housing Administration has found that these risk elements can be properly analyzed when they are grouped under several general categories of risk. There are five such categories as follows:

1. *THE PROPERTY*: Which refers to all those elements of risk introduced by the plot plan, the architectural design and attractiveness, the soundness of construction, and the livability and functional aspects of the plan and the general ensemble.
2. *THE NEIGHBORHOOD*: Which refers to those elements of risk introduced by the community as such.
3. *THE RELATION OF PROPERTY TO NEIGHBORHHOD*: Which refers to those elements of risk introduced by the lack of balance and correct relationship between the property and the market in which it is expected to sell or rent.
4. *THE BORROWER*: Which refers to the financial prospects, credit standing, and integrity of the mortgagor, considered in terms of his relationship to the mortgage transaction and his program of home acquisition.
5. *THE MORTGAGE PATTERNS*: Which sums up the relationship between the quality of the

·PROPERTY·

RATING OF PROPERTY:
(Assuming repairs, or alterations, or additions described in exhibits accompanying Mortgagors' Description of Real Estate or listed under "(l)" on the reverse side hereof, have been completed)

	FEATURE	REJECT	1	2	3	4	5	RATING
Fitness	GENERAL LAYOUT	0	3.0	6.0	9.0	12.0 X	15.0	12
	DESIGN OF PROPERTY	0	1.6	3.2	4.8 X	6.4	8.0	4.8
	SUITABILITY TO CLIMATE	0	1.4	2.8	4.2 X	5.6	7.0	4.2
Function	LIVABILITY	0	3.0	6.0	9.0	12.0 X	15.0	12.
	LIGHT AND AIR	0	1.6	3.2	4.8 X	6.4	8.0	4.8
	MECHANICAL EQUIPMENT	0	1.4	2.8	4.2	5.6	7.0 X	7.
	ACCESSORY BUILDINGS	0	.6	1.2	1.8	2.4 X	3.0	2.4
	SPECIAL EQUIPMENT	0	.4	.8	1.2 X	1.6	2.0	1.2
Durability	STRUCTURAL SOUNDNESS	0	4.0	8.0	12.0	16.0	20.0 X	20.
	RESISTANCE TO ELEMENTS	0	2.0	4.0	6.0 X	8.0	10.0	6.
	RESISTANCE TO USE	0	1.0	2.0	3.0 X	4.0	5.0	3.
							TOTAL RATING	77.4 %

ESTIMATE OF COST REQUIRED TO REPLACE BUILDING IMPROVEMENTS IN NEW CONDITION:
(Assuming contemplated alterations or additions described in exhibits accompanying Mortgagors' Description of Real Estate and those required under "(l)" on reverse side hereof have been incorporated)

TOTAL .... $..................

Distribution of estimate:
Main building.............. $.................. { .... cu. ft. @ .... cents per cu. ft.
.... sq. ft. @ .... cents per sq. ft.
(Total floor area)

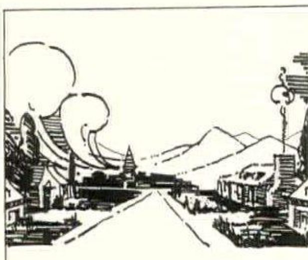
Garage.................. $..................
Other improvements, out-buildings, landscaping, etc. $

RISK CATEGORIES which are investigated by the Federal Housing Administration architects to determine the rating of property on which loan applications are made. The rating is expressed on a percentage basis, as indicated by sample entries on the charts. In cases where the rating comes out less than 50%, the loan application is rejected.

·NEIGHBORHOOD·

RATING OF NEIGHBORHOOD:

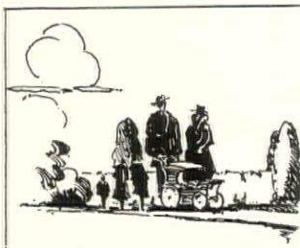
FEATURE	REJECT	1	2	3	4	5	RATING
STABILITY OF THE NEIGHBORHOOD	0	5	10	15	20 X	25	20
PROTECTION FROM ADVERSE INFLUENCES	0	4	8	12	16 X	20	16
ADEQUACY OF TRANSPORTATION	0	3	6	9 X	12	15	9
APPEAL OF THE NEIGHBORHOOD	0	2	4	6	8 X	10	8
SUFFICIENCY OF UTILITIES AND CONVENIENCES	0	2	4	6	8 X	10	8
LEVEL OF TAXES AND SPECIAL ASSESSMENTS	0	2	4	6 X	8	10	6
PRESENCE OF CIVIC, SOCIAL, AND COMMERCIAL CENTERS	0	1	2	3	4	5 X	5
TOPOGRAPHY AND SPECIAL HAZARDS OF NEIGHBORHOOD	0	1	2	3	4 X	5	4
						TOTAL RATING	76 %



·RELATION·OF·PROPERTY· ·TO· NEIGHBORHOOD·

RATING OF RELATION OF PROPERTY TO NEIGHBORHOOD:

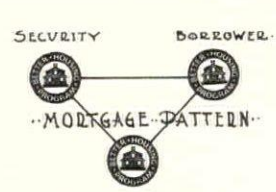
FEATURE	REJECT	1	2	3	4	5	RATING
CONFORMITY AS TO TYPE	0	3	6	9	12 X	15	12
CONFORMITY AS TO USEFULNESS AND FUNCTION	0	3	6	9 X	12	15	9
CONFORMITY AS TO PHYSICAL CONDITION	0	2	4	6	8	10 X	10
CONFORMITY AS TO ARCHITECTURE	0	2	4	6	8 X	10	8
RELATIVE ADEQUACY OF UTILITIES AND MUNICIPAL IMPROVEMENTS	0	2	4 X	6	8	10	4
RELATIVE ACCESSIBILITY TO NEIGHBORHOOD CONVENIENCES	0	2	4	6 X	8	10	6
RELATIVE FREEDOM FROM NUISANCES	0	2	4	6	8	10 X	10
CONFORMITY AS TO LOT CHARACTERISTICS	0	2	4	6	8 X	10	8
CONFORMITY AS TO PROBABLE REMAINING USEFUL LIFE	0	1	2	3	4	5 X	5
CONFORMITY AS TO PLACING OF BUILDINGS ON LOT	0	1	2	3	4	5 X	5
						TOTAL RATING	77 %



·BORROWER·

RATING OF BORROWER:

FEATURE	REJECT	1	2	3	4	5	RATING
CHARACTER	0	4.0	8.0	12.0 X	16.0	20.0	12
ATTITUDE TOWARD OBLIGATIONS	0	4.0	8.0	12.0 X	16.0	20.0	12
ABILITY TO PAY	0	4.0	8.0 X	12.0	16.0	20.0	8
PROSPECTS FOR FUTURE	0	2.4	4.8	7.2	9.6 X	12.0	9.6
BUSINESS HISTORY	0	2.0	4.0	6.0	8.0 X	10.0	8
RATIO VALUE OF PROPERTY TO ANNUAL INCOME	0	1.4	2.8 X	4.2	5.6	7.0	2.8
RATIO MONTHLY MTGE. OBLIGATION TO INCOME	0	1.2	2.4 X	3.6	4.8	6.0	2.4
ASSOCIATES	0	1.0	2.0	3.0	4.0 X	5.0	4.
						TOTAL RATING	58.8 %



RATING OF MORTGAGE PATTERN:

FEATURE	REJECT	1	2	3	4	5	RATING
RATIO OF LOAN TO VALUE (%)	0	30	35 X	40	45	50	35
RATIO OF USEFUL BLDG. LIFE TO LIFE OF MTGE. (%)	0	4	8	12 X	16	20	12
INTEREST RATE (%)	0	3	6	9 X	12	15	9
AMORTIZATION PROVISIONS	0	2	4	6 X	8	10	6
SERVICE CHARGES BY MORTGAGEE (%)	0	1	2	3	4 X	5	4
						TOTAL RATING	66 %

security, the value of the security, the prospects of the borrower, and the specific terms and provisions in the mortgage transaction.

The first category, "The Property," is given over to the Federal Housing Administration architect as his field of exclusive jurisdiction. It is his duty, by virtue of his particular training, to establish and justify the so-called "Rating of Property."

The rating of property is expressed on a percentage basis. In cases where a property rating comes out at less than 50%, the loan application is rejected and the property is declared ineligible for Mutual Mortgage Insurance. In arriving at the final percentage rating, the architect makes ratings of the eleven features shown on the property rating grid. (This grid is illustrated on page 286.) The eleven features entering into this category are the following:

Rated from the point of view of *fitness*:

1. General layout.
2. Design of property.
3. Suitability to climate.

Rated from the point of view of *function:*

4. Livability.
5. Light and air.
6. Mechanical equipment.
7. Accessory buildings.
8. Special equipment.

Rated from the point of view of *durability*:

9. Structural soundness.
10. Resistance to elements.
11. Resistance to use.

If, in considering one of these features, the architect finds a condition which is definitely substandard, he makes a mark in the column headed "Reject" and this is sufficient to reject the loan application regardless of any other elements in the situation. If, on the other hand, none of the features justifies a reject rating, he makes ratings by placing "X" marks, one for each feature, in the columns to the right of the "Reject" column. For instance, a mark in the column headed "3" indicates that he has found a typical, average, and satisfactory condition. A like indication in the "1" column indicates a fairly poor but acceptable condition. Likewise, a mark in the "5" column indicates an unusually good condition and a lack of risk indicating pronounced superior quality.

After he has placed eleven "X" marks on the grid, he takes the figures in the squares and carries them over and enters them in the column provided for the totals on the right side of the grid. These are the relative weights ascribed to the various risk features. The sum of the weights represents the rating of the property on a percentage basis.

The instructions given the architect in the Underwriting Manual set out the considerations to take into account when making these ratings. For illustration, in rating the first feature, "General Layout," he is told that this feature relates to the plan of improvement of the site, or the manner in which the improvements, including buildings, walks, plantings, and terracing, have been laid out or arranged on the lot. He is instructed to consider the accessibility of garage buildings and other accessory structures, and whether or not the property is cut up into small unusable patches. He also studies the placing and orientation of the buildings, and the degree to which there is a generally harmonious and correct functional relationship between the parts of the property.

In rating "Design of Property" he is instructed that, if the exterior of the house is a simple, direct expression of the plan and of the materials used, its design should rate high. Low rating should be given in the case of houses that are "shirt-front" designs, in which the appearance of the building has suffered from a failure to produce attractiveness. The use of false effects of roofing, false half-timber work, or tricky handling of materials may adversely affect rating as to design.

The Underwriting Manual instructs the architect how to rate "Mechanical Equipment." The presence of the following elements tends towards higher rating: proper design for distribution of heat, ease of operation by householder, avoidance of damage to structure in installation, good workmanship in installation, and apparatus made by well-established manufacturers who can furnish replacement parts.

Under "Structural Soundness" the Manual may be paraphrased as follows: The rating should be influenced by the probability of maintenance cost being high or low. For instance, a tile roof will have a longer life and will involve a lower maintenance cost than a shingle roof. Although brick or stone walls require occasional pointing, the upkeep is likely to be less than for shingles or siding. Fireproof floor construction is likely to require less interior repair than wood-floor construction.

The Manual proceeds along similar lines to outline the bases for rating in the remainder of the features set out above.

The architectural characteristics of properties are unquestionably major factors of mortgage risk and the services of qualified architects are required to assist in determining these risks. Nearly all the capacities of the architect are used when he works in this specific field: his knowledge of functional design, his familiarity with materials, his appreciation of the artistic, his engineering skill, and his sense of selection in determining appropriateness. In rendering such services, however, the architect has had to readjust his point of view to some extent and substitute the investment or financial attitude of mind for the habit of creative thinking. In determining mortgage risk he is not expected to discover means by which to correct or improve design, but he must adapt his qualifications to the purpose of weighing the relative qualities of proposed investments in the form in which he finds them. In the architectural field this means that habits of mind must be changed. Architects have to remember to grade what they find according to quality, not to follow the temptation to change what they find.

In the foregoing we have discussed at some length the duties of the Federal Housing Administration architect in the risk-rating procedure. The architect has other duties which include the making of cost estimates which materially assist the valuators in their appraisals, the making of inspections of new houses during the progress of construction, and the enforcement of compliance with Property Standards and Subdivision Standards established by the Administration.

The Administration has established an "In-Place

Unit-Price Method" of cost estimation with which the architect estimates the replacement cost of a subject property submitted for Mutual Mortgage Insurance. On certain types of properties the cubic foot method of cost estimation is used. The Underwriting Manual describes these methods. The estimate of replacement cost is used for the purpose of guiding the valuators in establishing the values of properties and is the approximate upper limit of the possible valuation of a property. It also serves as a check in assisting the potential borrower to ascertain that he is paying a proper price.

In the case of new building operations, the architect's responsibility continues and he is required to make not less than three construction inspections during the progress of construction. The Federal Housing Administration does not aim to set up a substantial supervision by the architect. These inspections are more or less in the form of that made by the average city's building department, and for the purpose of ascertaining conditions set out in the commitment for Mutual Mortgage Insurance as described in the plans and specifications.

The Administration has established a set of minimum property standards and the architects are required to enforce compliance with them. These standards are considered as minimum requirements or the point below which properties presented for insurance are ineligible. Property standards cover minimum room sizes, light and air in relation to rooms and in relation to adjoining properties, minimum acceptable mechanical equipment qualities, and general construction.

The Administration is seeking, and through the architects hopes to establish in the minds of prospective builders and buyers, a better class of construction. The better grades of construction receive higher ratings and the Administration hopes to raise the standard of living conditions and to promote better construction through the instrumentality of the risk-rating procedure.

The employment of architects by the Federal Housing Administration has a somewhat deeper significance than might be implied by the specific duties which they perform. There is little chance that the average layman can ascertain what he is buying in the way of a house. We may assume that for the typical purchaser the buying of a dwelling property represents the most important single investment he will ever be called upon to make. It is reasonable to expect that no layman without special training can purchase a home with a sense of security unless he has consulted a competent, ethical architect or other individual with a specialized background. The buyer needs an unbiased opinion.

One of the reasons why architects are employed by the Federal Housing Administration is that the typical buyer who finances his program of home acquisition with a mortgage insured by the Federal Housing Administration can feel confident that his home has been examined by competent men. To be eligible for Mutual Mortgage Insurance a mortgage must be secured by a property having good characteristics. Therefore the purchaser of a dwelling property securing an insured mortgage can feel relatively certain that he is making a good investment.

The Federal Housing Administration architect and the architectural profession as a whole are intrusted with the charge of acquainting and embedding in the minds of potential buyers and lending institutions the idea that quality of construction and attractiveness and appropriateness of design are economically sound and materially assist in the creation of good investments. The Federal Housing Administration has recognized this in its risk-rating procedure and has had the good judgment to employ qualified architects to assist in determining the ratings ascribed to mortgages.

Probably no other Governmental Agency has seen fit to place upon the architectural profession the degree of responsibility that has been allotted to it by the Federal Housing Administration. The "Rating of Property" grid provides an opportunity for the profession to demonstrate the value of its services in the general field of mortgage finance. The Federal Housing Administration architect has been rating property for the past ten months and the Administration has come to recognize fully not only the importance but the absolute necessity of using the qualified architect in connection with its work. The ground gained by the architect during the last year will never be lost. The architect has found a new field of activity and a new set of functions. He finds that his particular type of technical skill serves in a financial field as well as in an engineering and artistic field.

The Federal Housing Administration wishes the architectural profession to be familiar with its requirements and procedures. Information may be secured from any one of the sixty-three Insuring Offices or from the Federal Housing Administration, Washington, D. C.

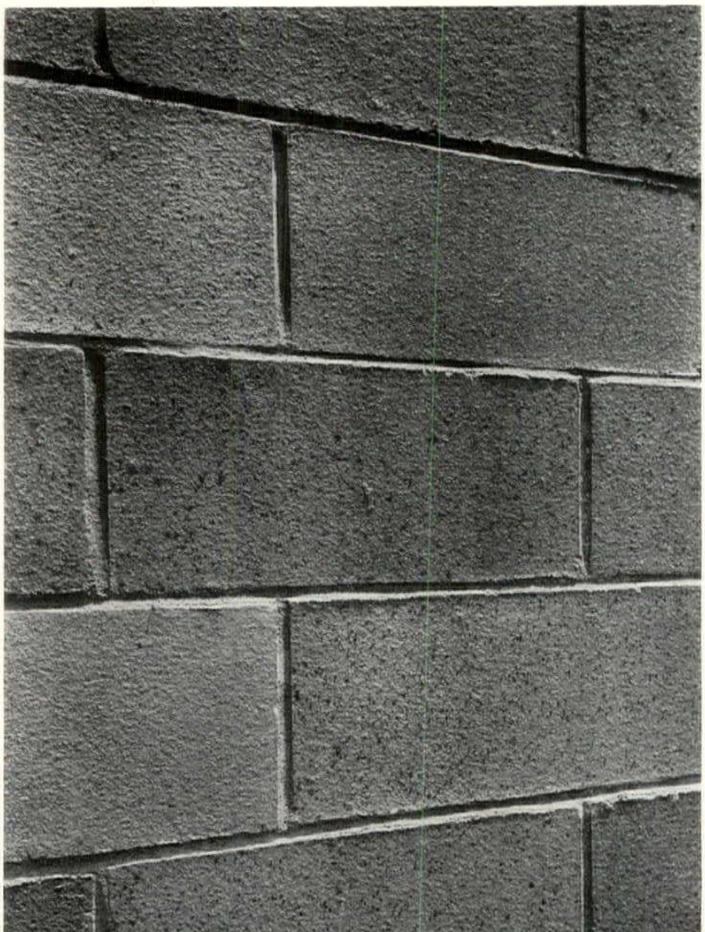
Photograph by F. S. Lincoln

THE CARL MACKLEY HOUSES IN PHILADELPHIA

EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

The Carl Mackley Houses are owned by the Juniata Park Housing Corporation, the majority of whose officials are officers of the American Federation of Hosiery Workers. The development is known as a community for hosiery workers in Philadelphia. It was financed as a limited-dividend, self-liquidating project by means of a PWA loan of $1,039,000 and at an estimated total cost of $1,153,607. The largest portion of the equity was advanced by the Federation, the remainder by individuals. The development covers an entire block, 480 feet by 490 feet. Each of the four building units, running in a northerly and southerly direction, is 30 feet wide, 480 feet long and three stories high. There are 284 apartments comprising a total of 1,085 rooms. The price of a five-room apartment is $52.50 a month. The smaller apartments rent in proportion, two room suites costing from $27 to $30 a month.

Photographs by F. S. Lincoln



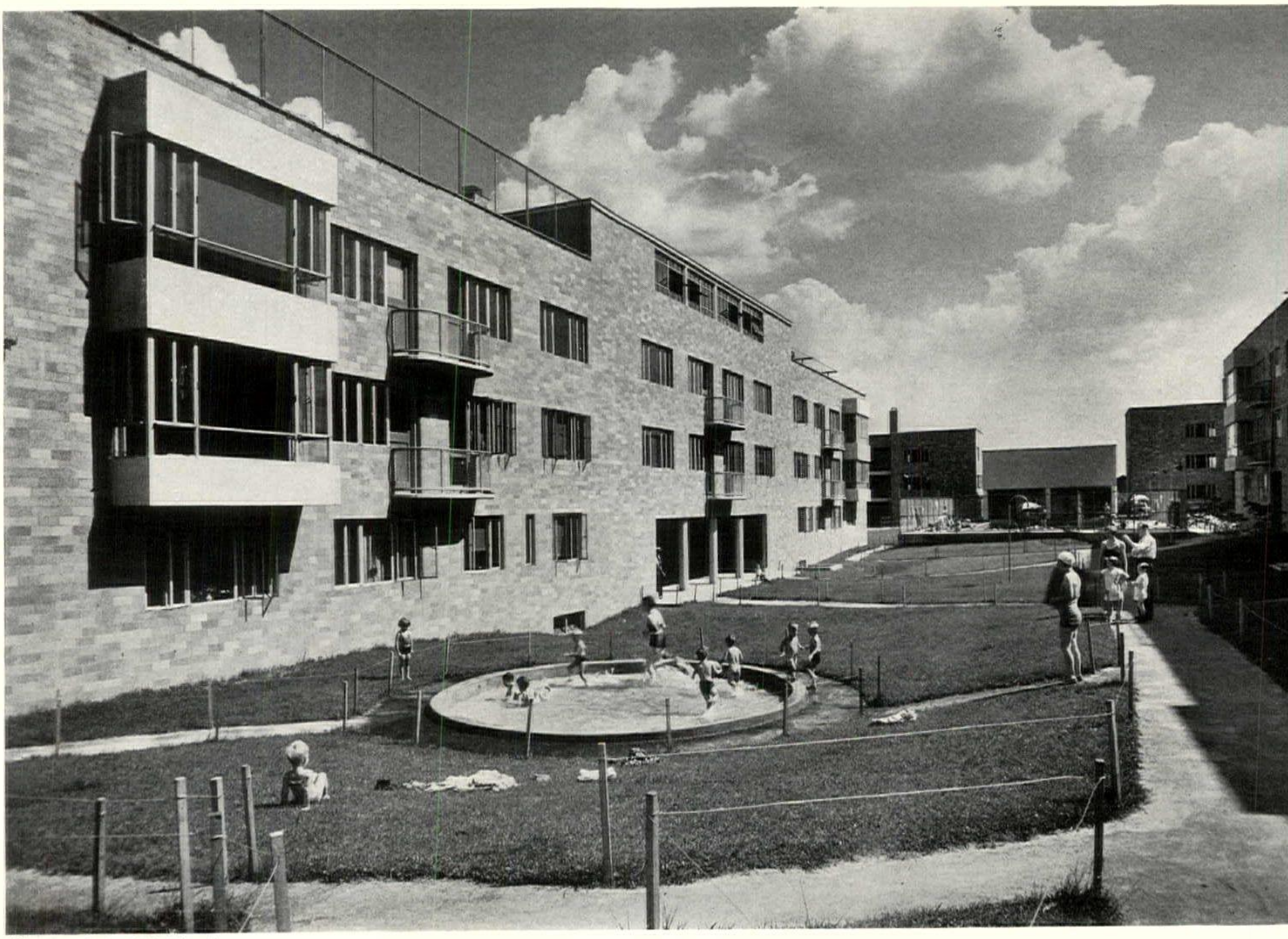
(ABOVE) GENERAL VIEW OF COURTS

(LEFT) DETAIL OF WALL CONSTRUCTION

JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA

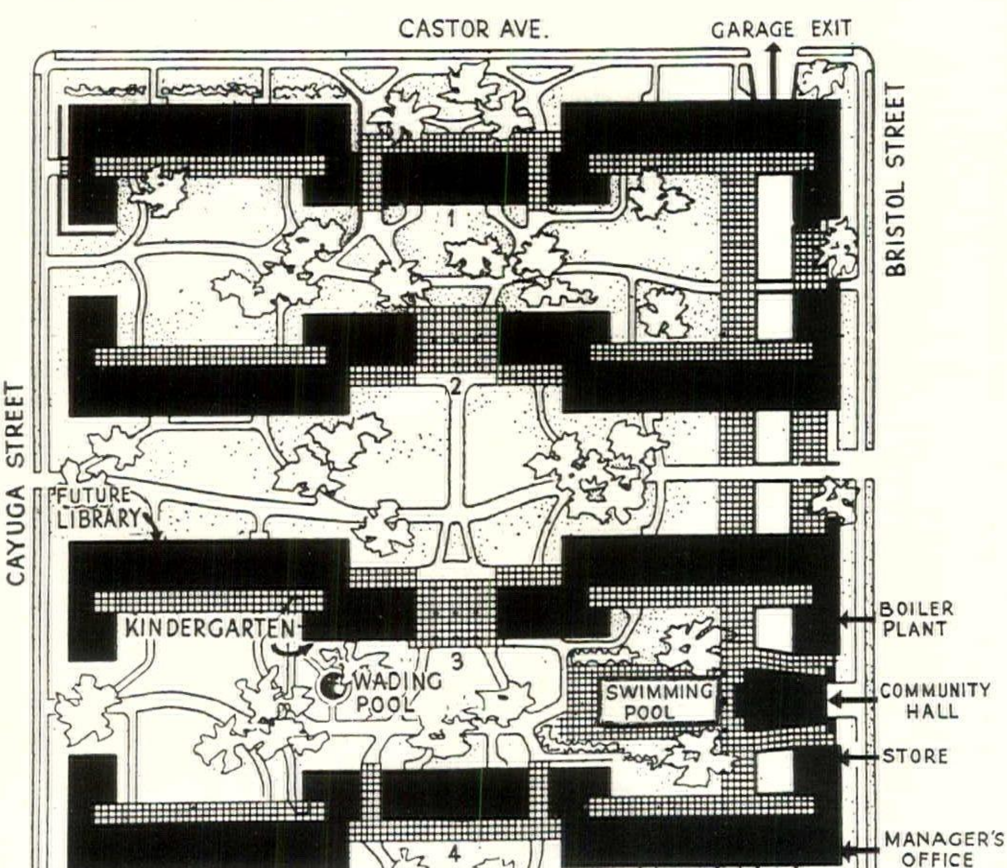
EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

ENTRANCE DETAIL



Photographs by F. S. Lincoln

CHILDREN'S WADING POOL



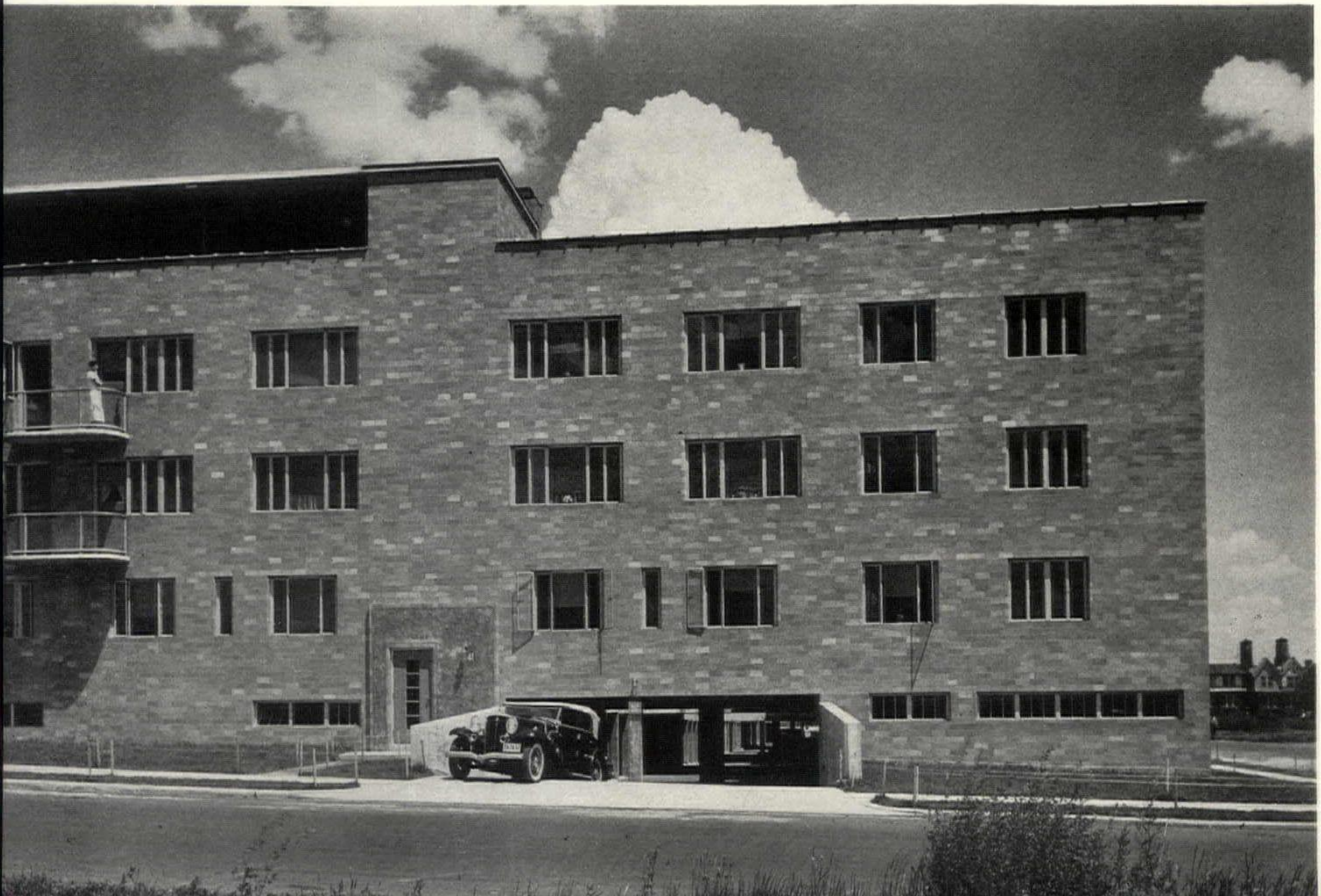
CONSTRUCTION FEATURES:

Steel casement windows. Reinforced concrete floors. Sanitary asphalt tile flooring. Electric kitchen ranges.

JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA

EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

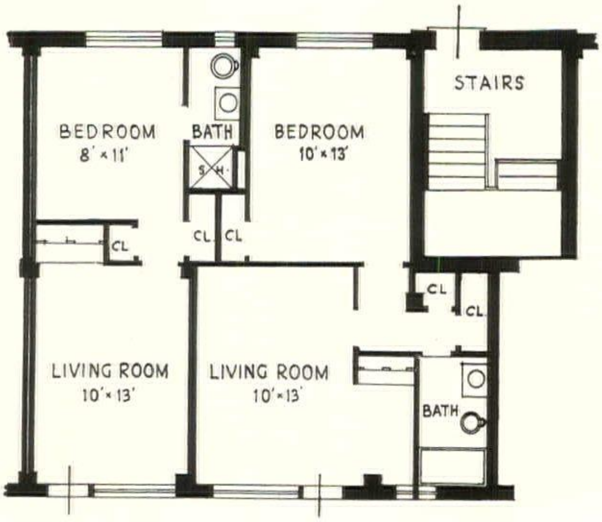
ENTRANCE TO GARAGE ON LOWER LEVEL



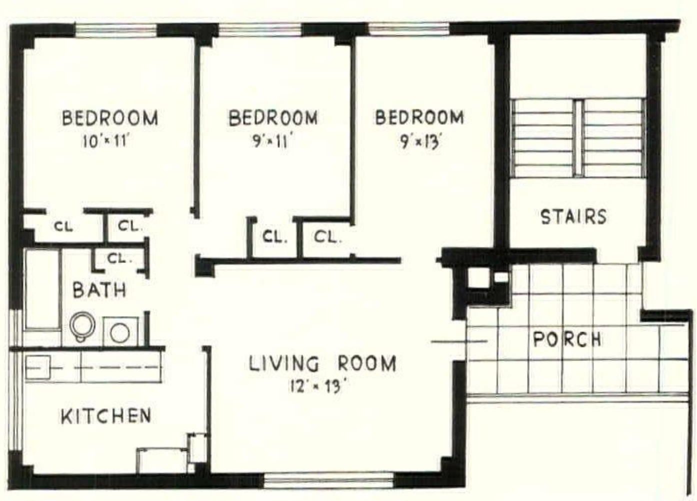
Photographs by F. S. Lincoln

SWIMMING POOL SEEN FROM COMMUNITY BUILDING

TWO AND TWO-AND-A-HALF-ROOM UNITS



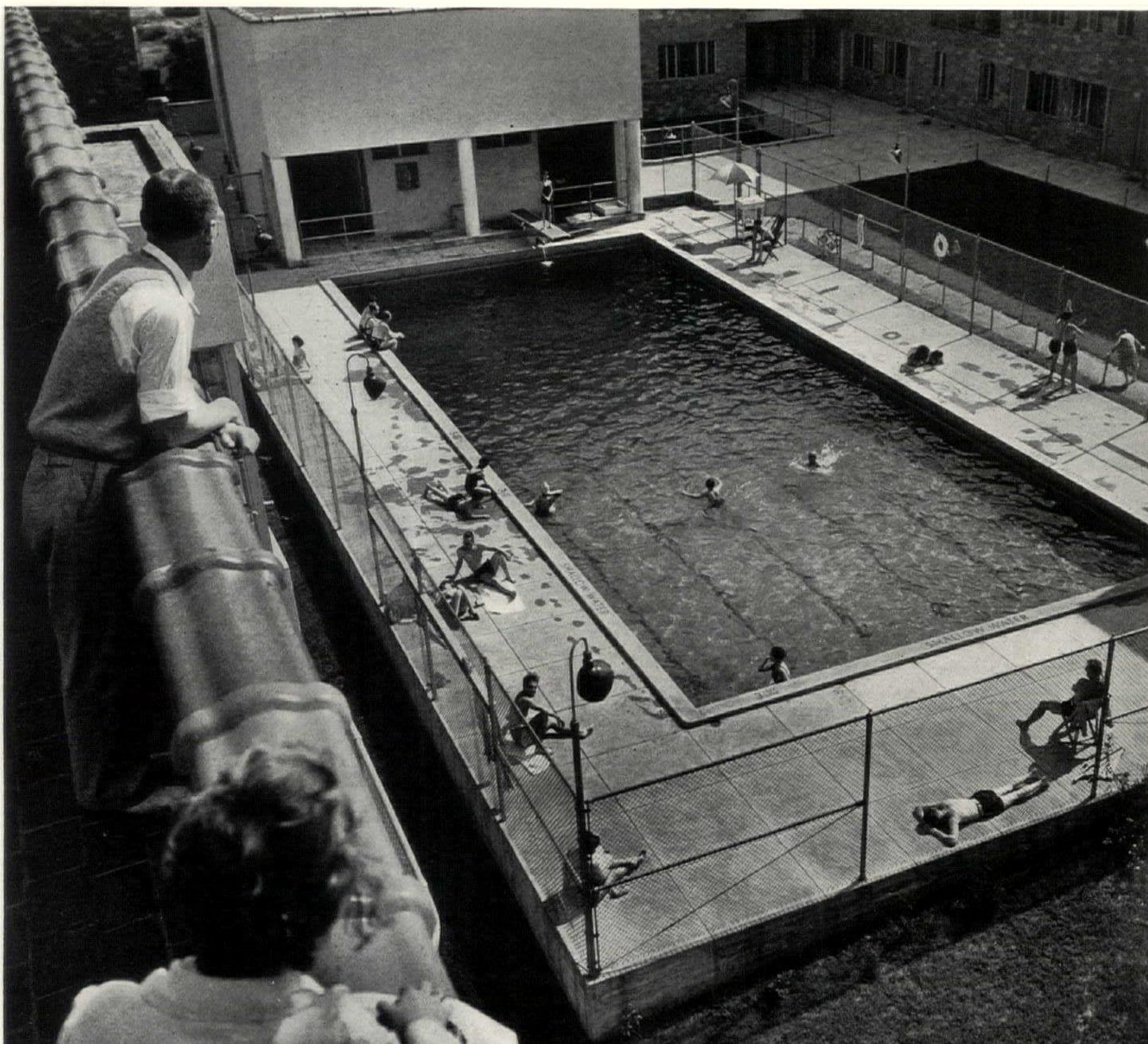
FOUR-ROOM APARTMENT



JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA

EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

SWIMMING POOL

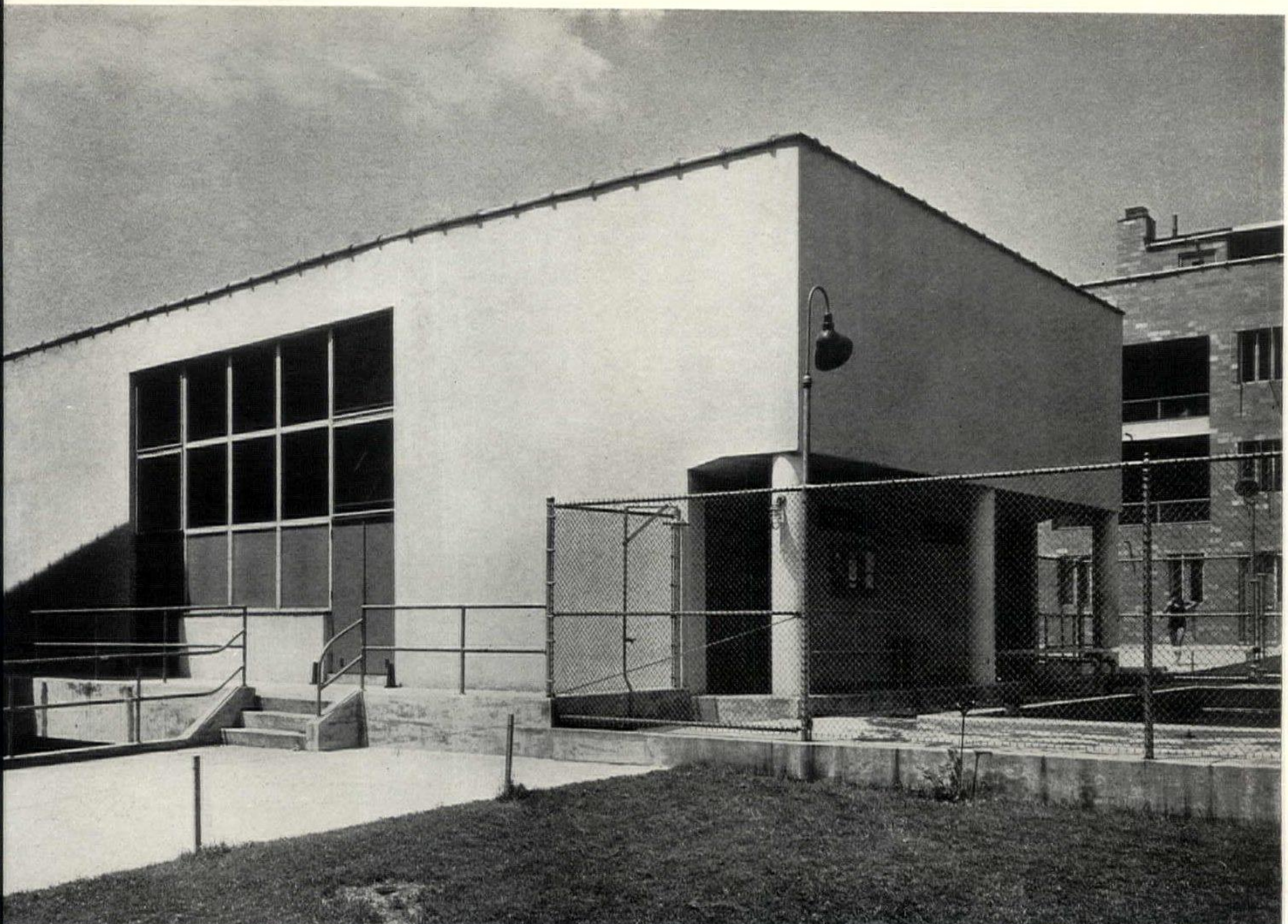


JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA

EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

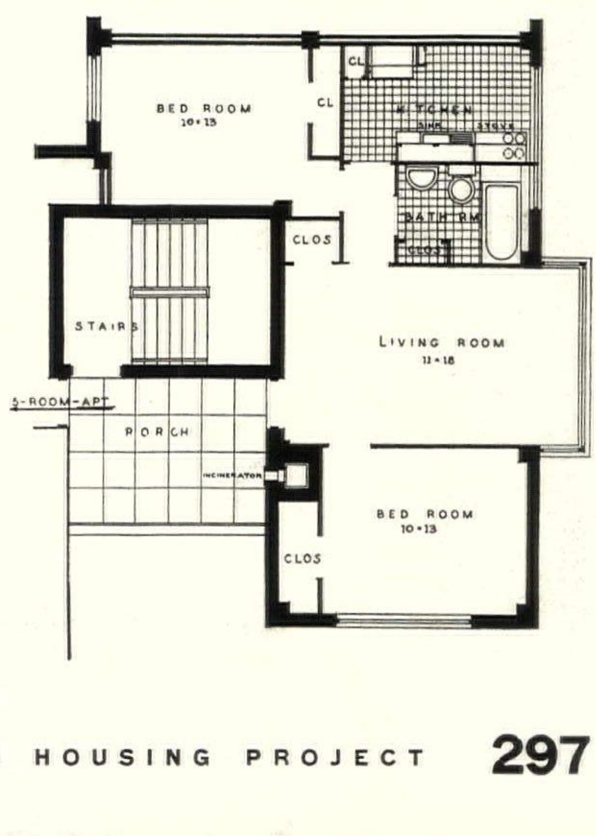
INTERIOR OF COMMUNITY HALL

Photographs by F. S. Lincoln

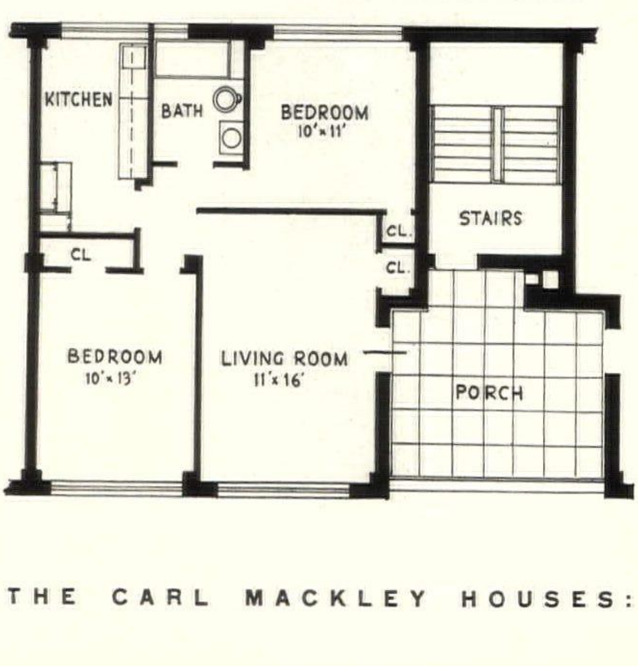


ENTRANCE TO COMMUNITY HALL

SPECIAL FOUR-ROOM APARTMENT



FIVE-ROOM APARTMENT



ROOF LAUNDRY

JUNIATA PARK HOUSING DEVELOPMENT IN PHILADELPHIA

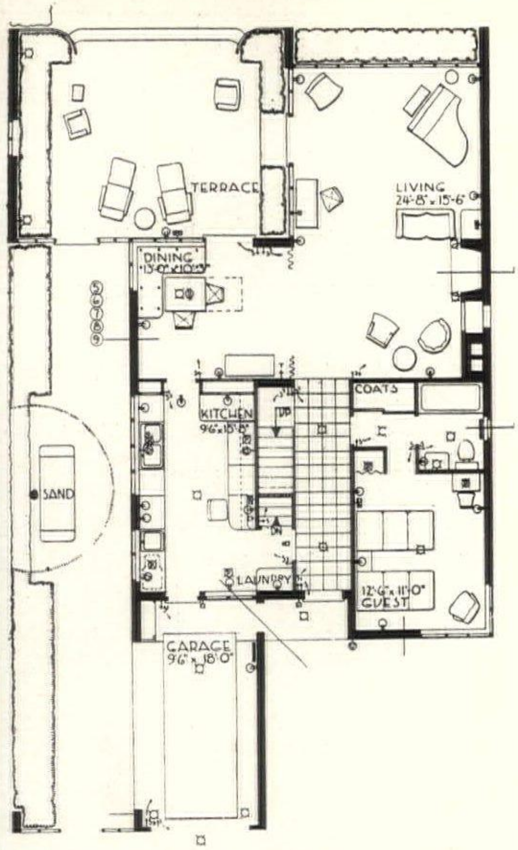
EXECUTED UNDER THE DIRECTION OF W. POPE BARNEY, ARCHITECT

ROOF PLAY SPACE

Photograph by F. S. Lincoln

THE HOUSE PLAN

ROOM ARRANGEMENTS AND CLOSETS



FIRST FLOOR PLAN OF HOUSE ILLUSTRATING A NEW TREND IN PLANNING. THE LIVING-DINING AREA IS SPACIOUS AND VARIED IN USE. HERE THERE ARE FOUR DISTINCT AREAS. THE LIVING ROOM PROPER, BY PLACING OF FURNITURE, CENTERS AROUND THE FIREPLACE; THE DINING ROOM IS COMPRISED WITHIN AN ALCOVE HAVING A BUILT-IN SEAT AND TABLE. THE END OF THE LIVING ROOM SERVES AS A MUSIC ROOM. IN ADDITION THERE IS AN OUTDOOR LIVING ROOM FOR USE IN FAIR WEATHER. GENERAL ELECTRIC HOUSE COMPETITION. FIRST PRIZE DESIGN BY HAYS AND SIMPSON, ARCHITECTS.

SECOND FLOOR PLAN. AN OUT-OF-DOORS ROOF TERRACE, ACCESSIBLE FROM SECOND FLOOR BEDROOMS. A PART OF THIS TERRACE IS PERMANENTLY COVERED. IT IS INTENDED FOR NIGHT OR DAY USE. GENERAL ELECTRIC HOUSE COMPETITION. FIRST PRIZE DESIGN BY HAYS AND SIMPSON, ARCHITECTS.

This article is a supplement to previous studies: Bedrooms-Bathrooms (February 1932), Trends in Lighting (October 1934), A Check List for New Construction and Modernization of Houses (October 1934), Planning the Kitchen (October 1934).

THE ARRANGEMENT OF THE HOUSE PLAN SHOULD PERMIT CONVENIENCE IN CARRYING ON HOUSEHOLD ACTIVITIES AND EASE IN GETTING ABOUT IN THE HOUSE.

The house plan for today can be based on organization of living, sleeping and working areas and of equipment. "Arrangement should be in conformity with the running of a household—the logical process of movement."[*1]

The President's Conference on Home Building and Home Ownership made the observation that "The small house of the future will, in all probabilities, not resemble any houses built in the past. It will be of good architecture if it shows honesty of purpose."[*2]

IT IS DESIRABLE THAT ALL ROOMS OF A HOUSE FOR LIVING, SLEEPING AND WORKING RECEIVE UTMOST BENEFIT OF THE SUN'S RAYS DURING THE WINTER AND OF COOLING BREEZES IN THE SUMMER.

The principle of orientation is the arranging of the various parts of a house so that this end may be attained. "Sunlight is one of the most potent enemies of dirt and disease. Germs do not thrive in sunlight, and dirt is more readily detected in a bright, cheery room than in one that is dark and dreary."[*3]

"Space is saved, and wasteful, dirt-collecting corners are eliminated by the installation of standardized equipment—refrigerator cabinets, closets, fixtures especially designed for building-in."[*1]

THE PLANNING OF A HOUSE AS A SERIES OF ROOMS WAS COMMONLY USED A CENTURY OR MORE AGO IN ORDER TO CUT DOWN DRAFTS AND TO CONSERVE HEAT FROM THE FIREPLACE.

With insulation and more efficient heating systems, the entire house could be planned as one open space, except for bath and kitchen and probably for sleeping.

LIVING ROOM

GIVE MAXIMUM AMOUNT TO LIVING ROOM WHERE SPACE IS MOST USED.

Rooms such as bedrooms, bathroom, kitchen may be contracted in size and designed around equipment and required furniture.

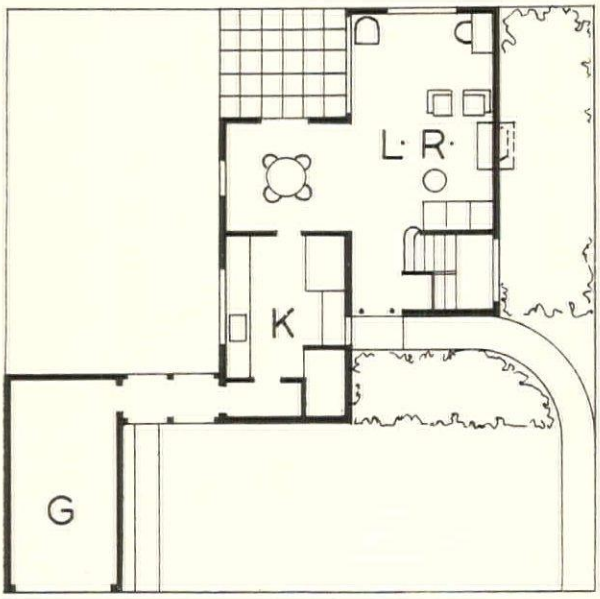
LOCATE LIVING ROOM TOWARD SOUTH OR WEST EXPOSURE; KITCHEN TO NORTH OR EAST.

PROVIDE READILY ACCESSIBLE STORAGE SPACE FOR GOLF STICKS, TENNIS RACKETS, TOYS AND OTHER PLAY EQUIPMENT AS A SUPPLEMENT TO A GROUND FLOOR COAT CLOSET.

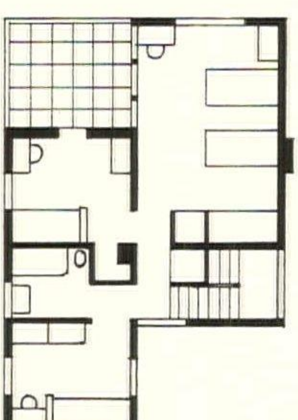
[*1] The Modern House. By F. R. S. Yorke. p. 34.

[*2] Housing Objectives and Programs. p. 36.

[*3] M. C. Betts, Chief, Division of Plans and Services, and W. R. Humphries, Chief Engineering Aid, Bureau of Agricultural Engineering, U. S. Department of Agriculture. Bulletin 1132.



PLAN OF HOUSE SUBMITTED BY J. ANDRE FOUILHOUX, ARCHITECT, IN NEW YORK CHAPTER, A. I. A., COMPETITION FOR LOW-COST HOUSING. IT WAS INTENDED THAT THE COST OF THIS HOUSE, EXCLUSIVE OF LAND, SHOULD NOT EXCEED $3,600.
FIRST FLOOR ARRANGEMENT: THE LIVING AND DINING SPACE ARE TREATED AS A SINGLE ROOM. THE L-SHAPE PROVIDES A NATURAL SEPARATION WHICH MAY BE MORE COMPLETELY SEPARATE BY MEANS OF A MOVABLE PARTITION OR CURTAIN. A PAVED TERRACE WITHIN THE ANGLE OF THIS L-SHAPED ROOM MAY SERVE AS A DINING OR SITTING TERRACE. THERE IS COMMENDABLE UTILIZATION OF SPACE FOR THE USUAL REQUIRED PLAN ELEMENTS. THERE IS A UTILITY ROOM NEXT TO KITCHEN. A CELLAR IS OMITTED FOR THE SAKE OF ECONOMY. THE ADDITION OF A FIREPLACE IS OPTIONAL. THE GARAGE, NOT INCLUDED IN THE ORIGINAL COST ESTIMATE, IS LOCATED FOR CONVENIENCE AT ONE SIDE AND NEAR TO STREET.



SECOND FLOOR PLAN: ONE OF THE THREE BEDROOMS IS OF SPACIOUS DIMENSIONS AND FOR PARENTS. THE HALL SPACE IS EXCEEDINGLY ECONOMICAL, HAVING LEAST POSSIBLE AREA AND IS AMPLY LIGHTED BY WINDOWS. ALL BEDROOMS HAVE CROSS-VENTILATION.

LIVING ROOM (Continued)

IN SPACING OF FURNITURE AVOID INTERFERENCE WITH DOORS, WINDOWS CLOSETS.

CLOSET IN LIVING ROOM FOR ROLL-AWAY BED, GAMES AND AUXILIARY CHAIRS

ARRANGE LIVING ROOM FOR CONVENIENCE IN ENTERTAINING GUESTS AND YOUNGER PERSONS IN ENTERTAINING THEIR FRIENDS.

LIVING ROOM MAY BE ENLARGED BY TAKING IN THE DINING ROOM, COMBIN A PART OF THE ROOM FOR DINING AND LIVING.

A dining alcove requires less floor area than a dining room. This is bec the average dining room provides for maximum seating. When the di table is placed at one end of a living room, unusual demands for seating cared for by usurping a part of the actual living room space.

The dining room is used only 3 hours a day, which indicates a waste of sp for limited use.

Where a dining room is required, convert this room to other use during day, such as a study room for school children, or playroom for children.

EQUIP DINING TABLE WITH EASY OPERATING CASTERS, SUCH AS ARE USED HOSPITAL EQUIPMENT, SO THAT TABLE MAY BE MOVED TO ONE SIDE WHEN IN USE.

THE ARRANGEMENT AND LOCATION OF DINING AREAS CAN BE MADE FLEX BECAUSE OF CHANGING SEATING REQUIREMENTS.

If the meal for guests is served in living room, an area should be so situa as to make it possible to screen the table while it is being prepared fo meal.

USE MAY BE MADE OF FOLDING PARTITIONS IN ORDER TO OBTAIN PRIVACY W REQUIRED.

THE DISTANCE BETWEEN DINING TABLE AND KITCHEN SHOULD BE AS SHORT POSSIBLE.

THE SPACIOUSNESS OF THE PRESENT-DAY LIVING ROOM NEED NOT BE LIMITED THE INCLOSING WALLS, BUT MAY BE EXTENDED TO THE GARDEN BY MEANS WINDOWS AND DOORS THAT OPEN ON TO SUN PORCH AND TERRACE.

In warm climates the outdoor dining porch or terrace serves as a much u auxiliary to the living-dining room.

LOCATE FIREPLACE WITH REFERENCE TO GROUPING OF FURNITURE.

• • •

WASH ROOM ON GROUND FLOOR WITH OUTSIDE WINDOW.

For kitchen planning see *The Architectural Record*, March, 1935.

FURNITURE THAT IS TO BE MOVED FREQUENTLY SHOULD BE OF LIGHT WEIGHT DURABLE.

Furniture should be suited to individual purpose and, when possible, to o uses.

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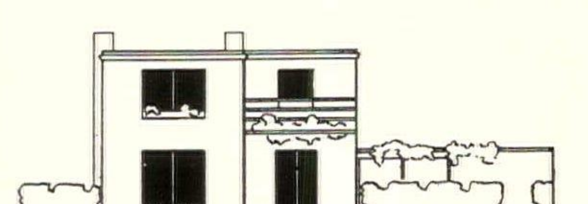
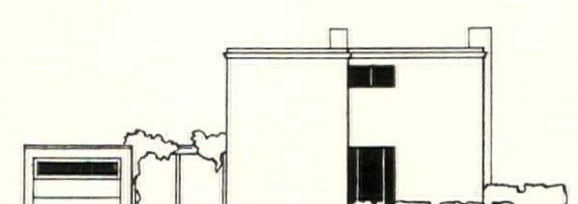
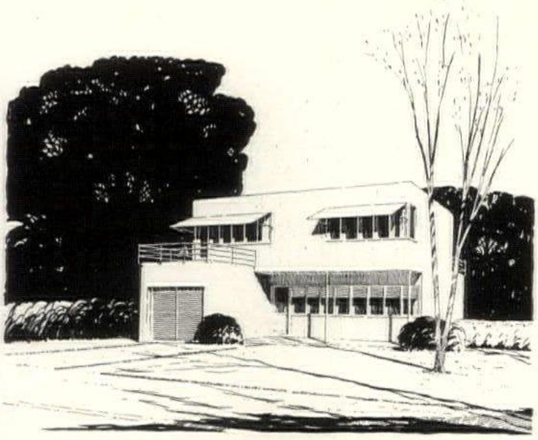
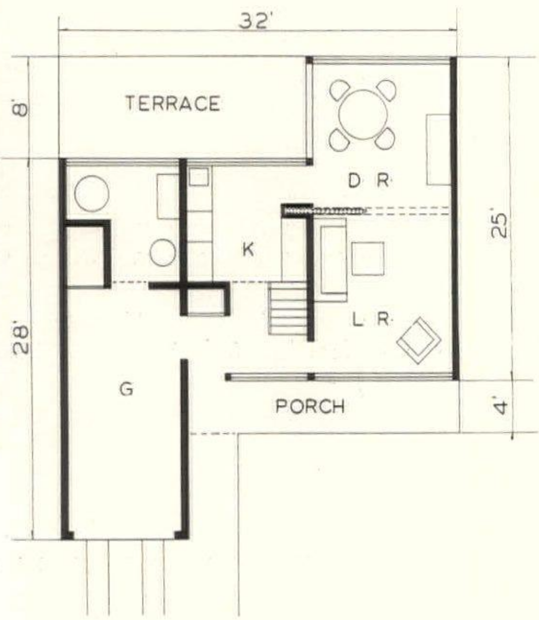
[14] President's Conference on Home Building and Home Ownership. Address by Mrs. Rip p. 19.









THIS HOUSE WAS PLANNED TO ACCOMMODATE A TYPICAL FAMILY (PARENTS AND TWO CHILDREN). ITS LOCATION IS ON A NARROW LOT (NOT LESS THAN FIFTY FEET WIDE). HOUSE DESIGN BY KOCHER AND FREY.

PROVISION FOR: LIVING ROOM, DINING SPACE, KITCHEN, THREE BEDROOMS, UTILITY ROOM, STORAGE, GARAGE.

FIRST FLOOR PLAN: ENTRANCE HALL GIVES ACCESS TO LIVING ROOM; TO KITCHEN; TO STAIRWAY LEADING TO SECOND FLOOR; TO GARAGE AND INDIRECTLY TO UTILITY ROOM AND STORAGE ROOM. THERE IS A COAT CLOSET IN HALLWAY. LIVING AND DINING ROOM ARE COMBINED AS ONE FAIR-SIZED ROOM BUT WITH POSSIBILITIES FOR SEPARATING DINING FROM LIVING ROOM. THE KITCHEN PLUMBING IS AT WALL ADJOINING UTILITY ROOM AND DIRECTLY BENEATH BATHROOM ON SECOND FLOOR. THIS IS THE MOST DIRECT AND ECONOMICAL PLUMBING PLAN FOR A TWO-STORY HOUSE. THERE IS A PORCH SHELTERED FROM SUN AT ENTRANCE. WINDOWS FACE TOWARD GARDEN AND TERRACE. THERE ARE NO WINDOWS IN THE DIRECTION OF HOUSES ON ADJOINING LOTS. BOTH THE FRONT PORCH AND REAR TERRACE ARE PROTECTED BY MEANS OF PROJECTING PLAN GIVING PRIVACY ON LOT OF LIMITED WIDTH. THIS PLAN TYPE IS SUITED TO ROW DEVELOPMENT BUT PREFERABLY WITH ALTERNATE SETBACK.

BEDROOM

CONSIDER REQUIRED FURNITURE AND USES OF ROOM PRELIMINARY TO ESTABLISHING SIZE AND ARRANGEMENT OF BEDROOM.

The customary needed furniture for a bedroom includes the following: two single beds or one double bed; single bed, 3'-0" to 3'-3" wide, 6' to 6'-6" long; double bed, 4'-0" to 4'-6" wide, 6'-0" to 6'-6" long; dressing table for women with wall mirror, drawers for dressing accessories, cosmetics, perfumes, approximate size, 2'-0" deep, 3'-0" long; one chest of drawers, 1'-8" deep, 3'-0" long. Two chests required for rooms of double use. Two chairs; one full length wall mirror attached to wall; night stand, size 1'-2" by 1'-2" used as light stand. A writing desk and seat may occasionally be required as desirable bedroom equipment.

IT IS POSSIBLE TO CONSERVE SPACE BY A CLOSET ARRANGED WITH STORAGE DRAWERS AND ELIMINATING THE CHEST.

ARRANGEMENT OF FURNITURE SHOULD PROVIDE COMFORTABLE AND CONVENIENT SPACE FOR DRESSING.

GLAZED WINDOW AREA SHOULD BE AT LEAST 16 SQUARE FEET. TOPS OF WINDOWS SHOULD BE NEAR CEILING TO OBTAIN UTMOST ADVANTAGE OF VENTILATION AND LIGHT.

WINDOWS THAT OPEN THEIR ENTIRE AREA OR BOTH TOP AND BOTTOM ARE DESIRABLE.

THERE SHOULD BE SUITABLE WALL SPACE FOR ALL PIECES OF FURNITURE.

The placing of furniture should not interfere with doors, windows and closets.

CONSIDER DRESSING ROOM AS A PART OF BATHROOM, THEREBY REDUCING SPACE REQUIREMENTS FOR BEDROOM.

EACH BEDROOM SHOULD BE ACCESSIBLE WITHOUT PASSAGE THROUGH OTHER BEDROOM.

It would seem that an economical arrangement for a second floor bedroom would be to plan a clothes closet large enough for use as a dressing room. Such a bedroom would need to be only large enough for beds and a small table.

SPACE AT BOTH SIDES OF THE BED, AND PASSAGE AT THE FOOT.

PREFERABLY TWO CLOSETS FOR EACH BEDROOM.

SPACE IN EACH BEDROOM FOR TWO BEDS, EACH 39 INCHES WIDE.

Width of space at side of bed, for convenience of person making it, 20 inches.

Width of passage at foot of bed 20 inches.*[6]

For bathroom planning see The Architectural Record, October, 1934; March, 1935.

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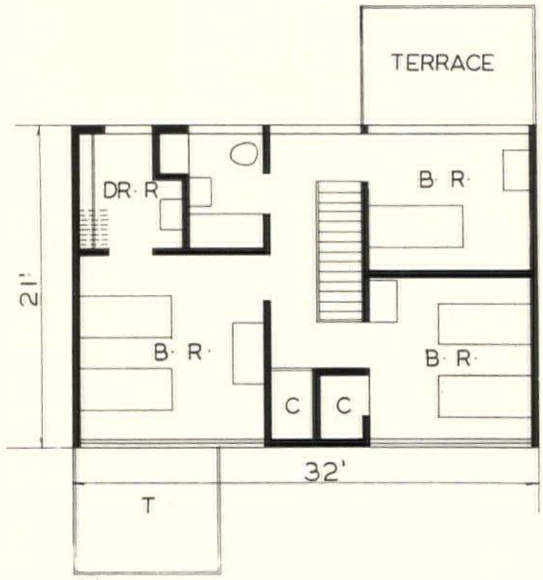
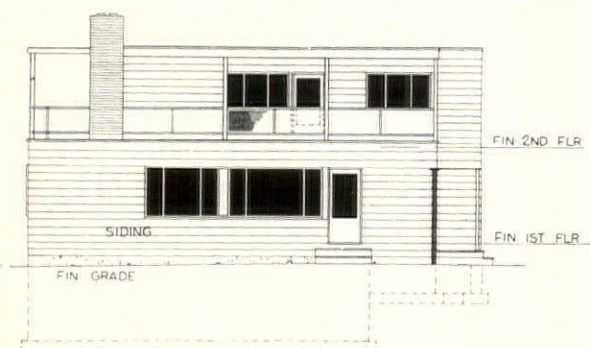
*[6] See The Architectural Record, April, 1934, pp. 330, 331.

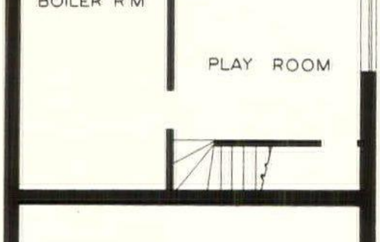


SECOND FLOOR PLAN: PRINCIPAL BEDROOM HAS DRESSING ROOM CLOSET WITH WASH-BASIN DRESSER.

CONSTRUCTION: WOOD FRAME, INSULATED AT WALLS AND ROOF. OUTER FACING OF HOUSE OF CALIFORNIA REDWOOD FLOORING, COVERED WITH CANVAS, AND PAINTED. ALL CORNERS ROUNDED TO A TWO-INCH RADIUS. ROOF DRAINAGE BY MEANS OF SINGLE SOIL STACK NEAR CENTER OF HOUSE; DOWNSPOUTS FOR GARAGE AND TERRACE. SECOND FLOOR AND ROOF OF STAMPED STEEL JOISTS.



EAST ELEVATION OF HOUSE BY WILLIAM LESCAZE, ARCHITECT. WALLS ARE CLAPBOARD SIDING PAINTED WHITE. SIDING IS APPLIED TO WOOD FRAME. PORCH RAIL AT SECOND FLOOR IS $1\frac{1}{2}''$ G. I. PIPE WITH GALVANIZED WIRE 1" MESH SCREEN, PAINTED GRAY.



BASEMENT PLAN: A SLOPED DRIVEWAY PERMITS LOCATION OF GARAGE UNDER HOUSE; HOUSE IS ENTERED FROM GARAGE THROUGH PLAYROOM. LARGE WINDOWS GIVE LIGHT AND VENTILATION TO PLAYROOM.

MINIMUM ROOM SIZES

	Minimum Dimensions	Minimum Area
Living Room	10 feet 6 inches	150 square feet
Main Bedroom	10 feet	110 square feet
Second Bedroom	8 feet 6 inches	100 square feet
Dining Room	10 feet 6 inches	120 square feet
Kitchen	7 feet 4 inches	65 square feet
Bathroom	4 feet 11 inches x 6 feet 8 inches	
Closets	1 foot 10 inch depth	

Adapted from Housing Standards, Housing Division, U. S. Public Works Administration.

The minimum sizes indicated are intended as lowest reasonable dimensions (based on experience observation). It is invariably desirable to increase room sizes for convenience of arrangement, comfort and appearance.

The following listing approximates sizes that are desirable for the average small house. In general it is preferred that living room be enlarged at expense of the sleeping rooms. The bedroom, however, should not be reduced to a size smaller than the minimum sizes recommended by the Housing Division of U. S. Public Works Administration.

Desirable Dimensions

	Desirable Dimensions
Living Room	12 feet by 18 feet
Main Bedroom	12 feet by 14 feet (for two beds)
Second Bedroom	10 feet by 12 feet (for two beds)
Dining Room	12 feet by 14 feet
Kitchen	7 feet 4 inches by 10 feet
Dining Space—Combined with Living Room	12 feet by 8 feet

MIRRORS

"IN THE MAJORITY OF HOMES, WHERE EVERY ONE DRESSES HURRIEDLY IN THE MORNING, THE MIRROR IS MOST CONVENIENT IF IT IS LONG ENOUGH TO PERMIT THE USER TO STAND.

"The following is a good general rule to use in placing the bathroom or bedroom mirror. To estimate the maximum distance from the floor, use the eye level of the average two-year old; and to determine the minimum distance for the top of the mirror from the floor, use the eye level of a man 6 feet tall.

"If all dressing mirrors (as distinguished from those primarily decorative) are purchased independently of pieces of furniture, minimum requirements for equipping the house would seem to be:

"1. **A mirror in the bathroom,** dimensioned so as to accommodate a 6-foot man who is shaving and a small child 34 inches tall washing his face. The minimum dimensions for such a mirror are 46 inches long, 10 inches wide, and set 25 inches from the floor.

"2. **A mirror in each bedroom,** low enough to afford a child of 2 years of age a view of the upper part of his body, and yet high enough to accommodate an adult. The minimum dimensions for a mirror for this situation are 50 inches long, 14 inches wide, and set 21 inches from the floor.

"An alternative for the bedroom is a shorter mirror which is easily raised or lowered. The minimum length of a mirror supplying a view of the upper part of the body would be 16 inches.

"3. **A full-length mirror,** located where any member of the family would be free to use it. To accommodate adults, the top of this mirror should not be less than 5 feet 11 inches from the floor. To accommodate young children the bottom should not be more than 14 inches from the floor, making the minimum length 57 inches. Or a mirror 6 inches shorter than this could be used with a platform when needed to accommodate the young child."*[7]

*[7]Closets and Other Storage Arrangements for the Farm Home. By Maud M. Wilson.

MIRRORS (Continued)

"THE FULL-LENGTH MIRROR SHOULD BE AT LEAST 14 INCHES WIDE UNLESS USED IN FITTING GARMENTS; THEN 18 INCHES IS DESIRABLE.

"If the house has only one full-length mirror, its use in fitting should be considered in locating it.

"CAREFUL ATTENTION SHOULD BE PAID TO THE PLACING OF THE MIRROR WITH REFERENCE TO NEARBY OBJECTS.

"The minimum width of the floor space before the mirror should be 24 inches, while a minimum width of 32 inches should be available at elbow height. A dressing table 18 inches high placed before the full-length mirror may be 15 inches wide without interfering with the vision of an adult. The most convenient arrangement, however, is to leave the space in front of the mirror entirely free of any non-movable obstruction over 18 inches wide."*7

NURSERY

LOCATION ON SUNNY SIDE OF HOUSE.

"The floor area should allow at least 84 square feet for each child. Artificial lighting should be high and indirect. If side lights are used, they should be out of reach of the child and the light source shielded. Since most of the child's play is on the floor, hardwood floors or floors overlaid with linoleum or cork are recommended."*5

THE NURSERY SHOULD BE LOCATED NEAR A LAVATORY.

"THIS ROOM SHOULD BE CONVERTIBLE TO OTHER USES WHEN THERE IS NO LONGER NEED FOR IT AS A NURSERY."*5

Since it will not be feasible to provide a nursery in most small houses, it is desirable to consider the use of a usual room or a corner of a room as play space for children. An inclosed porch may be considered or a corner of a bedroom. The attic also has possibilities for nursery use. Whatever selection is made, the location should be well ventilated and preferably with much sunlight.

LOCATION OF PLAY PEN FOR SMALL CHILD WITHIN VIEW OF KITCHEN. This may be in yard or on a terrace.

FURNITURE SELECTED FOR CHILD SAFETY, light in weight, freedom from sharp angles and dust-collecting moldings.

WALL COLOR FOR THE NURSERY should be cheerful and with finish that is easily cleaned.

FURNITURE, HANGINGS AND WALL SURFACE CAN FOLLOW A COLOR SCHEME AND A PLAN OF ARRANGEMENT.

LOCATION OF SLEEPING ROOM FOR CHILD with regard for quiet and, in case of older child, for uninterrupted study.

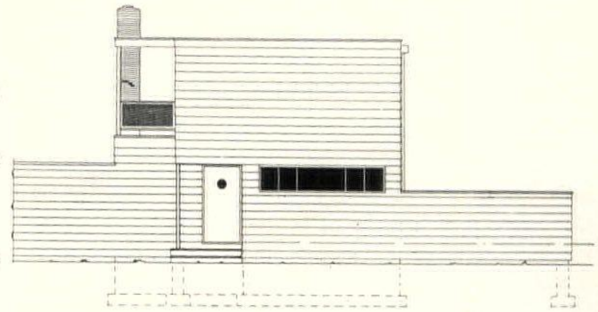
The room that serves as nursery may later be converted to sleeping room for growing child or as workshop for a boy.

WINDOWS SHOULD BE SCREENED OR OTHERWISE PROTECTED FOR SAFETY OF CHILD. HIGH WINDOWS ARE PREFERRED.

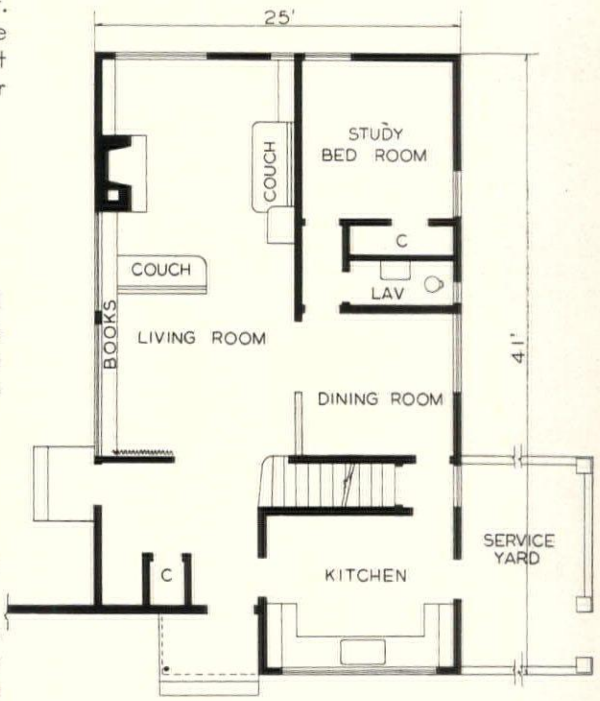
PROVIDE CLOSET WITH SPACE FOR STORAGE OF PLAYTHINGS AND CLOTHES.

*5 The Home and the Child. A publication of the White House Conference. The Century Co., p. 22.

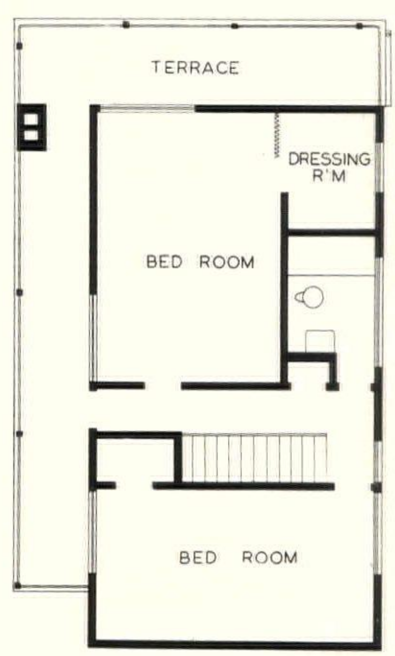
*7 Closets and Other Storage Arrangements for the Farm Home. By Maud M. Wilson.



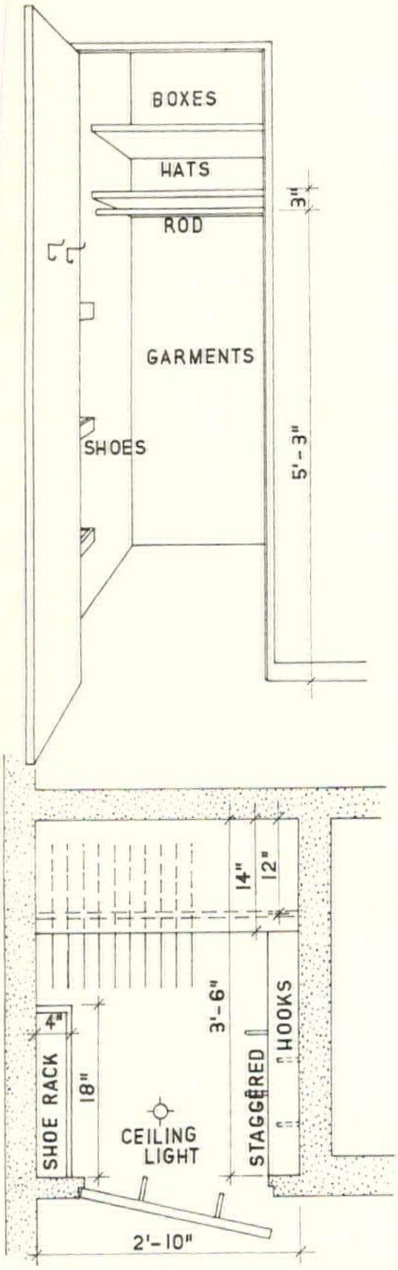
NORTH ELEVATION



FIRST FLOOR PLAN: LIVING ROOM, 13' 4" BY 25', HAS BEEN SUBDIVIDED BY LOCATION OF FURNITURE AND THE OFF-CENTER LOCATION OF FIREPLACE. EMPHASIS HAS BEEN GIVEN TO THE SITTING AREA. BOTH HALL AND DINING ROOM ARE SEPARATED BY CURTAINS. FURNITURE WAS DESIGNED AS A PART OF THE HOUSE. WILLIAM LESCAZE, ARCHITECT.



SECOND FLOOR PLAN: THE MASTER BEDROOM HAS A DRESSING ROOM THAT IS AN INTIMATE PART OF THE BEDROOM. THE HALL-PASSAGE GIVES COMMON ENTRANCE TO ROOF TERRACE FROM BEDROOMS.



BEDROOM CLOSET ARRANGEMENT FOR ADULT USE. SINGLE CLOSET OF MINIMUM PRACTICABLE WIDTH —WALK-IN TYPE. SIZE 34" x 42". GARMENT HANGER ROD 34" LONG, PLACED 63" ABOVE FLOOR. TWO SHELVES 14" x 34". FREE FLOOR AREA 18" x 24".

The following information on closets was prepared by Miss Maud Wilson, Home Economist, Agricultural Experiment Station, Oregon State Agricultural College, Corvallis, Oregon.

The publication of a bulletin incorporating this and additional closet data is announced by Dr. Louise Stanley of the Bureau of Home Economics, Department of Agriculture, Washington, D. C.

STORAGE

Every housekeeper knows the importance of having a place "to put things." It saves time, which is more important than ever now because there are so many more ways of using time than there used to be. It saves labor, which is particularly important in a household without servants, as most farm households are. And it helps to keep the house in order, which has much to do with the comfort and efficiency of the family.

Lack of closet space, however, and ill-planned closets are among the historic faults in house planning. Perhaps it is because the designer does not appreciate the housekeeping needs. Perhaps the house builder tries, in this way, to keep down costs.

AS A MATTER OF FACT, THE TOTAL COST OF A HOUSE AND ITS EQUIPMENT MAY BE LOWER IF THOROUGHGOING CONSIDERATION IS GIVEN TO STORAGE NEEDS OF THE FAMILY FROM THE OUTSET OF THE PLANS.

Alterations are expensive. Where built-ins are lacking, it is often necessary to buy pieces of furniture to supply storage space, at greater cost than for built-ins but with no greater capacity.

ROOMS SERVING MORE THAN ONE MAJOR PURPOSE ARE OFTEN MORE CONVENIENT, AND NO MORE EXPENSIVE, IF PROVIDED WITH ADJACENT STORAGE SPACES PLANNED FOR SPECIFIC USES, SUCH AS SEWING IN THE LIVING ROOM, OR USING THE LIVING ROOM AS A BEDROOM.

STANDARDS

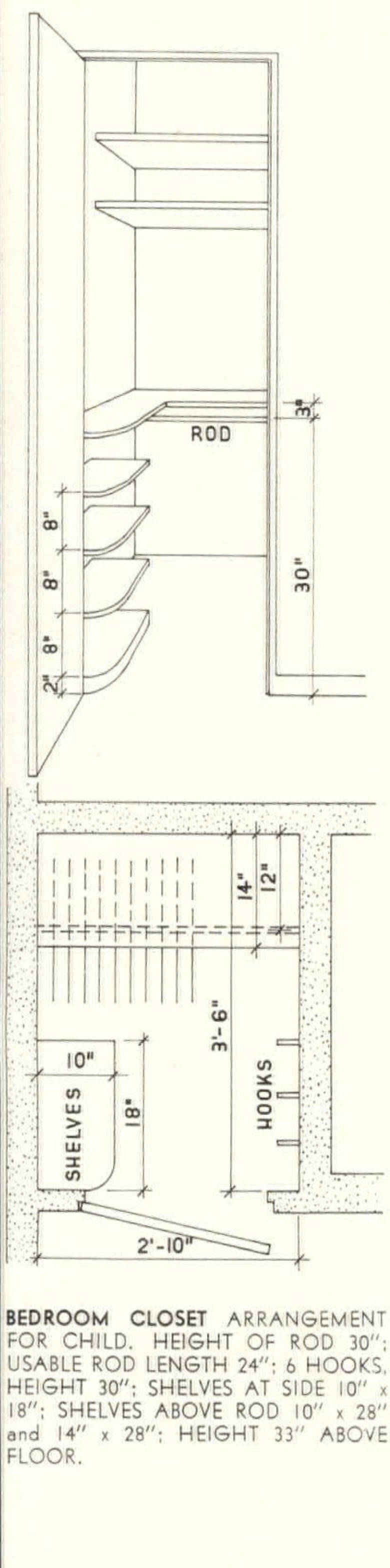
THE SIZE, SHAPE AND ARRANGEMENT OF THE CLOSET SHOULD BE SUCH AS TO MAKE READILY ACCESSIBLE ALL ARTICLES WHICH ARE IN FREQUENT USE.

The closet and its fittings should be dimensioned to accommodate the tallest person likely to use it; for efficiency in storage of clothing; and for ease of access. It should be possible to arrange the closet to accommodate persons of varying heights.

THE CLOSET SHOULD HAVE SUFFICIENT NATURAL OR ARTIFICIAL LIGHT SO THAT ITS CONTENTS MAY BE EASILY SEEN.

If possible, light from the room should enter the closet when the door is open. A light fixture should be placed within the closet unless the light of the room affords sufficient illumination.

EVERY CLOSET SHOULD BE VENTILATED; IF NOT BY A WINDOW, THEN BY OPENINGS IN THE DOOR.



BEDROOM CLOSET ARRANGEMENT FOR CHILD. HEIGHT OF ROD 30"; USABLE ROD LENGTH 24"; 6 HOOKS, HEIGHT 30"; SHELVES AT SIDE 10" x 18"; SHELVES ABOVE ROD 10" x 28" and 14" x 28"; HEIGHT 33" ABOVE FLOOR.

STANDARDS (Continued)

DEEP CORNERS SHOULD BE AVOIDED IN THE SHALLOW (REACH-IN) TYPE OF CLOSET.

Sliding doors may be used to save space in the room or to make the contents of the closet more accessible.

TWO OR MORE NARROW DOORS FOR A WIDE CLOSET ARE MORE CONVENIENT THAN ONE WIDER DOOR.

DOORS TO WALK-IN CLOSETS SHOULD FIT TIGHTLY AT THE BOTTOM TO KEEP OUT DUST. THE FLOOR OF A WARDROBE CLOSET SHOULD BE AT LEAST 2 INCHES ABOVE THAT OF THE ROOM TO PREVENT LINT FROM COLLECTING.

HOOKS SHOULD NOT BE PLACED WITHIN 5 INCHES OF THE EDGE OF A DOOR.

A HOOK FOR GARMENTS ON HANGERS SHOULD NOT BE PUT ON A DOOR THAT IS LESS THAN 30 INCHES WIDE.

TO SERVE THE NEEDS OF SMALL CHILDREN, HALF-GROWN BOYS OR GIRLS, AND ADULTS, IT SHOULD BE POSSIBLE TO ADJUST THE HEIGHT OF HOOKS, RODS, AND SHELVES, OR TO INSTALL SPECIAL FITTINGS FOR THE CHILD'S USE.

Hooks for use of small children should not be above eye level.

With children, the weight and size of a drawer is more of a factor than distance from the floor. A child can use a step, if the drawer is small enough and light enough to be pulled out easily.

CLOSETS ARRANGED SO AS TO PERMIT ALTERATION TO MEET INDIVIDUAL REQUIREMENTS.

CHOICE AND PLACING OF FITTINGS

IN OFFERING DIMENSIONS OF CLOSETS THE FOLLOWING PRACTICES SHOULD BE FOLLOWED IN STORING GARMENTS:

On hangers: All dresses, except those of infants. Skirts. Blouses. Men's dress shirts, if laundered at home. Men's coats and vests. Trousers, on hangers separate from coats and vests. Coats, overcoats and jackets. All coats stored away or seldom used.

On hooks: Articles which have been worn since being cleaned or laundered, as nightgowns, pajamas, slips, aprons. Bathrobes. Coats, jackets and leggings worn by small children at play.

On shelves: Hats, caps, gloves, mittens.

In drawers, trays or shelves: Men's work shirts. Dress shirts done at commercial laundry. Sweaters, aprons, slips, underwear, hose, nightwear. Toys and keepsakes of children.

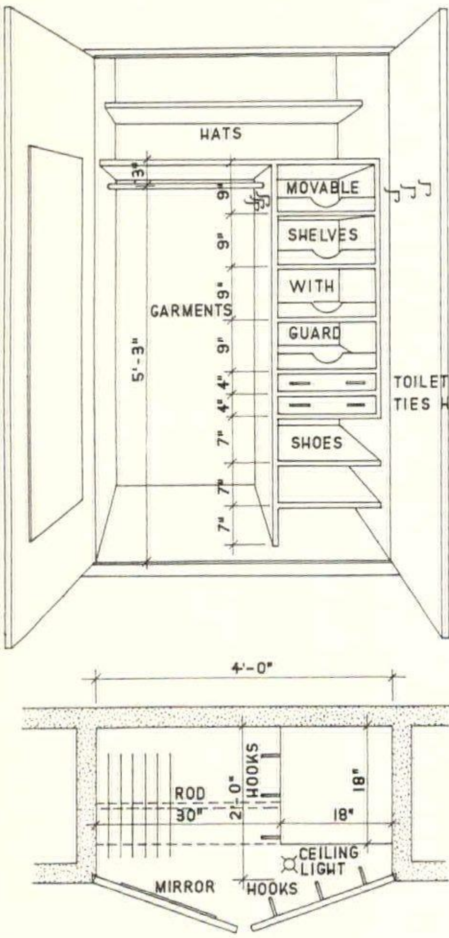
On racks or shelves: Shoes.

On hooks, racks, or in drawer: Ties.

The most economical arrangement for shoes is a cabinet of horizontal shelves, since this may be converted to other purposes, particularly when the closet is rearranged to meet children's needs. Tilted shelves or racks require less floor space than horizontal ones, but lack the advantage of convertibility.

Drawers or trays are more convenient than shelves for the storage of folded clothing. Shelves are given in a number of plans, however, because they are cheaper to build, and because with drawers and trays room must be allowed to pull them out.

It is assumed, except in the dressing closet and wardrobe plans, that only shoes, hats and reserve clothing in boxes are stored on shelves, and that drawers for folded articles are provided in a dresser nearby. Where drawers are used, a movable cabinet is preferable to a built-in one, except in a space under a sloping roof or stairs. Several small drawers are preferable to fewer and larger ones.



BEDROOM CLOSET OF WARDROBE TYPE. FOR ONE PERSON. ECONOMICAL USE OF SPACE FOR STORAGE PURPOSE. SHELF ABOVE ROD, 18" WIDE, 48" LONG, SET 66" ABOVE FLOOR. BASE OF CLOSET 2" ABOVE FLOOR. TIER OF SHELVES, TRAYS AND DRAWERS 18" WIDE, 18" LONG. MIRROR ON DOOR PLACED WITH RESPECT TO ARRANGEMENT OF ROOM AND DIRECTION OF LIGHT FROM WINDOWS.

CLOSETS (Continued)

THE CLOSET ROD SHOULD BE PLACED HIGH ENOUGH TO ALLOW 6 INCHES BELOW GARMENTS HANGING FROM IT, AND TO PERMIT CLEANING THE FLOOR WITHOUT DISTURBING THE GARMENTS.

The rod should not be set higher than this, unless the space underneath can be utilized.

THE PREFERRED POSITION FOR THE ROD IS PARALLEL TO THE DOORWAY, FOR CONVENIENCE IN SEEING AND PLACING GARMENTS.

ALL GARMENTS IN FREQUENT USE SHOULD BE READILY ACCESSIBLE.

To accomplish this, rods of the extension type are suggested where space in the closet does not permit easy withdrawal of a garment. The collapsible type of rod is preferred where it is necessary to place shelves behind the rod. Where only a small number of garments need to be stored on hangers, as in the closet for chore coats, a long hook is used instead of a rod. For seldom-used garments stored in long garment bags, it is well to provide a long high hook.

PLACE HOOKS AS NEAR THE DOOR OF THE CLOSET AS POSSIBLE. THEY SHOULD NOT BE PLACED BACK OF THE ROD.

A space-saving method of placing hooks is to arrange them in two rows, placing the upper ones on an extension (as a two-by-four on brackets) which sets them out into the room 4 inches farther than the lower ones.

HOOKS SHOULD NOT BE PLACED WITHIN 5 INCHES OF THE EDGE OF A DOOR.

HOOKS FOR USE OF SMALL CHILDREN SHOULD NOT BE ABOVE EYE LEVEL.

COMBINATION CLOTHES CLOSETS AND DRESSING ROOMS

In many situations it is preferable to dress in some place other than the sleeping room. For instance, the bedroom may be unheated, or perhaps it does not warm up in the morning in time to be comfortable for dressing. Or the living room may serve as the bedroom. In such cases a convenient arrangement is a combination clothes closet and dressing room, equipped with adequate and well-placed window and electric light, and heat register, radiator, or portable heater. It should have a draft-tight door if it opens into an unheated room. Space for use of person while dressing: 42 inches diameter.

FITTINGS OF DRESSING ROOM:

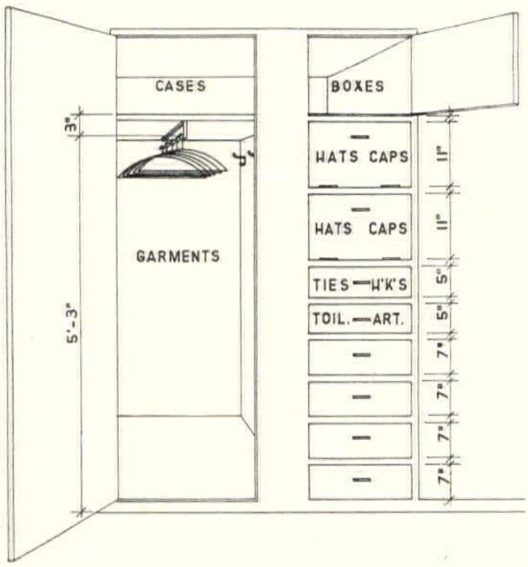
Chair or stool; shallow drawer conveniently located for toilet articles; cabinet top for layout toilet articles—12 by 12 inches minimum.

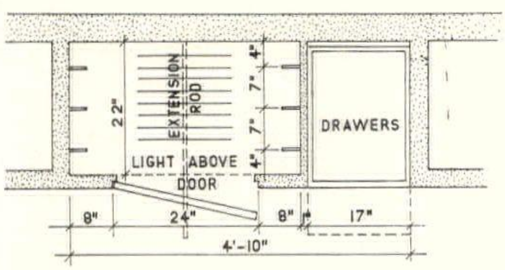
BED CLOSETS

ONE OF THE WAYS OF KEEPING DOWN THE SIZE OF THE HOUSE IS TO PLAN AREAS WHICH SERVE AS BEDROOMS AT NIGHT BUT ARE AVAILABLE FOR OTHER USES DURING THE DAY.

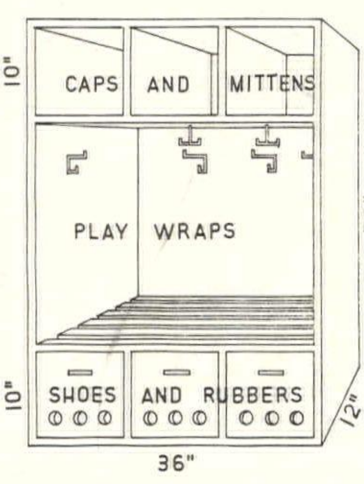
This may be done by providing a closet for the bed, with or without space for clothing storage and room for dressing. Such a closet may open from the living room, sun parlor, dining room, sewing room, child's play room, study, or living porch. A bed closet built in connection with the sleeping porch serves to keep the bed clothing warm and dry.

For use in this way in the farmhouse the roll-away type of bed is probably the best as there may be periods when the bed can be taken to the storeroom and the closet used for other purposes. Furthermore, the closet for this type of bed may open from a hall, and the bed be pulled to any one of several rooms as desired.





COMBINATION DRESSER AND CLOSET. SIZE: 22 INCHES BY 58 INCHES. THERE IS CLOTHING STORAGE FOR ONE PERSON; USE IS MADE OF EXTENSION ROD. DRESSER TIER HAS 4 DRAWERS 7" x 15" x 24"; 2 DRAWERS 5" x 15" x 24"; 2 COMPARTMENTS WITH FRONTS HINGED AT BOTTOM.



COAT CABINET FOR CHILDREN. INTENDED FOR INSTALLATION ON PORCH, IN HALL OR IN A COAT CLOSET. ACCOMMODATION FOR THREE CHILDREN OF PRE-SCHOOL AGE. 6 HOOKS; 3 COMPARTMENTS FOR CAPS AND MITTENS (11" WIDE, 12" LONG, 10" DEEP); 3 VENTILATED DRAWERS EACH 11" WIDE, 12" LONG AND 10" DEEP, FOR OVERSHOES AND RUBBERS. SLATTED SHELF OVER DRAWERS.

BED CLOSETS (Continued)

A CLOSET OPENING FROM A LIVING ROOM SHOULD BE OF SUCH DIMENSIONS THAT IT CAN BE USED FOR ANY ONE OF SEVERAL PURPOSES, SUCH AS STORING A BED, SEWING EQUIPMENT AND SUPPLIES, A CHILD'S PLAYTHINGS, GAME BOARDS, AND SMALL MUSICAL INSTRUMENTS.

Space that is large enough for a stored bed, clothing, and dressing facilities, is ample for any other purpose for which a living room closet is useful.

Dimensions for areas for clothing storage and dressing are based on measurements included in the general discussion of closets and dressing rooms. The area allowed for the bed is 2 feet in depth, and 5 feet in width.

BEDROOM CLOSETS

OF THE VARIOUS POSSIBLE SHAPES, THE SHALLOW CLOSET IS THE MOST ECONOMICAL OF SPACE, AND CAN BE CONVENIENTLY ARRANGED, PROVIDED THE OPENING IS NEARLY AS LONG AS THE CLOSET ITSELF.

A SEPARATE CLOSET FOR EACH PERSON IS DESIRABLE.

Where the closet must be shared by two persons it is more convenient if fitted with two rods for hangers.

BATHROOM CLOSETS AND CABINETS

THE AMOUNT AND LOCATION OF STORAGE SPACE FOR A BATHROOM SHOULD BE PLANNED WITH REFERENCE TO THE NEARBY CLOSET FACILITIES AS WELL AS TO THE FUNCTIONS THAT THE ROOM IS LIKELY TO SERVE.

The house with bedrooms and bathroom all on one floor may have a central closet for bedding which can also care for all equipment and supplies used in the bathroom except small, frequently used articles. The homemaker often prefers to keep all infants' wear in a downstairs bedroom. Men sometimes prefer bedrooms for shaving or the family may use commercial services for shaving, care of the hair, or shoe cleaning. **Special toilet facilities** may be provided for the use of guests, for persons who are ill, or for men engaged in dirty work. **A chute** may convey soiled clothing to the laundry. **Heated bedrooms or dressing rooms** may make unnecessary the use of the bathroom for dressing. **Articles used in cleaning the bathroom** may be stored with other cleaning supplies and equipment in a nearby closet. All these possible uses of the bathroom by various members of the household make a difference in the kind and quantity of material to be stored.

Bathroom storage requirements may include space for:

Linen: Clean bath towels, hand towels, wash cloths, bath mats—entire supply, small number only (main supply kept elsewhere), those kept especially for infants' use, those kept especially for use of guests; clean rags; towels and wash cloths in use; bath mat in use; pad used in bathing or changing baby.

Infant's wear, kept where the baby is cared for: Diapers, entire supply or small amount; other baby clothes.

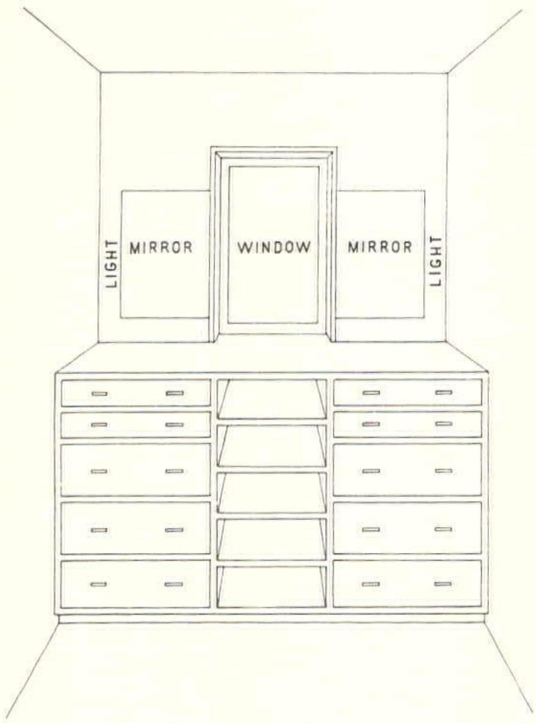
Other clothes: Handkerchiefs; stored in connection with bath-dressing room—nightgowns, pajamas, house slippers (daytime storage); day wear (storage during night).

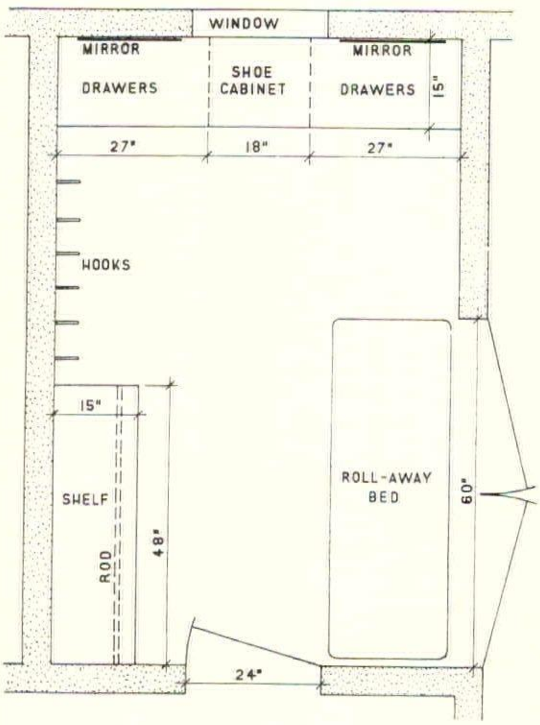
Toilet supplies and equipment: Glasses, paste, and brushes used in care of teeth; soap in use; combs, hair brushes; facial tissue; bath and nail brushes; bath salts, powder; shaving equipment; powder, face cream, etc.; curling iron, dryer; reserve supplies, such as soap, toilet paper, facial tissue.

Cleaning supplies and equipment: Water-closet and bath tub cleaners; closet brush; floor cloth.

Shoe polishing equipment and supplies.

Other equipment: Hot water bottle, syringe, attachments for syringe; bath spray; foot tub, baby tub; bed pan, child's chamber; child's toilet seat, nasal syringe.





BED CLOSET: SIZE, 6 FEET BY 9 FEET. PROVIDES FOR STORAGE OF DOUBLE ROLL-AWAY BED TO BE USED AS **EXTRA BED.** THE BED IS ROLLED INTO ADJOINING ROOM. THERE IS CLOTHING STORAGE AND DRESSING ROOM FOR TWO PERSONS. THERE IS A DOORWAY INTO HALL AS WELL AS INTO ROOM WHERE BED IS USED. SUITABLE FOR LOCATION WHERE BED IS USED ON SLEEPING PORCH.

HANGER ROD IS 48" LONG, SET 63" FROM FLOOR. THERE ARE SHELVES ABOVE ROD; 12 HOOKS. CABINET IS 15" DEEP, 72" LONG, 4' HIGH, CONSISTING OF TWO SETS OF DRAWERS, EACH 27" LONG, WITH SHOE SHELVES BETWEEN THEM. THERE IS A MIRROR ABOVE EACH SET OF DRAWERS.

BATHROOM CLOSETS AND CABINETS (Continued)

Medicines, disinfectants: Poisonous materials; first-aid kit; bandages; liniment, oils, etc.

Soiled linen: Diapers; other infant's wear; other clothing; towels.

IT IS DESIRABLE TO KEEP PRESCRIPTION MEDICINES AND POISONOUS SUBSTANCES IN A PLACE SEPARATE FROM TOILET SUPPLIES, OINTMENTS, AND THE LIKE.

PROVIDE SHALLOW CABINET RECESSED IN WALL

Mirror may be on door but this is not preferred; overhead illumination; shelves in this cabinet should be removable and adjustable as to distance apart; shelf for drinking glasses.

BATHROOM MIRROR IS MOST CONVENIENT IF PLACED DIRECTLY ON THE WALL RATHER THAN ON THE DOOR OF A CABINET.

OUT-OF-SEASON STORAGE OF GARMENTS AND BEDDING

Some homemakers prefer to **store out-of-season garments away from those in current use,** and this simplifies the planning of closets. Those opening from bedrooms can be somewhat smaller than if they provided for the entire wardrobe.

USUALLY ONE CLOSET IS SUFFICIENT FOR THE OUT-OF-SEASON STORAGE OF GARMENTS FOR THE ENTIRE FAMILY AND FOR GARMENTS AND BEDDING THAT ARE SELDOM USED.

While a central location is desirable, it is not necessary since accessibility is a minor matter. This closet may be dimensioned so as to provide for dresses and coats in moth-proof bags and other garments in moth-proof boxes or wrappings. Or the whole closet may be moth-proofed. (See U. S. Dept. Agr., Farmers' Bull. 1353, Clothes Moths and Their Control.)

ACTIVITY AREAS

Minimum width of opening of closet.................... 24 inches
Minimum free space in closet of walk-in type............ 24 by 24 inches

One of the ways of keeping down the size of the house is to plan areas which serve as bedrooms at night but are available for other uses during the day. This may be done by providing a closet for the bed, with or without space for clothing storage and room for dressing. Such a closet may open from the living room, sun parlor, dining room, sewing room, child's playroom, study, or living porch. A bed closet built in connection with the sleeping porch serves to keep the bed clothing warm and dry.

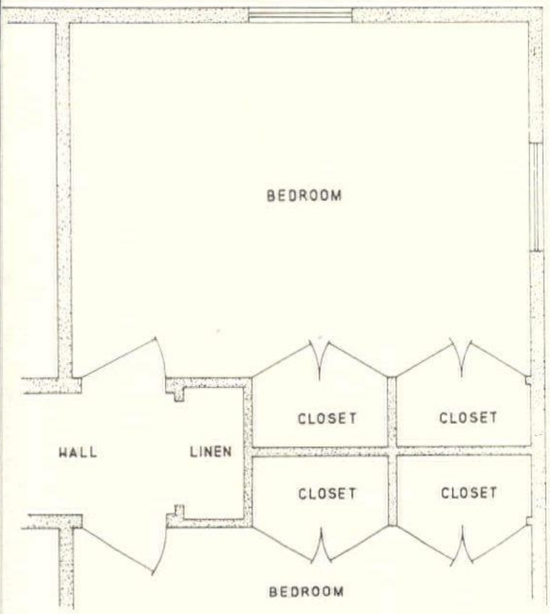
FIREWOOD CLOSET

A good arrangement is a closet convenient to the fireplace. If the design of the house permits a good-sized closet for this purpose, its convenience is enhanced if it is made large enough for the winter's supply of fireplace wood.

If wood is kept in the basement, a convenient arrangement is a wood lift located under a window seat with a hinged top that can be easily raised whenever another log is needed on the fire. Or the lift may be located under bookshelves or a storage cabinet.

SHOE RACKS AND SHOE-CLEANING CABINET

Shoe racks are of four types, two for the wall, one for space below garments that are hanging on hooks, and one a set of shelves for use where floor space is available. The shoe-cleaning cabinet should contain a foot rest, shelves for polishes and brushes, and a hook for a polishing cloth. Shelves should be made adjustable as to height and readily removable.



CLOSETS ARRANGED IN PAIRS IN ADJOINING BEDROOMS. LINEN CLOSET CONVENIENT FROM HALL.

VIEW OF COAT CLOSET ACCESSIBLE FROM ENTRANCE HALL. LAVATORY FACILITIES ARE PROVIDED. WALLS AND DOORS HAVE SANITARY WASHABLE FINISHES OF GLAZED TILE AND ENAMEL.

ROD

To determine length of rod, for garments or hangers, allow space per garment as follows:

Men's and boys' clothing

	Inches
Suits	2
Trousers	3
Overcoats	4
Shirts	1 1/2

Girls' clothing

	Inches
Wash dress	1 1/2
Coat without fur collar	2
Coat with fur collar	3

Women's clothing

	Inches
House and street dresses	1 1/2
Skirt	2
Jacket	3
Evening dress	2
Coat without fur collar	5
Coat with fur collar	6

Minimum distances from center of rod to wall:

	Inches
For adult use	12
For children 6 to 12 years of age	10
For children 3 to 5 years of age	8

DISTANCE BETWEEN FLOOR AND TOP OF ROD OR WARDROBE HOOK (ASSUMING USE OF HANGER WHICH PLACES TOP OF GARMENT 4 INCHES FROM TOP OF ROD):

	Inches
Garments of adults, general use	63
Short coats, skirts, shirts	45
Evening gowns	72
Garments stored in moth-proof bags	72
Garments of children 6 to 12 years of age	45
Garments of children 3 to 5 years of age	30
Distance between top of rod and bottom of shelf above it	2 1/2

HOOKS

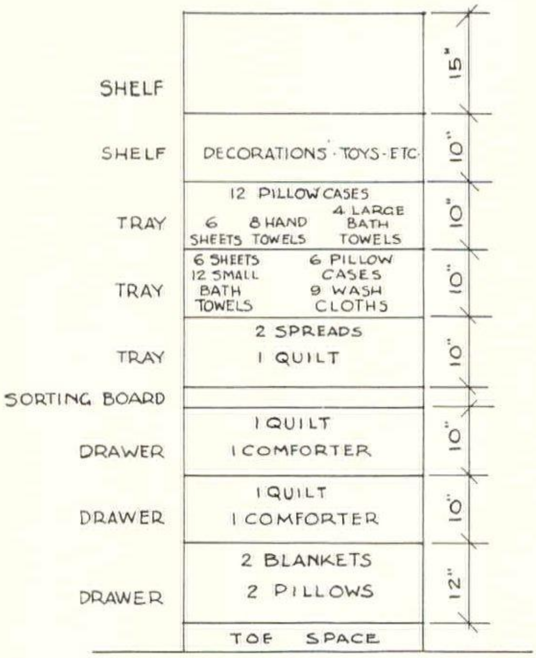
	Inches		Inches
Bedroom closet, hook to hook	7	Hook to corner	3 1/2
Bedroom closet, hook to hook	7	Hook to corner	3 1/2
Play coats, small children	9	" " "	4 1/2
Chore coats, men	12	" " "	6
Distance between top of hook and bottom of shelf above it			4
Depth of space occupied by garments on hooks			4

SHELVES

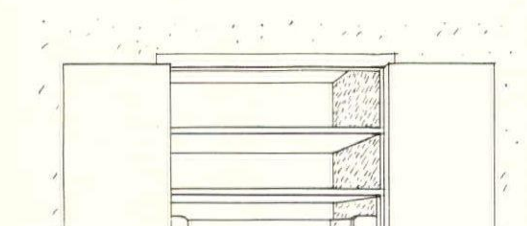
Article	Width of shelf front to back in inches	Length of space side to side in inches	Vertical height between shelves in inches
For a man:			
Hat	14	12	8
Hat box	15	13	9
Cap	12	11	4
Shoes	13	9	7
For a woman:			
Hat	12	12	8
Hat box	14	14	9
Shoes	10	7 1/2	7
For a child:			
Shoes	6-10	5 1/2-7	6

SHOES MAY BE STORED ON LOW SHELVES, OR SHOE RACKS.

The length of the shelf or rack should be 14 inches, 18 inches, or 21 inches, to allow for 2 or 3 pairs of women's or men's shoes.



LINEN CLOSET ARRANGEMENT WITH CAPACITY, DIMENSIONS AND METHOD OF STORING. DESIGNED BY MAUD M. WILSON, HOME ECONOMIST, FOR BUREAU OF HOME ECONOMICS, U. S. DEPARTMENT OF AGRICULTURE.



CLOSET FOR BEDDING AND LINEN—FOR STORAGE OF BED LINEN, BED COVERS, AND TOWELS. NOTE SORTING BOARD AT TABLE HEIGHT.

TELEPHONE BOOTH OR CLOSET

The telephone arrangements of a house should be such that any one can conduct a telephone conversation in an ordinary tone of voice without disturbing or being disturbed by other members of the household. In larger houses this can often be accomplished by installing the telephone, or an extension, in a hall or study. In the smaller house it is often necessary to plan a closet or booth to insure privacy.

Since telephone conversations carried on at home are apt to be long, it is well to install the instrument at sitting height, and to provide a shelf as an elbow rest and a place to write. An ordinary 16-inch backless stool is a satisfactory seating arrangement. A rectangular shelf should be at least 16 inches in depth and 28 inches in width. If triangular, the shelf should measure at least 28 inches on a short side. A shelf placed below this provides convenient space for telephone directories.

A booth 30 inches square is satisfactory for home use.

DIMENSIONS

Telephones: Wall type, small: Cabinet, 7 inches wide x 9 inches high x $3\frac{1}{2}$ inches deep; receiver, add $3\frac{1}{2}$ inches to width; transmitter, add $3\frac{1}{2}$ inches to depth. Desk type: Base, $5\frac{1}{2}$ inches diameter; width over-all, $6\frac{1}{2}$ inches; depth over-all, 6 inches; height over-all, 12 inches. Bell box: 7 inches wide by 9 inches high by 4 inches deep.

Directories: Maximum size, $9\frac{1}{2}$ inches x $11\frac{3}{4}$ inches.

User: Depth of space under table required for feet, 16 inches; width of space required for freedom of arm movement, 14 inches at either side of center of mouthpiece; distance from mouth of user to mouthpiece of instrument, 3 inches.

Booth and installation: Booth itself, 30 x 30 inches. Size of writing shelf, triangular type, minimum length of leg of triangle, 28 inches; rectangular, minimum width, 16 inches; minimum length, 28 inches. Width of lower shelf, 2 inches less than upper shelf. Distance from floor to top of writing shelf, 28 inches. Maximum distance from top of upper shelf to bottom of lower shelf, $3\frac{1}{2}$ inches.

Installation of wall type of telephone. Use bracket or frame long enough to bring back of cabinet $6\frac{1}{2}$ inches into room. This will bring the plane of the mouthpiece to 3 inches from edge of writing shelf. Install so that height of center of mouthpiece is $38\frac{1}{2}$ inches from floor.

TRUNKS AND FURNITURE CLOSET

In planning a house with neither basement nor attic, it is desirable to include a closet for trunks and unused furniture. This room is likely at various times to provide space for a baby carriage, high chair, or crib; unused bedsteads, springs, mattresses, cots; trunks, chests, and traveling bags; extra chairs; furniture awaiting repair; holiday decorations; cast-off clothing; books, sheet music, or magazines.

Trunks are valuable for storing unused clothing and bedding. They should be placed where they may be opened without moving them or articles stored nearby. If not needed for this purpose, trunks may be piled one upon the other.

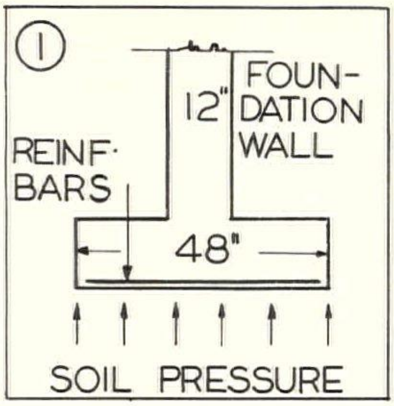
Wide shelves should be provided for traveling bags, boxes, and small articles. Mattresses may be rolled and covered.

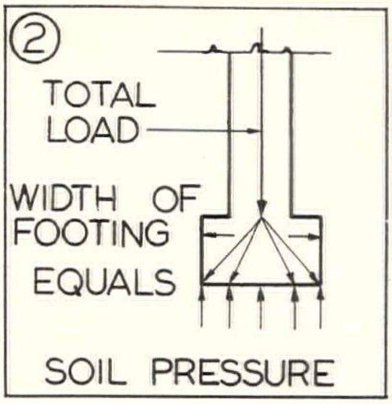
In general, it is best to store articles on the same floor on which they are likely to be used. First floor or basement space is desirable for camping equipment and porch furniture; extra beds should be stored on the floor with bedrooms.

A room 6 x 8 feet is generally large enough for these purposes. This size will permit the storage of luggage, child's furniture, and extra beds, but it does not allow for much unused furniture. If no beds are stored, a closet 4 x 6 feet is adequate.

Information on Closets taken from Closet Arrangements for the Farm House. By Maud M. Wilson.

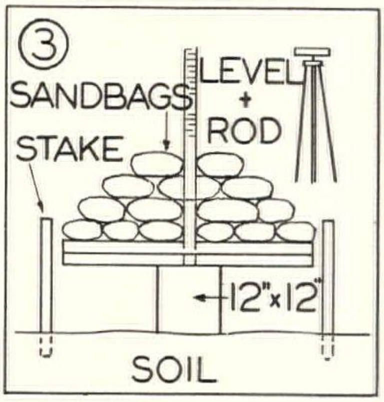
SMALL HOUSE FOOTING DESIGN





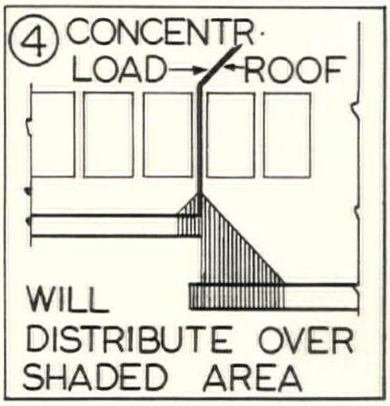
By SHELDON D. WERNER

The importance of proper footing design for small houses is attested by the general prevalence of settlement cracks in such structures. It is common practice to specify that framing be carried around chimneys, because the chimney footing is obviously more heavily loaded than the adjoining walls, but it is apparently not generally realized that the several walls of a house differ in loading to a greater extent than exists between the chimney and walls. The function of any footing is to distribute the load over an area sufficient to reduce the settlement to a certain tolerance, depending on the character of the soil. In the case of a building with isolated and continuous unreinforced concrete footings, it becomes a great importance to proportion them so that an equal soil pressure is obtained at every point. If this is not done, the footing will crack near the line where the load changes, the more heavily loaded portion settling at a faster rate than the lightly loaded portion (Figure 6).



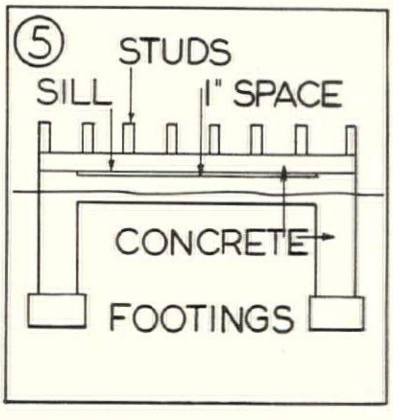
Shear and bending do not generally enter into the design of small house footings, because of the light loads involved and the absence of concentrations. It is safe to assume that where the footing width is less than four times the thickness of the wall it supports, reinforcing will not be required. Where this ratio is exceeded, the footing must be considered as a series of 12″ wide beams supported by the wall in the center, and carrying the soil pressure as a uniform load (Figure 1).

If the value of steel required per lineal foot of wall is found to be less than .05 square inches, it may be disregarded entirely, and the steel omitted. All other stresses may be disregarded and the problem of proportion analyzed.

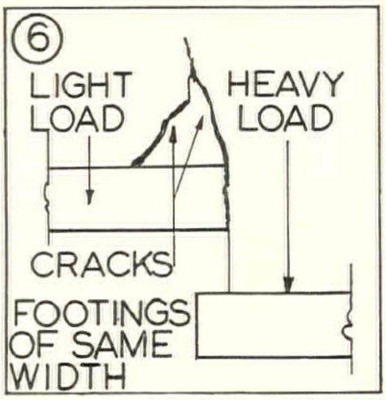


It is first necessary to determine the load per lineal foot separately for each section of the wall where it varies, and per unit for chimneys, lally columns, post footings, or other points of concentration. It must be remembered that settlement is the product of load and time, so that maximum stresses and live loads are not considered unless they are of long duration.

The weight of the footing itself must necessarily be inserted after the other loads have been determined, since its size must be assumed until the analysis is complete. This can usually be done without any appreciable error after the loads are tabulated, and if the assumed weight is found to be within 100 lb. of that required, no revision is necessary. The most lightly loaded walls will determine the soil pressure to be used, and should have no footing at all unless required by the building code, in which case it should be the minimum size. The soil pressure per square foot will then be the total load per lineal foot, divided by the width of the wall in feet, or the minimum footing width (Figure 2, 7 and 8). The width of all other footings is then readily determined by dividing the load per foot by the soil pressure. This will result in an even square foot load over the entire foundation, and comparatively even settlement. Where the soil is not of the same character under all the footings, or where rock is encountered, in part, the difference in bearing values should be determined by test, and footings over the softer soil be increased in direct proportion.

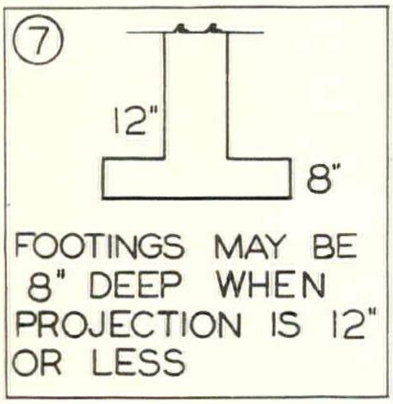


The method of testing, and the value of the results will vary greatly, and where any extreme condition is encountered, should be left to the judgment of a competent engineer. An economical test may be performed by constructing a substantial platform of wood, 4′ x 4′, and placing a built-up, but carefully leveled 12″ cube of wood in its exact center (Figure 3). This block is placed on the undisturbed earth in the excavation, the platform held in a horizontal plane by stakes which do not

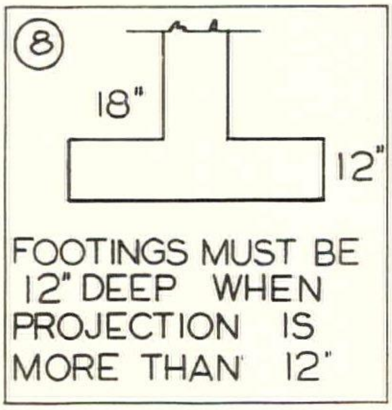


interfere with its vertical movement, and a level reading taken. The platform is then loaded with cement or sand bags of known weight, and at a uniform rate of speed, until a settlement of 1/4 or 1/2 inch is noted. The weight and the time in placing the weight are noted, and compared with similar tests at other points. If this is carried out with precision, a good indication of the value of the soil in resisting settlement will be obtained, and the results used to advantage, as stated above.

The weight of chimneys is found by computing the whole cubical contents and deducting openings for flues, fireplaces and ash pits. Posts and lally columns will generally produce a sufficient concentration to require a footing, and each should be investigated and provided for by dividing the total load by the soil pressure and using a square footing. For chimneys or rectangular piers, the footing shape should approximate that of the masonry it supports.

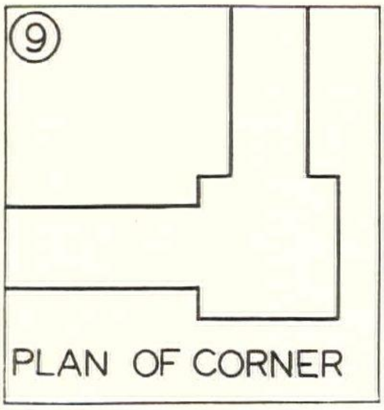


It will often be found that roof valleys will concentrate a considerable load at the corner of a wall, and, if there are door or window openings closely adjoining the corner, will leave, in effect, a slender column of wood or masonry, bringing this concentration plus that of the lintels, to the foundation wall (Figure 4). Should the foundation wall continue past the corner, in line with either of the outside walls, the concentration will spread downward from the point of application at a 90° angle, and thus distribute the load over a length approximately equal to the depth of the wall. In this case, the footing should be widened over that length by an amount equal to the concentrated load, divided by the soil pressure plus the length of the distribution. Where the foundation wall turns the corner but is not connected with interior foundation walls, the distribution will be small and the entire additional footing required should be placed at the corner, forming a square in which the concentration is centered (Figure 9). This should also be done where the walls are continuous but of greatly varying depth. The same principle will apply to floor girders, or any member producing a concentration greater than one-half the uniform load per foot of the supporting wall. Where the concentration is less than one-half it may be disregarded.



It will sometimes be found that in very small houses, with a partial cellar, the most lightly loaded wall will carry only 250 pounds per lineal foot, and the more heavily loaded cellar walls as high as 2,500. Assuming the 250-pound wall to be 8″ thick and without a footing, the soil pressure will be 375 pounds per square foot, and the 2,500-pound wall will require a 7′ 6″ wide footing to produce an equal 375-pound soil pressure throughout. To eliminate this condition it is necessary to increase the soil pressure under the 250-pound wall by using piers, spaced for example 10 feet apart, and building the intermediate spandrel walls so that they do not support the house sill, but just hold it in position (Figure 5). This will increase the total load to 2,500 pounds at each pier footing, and by making these 1′ 5″ square, result in a 1,250-pound soil pressure, thus requiring a 2′ footing for the 2,500-pound wall. In this case, the house sill will carry the load from pier to pier, and should be made a minimum of 6″ x 6″ instead of the usual 4″ x 4″ or 4″ x 6″. The spandrel wall should then be laid with a 1″ space between the sill and masonry.

Concrete block foundation walls which carry a load in excess of 400 pounds per lineal foot will require a footing because of the greatly reduced bearing area of this block, although it may be only the width of the wall where calculation shows no footing is required. In larger houses, where the footing loads may run in excess of 4,000 pounds per lineal foot, the soil pressure should not exceed 4,000 pounds per lineal foot, unless tests or previous experience show soil at that particular site to be safe for a higher pressure. Retaining walls, or any wall, not supported at the top, require a footing designed to resist an overturning moment.

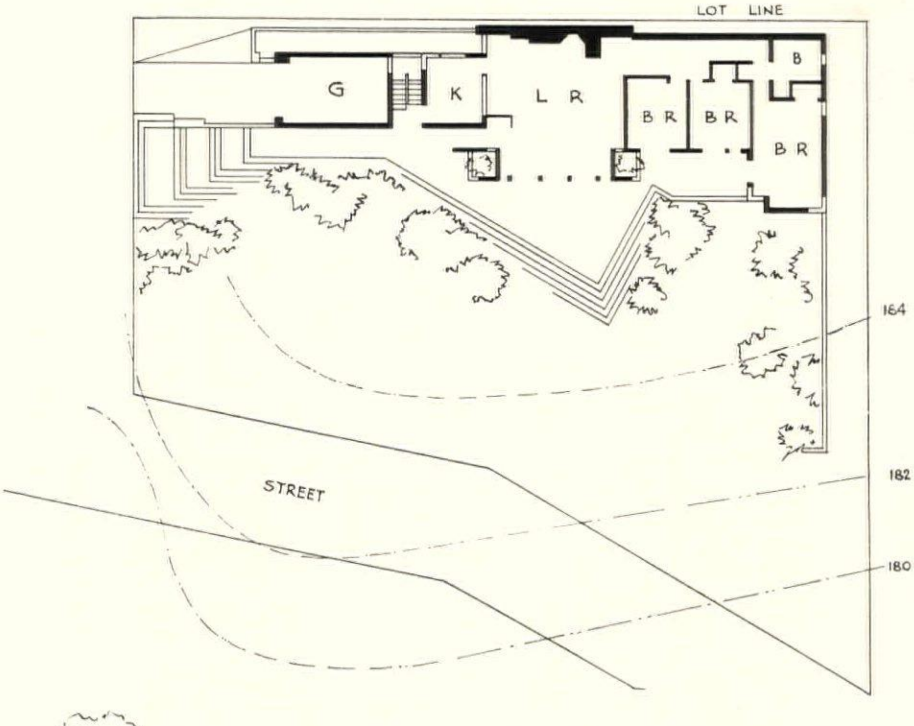


The dead load should be selected first and the floor live loads added or proportioned over the area covered. Thus, if a span of 18 feet supports a living and dining room, an average of 6 pounds per square foot should be added to the dead load for this area, the weight per lineal foot being nine times that amount of each supporting wall.

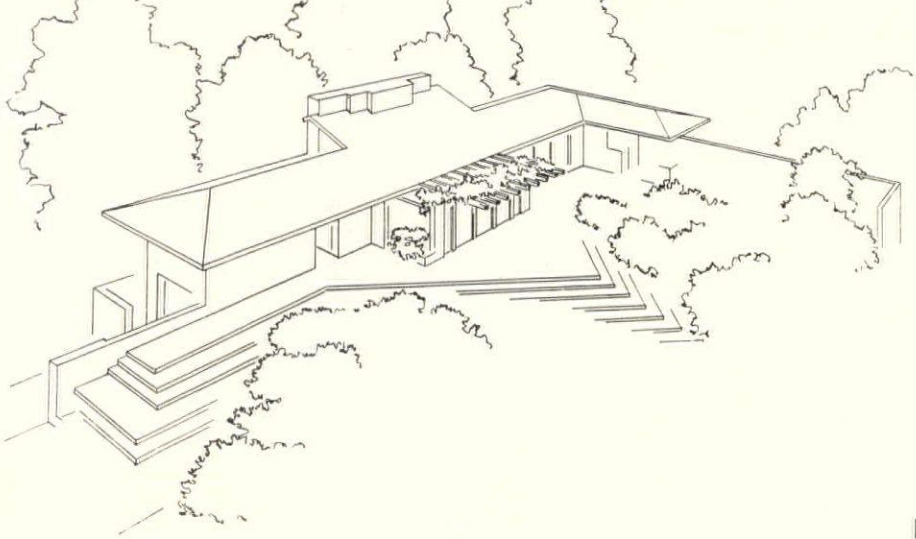
Ordinary shrinkage cracks are likely to appear in any building shortly after completion, but these usually occur only once, and seldom affect the foundation walls. Settlement, however, is a continuous process, and will produce cracks which cannot be permanently repaired. These are especially serious in foundation and masonry walls, since they leave an opening for frost and termites, two very destructive agencies.

Photographic Laboratory, University of Minnesota

PORTFOLIO OF HOUSES

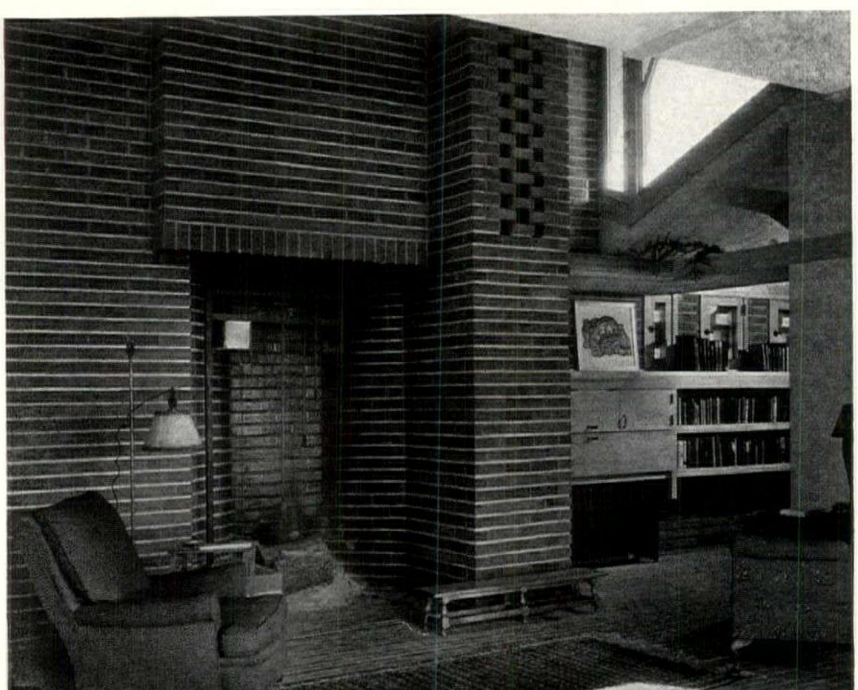


HOUSE OF PROF. MALCOLM WILLEY IN MINNEAPOLIS



FRANK LLOYD WRIGHT, ARCHITECT

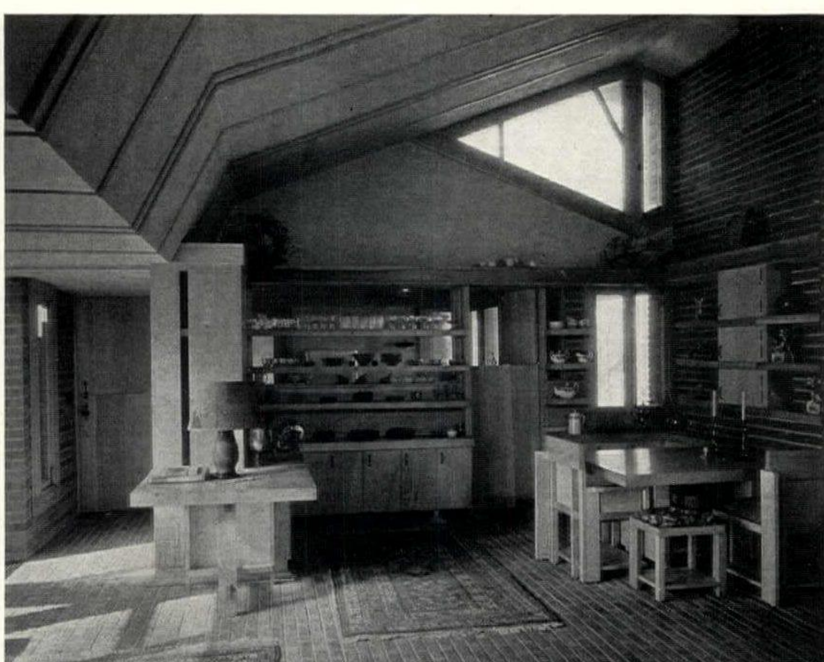
Photographic Laboratory, University of Minnesota



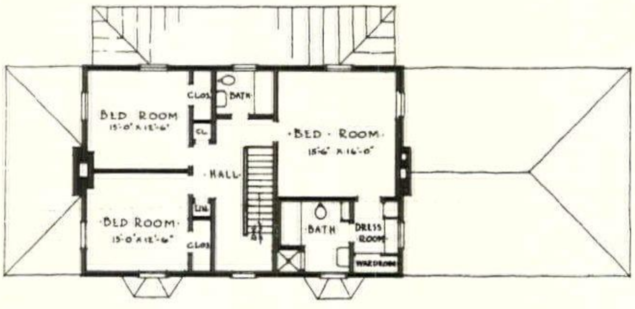
(ABOVE) LIVING ROOM WAS PLANNED FOR OUTDOOR VIEW. (LEFT) FIREPLACE DETAIL

HOUSE OF PROF. WILLEY
MINNEAPOLIS

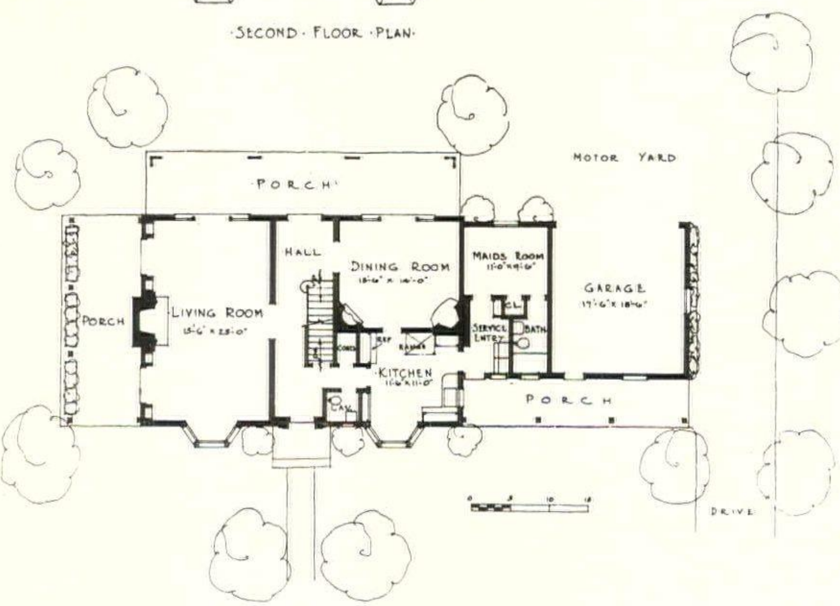
(ABOVE) KITCHEN IS ADJACENT TO LIVING ROOM. (RIGHT) DETAIL OF DINING SPACE.



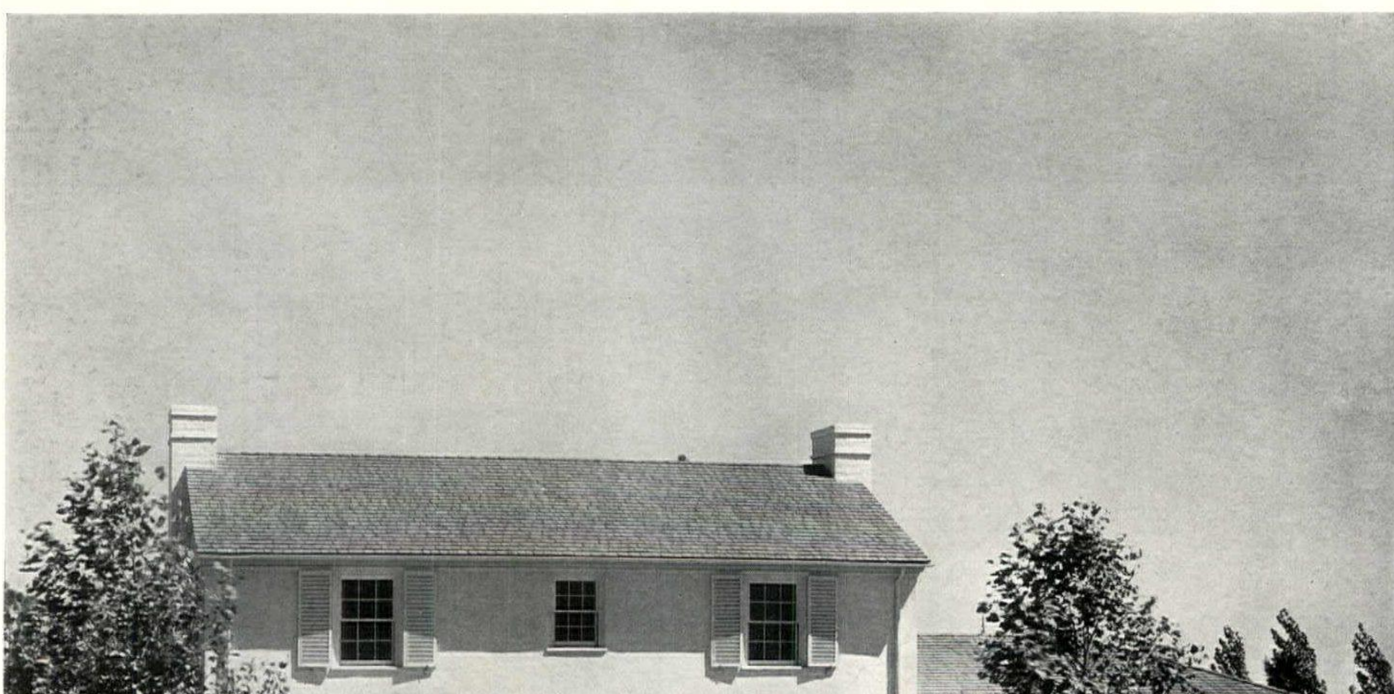
FRANK LLOYD WRIGHT
ARCHITECT



·SECOND · FLOOR · PLAN·



The arrangement of rooms in this house takes advantage of views to the southeast and north. The simple plan and design make for economy of construction. Structural system: wood frame and stucco exterior; shingle roof. Windows: Libbey-Owens-Ford standard glass, double-hung wood sash, bronze screens. Color scheme: walls and trim painted white. All interior trim: Vitrolite enamel. Interior walls papered. Floors: oak throughout except for tile in bathrooms. Polished brass Luminaire lighting fixtures and Russwin hardware in living room, dining room and halls; pewter in bathrooms, chromium in kitchen and baths. Heating system: Payne gas-fired hot-air furnace.



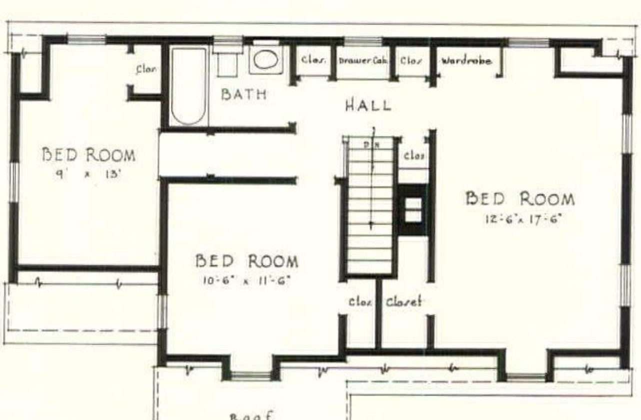
Photographs by George D. Haight

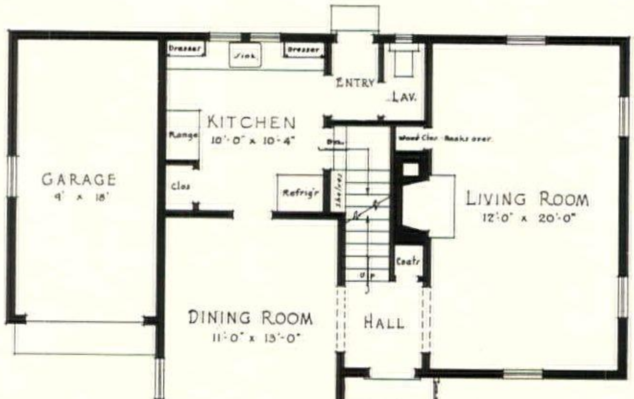
H. ROY KELLEY
ARCHITECT

FRED BARLOW
LANDSCAPE ARCHITECT

Photographs by Gustav Anderson

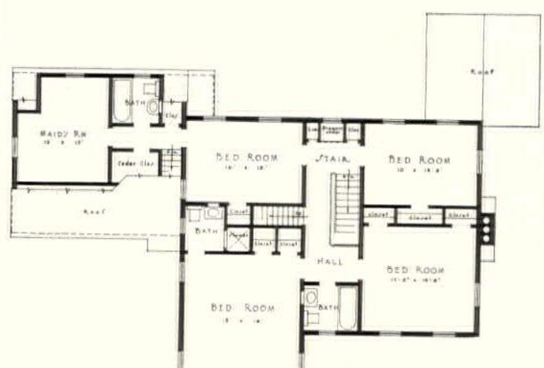
TWO LONG ISLAND HOUSES BY M. R. JOHNKE, ARCHITECT





(ABOVE) HOUSE IN ROCKVILLE CENTRE

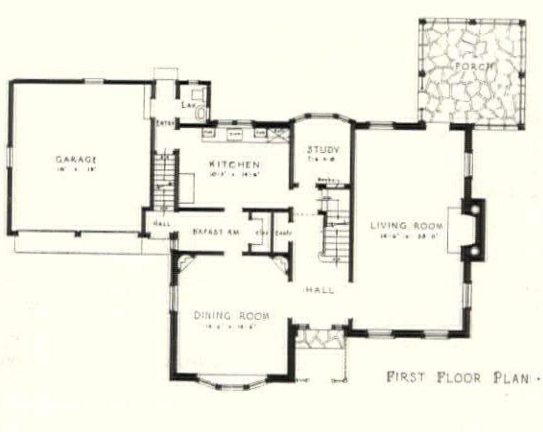
Compactly planned, this house serves the requirements of a family of three adults and two children. Structural system: poured concrete foundations; wood frame with hand-rived shingle facing, stone and brick veneer; Vermont gray slate roof; Celotex insulation. Random width plank floors in main rooms, slate flagging on porch and terraces. Color scheme: whitewashed brick, white trim, gray stained shingles, green shutters. Heating: two-pipe vapor vacuum hot-water system; American Radiator recessed radiators. Cost, including oil burner, gas range, landscaping: $14,000.



SECOND FLOOR PLAN

(LEFT) HOUSE OF MARTHA ELLISON AT HEMPSTEAD, LONG ISLAND, N. Y.

Structural system: poured concrete foundations; wood frame with shingle facing; shingle roof; Celotex insulation board used as a base for interior plaster finish. Red oak floors. Color scheme: walls painted white, shutters and roof green (Sherwin-Williams). Windows: Pennvernon standard glass, double-hung wood sash, copper screens. Heating: two-pipe steam system. Cost, including oil burner, gas range, landscaping: $4,500.



FIRST FLOOR PLAN

Photograph by Gustav Anderson

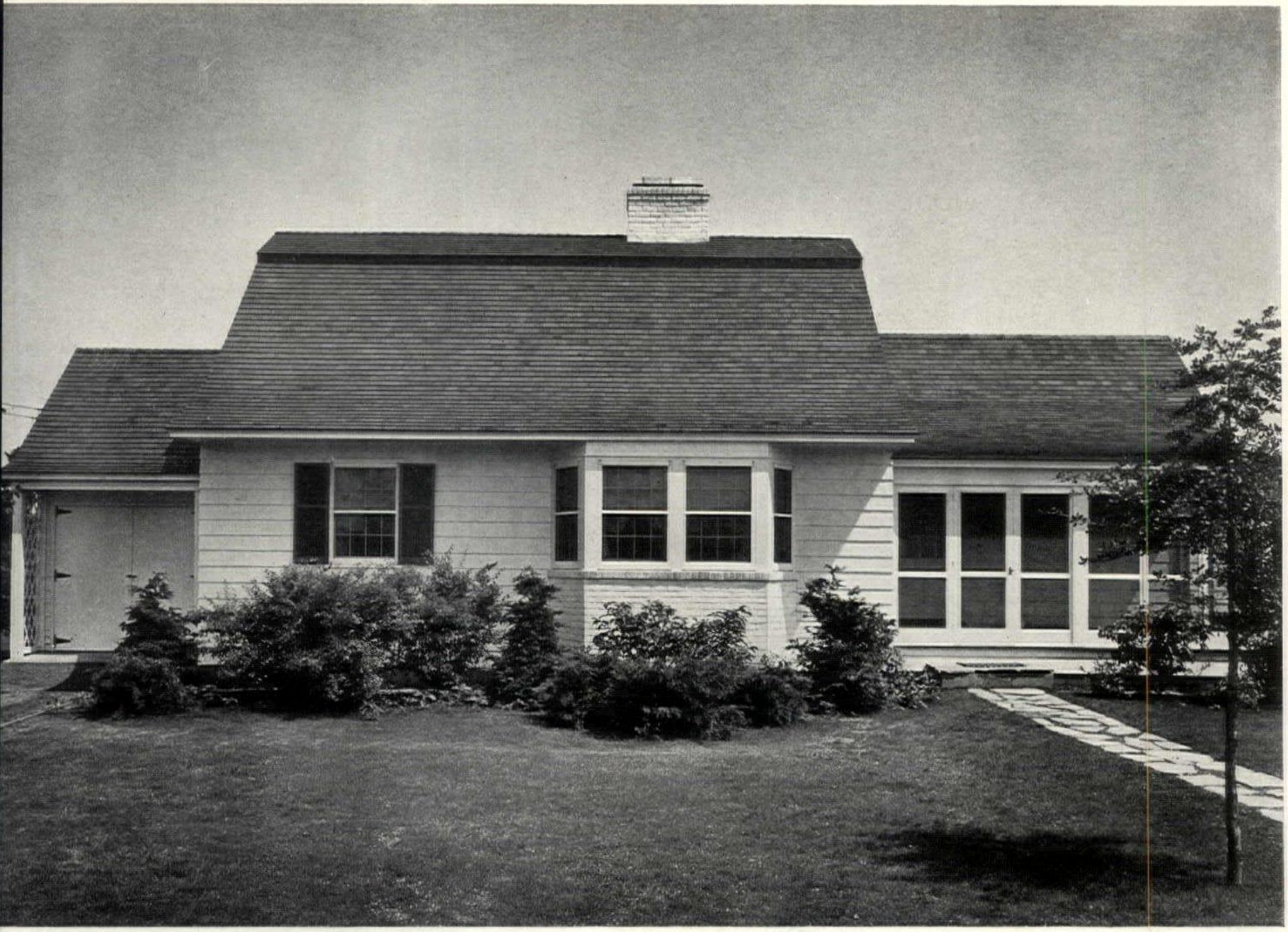
(LEFT) HOUSE OF MRS. HOOD AT HEMPSTEAD, LONG ISLAND, NEW YORK
M. R. JOHNKE, ARCHITECT

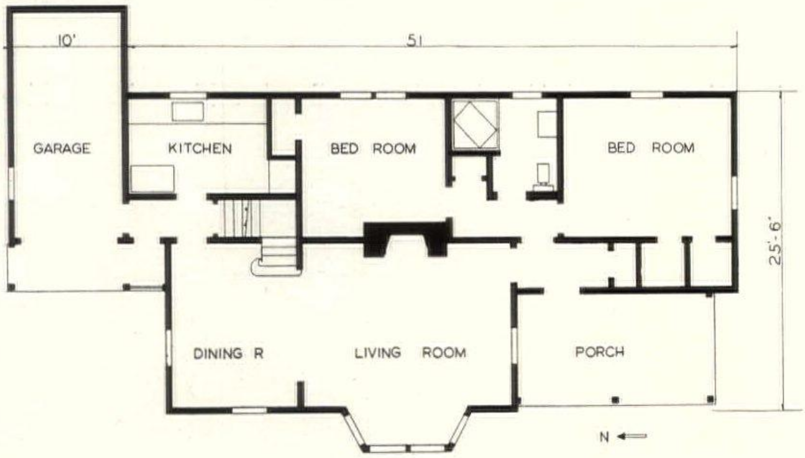
(BELOW) "THE WILLSHIRE"—AT ORCHARD HILL, WESTCHESTER, NEW YORK
RANDOLPH EVANS, ARCHITECT

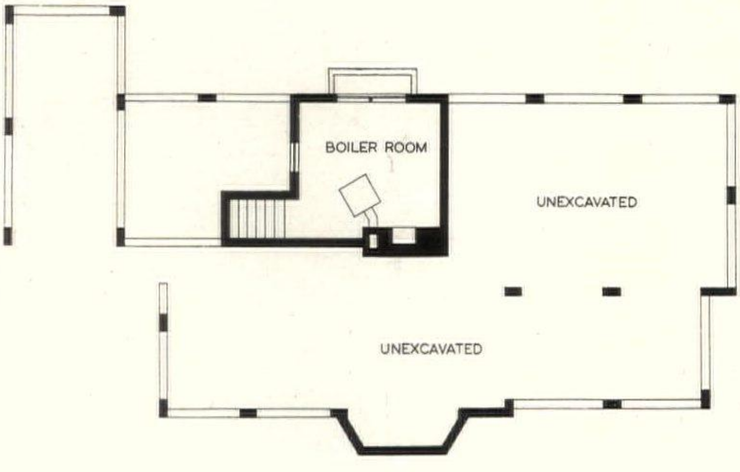
"THE BARNSTABLE" — AT HARBOUR GREEN, MASSAPEQUA, LONG ISLAND

RANDOLPH EVANS, ARCHITECT

Photographs by Gustav Anderson







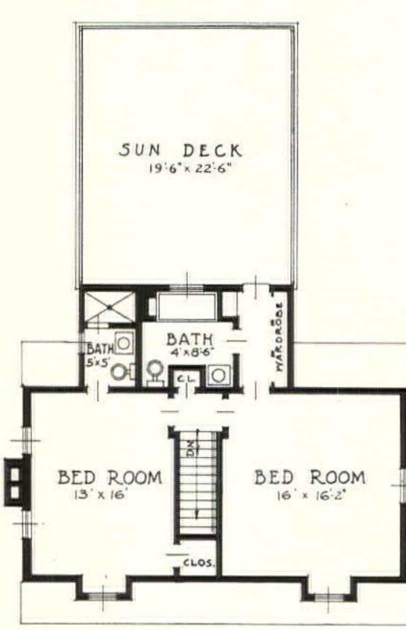
Rooms are all grouped on one floor with space available for additional rooms on second floor. Cellar is unexcavated except for a boiler room. Structural system: poured concrete foundations; wood frame walls and shingle facing; Johns-Manville insulation lath applied to ceilings. Windows: standard glass, double-hung wood sash, bronze screens. Color scheme: white walls, green blinds, green shingled roof. Floors: oak throughout. Pewter lighting fixtures of Colonial design. Schlage brass hardware. Steam heating system. Built-in features: kitchen cabinets, equipped with electric washing machine, recess for trays in kitchen, shoe racks in bedroom closets. Cost: $5,500 for house, $1,700 for furnishings, $140 for landscaping.

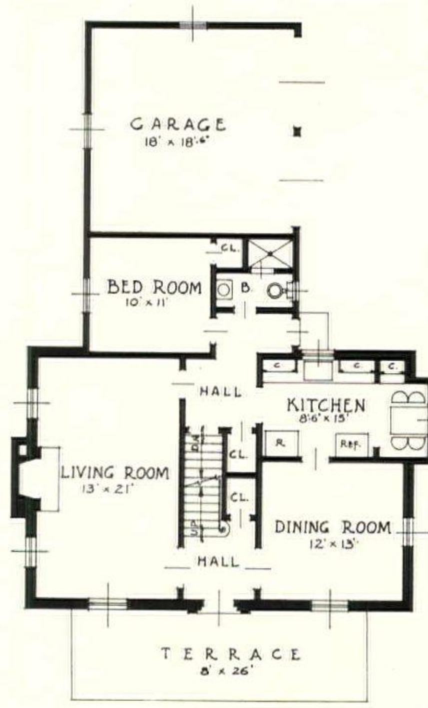
Photograph by Murray M. Peters

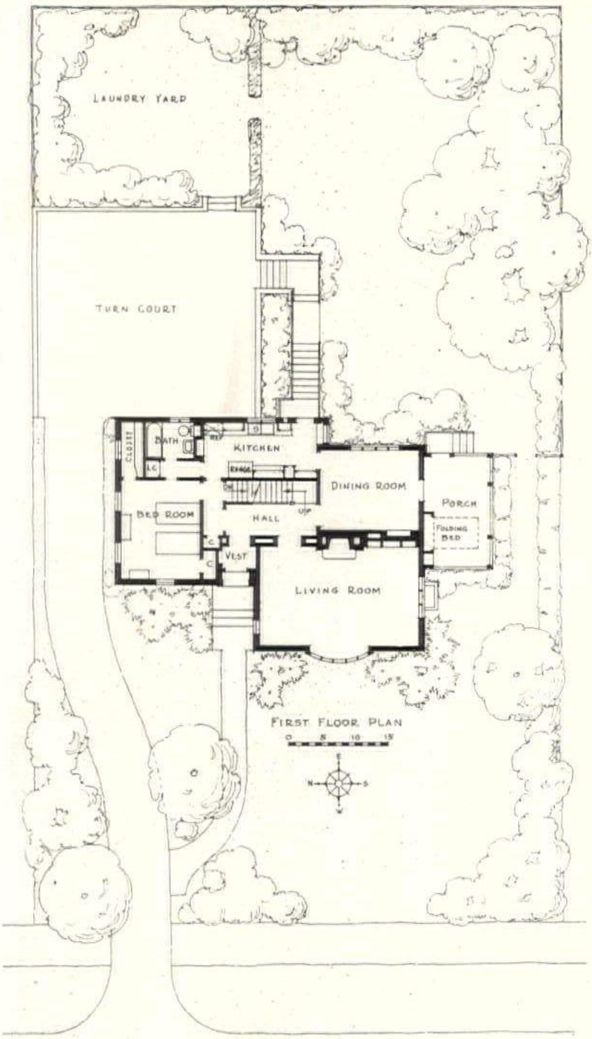
HOUSE OF MRS. A. E. KEARNEY AT ROCKVILLE CENTRE, LONG ISLAND

WALTER D. SPELMAN, ARCHITECT

Structural system: poured concrete foundations; wood frame with brick veneer painted white; Reynolds Metallation; slate roof; copper gutters and leaders. Rear unit: stucco walls; flat roof built up with 5-ply Ruberoid surface. Floors: red oak in main rooms; Armstrong linoleum in kitchen and rear hall; ceramic mosaic tile in bathrooms. Windows: Libbey-Owens-Ford standard clear glass, double-hung wood sash, copper screens. Green painted shutters. Schlage brass hardware. Plumbing: Kohler fixtures with chromium fittings and brass pipe. Steam heating system: oil burner, Kohler boiler. Building cost: 30¢ a cubic foot.







HOUSE AT INTERLACHEN PARK
NEAR MINNEAPOLIS

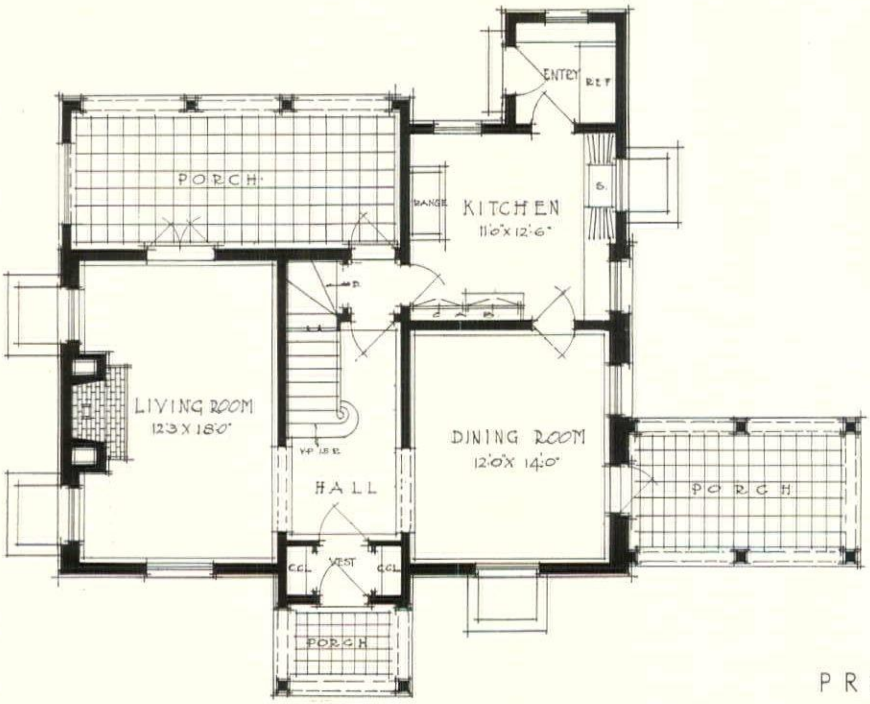
ROLLIN C. CHAPIN, ARCHITECT

NICHOLS, CORNELL AND NASON
LANDSCAPE ARCHITECTS

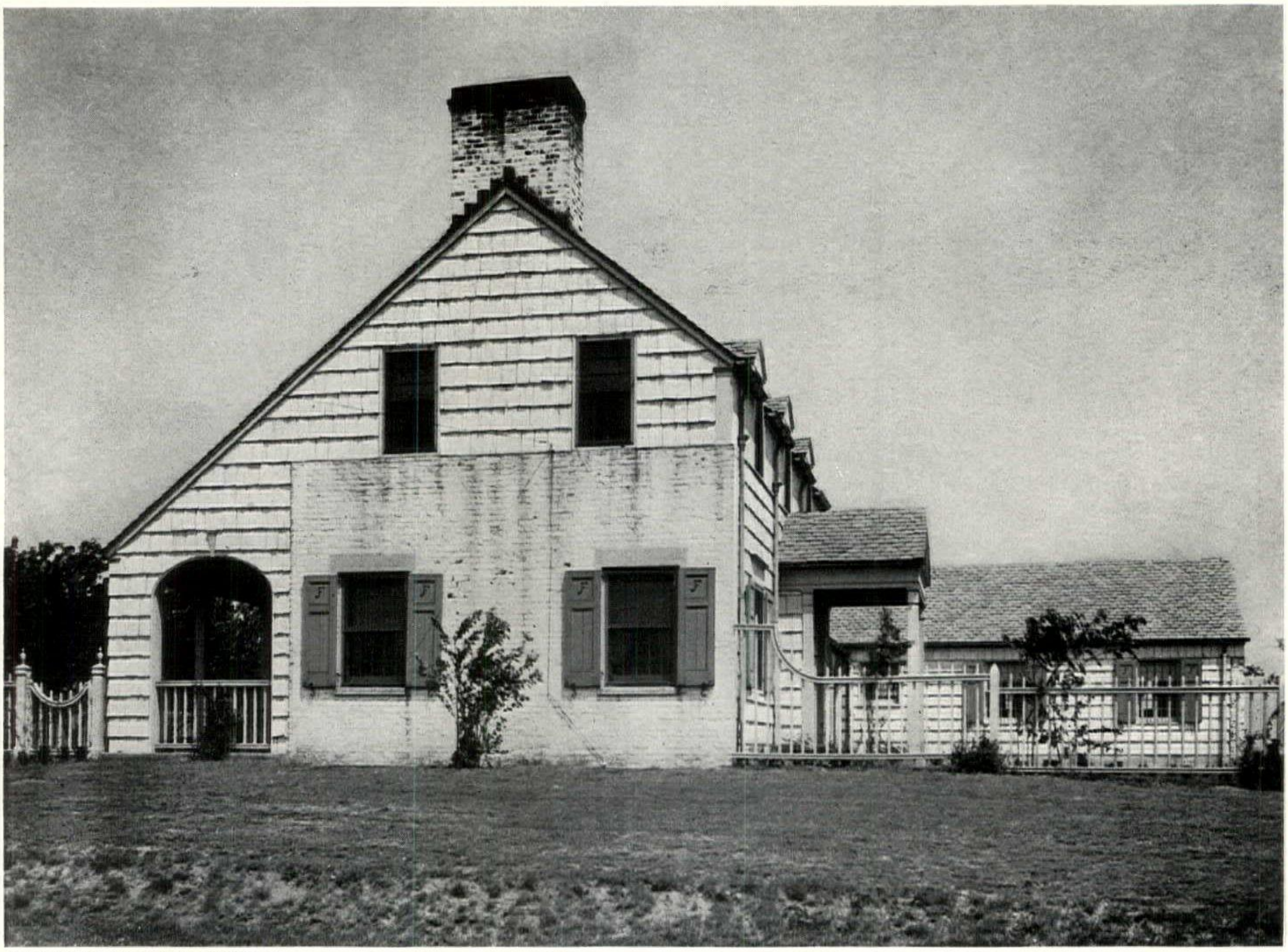
Living room, dining room and porch are grouped on south end of house where a view is obtained over wooded country and a nearby golf course. Structural system: concrete block foundations; brick veneer walls; shingle roof; Celotex blanket-type insulation. Color scheme: stained white walls, stained medium brown roof, dull red brick chimney, light brown sash and trim. Sargent hardware. Windows: Pennvernon glass, wood sash, bronze screens. Air conditioning system: Lewis air conditioner for humidification; hot-water heating. Cost, including driveway, walks, retaining walls, sewage disposal system, water supply system: $14,300.

TWO COTTAGES AT FORSGATE COUNTRY CLUB, JAMESBURG, N. J.

CLIFFORD CHARLES WENDEHACK, ARCHITECT

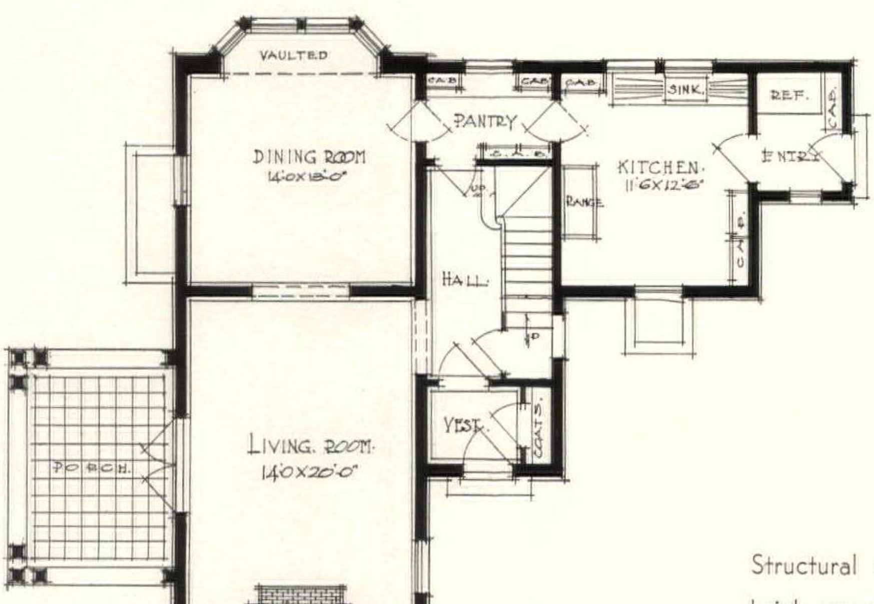


PROFESSIONAL'S COTTAGE



Photographs by Gustav Anderson

SUPERINTENDENT'S COTTAGE

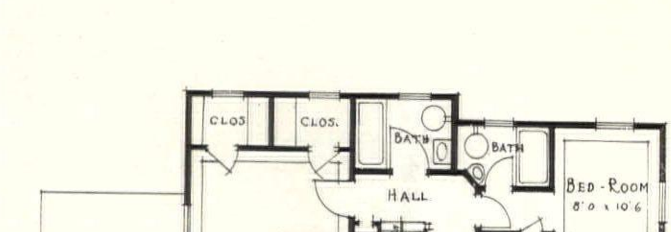


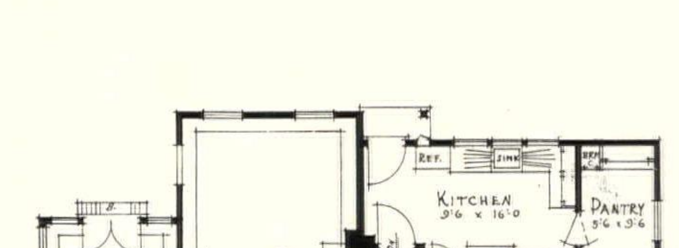
Structural system: concrete foundations; frame walls; brick veneer and shingle facing; slate roof. Oak floors in main rooms, bluestone passage. Corbin hardware. Windows: plate glass, double-hung wood sash, bronze screens. Steam heating system. Cost: approximately $8,000.

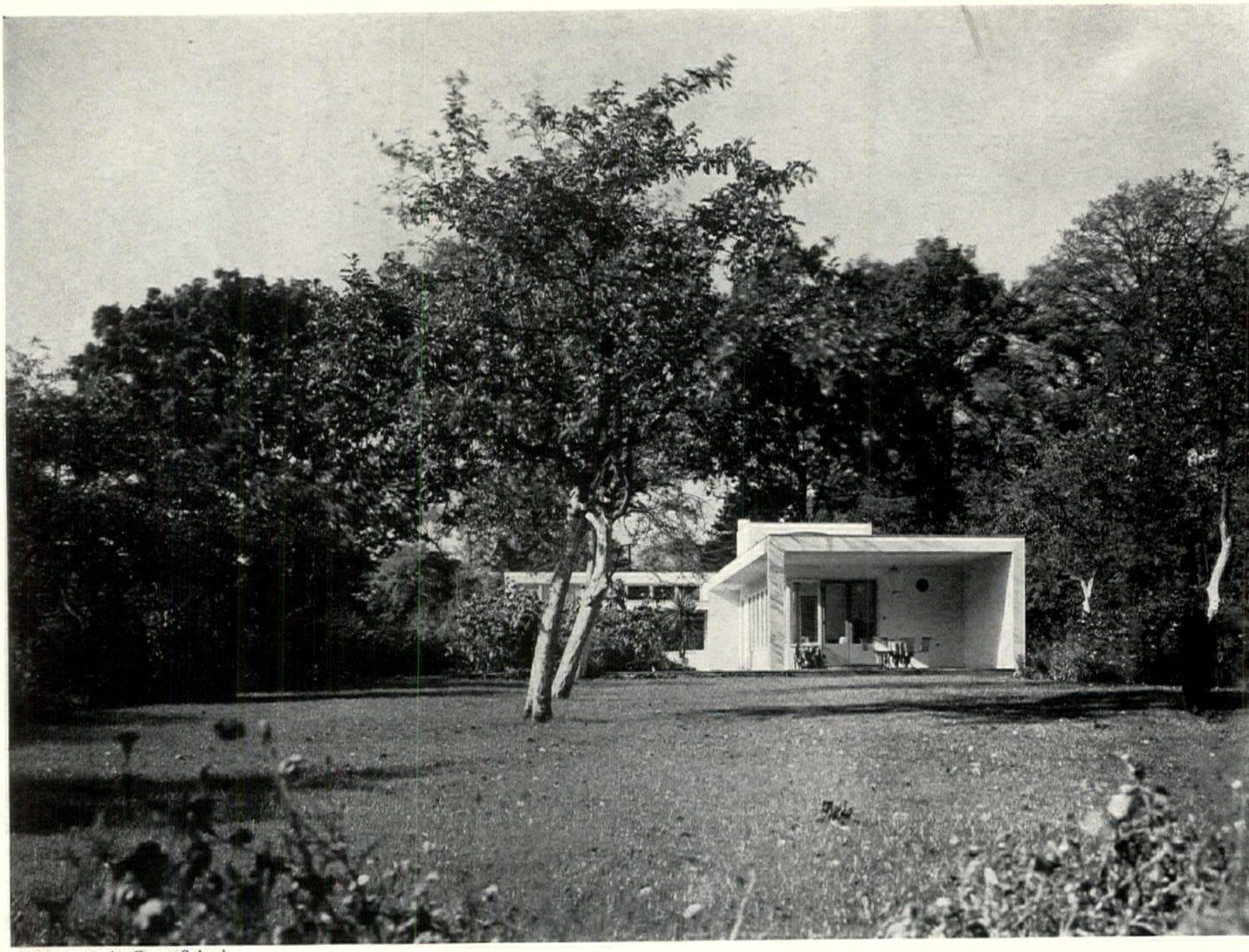
HOUSE OF HOWARD TOWNSEND, JR., AT DOUGLASTON, LONG ISLAND
GEORGE ROGER THOMPSON, ARCHITECT

Photographs by George H. Van Anda

Structural system: concrete foundations; wood frame with shingle facing; shingle roof. Oak floors in principal rooms, tile in sun room. Interior wall finishes: painted plaster and wall paper. Corbin brass and chromium hardware. Steam heating system. Windows: standard glass, steel casement and wood casement, double-hung sash. Cost: $13,500.

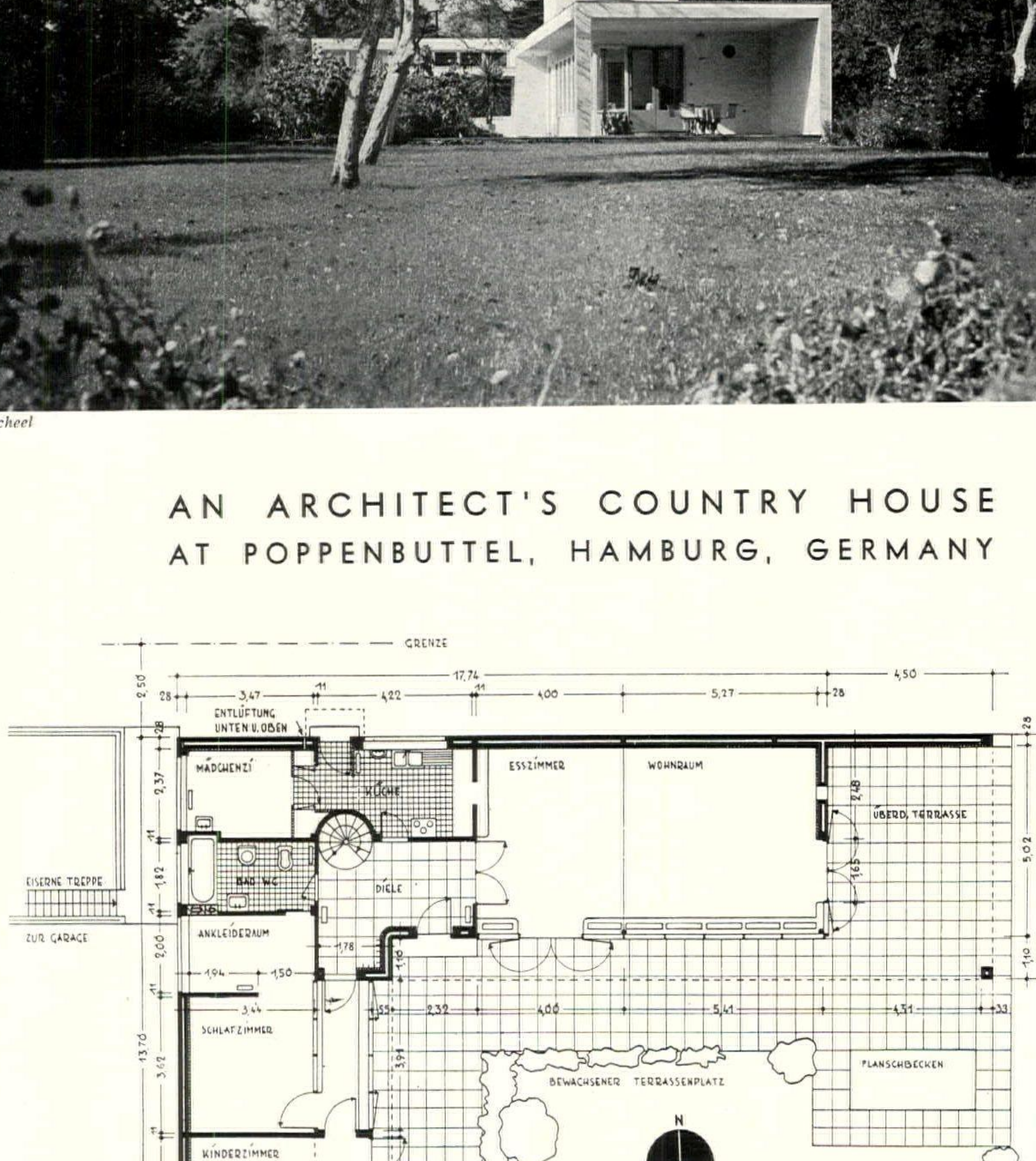




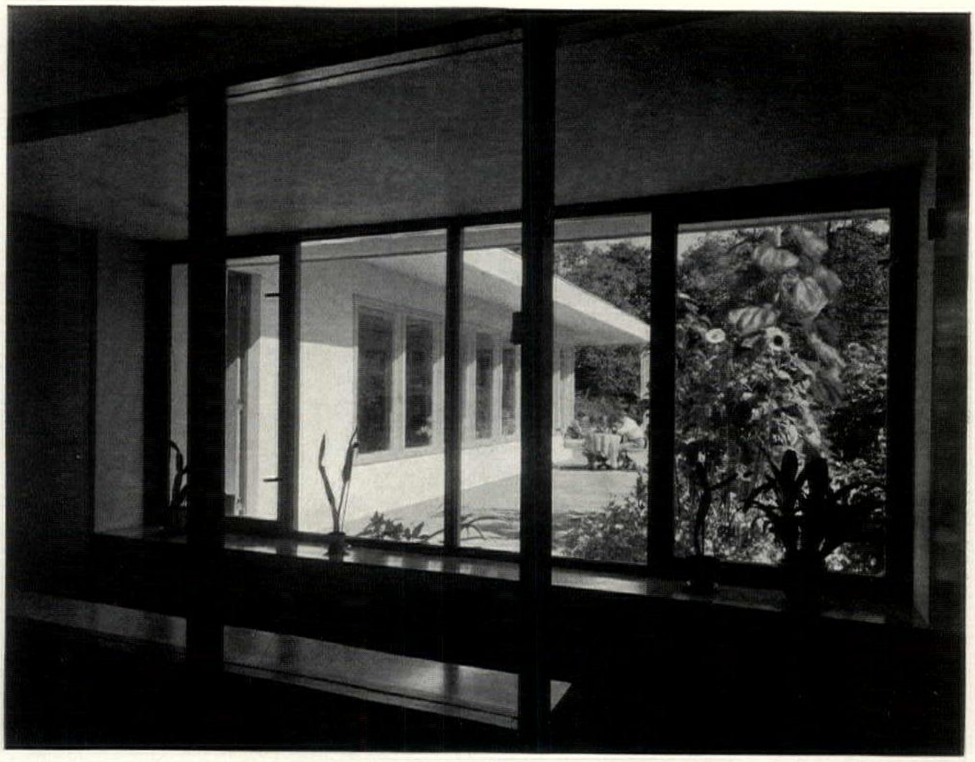


Photographs by Ernst Scheel

AN ARCHITECT'S COUNTRY HOUSE AT POPPENBUTTEL, HAMBURG, GERMANY



ERT HAUSCHILDT
ARCHITECT



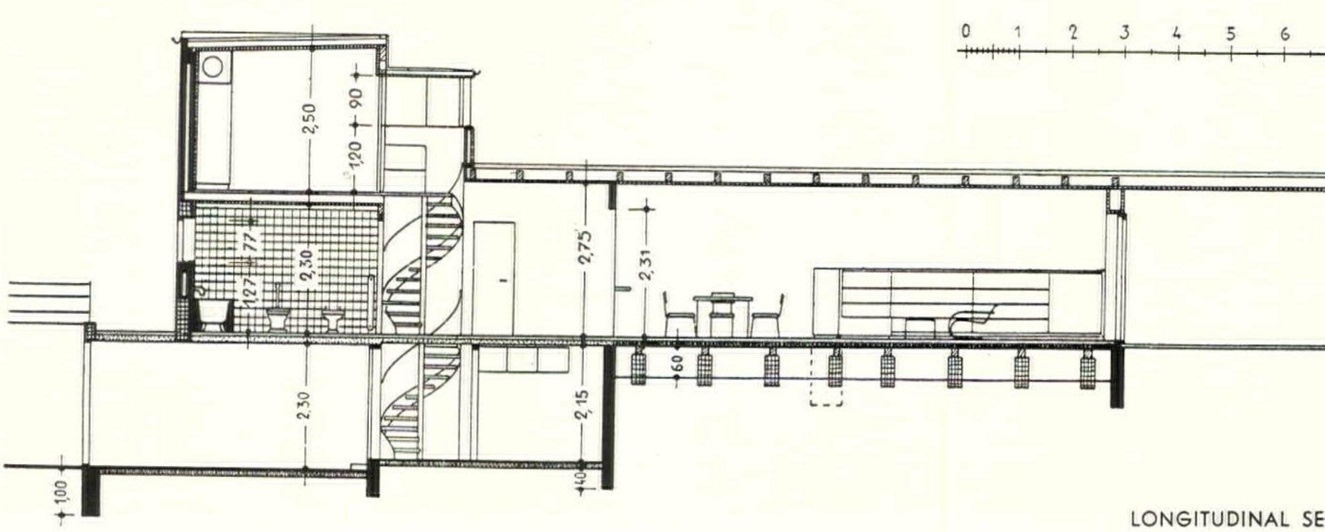
VIEW FROM BEDROOM CORRIDOR

H TERRACE OPENING OFF LIVING ROOM

Photographs by Ernst Scheel

LIVING

COUNTRY HOUSE OF ALBERT HAUSCHILDT, ARCHIT
AT POPPENBUTTEL, NEAR HAMBURG, GERMA

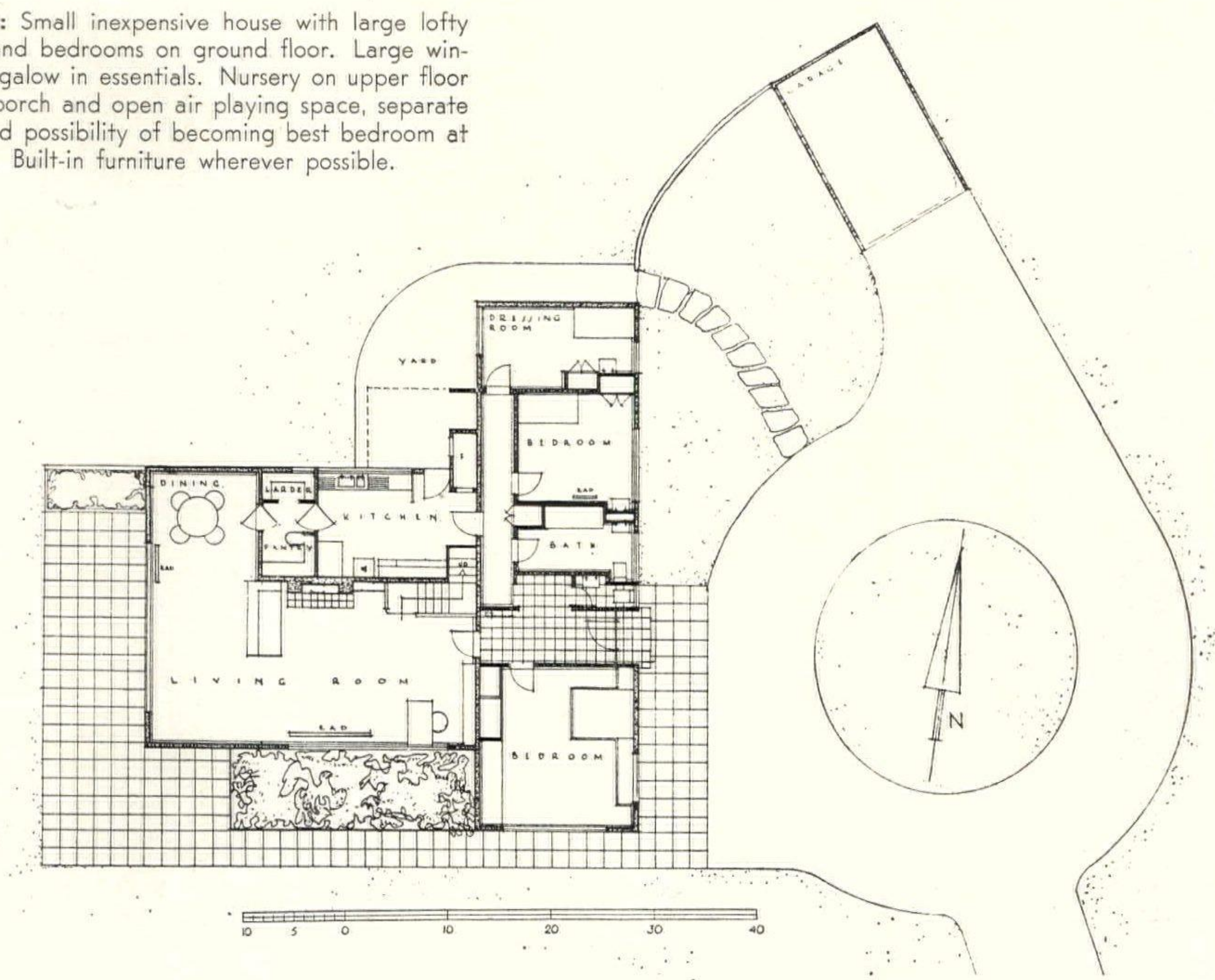


LONGITUDINAL SE

A CONCRETE HOUSE AT NAST HYDE, HATFIELD, ENGLAND

DESIGNED BY F. R. S. YORKE

Requirements: Small inexpensive house with large lofty living room and bedrooms on ground floor. Large windows. A bungalow in essentials. Nursery on upper floor to have sun porch and open air playing space, separate bathroom, and possibility of becoming best bedroom at a later date. Built-in furniture wherever possible.

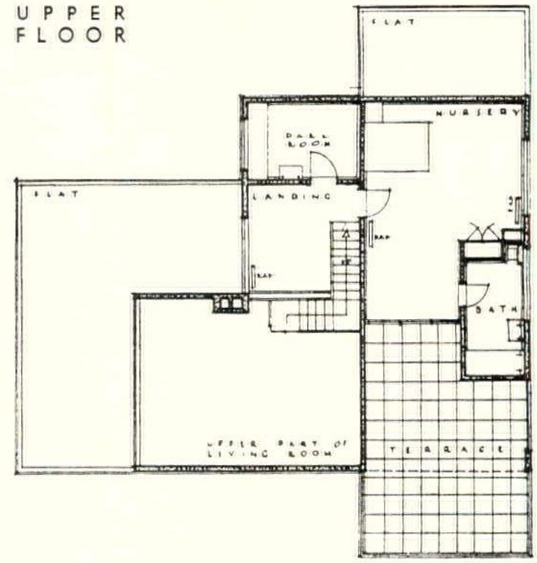


GROUND FLOOR

Photograph by Dell and Wainwright

BUILT-IN FURNITURE

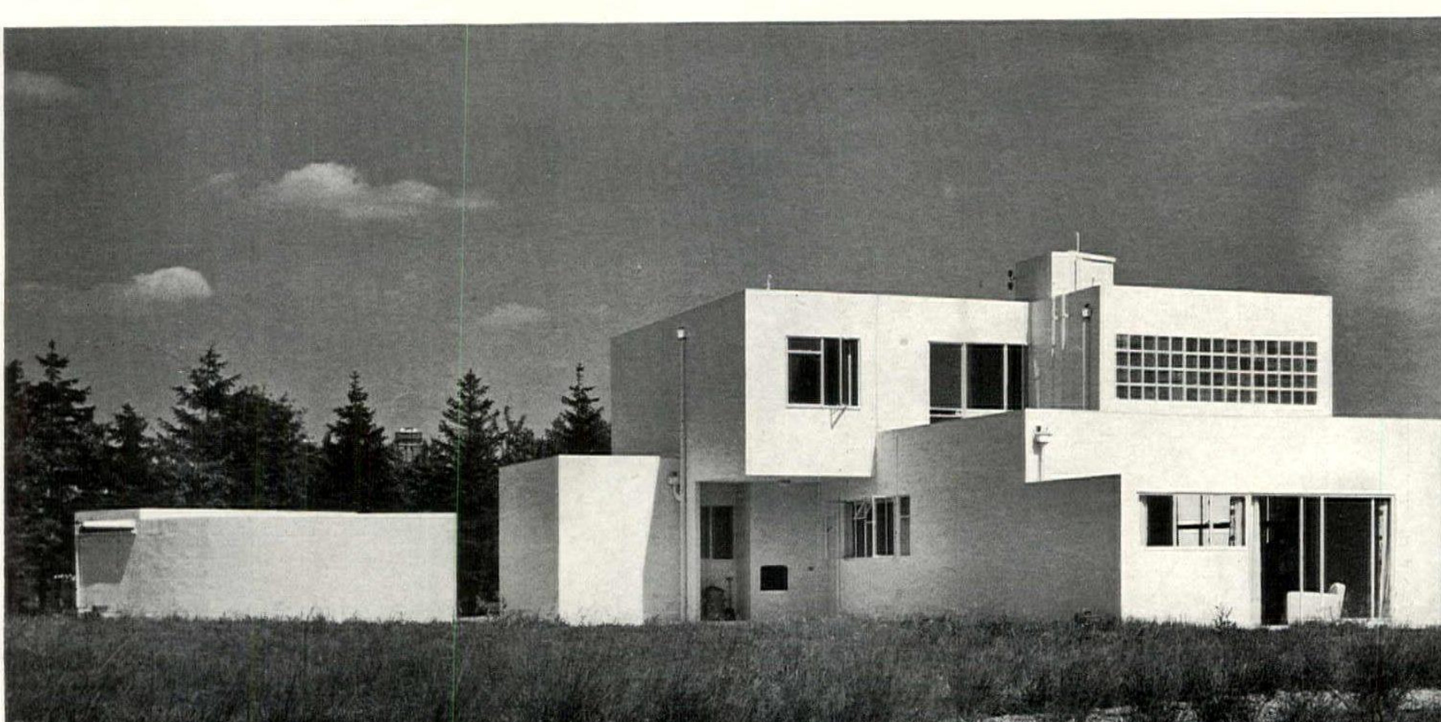
UPPER FLOOR



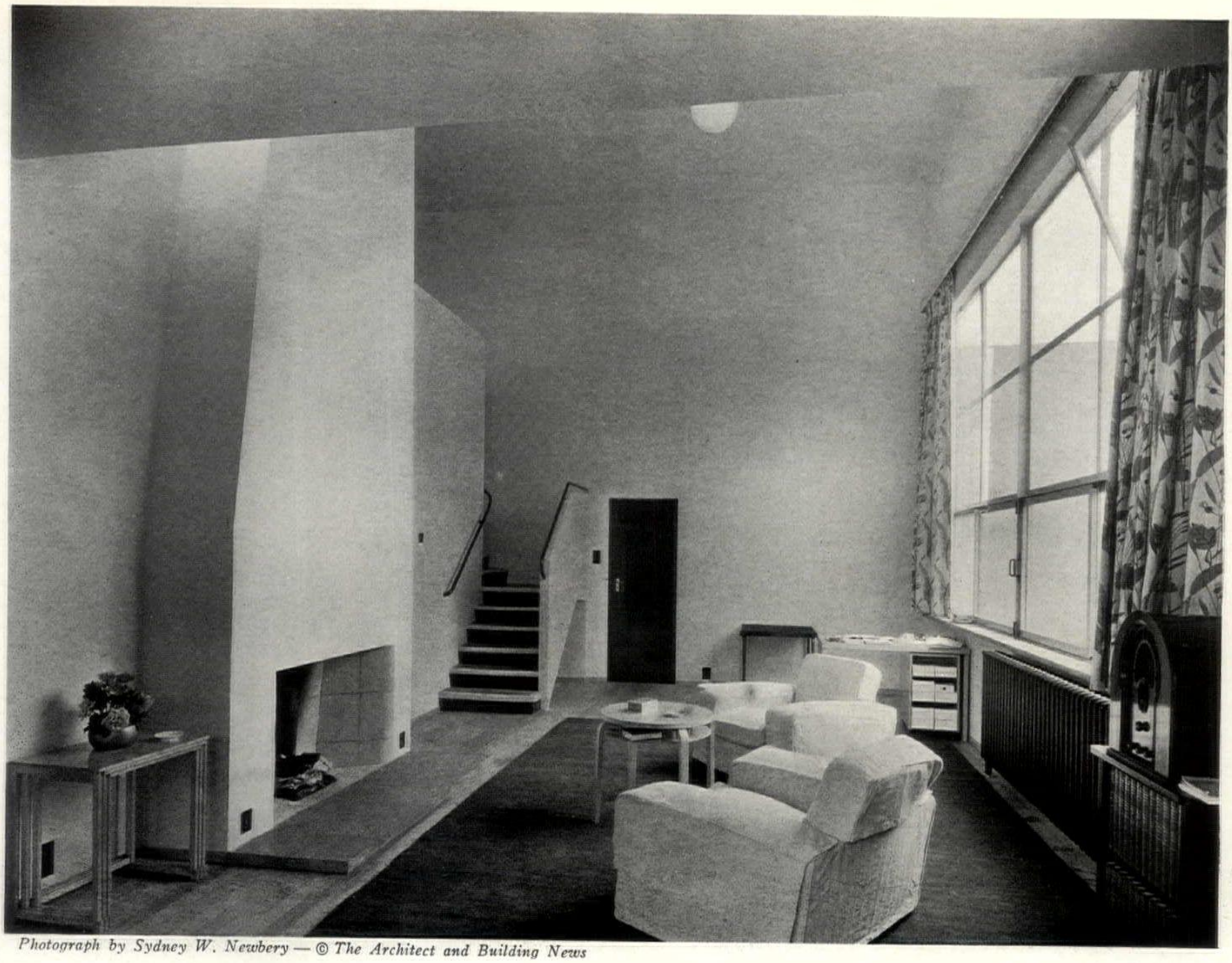
Upper floor: Only other room, in addition to nursery, is a dark room, added after building work began. This room is supported by blank cantilever wall on north.

Living room: Made as large as possible by including dining recess and first floor landing. Dining recess end is ceiled at 9 feet but main part of the room extends through the upper story to a height of 17 feet. Staircase and landing are inside the room. The living space is extended to the garden when sliding glazed doors are opened between the living room and the paved terrace.

A CONCRETE HOUSE AT HATFIELD, HERTFORDSHIRE, ENGLAND



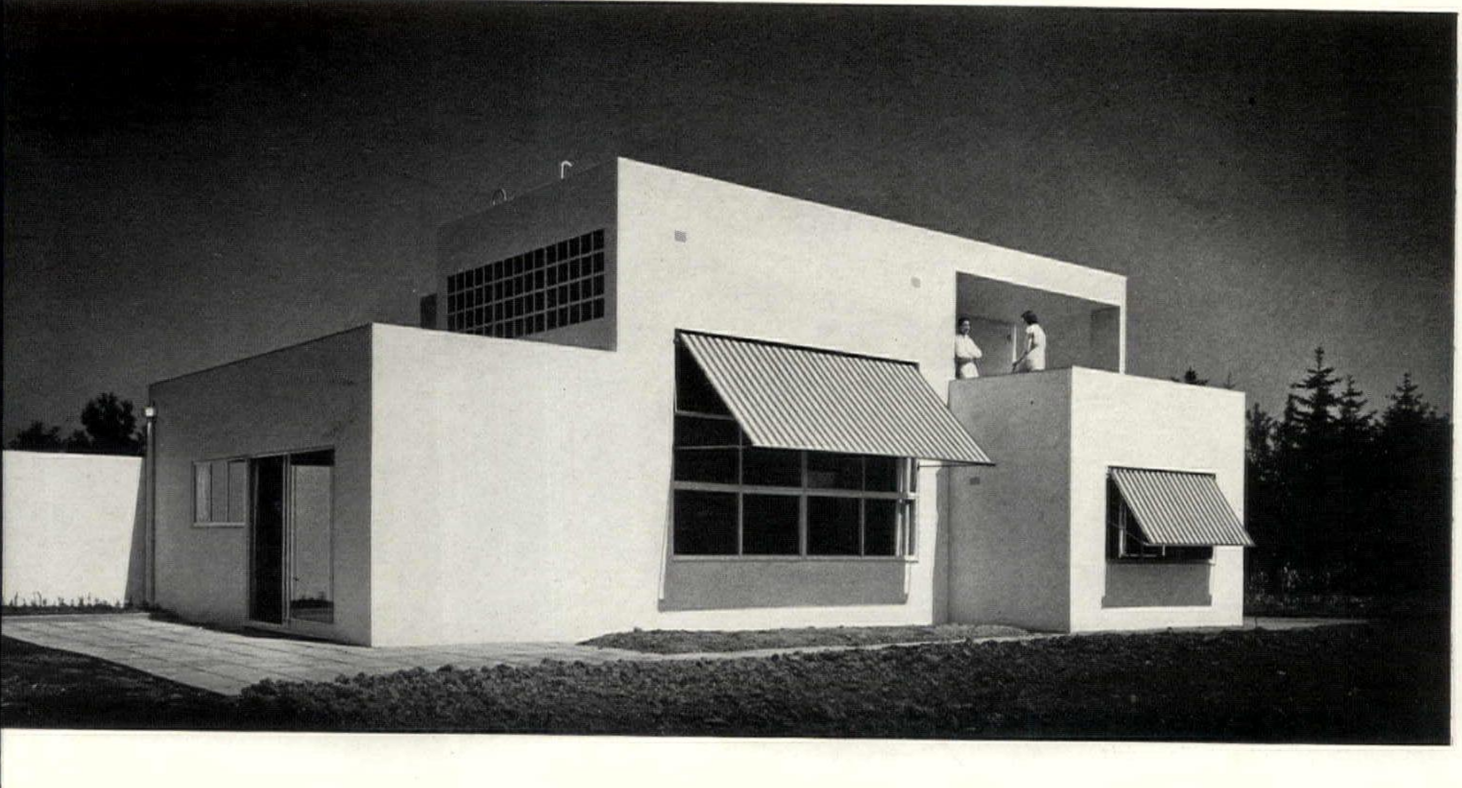
Photographs by Dell and Wainwright



Photograph by Sydney W. Newbery — © The Architect and Building News

LIVING ROOM

DESIGNED BY F. R. S. YORKE



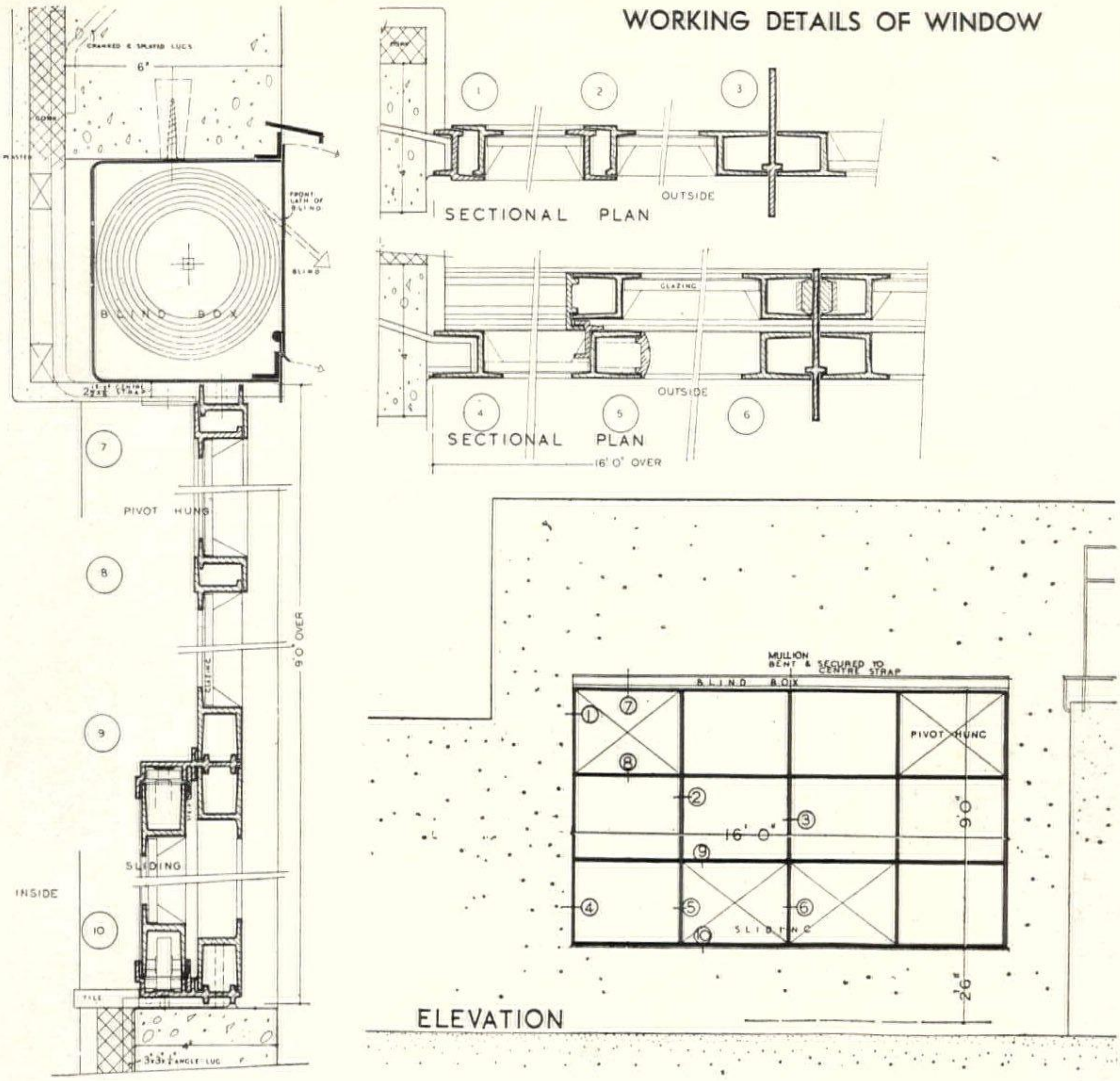
Sydney W. Newbery — © The Architect and Building News

Photographs by Dell and Wainwright

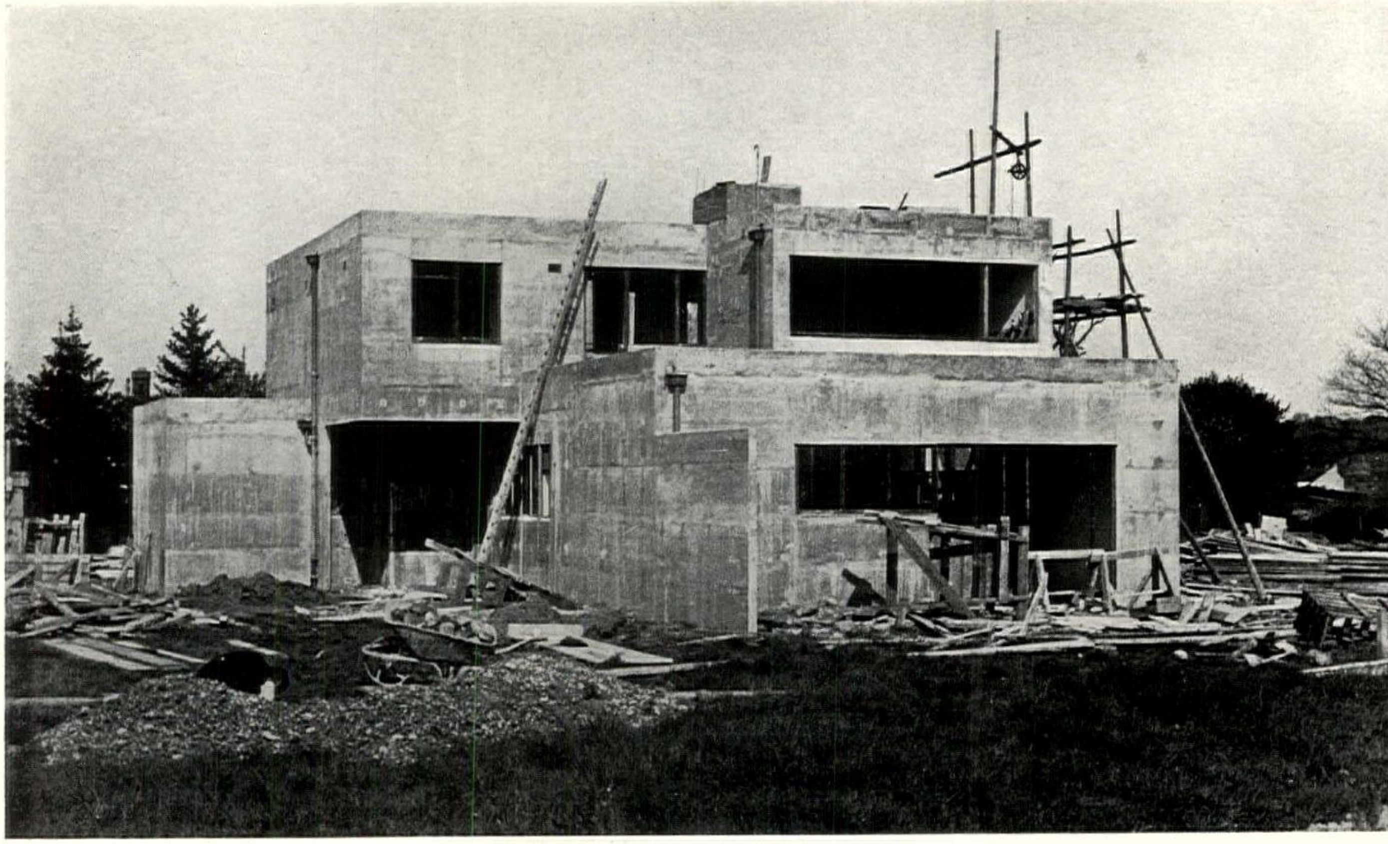
CONCRETE HOUSE AT HATFIELD, HERTFORDSHIRE, ENGLAND

DESIGNED BY F. R. S. YORKE

WORKING DETAILS OF WINDOW



WINDOW HAS CENTER-HUNG LIGHTS AT THE TOP AND TWO SLIDING LIGHTS AT THE BOTTOM. THE LATTER MOVE ON A SPECIAL SECTION (SEE DETAIL) AND ARE SEALED WITH BRASS WEATHERSTRIPS.



Construction: Reinforced concrete bearing walls 4 inches thick generally; increased to 6 inches in special cases. Reinforcement in walls consists of 3/8-inch rods at 12-inch centers horizontally and vertically. Solid reinforced concrete floor and roof slabs, generally 5 inches thick, reinforced to suit spans. Concrete composed of 4 parts coarse aggregate (3/4 to 3/8 inch), 2 parts fine aggregate (3/8 inch and smaller), 1 part cement. This method of construction (see Figures 1 and 2) appeared most economical and was the only one that would give a straightforward solution. The plan—sizes of openings and the like—is such that had brick been used for walls, lintels of concrete over openings would have been either exposed or faced with brick; neither of these treatments appeared satisfactory. In the case of frame construction with reinforced concrete frame, and some other light material for interior walls, it is difficult to obtain a clean weatherproof external surface without the application of plaster over the whole exterior. Special frame and panel systems that have been evolved are economical for small buildings only when types can be standardized and mass-produced. For a single house it appeared best to use a single structural material—reinforced concrete.

Waterproofing: Sika waterproofing compound, added to mixing water for concrete in ground slab and in walls to a height of 18 inches above ground.

Insulation: Forms were lined with 1/2-inch Celotex with projecting galvanized bonding wires (see Figures 3 and 4) so that the fiber board is fixed to the concrete as permanent insulation. This received one skim coat of plaster. Similar treatment for roof slab which, in addition, has 1 1/2-inch compressed cork slabs above concrete.

Formwork: Wood board and battens, site fabricated, lined for external face with 3/16-inch Masonite Presdwood and for internal face as described under "Insulation." Exact spacing of internal and external formwork for 4-inch and 6-inch walls was maintained by laying at intervals on completed section of wall 4-inch or 6-inch precast cubes of concrete. These cubes had circular holes through centers to take bolts, so that formwork for both faces could be drawn tightly together, leaving exactly 4-inch or 6-inch space for concrete (see Figures 5 and 6).

Floor Finishes: On ground floor, either jointless composition in two coats direct on concrete, or maple boards secured to battens held to concrete by patent galvanized floor clips (see Figure 7); pitch poured between battens to 1/4 inch and remainder of space filled with dry sand. On upper floor, cork carpet laid with mastic to cement screed over structural concrete. On stairs, rubber treads and nosings; concrete face of risers painted.

Heating: Radiators with central hot-water boiler, supplemented by coal-burning fire in living room and plugs for electric heaters in all rooms.

Windows: Standard steel sections to special pane sizes. Window between nursery and roof terrace is sliding-folding, so that children may run from room to open air without obstruction.

External Finish: Concrete rubbed down, where irregularities occurred, by means of electric flextol revolving carborundum disc. Whole of exterior concrete painted pale pink. Windows and trim painted with white enamel. Plumbing pipes for bathrooms and bedroom lavatories, and rainwater pipe from terrace, are concealed in a duct behind the ground floor bath. The rainwater pipe runs to this duct through a horizontal casing in the space between the head of the entrance door and the ceiling.

Cost, calculating one pound sterling at $5: $8,500, which is a little more expensive than brick house of similar quality but traditional design. To build same design in brick would, however, be difficult and probably more expensive than in concrete.

A CONCRETE HOUSE AT HATFIELD, ENGLAND

DESIGNED BY F. R. S. YORKE

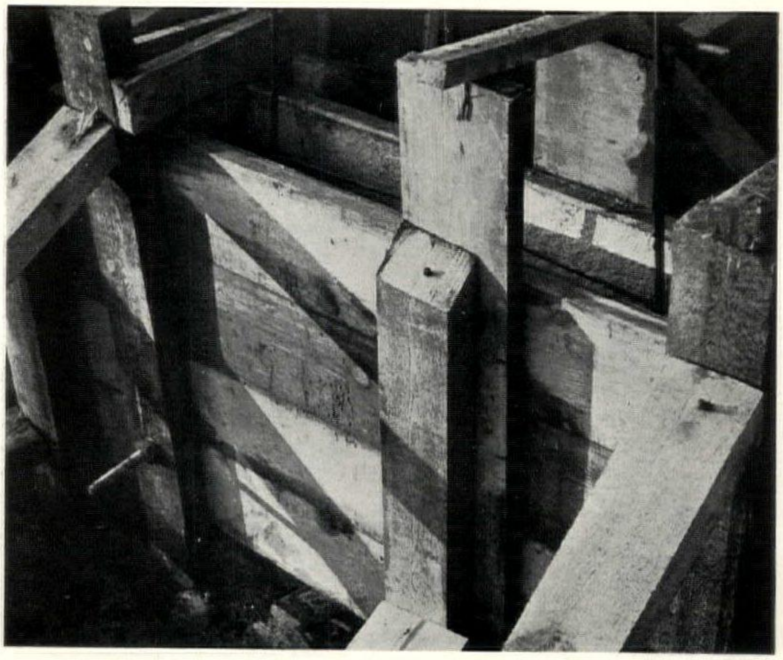
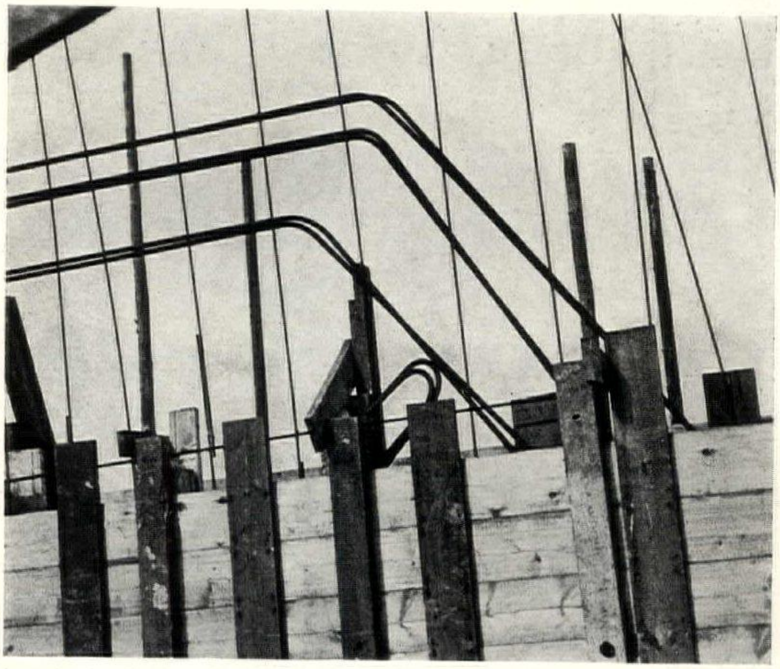
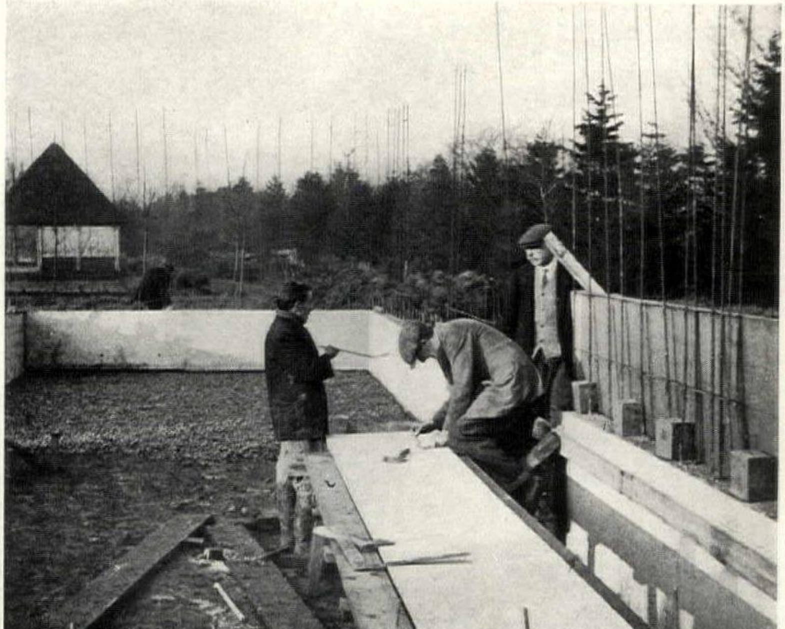


FIGURE 1 — FORMWORK FOR CONCRETE WALLS.

FIGURE 2 — REINFORCING RODS IN WALL.



FIGURES 3 AND 4 (BELOW) — BONDING WIRES ARE APPLIED TO CELOTEX (THEN PLACED IN THE FORMS) SO THAT CONCRETE WILL HOLD THE INSULATION PERMANENTLY IN PLACE.



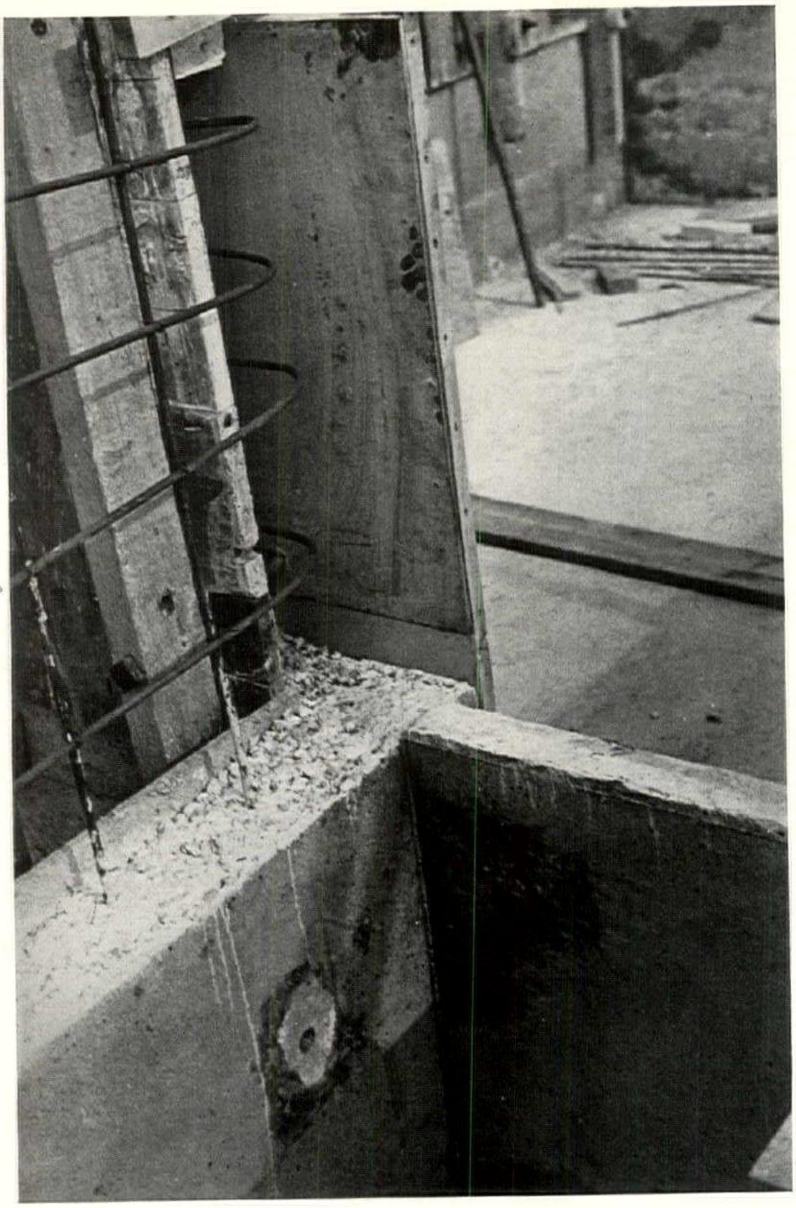


FIGURE 5 — DETAIL OF WALL REINFORCING SHOWING HOW EXTERNAL FORMWORK AND FIBER-BOARD LINING ARE POSITIONED.

FIGURE 6 — 4-INCH AND 6-INCH PRECAST CONCRETE CUBES WITH CIRCULAR HOLES THROUGH CENTERS TO TAKE BOLTS ARE USED TO MAKE ALIGNMENTS IN WALL FORMWORK.

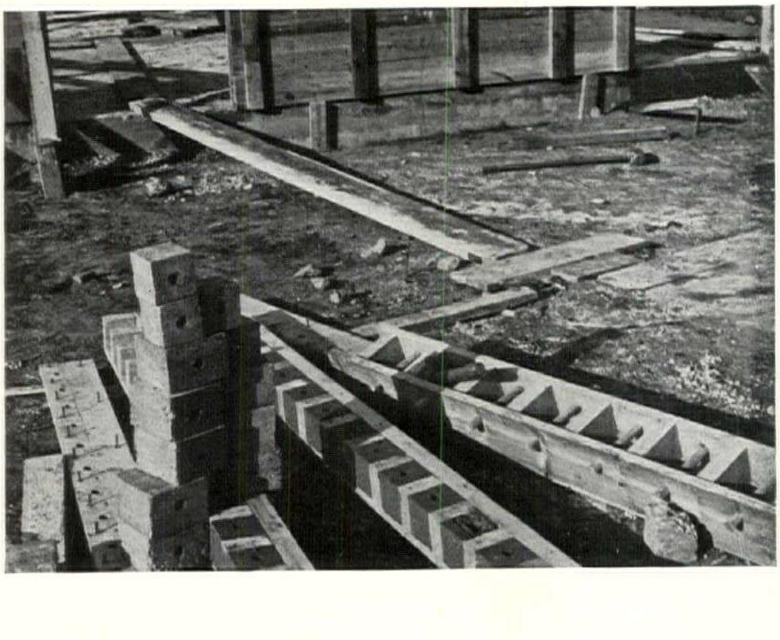
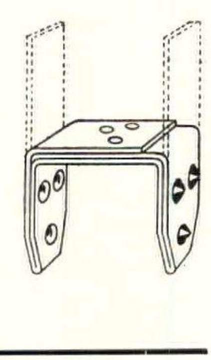


FIGURE 7 — PATENTED FLOOR CLIPS HOLD WOOD FLOORING TO CONCRETE.



A CONCRETE HOUSE AT HATFIELD, ENGLAND

DESIGNED BY F. R. S. YORKE

THE ROLE OF MATERIALS IN MODERN HOUSING

This article, prepared especially for The Record, is a condensed version of an address which Mr. Burchard gave before the 38th annual meeting of the American Society for Testing Materials, recently held in Detroit. The original paper, bearing the same title, will be published in full by the A. S. T. M. as a special publication.

Mr. Burchard's appraisal of various building materials is based largely on experiments made by Bemis Industries, Inc., of which he is vice-president. For many years this company, located in Boston, has been active in housing research, both in the laboratory and in the field, with a view to producing individual houses more cheaply. Numerous experimental houses have been built to test new structural systems. Findings based on these investigations were described by Mr. Burchard in an article which appeared in the January 1934 issue (pages 3-8) of The Record.

The present article ventures into prophecy—a field which is always controversial. The Record publishes the paper, therefore, not as an expression of editorial belief, but as the personal opinion of an active investigator in housing research. The standards which Mr. Burchard sets up for the development of materials, new and old, are believed worthy of consideration by designers and manufacturers alike at a time when building design and construction are characterized by rapid change.

By JOHN ELY BURCHARD

At long last it seems safe to predict that we are on the verge of a revolution in American housing design. We know by now the general form these new houses will take. There will be much greater freedom of plan, fewer limiting fixed partitions. Walls will be designed to let in much more light. The old lighting fixtures will be replaced by cove lighting, the anachronism of the candle or oil-lamp fixture supporting the mazda bulb will disappear. The new house must provide for conditioned air. Finish will be simpler, flatter, easier to keep clean. The flat roof is inevitable; it is more efficient, and properly treated can be beautiful. The whole house will be lighter and cleaner and freer and in much closer contact with the out-of-doors.

Simultaneously with the rapid evolution that is even now going on, and that will accelerate until it appears like revolution, there will be a corresponding evolution in the materials used. This will at first take the form not of discovery of many new materials but of discovery of saner uses of old ones—the elimination of some that have been used long and ably by tradition and the substitution of others that have been sadly neglected.

The brunt of this evolution will fall on low-cost housing. If this should not be so there will be no important change. The wealthy client may in the future as in the past command the materials and styles of all time as they please his fancy, whether they be archaeological or drastically contemporary. Delft tiles over a hundred years old for his bath, Tudor paneling for his library, chromium mirrors and mantels for his lounge, will rise with equal facility from his wallet. However great the wish to ape such examples, the house of the average owner or renter will as in the past be governed primarily by conditions of economy. That is, of course, the most cogent reason why our housing must change. Quite aside from any questions of prefabrication, group housing, government subsidy, the principles of modern design lend themselves to fundamental economies.

At this point, therefore, it is essential that the proponents of modernism be realistic. The methods of design do carry implications of economy but the methods must be applied with common sense. Early modern houses were created principally for a well-to-do intelligentsia and gave rise therefore to the impression that opulent exotic woods and gleaming unusual metals were the essence of modernism, were indeed necessary to make otherwise simple design bearable. This, of course, is nonsense; if it were true there would be no great rise of modernism.

Now realism about cost seems hard to attain. It has always plagued the "prefabricators," for example. Some of these people were and some still are sales promoters—interested in promotion of more of their own products, hence inhibited at the outset by limitations in their research that would not have been tolerated in their own laboratories. It is reasonable of course to try to fit certain materials into modern housing but unreasonable to try to fit modern housing around the materials. Others with no preconceptions about materials had *a priori* notions of design, notions that resulted in houses costing many times what they should. But these romantics always fell back, and still do fall back, on the hypothetical economies to be achieved by mass production. Now the great god Mass Production is by no means omnipotent. It is often responsible for tremendous savings, but sometimes it is not and in any event it is unlikely that the savings are of the order imagined by the public. At the extreme of this school of thought are those purveyors of balderdash who announce that though their first house may cost a million dollars, their millionth will cost one thousand. It is possible, but unlikely. Finally, between these two schools of thought is that of the middle ground—that of the man who achieves a house which costs more than conventional houses but which he finds better and which he therefore proceeds to market as a better article for slightly more money. Inasmuch as our crying need is not a better house for more money but an equally good or even slightly inferior house for a lot less money, persons who fall into this trap leave the van of the battle and start conducting a rear-guard action.

But the *Sturm und Drang* period must end. It is certainly possible to look at housing with a critical eye. It is certainly possible to be honest with one's self, to ask and answer fairly a few simple questions. When I contemplate using an old material in a new way I must inquire, "Will my way use less material; will the cost of using it as I propose be less than the cost as now used; if I require more material, will my use make economies in fabrication and erection that will more than offset the increased material cost?" Again, when I plan on using a new material I must ask, "Is the material cheap enough; will it ever be cheap enough; if not, does its use as I plan offer sufficient offsetting economies?" These are easy questions. Unfortunately, it has not been easy for any one in the misty field of housing to be hard-boiled about reality.

Yet this is the simplest fundamental that must lie at the base of all change. Of course we could use better housing with greater social advantages, better health conditions, more livability for more people. But purely from the point of view of materials we perhaps do not at the outset need better materials. We need cheaper houses, if possible with no sacrifice of physical standards but certainly cheaper.

STRUCTURAL REQUIREMENTS

This criterion applies with equal force to prefabricator and speculative builder, to architect and social worker, to houses detached or grouped, paid for by individuals or by society. Regardless of social trends in modern housing, it is certain that modern housing must on the whole be of lower cost and that the use of materials must be governed accordingly.

Remembering always that this economic property is of first importance, we may profitably inquire what other properties materials must have in order to fit into the modern scheme. With no attempt to evaluate these properties in order of importance, they are:

1. *Relative permanency of dimension.* Materials must not change so much with normal changes in temperature and humidity as to cause major defects in the structure or even annoying failure of parts such as windows to operate properly. For factory-built housing this property becomes still more important. The changes after fabrication and before erection must never be so great as to defeat ease of erection or an accurate result therefrom.

2. *Lightness.* Materials must be light enough to permit economical shipment and reasonable deadloads. This is a property to be measured not in terms of specific gravity but in terms of the weights of the required sections. Material weighing 500 pounds per cubic foot, but usable in thicknesses of ⅛-inch, would accordingly be regarded as lighter than material weighing 30 pounds per cubic foot but requiring a minimum thickness of 8 inches.

3. *Adequate strength.* Most materials now used in house building are if anything too strong. Where this excess strength does not cost anything it is of course no handicap. Materials must be carefully regarded whose strength in most respects is adequate but which have one type of weakness such as shearing or tensile strengths materially less than their compressive strengths.

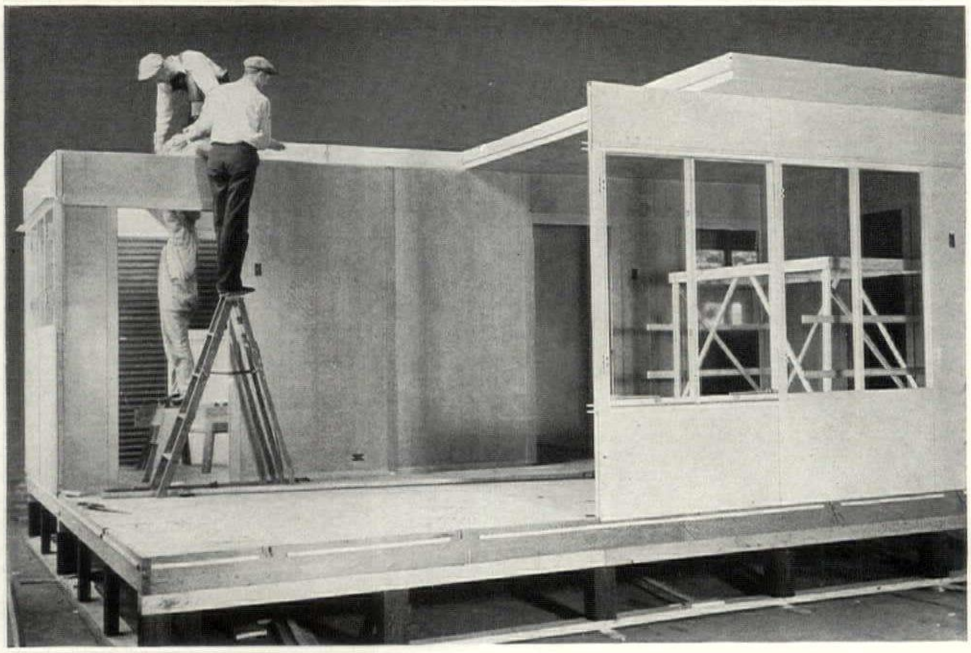
4. *Durability.* For materials to be used outdoors, durability against weather erosion and against gases normal to the atmosphere and against water; for the interior, durability against water, alcohol, household cleansers, rapid heat and humidity changes, children's fingers; for concealed materials, durability against water, gases common to the atmosphere, and vermin.

5. *Reasonable resistance to breakage from impact shock* which will occur primarily in the course of shipment or erection. To the extent to which non-shock-resistant materials may economically be adequately packed and handled during erection, they may qualify as satisfying this requirement. Shock is less likely to occur after the building is occupied.

6. *Good resistance to passage of heat.* The requirement applies chiefly to the composite exterior wall and not to each of its collateral materials. But care must also be taken in the use of good conductors not to provide through-sections of such material, however thin. In other words, the wall must have a high total resistance to afford economical heating and must have no spots of excessively low resistance which will cause condensation, an increasing risk as humidified air begins to be used.

7. *Good resistance to passage of sound.* This is a requirement primarily of the composite interior partition or floor. It becomes more important as increasing mechanization makes our domestic environment more continuously noisy. It will be specially required in party walls of group housing, in partitions surrounding kitchens and cellars and baths, and in all floors. The conventional floors are not satisfactory in this respect. Prevention of sound transmission in the house will be largely a matter of rigid construction. There will be few rooms so large as to require sound-absorptive material in addition to that afforded by normal furnishings. In fact, to the man of today an excess of sound-absorbing materials in a small room creates a peculiar and unpleasant condition. None the less, sound absorption, rarely present in materials not specifically designed for the purpose, must be scored as a credit for any material that possesses it.

8. *Fire resistance.* Our houses are not so fireproof as they ought to be. But in the early quest for cheaper housing, it must be remembered that lowered insurance rates for fireproof construction do not offset interest on the increased costs at present. There is relatively little risk to life in the burning of a small detached house. In group housing proper planning can minimize the risk of fire spreading. For the immediate future non-combustibility must be reckoned as a credit



NEW WOOD CONSTRUCTION

Prefabricated wood panels being assembled in a model house built by Forest Products Laboratory, U. S. Department of Agriculture.

rather than combustibility as a debit. It will be a long time before the normal furnishings of our houses will not supply adequate fuel for a hot fire. Meanwhile also few materials now used, except concrete and the ceramics, can be said to be fireproof in the presence of a hot fire. Metals, for example, although they will not burn, soften to the danger point and are little better in this respect than timber.

9. *Weather resistance.* In contrast to durability against weather this means the property of materials used on exteriors to keep the winds and the snows and the rains out of the house. In a sense it is coupled with durability in that the material must not only perform this function at the outset but must continue to do so thereafter. Hence a material that was not destroyed itself but lost its protective property could not be said to be durable.

10. *Beauty.* The property need apply only to those materials that are seen. In modern design, however, there will be a tendency to use fewer and fewer materials that do not show. Fortunately, it is a property possessed by every material. No honest composition, either of nature or of man's synthesis, fails of beauty when it is well synthesized and well used. Man has learned to produce good examples of the various genera of materials. He has not always learned to use them well and materials are all too often amenable to bad usage. As long as used in the simple and straightforward way in its own milieu and not in that of another, any material will be beautiful. This is perhaps the greatest lesson modern design is teaching us.

Other important properties of materials will be found, upon analysis, to fall within these categories or that of economy. For example, workability is almost entirely related to economy; so, too, is ability to be formed with precision. All materials can be worked but the working of some is harder and hence more costly than that of others.

Since most of the groups of materials to be discussed possess most of the properties listed, it will be sufficient to comment on the properties they do not possess in adequate degree.

VEGETABLE GROUP

Wood is, of course, the outstanding representative of this class. Until very recently it has been the tendency to think that wood was doomed to relative extinction in housing after a long and distinguished life as the principal building material of man. This premature conclusion was based primarily on the inconsistency of dimensions. As is well known, wood expands and contracts to a considerable degree with changing moisture content; this movement is serious only across the grain and may be nearly twice as great tangentially as radially to the annular rings. Results of the phenomenon are familiar to every one who has ever tried to close a swollen door.

Efforts to eliminate the difficulty have been of two kinds: the one, which has tried to seal the wood against entrance of moisture, cannot be said to have afforded a generally satisfactory result; the other, which consists of proper curing followed by coatings of aluminum leaf, is satisfactory to preserve the original size of wood of substantial dimension for several weeks, a sufficient period to get it into the structure and covered up. This preparation will prevent subsequent serious structural defects but will not be permanently satisfactory for wood which has to be exposed constantly as in the case of windows and doors. For such uses wood may be temper-cured, a process involving overdrying the wood and bringing it slowly back to moisture equilibrium. By this process doors and windows have been made that could be guaranteed not to stick under any conditions encountered in the temperate zone. Both of these processes are, however, costly and tend to eliminate most of the cost advantage still held by lumber.

In the case of windows and doors, the extreme treatment required by wood indicates that it is no "ideal" material for window frames, doors and sash. But in reasonable cost ranges the substitutes are at present rather too good conductors of heat and will produce condensation. Improvements in molded plastics may provide the low-cost window and door frames we need; until they do, wood will probably remain the most suit-

NEW STEEL CONSTRUCTION

"Steelox House" developed by the Insulated Steel Construction Co. of Middletown, Ohio. Walls and roof are made of interlocking channel-shaped steel sections.

able though by no means a thoroughly desirable material. For inside doors, metal frame and trim with composition doors are even now preferable to wood.

The prefabricator who wants the sizes and positions of holes and the like to remain where he puts them in his members finds the changing dimension of wood a constant annoyance and the necessary conditioning equipment for large-scale work would demand controlled-humidity dryers, air-conditioned fabricating and storing rooms, and even some protection on the site, all at large scale, with inevitable resultant expense. Thus wood as we now know its properties does not in its natural form appeal to the prefabricator.

Recent developments in plywoods have, however, opened new vistas. The use of thermo-setting glues instead of the old casein types seems to have made possible plywoods that are stronger, less likely to warp and twist, and obtainable in larger sizes. The manufacturers, moreover, promise that the higher price now charged for these plywoods is not fundamentally necessary in the future. Again, work at the Forest Products Laboratory has demonstrated that it is possible to glue plywood to wood framing so that the glue bond is stronger than the wood itself. Based on this discovery, floor and wall panels have been made of studding or joists with plywood covers nailed and glued to them. The faces and the framing cooperate under the principle of stressed covering, long known to designers of aircraft, to permit units requiring less lumber than that of conventional frames. Prefabrication of the wood panel is thus brought perceptibly nearer.

Assuming adequate life of the glue, these panels suggest a number of further interesting lines of investigation. Certain types of high-grade plastic paints are debarred from field use because of drying difficulties. In the shop where drying equipment is available they might be employed to advantage, both of cost and of other properties. Certain expensive hand-finishing jobs, such as sanding floors, might be transferred to full machine operation in the factory if flooring could be glued to the panels and if the satisfactory joining of two adjacent panels would be worked out. Painted plywood, or plywood covered with simple textiles like canvas, might afford attractive and durable wall and ceiling finishes.

Another defect of wood that has often led to bad workmanship is the difficulty of making satisfactory connections other than those in bearing because low shearing strengths make it difficult to transmit tension. In this connection work abroad, and to a lesser extent here, with toothed and ring metal connectors may be of significance. These connectors, developed primarily to improve fabrication of wooden trusses, might in smaller sizes have real significance in house building although as they are now used they are somewhat too crude for the prefabricator.

Thin veneers backed on cloth have of course been used successfully for a number of years but they would seem to be of special promise for factory finishing as their flexible shape would permit carrying them on rollers and the new gluing methods might make the bonds absolutely certain. Meanwhile there may be expected still further improvements in the technique of processing wood fiber into boards, a technique which has already taken us from relatively weak insulating boards to hard pressed and oil-tempered products of remarkable strength, durability, and beauty, though perhaps not for flooring as is so often suggested. Wood flour is also being experimented with as a basis for a new thermoplastic and the product is of interest though cost information is at present uncertain. With notable exceptions in the case of sugar cane and licorice fibers, many efforts to employ other vegetable fibers for products ranging from fiberboards to synthetics of high dielectric capacity have not been successful, judged purely from an economic point of view. Their properties are often remarkable but they cannot at the time of writing be regarded seriously.

The beauty of wood goes without saying, and the remarkable vitality indicated by recent wood technology suggests that it will have a very large rôle in modern housing, even though the wood-framed house should disappear altogether.

Efforts at fireproofing, however, still show no real promise of success without materially altering other desirable characteristics of the wood.

THE METALS

Although the metals as a group have a generally high strength per unit of cross section as compared with wood, and actually average higher also per unit of weight, most of them have such low moduli of elasticity as not to render them suitable for framing members. This practically limits the structural metals to iron alloys and to aluminum. Though steel costs intrinsically a little more than the wood it would replace in framing, it might be possible for it to gain precedence over wood for structure. The use of steel for lintels and the like does, for example, eliminate structural defects due to cross-grain shrinkage. Where metal frames are to be used, however, the problem of condensation is acute. Insulation must be carefully applied over all through-metal, resulting inevitably in an additional cost factor. The problem of spots of condensation has been insufficiently recognized by experimenters who seem to overlook the fact that air-tight interior wall finishes are a practical impossibility.

None the less, steel frames might be able to stand the cost differential of increased base cost and increased insulating cost if their advantages were thoroughly exploited. These advantages lie in the fact that metals can be fabricated with repetitive features such as holes for the semi-automatic attachment of finish and that these holes will stay where they are punched or drilled. Although many steel frames have had these holes, most of them have been employed only with conventional methods of attaching finish. Used with prefabricated finish and semi-automatic or self-keying means, steel frames might well justify their increased cost. The experiment would seem to be worth making at a reasonable scale. Even then it is hard to be sure that inexpensive protective treatments against corrosion will maintain their value through the years on steel that is covered up and subject to neither inspection nor maintenance. The problem of corrosion of metals is of course a generally serious one. It applies with particular force to efforts to use metal as face sheets or battens on the exterior. For either use it is probable that maintenance will by no means be eliminated but the problem may be less acute for battens than for sheets and varies materially in its magnitude with the metal used.

A few of the metals, notably copper and aluminum, undergo normal atmospheric corrosion with end products that are protective against further corrosion and that are also attractive. Metallurgy has of course developed protective alloys for nearly all the other metals, including steel, but the rare nature of some of the elements used in the alloys seems to bar them definitely from the low-cost field, at least until these elements cease to be rare. Similar in effect are processes that bond protective materials to the steel by means of intermediate terne-plate, but these processes are at present too costly to allow their products to be widely used in low-cost housing—the greater the pity.

As inside finishing elements, however, lacquer and other treatments including such things as porcelain enameling (dangerous out-of-doors because of the liability of chipping) promise that many of the metals may be suitable. The results with extruded aluminum and electrolytically deposited copper are, for example, really splendid. Design of modern Pullman cars shows there need be no loss of interior aesthetics by the use of metals in this way, and where the metals need little polishing and are easily cleaned they may prove very efficient. There is reason therefore to expect increased use of metals in our house interiors.

In subsidiary fields metals remain the best materials for flashings; electro-sheet copper affords an interesting way to produce built-up roofing; aluminum foil seems to give remarkable results as an insulator although some of us may wonder what will happen if time removes the bright finish. Pleasant as steel and other metal sash are from the point of view of operation, they have the problem of condensation to face and in an air-conditioned house the problem may be still more acute. On the other hand, metal door bucks throughout the interior, coupled with composition doors and simple metal trim, should be used more and more.

CONCRETES

In fields other than that of prefabrication there may be an increased use of poured concretes. Concrete has the virtue, from the architectural point of view, of being a thoroughly plastic material. Unfortunately, it can seldom be used without insulation and most persons do not like it as floor surface or as interior wall finish. If it is to be used effectively in low-cost housing, the other materials must not be affected by moisture because the time of drying out is serious.

Instead of plaster and wet concrete surfaces we already have factory-made plaster and concrete in the form of gypsum boards and asbestos-cement sheets. Although the latter are more expensive than the former, they have more promise; they do not have to be covered with paper, they are stronger, more fireproof, not destroyed by water, and susceptible of a wider variety of finishes. Recently asbestos-cement manufacturers are really beginning to be aware of the beauties innate in their material and we may see the time when they cease to try to make their products look like cedar shingles or ceramic tiles and strive for franker use of their material. In this connection the work of Earley with mosaic concrete panels suggests remarkable possibilities for decorative veneers. Modern housing may expect to see greatly increased use of cementitious materials in this form.

In the form of precast blocks and the like, however, there seems to be less promise. Precasting concrete has always appealed to inventors by the legion. But due to slow setting, concrete is not particularly amenable to factory manufacture in complicated shapes that have to be poured, and tongues and the like are frangible and fit none too well. Lightweight blocks of cinder concrete or Haydite still are among the most economical foundation materials, but they can not be regarded as the type of material we shall always want for this purpose. They suffer from some of the same defects as other masonry materials. Aerated cements have in general proved unsatisfactory. Wood concretes have not been successful. Precast floor slabs have their present economies, but they need much finishing and cannot be deemed an important factor for modern housing. The great rôle of concrete would seem to be in the form of the thin, tough, beautiful panel of considerable size.

CERAMICS

With one exception, ceramics and stone products seem to be waging a losing battle. The building of masonry walls is altogether too laborious a process to survive in an unlaborious age. Beautiful as brick and stone walls may be, they must be archaeological in the low-cost modern house. Ceramics are of course durable and require relatively little upkeep, but as used in masonry they involve too many joints, too many places where wind and water can get into the building. They are too good heat conductors, and require too much interior finishing even according to modern standards. And under today's conditions, which have perforce eliminated the arch, the dome, and the vault, as a means of spanning walls, they are limited to mural work, thus producing a house that has little homogeneity. Similar conclusions must be reached with respect to the really handsome synthetic stones of today. Minor uses may be found for other ceramic products, such as expanded clay bricks, and the new Microporite which seems to have remarkable properties but of which we as yet know too little to venture on prophecy.

The one exception in the ceramic field is glass. Glass is perhaps the most romantic material of our age. We have realized in modern housing that we have shut too much light from our lives, and glass is the medium by which we must restore the equilibrium. But we cannot lose the heat that glass so readily transmits or suffer the burning rays of the noonday sun. Glass technology is ready, though not yet at prices we can afford to pay. It has provided us with double glass, two panes separated by a dehumidified air space and bound together at the edges by synthetic resin, so that glass is in measure ready for air conditioning. Of course the air in the space must be truly dry and the inside surfaces of the glass clean and the bonding medium air-tight. We want to shut out the breezes and yet have the beneficial antirachitic effects of ultraviolet light. Glass is prepared for this, too. Although the problem of decreased ultraviolet transmission efficiency due to solarization is not completely solved, the technology improves. We want summer light without attendant heat and the glass industry gives us *Aklo,* a glass that will absorb a large part of the heat rays of the invisible spectrum while transmitting the visible rays and that, though getting hot in the process, is tough enough to withstand the rapid cooling of a sudden shower. Glass has shattered readily, but laminated glass improves yearly and now we have tempered or case-hardened glass with an extremely tough outside area of compression that makes shattering risks almost negligible.

Moreover, glass products that have been known for long have perhaps not been suitably exploited in houses of the past. Where airs are reasonably clean the functional patterns of ribbed industrial glasses might serve the house designer well, give light with privacy, and add pattern and texture to our house interiors. Glass bricks, used abroad for fifteen years and here for six, are still very costly, but have tremendous possibilities and perhaps if used in quantities comparable with bricks might come within the desired cost range.

Glass eliminates infiltration; it is a good fire-stop; it is non-porous; does not suffer surface cracking; absorbs no odors; is impervious to air, water, grease, most acids, and all vermin; does not lose its hardness or brilliance on exposure to moisture; its polished surfaces do not disintegrate, they retain their luster, they are ideally easy to clean.

SYNTHETICS

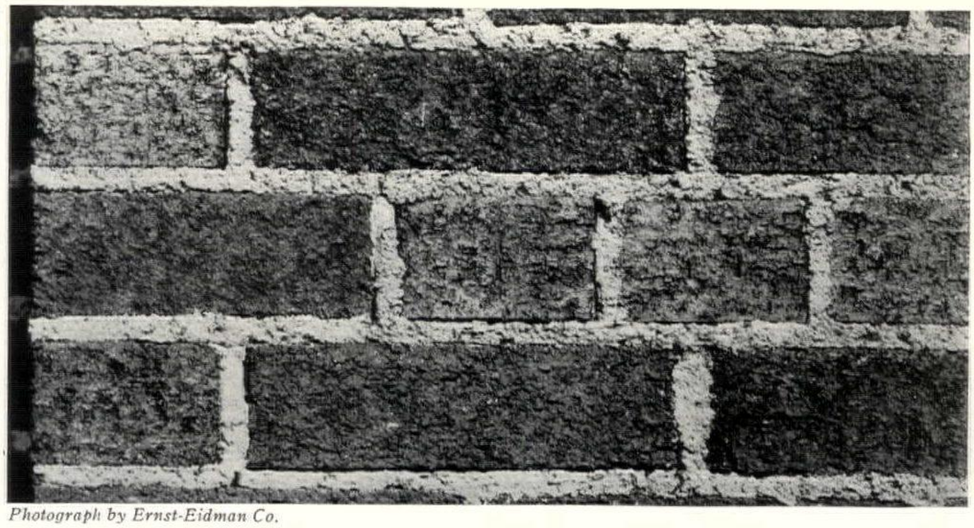
New synthetics come to us daily. Most of those that are established have already been mentioned in one or another connection. Many are too new to judge. The one on which all of us in this field have long pinned our faith, synthetic resin of thermo-plastic or thermo-setting type, still remains too expensive for us to use except in minor ways. The properties of the material are almost ideal and its use on a large scale in our modern house merely awaits the not impossible day when the manufacturers succeed in bringing its cost within range of the pocketbook.

NEW CONCRETE CONSTRUCTION

Precast mosaic concrete panels, developed by Earley Process Corp., of Washington, D. C., being put into place on building site.

Reni Photographers

By DR. E. W. SCRIPTURE, JR.
Director, Master Builders Research Laboratories



Photograph by Ernst-Eidman Co.

SHRINKAGE OF MORTAR

PRINCIPAL CAUSE OF LEAKY BRICKWORK

The subject of brick construction, whether with relation to leakage or to its other properties (such as strength, durability and so forth), is highly controversial. Most differences of opinion are more differences of approach to the subject than of actual disagreement on the fundamentals. Recently a movement toward coordination of various views has been apparent.

To secure best results in brick construction, it is necessary to consider the characteristics of the brick and the mortar, as well as the purpose to which the wall will be put or the conditions which it must meet in service. The composition of the mortar should certainly be adapted to the properties of the brick or else the characteristics of the brick should be controlled. On the other hand, with a brick and mortar which are mutually compatible, control of the water is of utmost importance.

It would not be possible to give a thorough discussion of all factors involved in brick construction within the limits of a single article. It seemed desirable, however, to point out particularly one factor which has been somewhat neglected—namely, shrinkage.

DIFFICULTIES IN BRICK CONSTRUCTION

Practically all authorities agree that the principal cause of leaky brickwork is mortar shrinkage, with ensuing shrinkage cracks. Prof. Carlson calls attention (Journal of Industrial & Engineering Chemistry, June, 1935) to volume change as the limiting factor in the usefulness of concrete. A similar point may be made with respect to brick mortars. Recent tests conducted by Palmer and Parsons at the Bureau of Standards show that all mortars shrink whether job-mixed or made with patented masonry cements. In their "Permeability Tests of 8 Inch Brick Wallettes" (ASTM, Vol. 34, 1934) they found that 73% of all leaks in 240 test wallettes appeared at the junctures of the vertical and horizontal mortar joints. Every mortar that is in common usage in the United States, a total of 51 tested, including patented mortars, lime and cement of all well-known brands, shrank.

This inherent weakness of brick masonry construction, mortar shrinkage, is largely responsible for its tendency to permit water penetration. Although leakage or water transmission through brick walls is an old problem, it has been aggravated in recent years by the constant demand for more speed in construction, thinner and more exposed walls, and changed conditions of workmanship. By far the greatest cause of leakage in brick walls is faulty joints, that is, where water enters between the brick and the mortar or through cracks in the mortar.

Numerous researches on this subject have disclosed several causes for the defects in brick construction which can be attributed to the mortar:

1. Excessive shrinkage.
2. Low plasticity.
3. Poor bonding qualities.
4. Solubility of the mortar.
5. Low strength.

Within the past decade considerable progress has been made in producing mortars with improved bonding qualities, increased strength and lower water absorption. Less successful have been attempts to eliminate solubility resulting in efflorescence, to increase plasticity and to reduce shrinkage. Of all these desirable mortar properties reduced shrinkage has received the least attention, probably owing in part to the fact that its seriousness has not been realized and in part to the belief that it was an attendant evil about which little could be done.

Laying brick in mortar involves to a very high degree all the difficulties inherent in the use of two dissimilar materials in juxtaposition. Such questions as control of the absorption rate of the brick or conversely of the water-retaining capacity of the mortar and adaptation of the mortar mix to the type of brick and kind of service contemplated are all factors in this problem. As these involve complex relations and are rather controversial in many of their aspects it is not proposed to enter in detail into all these phases but only to point out the importance of volume change, especially shrinkage.

WATER CONTENT OF MORTAR

With volume change and shrinkage is bound up control of the water content of the mortar. The function of the water, in excess of that required to hydrate the cement, is to provide a medium in which the solid particles can move, making the mortar plastic. If the amount of water required to produce a plastic mortar were just that necessary to hydrate the cement, the early shrinkage problem would be overcome, but this does not seem possible.

Even allowing for the absorption of the brick does not obviate the difficulty. If just sufficient water were used (1) to hydrate the cement or lime and (2) to satisfy the absorption of the brick, as soon as the mortar is placed in contact with the brick, enough water would be abstracted to make it unworkable.

Furthermore, the rapid abstraction of water from the mortar by the brick itself constitutes a source of early shrinkage. It has been maintained that this and other early movement of the mortar is compensated by a movement of the brick. While this may be true to a limited extent of the horizontal joints, it is certainly not true of the vertical joints. As the wall is built the bricks press down on each other, tending to close up shrinkage cracks between brick and mortar in the horizontal joints, but there is no force tending to produce a lateral movement to close up the vertical joints. It is generally recognized that leakage is most prevalent through the vertical joints and this is probably the reason.

There are at least three ways of overcoming the effects of absorption of water by the bricks: (1) use of sufficient excess water to allow for that absorbed; (2) use of a mortar which resists abstraction of water, i.e., a mortar of high water-retaining capacity; and (3) use of a mortar which remains plastic over a wide range of water content; or, of course, a combination of two or more of these. None of these, however, solves the shrinkage problem.

A consideration of shrinkage involves a study of the relations of the type of mortar and its water requirement on the one hand and its workability on the other hand. Assuming that the mortar and the brick are suitably selected in any given case, control of shrinkage implies control of water maintaining adequate plasticity.

ANALYSIS OF SHRINKAGE

The principal forces affecting volume change of mortars are four:

1. Loss or gain of water by evaporation or absorption.
2. Hydration of cement.
3. Temperature changes.
4. External stresses.

While it is clearly recognized that other influences are at work they are of less importance. Consequently this discussion is confined to the more significant effects of these four factors.

(a) WHAT HAPPENS DURING HARDENING

To appreciate the rôle of volume change in determining the characteristics of a brick wall it is necessary to have a clear picture of the changes taking place during and subsequent to hardening.

When the mortar is first mixed ready for use it is composed of a fine cementitious material, usually cement or lime, sand, and water to bring it to a workable consistency. Placed between the brick two actions proceed simultaneously: the mortar loses water either by evaporation or by absorption into the brick, and the cement sets and acquires strength. The loss of water by either of these methods causes the solid particles of the mortar to be drawn together, reducing the volume, consequently the mortar shrinks in any direction in which it is free to move. As long as the mortar is in a plastic state these shrinkage movements can take place easily and may be comparatively large. Shrinkage at this stage is most serious in the case of brick mortar, because the bond with the brick has little or no strength, hence is easily broken by shrinkage of the mortar. This break is ordinarily not visible in the beginning, but does not seal and the crack is increased by subsequent volume changes. Prevention of this early rupture of the bond has been sought by control of the absorption of the brick or by increase of the water-retaining capacity of the mortar through changes in the mortar composition. While these have met with some success they can hardly be said to have solved the problem entirely.

As the mortar acquires more strength and rigidity the same shrinkage forces are exerted but no longer produce such large actual volume changes. Instead, with some smaller shrinkage, the loss of water also produces voids and sets up strains by opposing to the tendency to shrink the resistance to deformation which the mortar has acquired.

While this is a very general picture of the happenings during hardening, other influences of considerable importance are at work. Not only is the mortar itself gaining strength, but a bond is being built up between the brick and the mortar, and this is very susceptible to adverse conditions. The shrinkage movements of themselves tend to pull the mortar away from the brick, weakening or even destroying the bond. If water is taken out of the mortar very rapidly, as is the case with a very porous brick and a mortar of low water-retaining capacity, the bond may be completely broken. On the other hand, with a wet mortar from which the water is not rapidly drawn, a separation of the solid particles toward the bottom, of the water to the top, may take place producing a pocket of water on the underside of the brick and a complete lack of bond at that point.

Two forces tending to counteract shrinkage are operative during the hardening period. The first of these is an actual movement of the bricks. While the mortar is still plastic the bricks will move in a downward direction under the force of gravity, taking up a part of the early shrinkage in the horizontal joints. This is not, however, the case with the vertical joints.

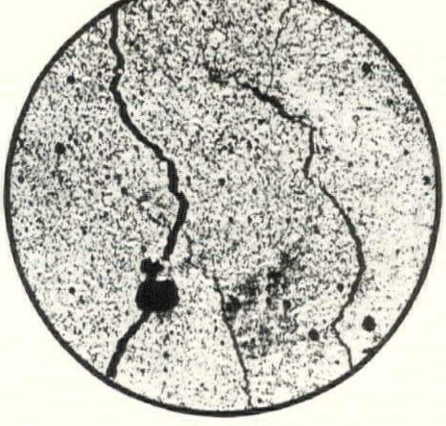
Some of the water used in making the mortar is not lost by evaporation or absorption but combines with the cement or lime. As this hydration reaction increases the size of the cement particles they tend to fill some of the voids and compensate for a part of the decrease in volume. Both of these influences combined are not, however, great enough to take up all or even a large part of the shrinkage.

In general, during hardening, the mortar tends to contract and develop voids through loss of water. This action proceeds rapidly and causes a large shrinkage during the early hardening period while the mortar

CRACKS IN UNSTRESSED CONDITION

FIGURE 1:

Photomicrographs show how cracks due to mortar shrinkage open wider and new cracks appear with application of loads.



CRACKS WHEN LOAD IS APPLIED

is still either plastic or relatively weak. As it acquires strength the speed and size of this shrinking action are progressively diminished, ceasing almost completely when the mortar is cured and dried out. In spite of some modifying influences such shrinkage takes place in *all mortars,* more in some than in others.

What effect shrinkage during hardening will have depends on the balancing of three factors—the magnitude of the shrinkage, the strength of the mortar itself, and the strength of the bond between mortar and brick. The mortar may shrink away from the brick, impairing the bond and leaving cracks through which water can penetrate; the mortar may itself develop cracks; or, no actual cracks may appear, but a state of tensile strain may be set up within the mortar or between mortar and brick. What happens in any particular case varies with the conditions, but ordinarily it may be expected that all of these phenomena are observable to some extent. Cracks between mortar and brick are especially apt to develop in the vertical joints, cracks in the mortar at the junction of vertical and horizontal joints, and a condition of strain anywhere that cracks have not relieved the shrinkage force.

The photomicrographs of Figure 1 show the cracks which develop in practically all mortars from shrinkage (a) in an unstressed condition and (b) after the application of a compression load. In Figure 2 are illustrated the cracks which develop between brick and mortar from shrinkage and lack of bond: (a) a complete failure of bond, (b) a partial failure and (c) a good bond secured with a good mortar.

(b) WHAT HAPPENS AFTER HARDENING

After the mortar has cured and dried out with attendant development of cracks and strains, volume changes may still exist, though smaller than those of the hardening period. If the wall is wet, by rain or otherwise, the pores fill up and the mortar tends to expand slightly. On drying out again it contracts a nearly equal amount. This alternate expansion and contraction occurs every time the wall is wetted and dried. These changes are so small that in themselves they would probably have little or no effect, but with the state of strain set up during hardening, their constant repetition operates to open up new cracks as well as enlarge those already present.

Again, temperature variations will cause small volume changes. A rise in temperature expands the mortar, a fall contracts it. Like the changes produced by wetting and drying, these effects are so small that they are probably only harmful because the mortar is already partially cracked and in a state of strain. If the two effects of moisture and temperature were superimposed they might be injurious even to a perfect mortar in that they might exceed the elastic limit. Fortunately such a cumulative effect is most unusual in nature; when it is hot, the mortar dries out so that the expansion from rise in temperature is compensated by the contraction on drying. Similarly, when it is cold, the mortar tends to take up moisture, compensating for the contraction on cooling by the expansion of wetting.

A third force which may play a part after hardening is that of external stress. If a mechanical strain is exerted on the wall as by loading, by wind pressure or by a blow, the structure will tend to be deformed. If the strength is sufficient at all points this deformation will be resisted, but with a mortar in a condition of strain and containing imperfections in the form of microscopic shrinkage cracks the added mechanical load will open up wider the already existing cracks (see Figure 1) and produce new cracks at the points of maximum strain.

While other qualities of the mortar have some influence in determining its durability under various weathering conditions, the part played by volume change is very important. The small alternate contractions and expansions produced by wetting and drying or by temperature or the distortions of mechanical stress tend as previously stated to open up cracks which have been formed by shrinkage during early hardening or to produce new cracks in areas which have been put in a condition of strain by the same force. Water entering these openings—frozen and thawed—gradually breaks down the structure.

OTHER FACTORS AFFECTING SHRINKAGE

With a mortar of the type commonly used for laying up brick, composed of cement, lime and sand, there are four major points which determine the amount of shrinkage which may be expected:

1. Nature of cementitious materials.
2. Grading of the aggregate.
3. Richness or leanness of the mix.
4. Proportion of water in the mix.

Quite a wide variation in volume change is found among the different cementing materials. During early

FIGURE 2: Photomicrographs by Prof. W. C. Voss (M. I. T.) showing various bond conditions between brick and mortar.

COMPLETE FAILURE OF BOND PARTIAL FAILURE OF BOND GOOD BOND WITH GOOD MORTAR

hardening lime shrinks more than portland cement; subsequent to hardening the reverse is true. Volume changes are less with lime than cement (*cf.* Palmer and Parsons). There are, moreover, fairly wide variations among different cements and limes. Lime which has been soaked over a considerable period of time probably undergoes smaller volume changes than lime which is made up and used immediately. All of the cementitious materials, however, shrink to a considerable extent. To avoid troubles from this cause it is necessary to select those materials which have the smallest possible shrinkage and to combine them in proportions which will avoid large volume changes, but will at the same time confer the other properties required in a usable mortar, including strength and workability.

Shrinkage is significantly influenced by the size grading of the sand used. The finer the sand the greater will be the shrinkage. Also a sand which is graded over a range of sizes to give good packing will cause less shrinkage than one which contains only a narrow range of sizes or has an excessive proportion of one size.

Consequently a sand should be selected with a fairly even distribution over the different sizes and of as coarse a nature as possible. Here again the other characteristics, especially workability, required in a practical mortar restrict the choice. If the sand is too coarse, harsh unworkable mixes are produced and for laying up the comparatively narrow joints used in brickwork the maximum size cannot be large. Another limitation is that, unfortunately, well-graded sands are not always available in the vicinity of the job.

The relation between richness of the mix and volume change is very simple: the richer the mix, the larger are the volume changes. It is therefore desirable to use as lean a mix as possible. Lean mortars are, however, less plastic and less strong than those containing more cement or lime, placing a very definite limit to the extent to which any decrease in richness can be carried. It is a common observation, however, that more difficulty has been experienced of late years as the result of using too rich a mix than through too lean a mix.

WATER VERSUS SHRINKAGE

Probably the most important factor in shrinkage is the proportion of water used in the mortar. In fact, it is the underlying influence in determining volume changes. Those cementitious materials which take more water shrink more; fine, poorly-graded sand requires more water; rich mixes use more water. This is the reason these materials show high shrinkage. It is fairly safe to state in a general way that the shrinkage is proportional to the amount of water used per cubic yard of mortar. The importance of using as dry a mortar as possible is at once evident.

WORKABILITY VERSUS SHRINKAGE

To secure a satisfactory brick job it is necessary to reduce the shrinkage of the mortar, but it is also necessary that the mortar shall be workable. As before stated, one important cause of leakage in brick walls is a failure to secure well-filled joints, especially the vertical joints. When the tendency of the mortar to shrink away from the brick is exerted on incompletely filled joints, it is not surprising that cracks are opened up between the brick and the mortar through which water can pass readily. It should be pointed out, however, that, even when joints are properly filled with mortar, they are still subject to shrinkage and consequent bond failure, and that "perfect workmanship" in this regard is not full assurance of perfect results.

Compacting the mortar after the brick has been laid, as by tooling, will help to take up some of the initial shrinkage and produce a stronger, more watertight wall. If the mortar is not workable when this operation is performed no beneficial effect can be derived. It will be evident that, with average workmanship, a highly workable mortar is necessary to aid the mason in securing well-filled, compacted joints and good adhesion between brick and mortar. Stated another way, with a given calibre of workmanship, the more workable the mortar the better the job.

Unfortunately many of the factors which improve the workability of a mortar are just the influences which promote large volume changes. Richness of mix, fineness of sand, increased water, all make the mortar more plastic, but all increase shrinkage. Basically the problem is resolved into a balancing of the water ratio against workability and shrinkage. The first must be kept high, the second reduced to a minimum. Any means, therefore, which will permit the water to be decreased without impairing workability will have a beneficial effect.

ATTEMPTS TO IMPROVE MORTARS

Many devices and materials have been proposed and used for the improvement of brick mortar. A number of soluble chemicals, of which the chlorides are typical, have been used to accelerate the hardening of the cement. This they accomplish, but they have little or no effect on workability or shrinkage. They are open to the objection that they contribute nothing to the ultimate strength of the mortar or to any other property, but do introduce soluble salts which may lead to efflorescence. Stearates in various forms are widely used and perform a useful function in reducing the absorption of the mortar. This, of course, decreases danger of leakage through the mortar, helps to prevent efflorescence and improves the durability. They may also contribute somewhat to workability, but this effect is not large.

PLASTICIZERS AND POZZOLANAS

Various finely divided solids have been added to brick mortars, presumably to impart plasticity. Any fine material, including lime, will accomplish this purpose and lime is generally considered the most effective of all. Within limits a certain proportion of lime or some other fine material having a similar effect is desirable in a brick mortar to give it a plastic quality known as "fatness." Lime also increases the water-retaining capacity of the mortar and diminishes volume changes after hardening. The proportions of lime and cement to be used in a mortar should be governed by the nature of the brick, higher proportions of lime being required for the more porous bricks, and by the service conditions to be expected.

The finely divided solids used in a mortar require the addition of more water and in this respect some are worse than others. In so far as additional water is needed they have an adverse effect on shrinkage. One other purpose may be served by suitable finely divided solids and that is the absorption of free lime and possibly other solubles in the mortar. By combining with the soluble portions of the mortar, these materials reduce the tendency toward efflorescence and contribute to the durability of the mortar. To accomplish this the fines must be pozzolanic in nature. Many of the substances used, such as lime, whiting, marble dust, are not but many others, generally of a silicious nature, are. Even among the pozzolanic materials there is wide variation in degree of activity. To derive any real benefit such a material should have a high degree of reactivity and this is found more in synthetic pozzolanas than in the natural products. Finely divided solids have a definite place in brick mortar in so far as they contribute "fatness" and reduce solubles; they are disadvantageous insofar as they require additional water.

WATER-RETAINING CAPACITY

The "water-retaining capacity" of the mortar should be suitable to the brick which is being used. With an absorbent brick a high "water-retaining capacity" is necessary to prevent water being drawn out too rapidly, increasing shrinkage and impairing the bond. With a relatively non-porous brick the "water-retaining capacity" need not be so great. This is best controlled by selecting the right character and combination of cementitious materials, and is aided by the addition of gelatinous materials high in water-retaining value.

ROLE OF WATER IN MORTAR

Water in a brick mortar serves two purposes: it combines with the cement and lime, giving them strength; it furnishes a medium in which the solid particles can move, making the mortar plastic. Roughly, the water needed to give a workable mortar is more than twice as much as that taken up by the cement. The water which is not consumed by this hydration reaction will, sooner or later, leave the mortar either by evaporation or by absorption in the brick. In so doing it causes contraction and produces shrinkage cracks as long as the mortar lacks sufficient rigidity to withstand the contracting force. Thereafter the water leaving the mortar is simply replaced by air forming a system of more or less inter-connecting capillary voids (see Figure 2).

The shrinkage cracks are sources of mechanical weakness and points of attack for the destructive agencies to which all structures are exposed. The capillaries permit the penetration of water into the mortar, sometimes causing leakage, always detracting from durability and often allowing soluble salts to be brought to the surface as efflorescence.

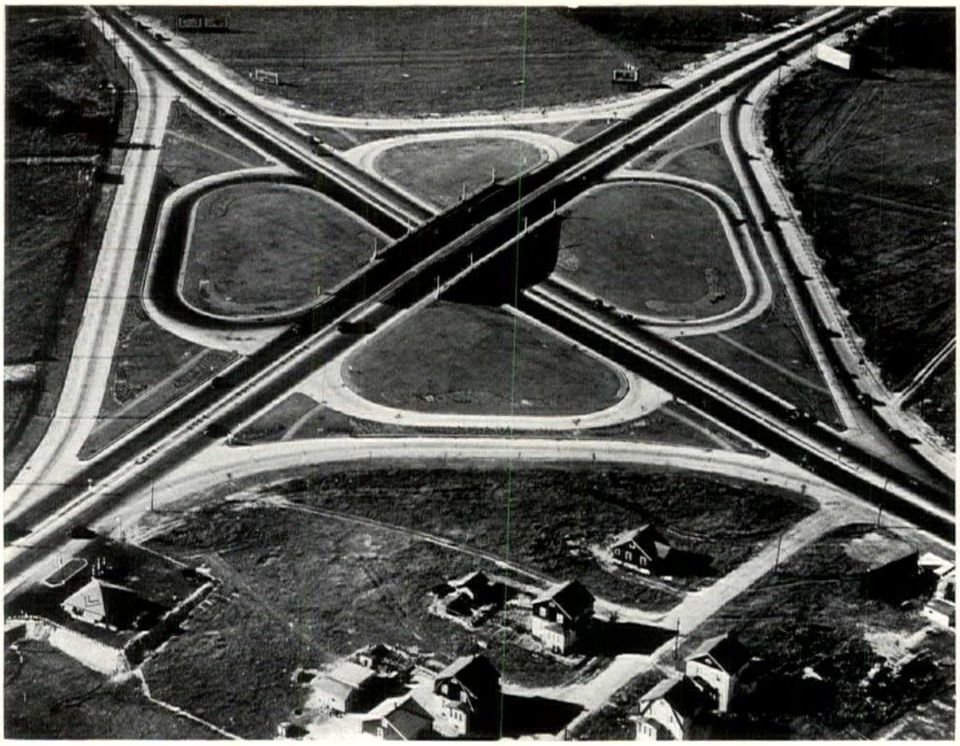
WORKABILITY WITH REDUCED WATER

It has been found that some gelatinous materials will have a beneficial effect on workability. They will reduce the quantity of water required with any given mortar to give the desired flow. By reducing the water without impairing workability or, what is the same thing, by increasing workability at the same water ratio, the volume changes of the mortar are reduced. Just how this decrease in shrinkage is secured will vary with the specific condition. If greater workability is required to promote good workmanship, the mortar mix and its water content will be kept the same and the plasticity increased by addition of the gelatinous material. If the workability is satisfactory, shrinkage may be diminished by using less water, or by making the mix leaner, or by altering the proportions of cement and lime.

CONCLUSIONS

Briefly stated, to control the volume changes of a brick mortar and to secure good workmanship, it is necessary to provide a workable mortar with as little water as possible. This end may be reached by careful design of the mix with respect to the kind and proportions of cementitious material, grading of the sand and richness of the mix. The composition of the mortar, which must be adapted to the brick, should be so controlled that it will produce all the desired properties as far as possible. While much may be accomplished by proper selection of materials and suitable proportioning, volume changes due to the water needed still remain and further improvement is to be sought in reduction of the quantity of water required to make the mortar workable.

If brick could be laid in mortar with just sufficient water for the hydration of the cement, practically all mortar troubles would disappear. The avoidance of defects obviously lies in approaching as closely as possible to this ideal, by so selecting and combining the mortar materials that the smallest amount of water is used consistent with workability. By such means all desirable properties of the mortar can be fully developed and volume change—shrinkage—reduced to a minimum.



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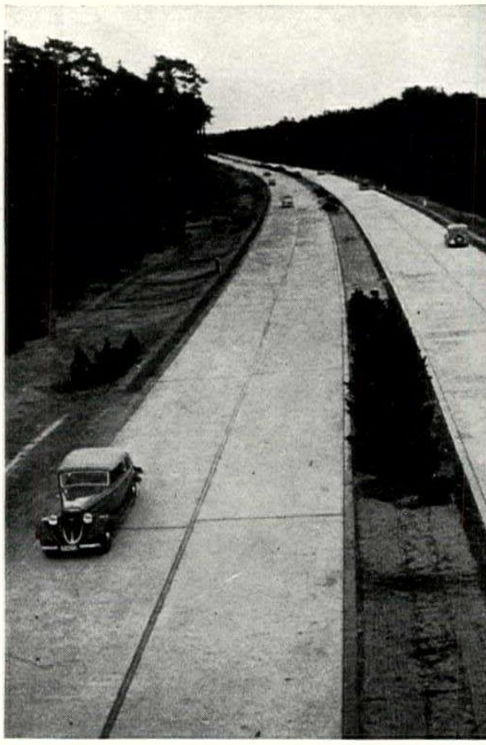


Die Kunstkammer

2.

NEW TOWNS FOR HIGH-SPEED ROADS

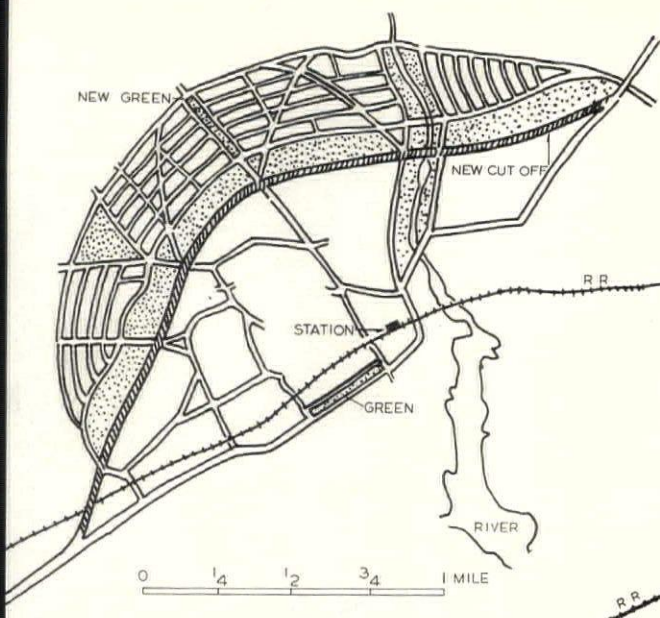
The American parkway, as it has been built around New York and other cities, is in conception a relic of the horse and buggy days when the rate of progress over the road gave time for the enjoyment of scenery. This was indeed the object of the drive and a source of inspiration for the drivers who were much more closely pent in the city than we are today. Motoring may still be carriage exercise for some, but I think the number who drive for the sake of being outdoors and enjoying the scenery is constantly diminishing and that most persons motor to get somewhere for business or pleasure.

Safe and ordinary speeds for cheap cars today are from 40 to 60 miles an hour, yet the speed must be kept under 30 or 35 because the parkways are designed for luxury in landscape rather than for comfort in use. It is ridiculous to be driving a car which is comfortable at 60 miles per hour at half that speed because the roadway was designed for luxurious planting, extravagant lawns and curves to delight the leisurely driver of the past.

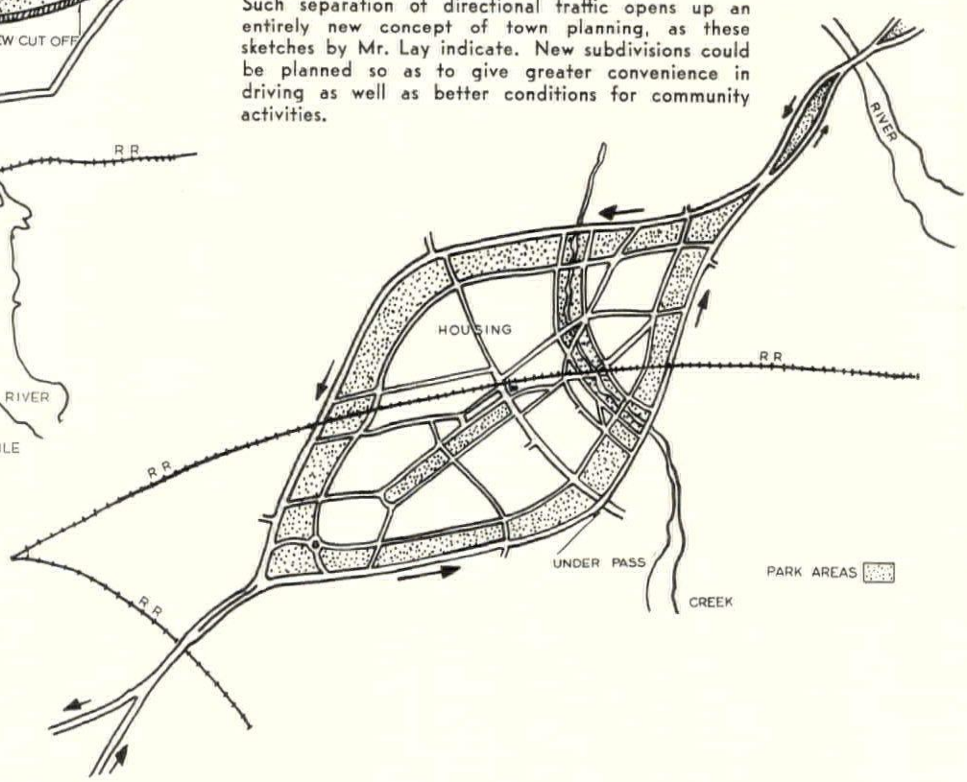
The ideal for which we should strive is a means whereby we can drive from a garage not more than ¼ mile to a super highway on which we can continue uninterruptedly until within 5 miles or so of our destination in another city or in a country camp or farm. A satisfactory adjustment between utility and luxury in parkways would produce a parkway with no grade crossings, with straight runs wherever possible, with the curves long and well banked, with no sharp peaks in profile to hide what is in front from a driver sitting low, and with no more luxury in landscape treatment than enough to hide the dullness of factories or slums.

It is desirable wherever possible that the two directions of the roadway be separated by a strip of grass or planting 20 or more feet wide to prevent head-on collisions between cars too far to the left and to avoid some of the tiring whiz of cars passing in the other direction. Sharp changes in profile (a steep rise and a drop beyond) need not then be avoided since head-on collisions are impossible. There is no doubt that the grass strip lessens the danger of left-hand turns and makes entrance to the highway for a left-hand turn much safer. In the case of six- or eight-lane roads where the traffic is likely to be all one way on certain days or hours a further division into three or four roads of two lanes each might be desirable. On days of heavy traffic in one direction four or six lanes could be all one way, leaving two for the few cars going in the opposite direction. On a road of two lanes in each direction the speed on the outside should be 40 to 45, on the inner lane 45 or higher which permits a car at the lower speed to take the outside lane to let a higher speed car go by. The minimum of 40 should be obligatory.

It is my opinion that a separation of 20 to 50 feet is sufficient for most drivers and that any additional space is simply a strip park and not very useful as a park. The design of these big high-speed roads is still a matter of study and of disagreement because they are a new conception to meet the need of high-speed cars.



To prevent head-on collisions of automobiles the two directions of the high-speed road should be separated wherever possible by a strip of grass or planting. Each roadway then becomes a one-way street and could be a mile or more apart if so desired. Such separation of directional traffic opens up an entirely new concept of town planning, as these sketches by Mr. Lay indicate. New subdivisions could be planned so as to give greater convenience in driving as well as better conditions for community activities.



Left: (1) Clover-leaf intersection near Woodbridge, N. J., built by New Jersey State Highway Commission. (2) High-speed automobile road between Frankfurt and Darmstadt in Germany.

By **CHARLES DOWNING LAY**, Landscape Architect

When the road is separated by grass or planting into two roads for traffic in opposite directions each road then becomes a one-way street with no relation to the other. It is entirely possible in fact to have these one-way roads a mile or more apart without serious inconvenience. The separation, whether it is much or little, is determined by the cost of construction, the cost of bridges and the cost of land. Division by a separation of a quarter of a mile, or more or less, might require less taking of land than a separation of a hundred or more feet. The two roads might meet as one for important bridges or intersections.

An advantage in a separation of roadways is sometimes to be found in the reduced cost of cut-and-fill, especially when the intervening green strip can be used to take up the slope between roadways at different levels.

These big roads 300 feet or so wide can usually only be run through unimproved or open country, but the one-way road might conceivably be run on old highways without excessive damage. The inconvenience caused some of the owners of property on the one-way street should not be great if cross connections are frequent. The one-way street has become so common that it does not often incur objection.

The land for highways will cost less the more removed from towns, but the citizens of each town are likely to urge that it be brought, for their convenience, near the community center. If the super highway is 5 miles from town and the ordinary speed is 40 miles an hour, 7½ minutes will be required to reach the center. But if it is brought nearer so that some traffic lights must be passed, the lesser distance plus 3 lights would equal the longer run in time: thus, 3 lights or 4½ minutes plus 1½ miles at 30 equal 7½ minutes. This is a fundamental consideration.

There are further advantages in a separation of roadways in that going off and going on may be done from either side. This may greatly reduce the cost of construction or make easier the choice of a location. A left turn presents little danger on a one-way street.

The cost of policing the separated one-way roads will be greater, but there is no reason to suppose that the cost of upkeep will be any more.

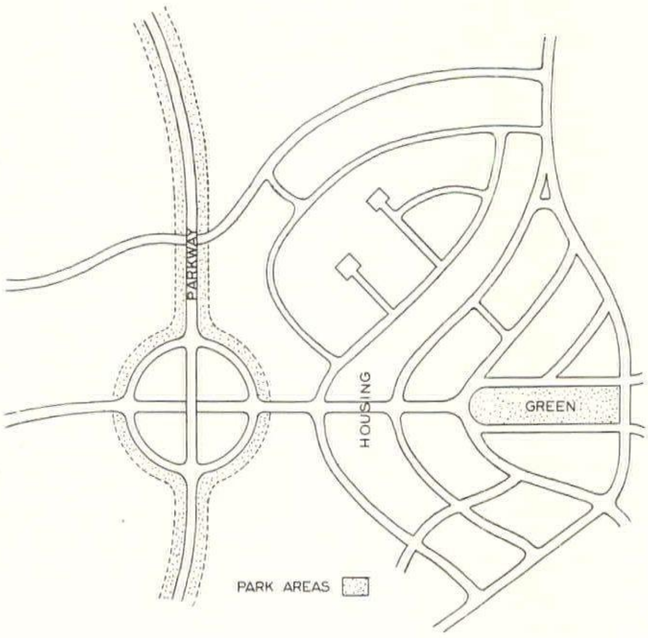
No distinction can be made between parkways, trunk highways and super highways, except in the lower speeds, fancy planting and prohibition of trucks on the parkways, and the fact that access from adjoining property can be prohibited on a parkway but not on a highway.

There is nothing so gratifying to long-distance motorists as a byway or by-pass for every city and village, for the difficulty of going through towns congested with local traffic, pedestrians and parked cars is the great cause of low average speeds on long runs.

The separation of grades in super highway or other streets has brought about the clover leaf, a scheme for entrance and exit for cars in both directions without making a left-hand turn through traffic.

Going on and off at the center has never been tried but might work to advantage in some places, particularly where the separation is wide.

A town plan by Charles Downing Lay, landscape architect, showing how a new community could be developed near a clover-leaf intersection in such fashion that entrance to or exit from the highway in either direction becomes easy.



For the comfort of tourists, as distinguished from automobile commuters and pleasure drivers, there should be frequent opportunities to turn off from the road to a comfortable parking place for rest, for repairs, or for change of drivers, or for lunch. If these parking spaces are not more than 3 miles apart and agreeable in themselves, or if they give a pleasant view or easy access to a town or a restaurant, every reasonable demand for luxury will have been satisfied, without elaborate landscaping between stopping places or, as Commissioner MacDonald of Connecticut prefers to call them, "halts."

If the park along a parkway is to have any value except for scenery, it should be possible for motorists to stop on a hard gravel road at any place within reason along the way. The wider the parkway is made, the more important it becomes to provide for its full use. It is my belief that all our highways are lacking in comfortable stopping places and that this lack lessens the pleasure of driving. By "comfortable" I mean a place off the highway where one is expected to stop in order to enjoy a view or the shade or a running brook.

So far as I know, the problem of controlling the use of the land adjoining a super highway has never been well-studied. There are endless miles through the country built on new locations and offering admirable sites near towns and villages for new subdivisions or new dwellings. A four-lane super highway or trunk highway is dangerous for pedestrians to cross and becomes with heavy traffic an almost impassable barrier. It is too noisy most of the time for comfortable living, and except where public opinion demands rigid zoning it is likely to become a jumble of hot-dog stands, barbecues, gas stations and novelty shops. Any such development should be at a distance, as if the trunk highway were built as a by-pass or cut-off. Five hundred feet to the nearest dwelling might be enough to give the new community some protection from noise and desirable isolation, without giving up any of the advantages of being near the trunk highway.

The 500-foot strip between the highway and the new community would probably be used for a park and for industry. The location should be near a "clover-leaf" or other form of separated grade so that entrance and exit from the highway in either direction becomes easy.

A stoplight system is too inconvenient and too expensive. If traffic on the trunk is stopped for one minute in five it is a clear reduction of 20% in the capacity of the road. The cost of bridges and grading makes it evident that for access to the new villages the clover-leaf should be in a place where every natural condition favors its location.

The sensible plan, however, seems to be to put the village between the one-way roads, which obviates all expensive clover-leaf schemes. If the separated one-way trunks run east and west, then the villagers would drive north to get on the highway if they were going west, and south if they were going east. They might of course still like an underpass at each one-way highway to give easy access to the country beyond.

The trunk highway should reflect the tendency toward decentralization but its effects in this way have hardly been felt in most communities. Except for an accidental creation, beginning with a hot-dog stand, a gas station, a restaurant, a novelty shop and cottages for the attendants, the new community is most likely to start as a new subdivision or possibly around a large auto camp or cabin camp.

There are not many towns having planning boards with energy and push sufficient to secure modifications in the super highway plan which would make a new development easy. The development is likely therefore to be started by some landowner anxious to sell building lots; it is likely to be too near the super highway and it will probably depend upon a stop light for access or crossing.

The super highway on a new location does offer exceptional opportunities for subdivisions of a good class on low-priced land. If they are skillfully planned in relation to the highway and the nearby town they are likely to become the most desirable residential districts.

On a well-designed super highway one should be able to go the full 40 or 60 miles an hour from the time of starting, and reach Boston from New York (250 miles) between early lunch and late dinner.

If trucks are to be permitted on these roads there should be a minimum of three lanes each way and their speed should be restricted to a minimum and maximum so that the need for passing will be infrequent. Holland is building good roads of this type, and Germany has built from Koln to Bonn, 21 kilometers, a perfect high-speed motor road.

The lack of such through trunk lines not only restricts the automobile to about half its capacity, but also actually cuts down its use more, because high-speed trunk roads would, by means of branches, serve all the cities within 20 miles of the main route and give rapid communication between all towns in a large region. If the automobile cannot be comfortably used for long distances at high speed, it is because our highway engineers have not kept up with the progress in automobiles.

IN THE JANUARY ISSUE

An article on reinforced concrete, with examples of concrete construction, giving special attention to the design of houses, large and small . . . A Portfolio of Concrete Houses, illustrating the work of Antonin Raymond and others . . . A Portfolio of interiors and current building types.

RESTORATION OF WILLIAMSBURG

By arrangement with Colonial Williamsburg, Inc., the whole of this present issue is devoted to an authoritative presentation of the Restoration.

The restored buildings and gardens of this early Colonial settlement in Virginia are shown pictorially in a 60-page PORTFOLIO which reproduces a series of carefully detailed photographs taken by F. S. Lincoln. These illustrations are supplemented by maps, city plan, floor plans, detail drawings, garden plans and facsimile reproductions of characteristic colors.

The story is told textually by the Restoration architects and designers in the following:

THE RESTORATION OF COLONIAL WILLIAMSBURG IN VIRGINIA, by Fiske Kimball.

THE HISTORICAL BACKGROUND.

NOTES ON THE ARCHITECTURE, by William Graves Perry.

CITY PLAN AND LANDSCAPING PROBLEMS, by Arthur A. Shurcliff.

PAINTS, FURNITURE AND FURNISHINGS, by Mrs. Susan Higginson Nash.

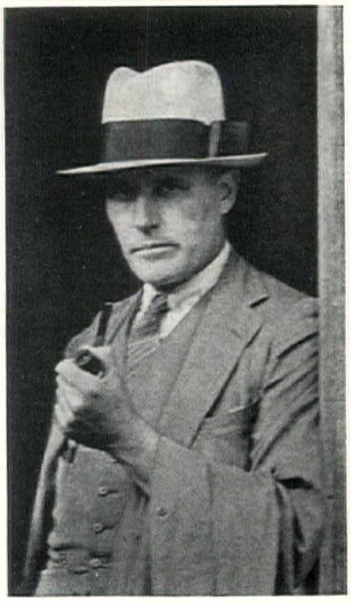
Ralph Steiner

F. S. LINCOLN, PHOTOGRAPHER

ARCHITECTS OF THE RESTORATION

WILLIAM GRAVES PERRY

THOMAS MOTT SHAW



ANDREW H. HEPBURN

THE BOARD OF ADVISORY ARCHITECTS AND OTHERS ON A TOUR OF INSPECTION. *Left to right: Robert Trimble of Todd & Brown, Inc.; Mrs. Susan Higginson Nash, associate of Perry, Shaw & Hepburn; William Graves Perry, Boston; Thomas Mott Shaw, Boston; Philip Stern, Fredericksburg, Va.; Edmund S. Campbell, professor of architecture, University of Virginia; A. Lawrence Kocher, managing editor, The Architectural Record; W. Duncan Lee, Richmond, Va.; (seated) D. Everett Waid, New York City; Fiske Kimball, director, Pennsylvania Museum of Art; (seated) R. E. Lee Taylor, Baltimore, Md.; Andrew H. Hepburn, Boston; Marcellus E. Wright, Richmond, Va.; (seated) Arthur A. Shurcliff, landscape architect, Boston; Robert Peabody Bellows, Boston; Thomas E. Tallmadge, Chicago; Harold R. Shurtleff, in charge of research and record for Perry, Shaw & Hepburn; Conrad W. Anner, associate of Perry, Shaw & Hepburn.*

DR. W. A. R. GOODWIN
RECTOR, BRUTON PARISH

Frank Ehrenford

JOHN D. ROCKEFELLER, JR.

In 1927, *upon suggestion from Dr. W. A. R. Goodwin, rector of Bruton Parish, John D. Rockefeller, Jr., undertook the restoration of the Colonial area of Williamsburg. Dr. Goodwin was commissioned to purchase the necessary properties.*

"The area thus secured was turned over to two corporations which were now formed to carry the undertaking forward. The Williamsburg Holding Corporation (now Williamsburg Restoration, Incorporated) became the executive and business organization in charge of the project. Colonial Williamsburg, Incorporated, was formed to hold title to properties presented to the restoration by the city of Williamsburg, the Association for the Preservation of Virginia Antiquities, and by individual donors; and it has since held and managed properties and buildings which are confined strictly to historical and educational purposes.

"Meanwhile, the firm of Perry, Shaw and Hepburn, architects, was retained to have charge of the architectural development of the plan; Arthur A. Shurcliff to have charge of the landscape restoration and work of city planning; and the firm of Todd and Brown, Incorporated, engineer-contractors, to govern the working organization which carried out the plans developed by the architects and landscape architect and approved by the executive corporation." (*From* A Brief and True Report for the Traveller Concerning Williamsburg in Virginia, *published by Colonial Williamsburg, Inc.,* 1935).

By 1935 *the restoration was complete as to form, although it will continue with respect to detail. Some* 440 *buildings of late construction have been torn down and* 18 *moved outside the Colonial area;* 66 *Colonial buildings have been repaired or restored;* 84 *have been reproduced upon Colonial foundations. Federal Highway* 60 *has been diverted to a by-pass road, and streets, open spaces and gardens have resumed their Colonial appearance, with lamp-posts, fences, brick walks, street surfaces and plantings derived from authentic records.*

THE ARCHITECTURAL RECORD

VOLUME 78 • NUMBER 6 • ISSUE OF DECEMBER, 1935

THE RESTORATION OF COLONIAL WILLIAMSBURG IN VIRGINIA

¶ THE CITY of Williamsburg as it existed in 1927 gave little suggestion of its ancient importance in American history and architecture. The Capitol, the Palace, had long been razed to the ground, the original College building had been completely denatured by successive fires and rebuildings. Many of the oldest houses had been transformed out of recognition. Small wonder there were voices raised to doubt the value of attempting its restoration, and to question why some more grateful choice had not been made for such an undertaking.

This stage of memories of Spotswood and Botetourt, of George Wythe and Patrick Henry, of Washington and Jefferson, of Lafayette and Rochambeau —had its physical setting been of a corresponding architectural interest? If indeed it had been so in their day, did enough evidence remain to rebuild it except in an imaginary and theatrical way, without valid relation to the original reality?

Today we know that Williamsburg, at the Revolution, was a town of beauty and of architectural significance; that its major buildings were milestones in the history of American style, its Palace Garden perhaps the most beautiful in America; that the Capitol, the Palace with its garden, the College, the historic Raleigh Tavern, could be evoked in substantial accuracy and perfection, so that the actors in their halls, could they return, would scarcely guess the intervening destruction and neglect.

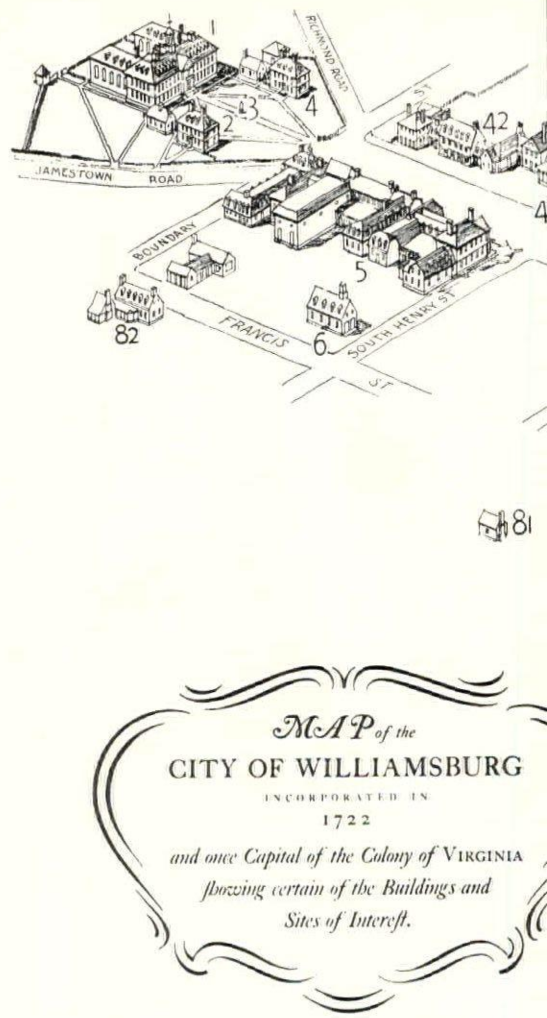
For an undertaking of such magnitude and importance it was vital that the architects should be not only men willing to dedicate themselves to the task with sympathy and understanding, but also men of experience in directing large enterprises. The choice made has proved a happy one. Approaching the work in a belief that perhaps it might require buildings and gardens freely designed in the old manner, the architects, as the soil and the old records commenced to give up their secrets, became passionate historical students, happy to subordinate their creative abilities to a loyal interpretation of the ample evidence discovered. They have shown their capacity to enlist every desirable advice, to develop the necessary historical, archaeological, artistic and executive staff, and to carry the whole work through with the most conspicuous success.

All honor to the vision and energy of Dr. Goodwin, the "onlie begetter" of the enterprise, to the generosity and devotion of the donor, to the taste and skill of the artists and technicians, who have recreated for us this incomparable monument of our early history and art. —FISKE KIMBALL.

OPPOSITE PAGE: KITCHEN OF ST. GEORGE TUCKER HOUSE

LEGEND OF BUILDINGS ON THE GUIDE-MAP OF WILLIAMSBURG

(1) *The Wren Building.* (2) *Brafferton Building.* (3) *The Botetourt Statue.* (4) *The President's House.* (5) *New Shop Buildings.* (6) *The New Fire House.* (7) *Taliaferro-Cole House.* (8) *The Pulaski Club.* (9) *The Rectory.* (10) *Maupin Shop.* (11) *The James Galt House.* (12) *John Custis Tenement.* (13) *The Travis House.* (14) *Colonial Prison.* (15) *The Powder Magazine.* (16) *The Market Square Tavern.* (17) *Lightfoot House.* (18) *Captain Orr's Dwelling.* (19) *Bland-Wetherburn House.* (20) *Charlton's Inn.* (21) *Purdie's Dwelling.* (22) *The Kerr House.* (23) *The Capitol.* (24) *Public Record Office.* (25) *Colonial House.* (26) *Colonial House.* (27) *The Raleigh Tavern.* (28) *The Sign of the Golden Ball.* (29) *Davidson Shop.* (30) *Teterel Shop.* (31) *Virginia Gazette Printing Office Site.* (32) *Dr. Blair's Apothecary Shop.* (33) *The Ludwell-Paradise House.* (34) *The Old Court House.* (35) *The Norton House.* (36) *The James Geddy House.* (37) *Bruton Parish Church.* (38) *The Armistead House.* (39) *The Blair House.* (40, 41, 42) *New Shop Buildings.* (43) *The Timson House.* (44) *The Minor House.* (45) *The Wythe House.* (46) *The Carter-Saunders House.* (47) *The Governor's Palace.* (48) *The Brush House.* (49) *The Site of the First Theatre in America.* (50) *The Levingston House.* (51) *The St. George Tucker House.* (52) *The Archibald Blair House.* (53) *The Randolph-Peachy House.* (54) *Colonial House.* (55) *Colonial House.* (56) *The Public Gaol.* (57) *The Coke-Garrett House.* (58) *Dr. Robert Waller House.* (59) *Site of the Second Williamsburg Theatre.* (60) *Benjamin Waller House.* (61) *Bassett Hall.* (62) *Colonial House.* (63) *Ayscough's Shop.* (64) *The Semple House.* (65) *Colonial House.* (66) *Chiswell-Bucktrout House.* (67) *The Wig-Maker's House.* (68) *The Moody House.* (69) *The Roper House.* (70) *Colonial Dwelling.* (71) *Powell-Hallam House.* (72) *Braxton House.* (73) *Colonial House.* (74) *The Orrell House.* (75) *The Quarter.* (76) *The Masonic Lodge.* (77) *The Bracken House.* (78) *The Allen-Byrd House.* (79) *Site of the First Colonial Court House.* (80) *Tazewell Hall.* (81) *The Custis Kitchen.* (82) *The Griffin House.*



THE HISTORICAL BACKGROUND

¶ WILLIAMSBURG was the seat of government and the economic, educational, religious and social center of the Virginia colony from 1699 to 1779. In the former year land was laid out and surveyed by Theodorick Bland in accordance with an act of the General Assembly "directing the building the Capitoll and the City of Williamsburg" at Middle Plantation.

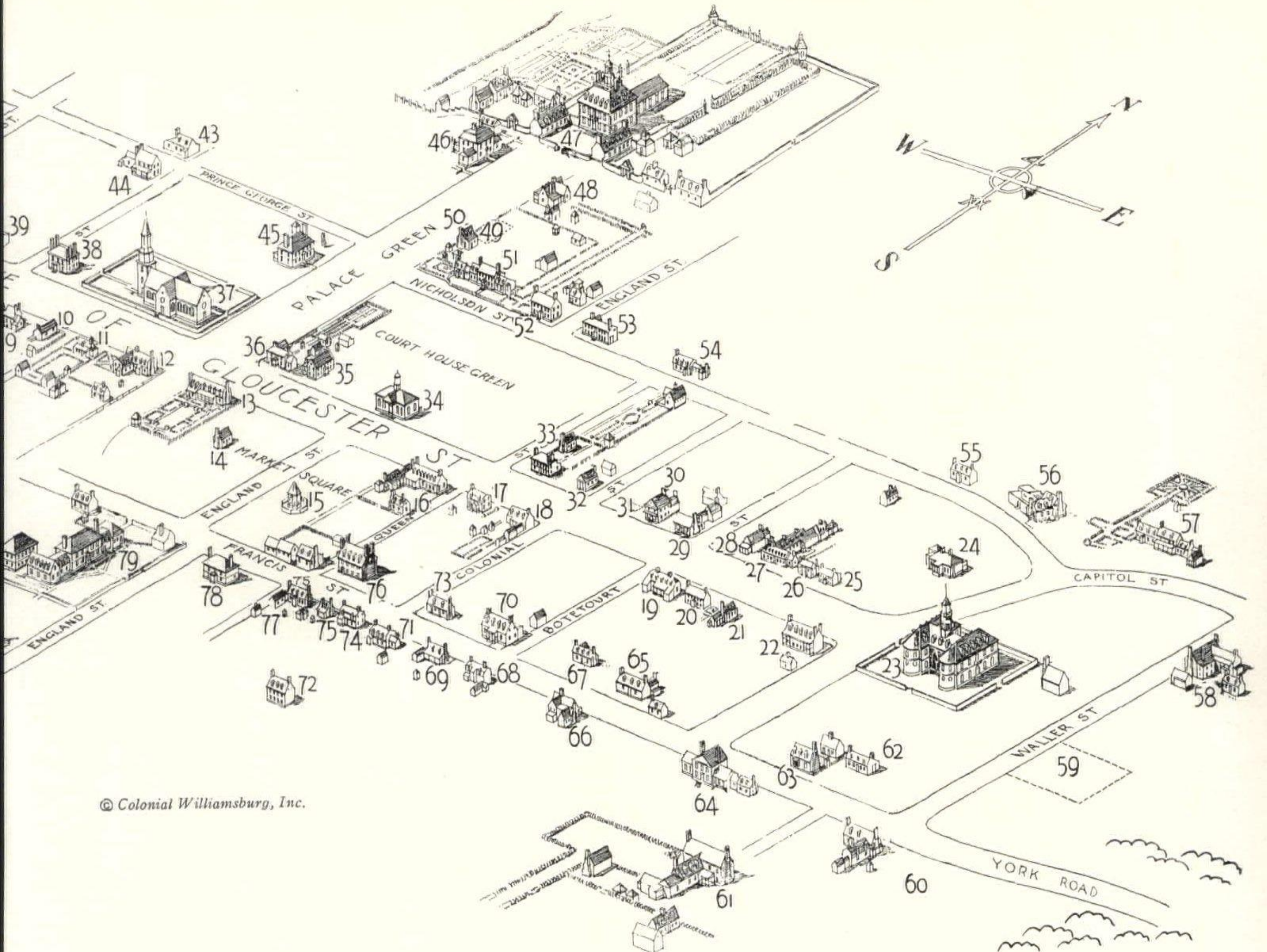
Middle Plantation had been settled in 1633 on high ground midway between the York and James Rivers and had been protected from the Indians by a palisade. It contained two institutions which still survive, Bruton Parish Church and the College of William and Mary. Bruton Parish was organized in 1674 by uniting two older parishes and the removal of the capital to this location created a need for a larger building, which was built between 1710 and 1715 and is still in use.

In 1693 the College of William and Mary (next to Harvard in seniority) was granted a royal charter and the General Assembly ordered its erection "as neare the Church now standing in Middle Plantation old ffields as Convenience will permit." The plan for the main academic building was made by Sir Christopher Wren, surveyor general to their majesties King William and Queen Mary, patrons of the College. Foundation bricks were laid in 1695 under the direction of Thomas Hadley, master builder, and although damaged by three fires (1705, 1859 and 1862) the outside walls are largely original today.

When the city was laid out in 1699 a "noble great street" six poles (99 feet) wide and seven-eighths of a mile long was projected which was later named Duke of Gloucester Street. Its western terminus was the College, and its eastern the Capitol. Parallel to the main street were two streets of lesser width and intersecting it were numerous cross streets.

To the north of the main street and about midway on its length was a broad tree-lined avenue terminated by the royal Governor's Palace, built 1705-1718.

The city plan—Williamsburg was designated as a city in the act of 1699 and was incorporated as such in 1722—included restrictions governing the type of



building which could be erected on the half-acre lots, and provided for public greens and squares. It was an effective placing of open spaces and avenues to emphasize public buildings, and has remained substantially unchanged for more than two centuries.

Colonial Williamsburg, while it served as the capital, occupied an area about a mile square, with perhaps 300 houses and a resident population of approximately 3,000. During "public times," when the assemblies were held and the courts sat, as many as 4,000 more thronged into the city and taxed the capacity of the numerous public houses, taverns, inns and ordinaries. At this time there were fairs, horse races, cock fights, slave auctions, lotteries, theatrical performances, gaming, balls, fireworks and other diversions. Merchants and planters met to transact their business, craftsmen displayed their wares, and numerous shops supplied the latest fashions out of London. Of such times, Colonel Spotswood wrote that he entertained four hundred guests at supper at the Palace, and one of his successors in office, Governor William Gooch said, "the Gentm. and Ladies here are perfectly well bred not an ill Dancer in my Govt."

In the years prior to the Revolution Williamsburg was one of the most important political centers in the Colonies. An act was passed in 1779 for removing the seat of government to Richmond, and the transfer took place the following year. During the campaign which ended with the surrender of Cornwallis at Yorktown in October, 1781, the British spent ten days in Williamsburg, followed shortly by a concentration there of General Washington's army, the French forces, and the Virginia militia. The French army, after the surrender of Cornwallis, wintered in Williamsburg.

Except for intervals during the Civil and World Wars, Williamsburg has remained a quiet college town and county seat. The battle of Williamsburg was fought in 1862 and Federal troops occupied the place until 1865. In 1917 Williamsburg became the base of supplies for Penniman, a nearby town of 15,000 which manufactured munitions and which has since disappeared.

The population in 1930 was 3,778. Some of the historic Colonial buildings had been destroyed, mostly by fire during the Yorktown Campaign and the Civil War. The Governor's Palace was burned while in use as a hospital in 1781; the Capitol (of which the eastern half had been demolished in 1794 to repair the western half) was burned in 1832, and the Raleigh Tavern in 1859. Buildings of lesser note had been torn down for firewood and for building officers' quarters during the Civil War or had otherwise disappeared in the course of nearly a century and a half. Nevertheless, Williamsburg had maintained both the essentials of its Colonial city plan and a noteworthy proportion of its Colonial buildings.

¶ THE INITIATIVE in the restoration came from Dr. W. A. R. Goodwin and the means from John D. Rockefeller, Jr., both of whom were without doubt influenced by the historic associations of Bruton Parish church, and William and Mary. As rector, Dr. Goodwin brought about the restoration of the church in 1905. In 1928, at his instance, the home of George Wythe (the first professor of the first law course in an American college, teacher of John Marshall, Thomas Jefferson, James Monroe and Henry Clay, and a signer of the Declaration of Independence), was restored.

In 1925 Mr. Rockefeller attended a lecture by Dr. Goodwin in New York before the Phi Beta Kappa Society, founded in 1776 by students of William and Mary. Invited by Dr. Goodwin, Mr. Rockefeller visited Williamsburg later in the year and Dr. Goodwin presented the outline of a plan for restoring the city to its Colonial appearance. In 1927 Dr. Goodwin was commissioned by Mr. Rockefeller to buy the necessary properties. Practically the entire area which had comprised the Colonial city was acquired.

The plan contemplated cooperation from the State legislature, the city of Williamsburg, patriotic societies, utility corporations and private owners; this was given in generous measure. By the beginning of 1935 the restoration was complete as to form, although it will continue with respect to detail; and the event was signalized by the publication of a handbook of 200 pages, illustrated with ancient maps and prints, entitled *A Brief and True Report for the Traveller Concerning Williamsburg in Virginia*, from which the facts contained in the present introductory summary are taken.

Four hundred and forty-two buildings of modern construction have been torn down and eighteen moved outside the Colonial area. Sixty-six Colonial buildings have been repaired or restored, while eighty-four have been reproduced upon Colonial foundations. The part of the Colonial area which has been restored includes the Duke of Gloucester Street, the original College yards, the Palace Green, the Court House Green, the Market Square, the Capitol Square and the bordering properties. Federal Highway 60 has been diverted to a by-pass road. The Duke of Gloucester Street and its vicinage have resumed their Colonial appearance, with lamp-posts, fences, brick walks, street surfaces, plantings and the like derived from authentic records.

Among the historic buildings restored or reconstructed are the Governor's Palace with its gardens and outbuildings, the Capitol, the Raleigh Tavern, the Ludwell-Paradise House and the Old Court House of 1770. These are exhibition buildings. The Capitol is completely furnished according to evidence of official records; the Raleigh Tavern furnished from data secured in original inventories of its keepers; the Court House contains an exhibit of materials and objects recovered by archaeologists in excavating more than one hundred and fifty Colonial foundations. For history, for architecture, for interior decoration and for landscape architecture in Colonial America, restored Williamsburg is a unique repository of information.

The Archibald Blair dairy, smokehouse and outbuildings before and after restoration.

NOTES ON THE ARCHITECTURE

By WILLIAM GRAVES PERRY

¶ RESTORATION based upon research, and faithful to fact, opens many alluring avenues, but it closes ruthlessly many others just as alluring. Usually the more difficult parts of the journey toward the goal of authenticity offer tempting by-paths and detours. The progress offers also its reward to the persistent pilgrim who finds the road widening and the gradients less difficult to overcome in direct proportion to the number of problems solved. The temptation to philander with exceptions and with concessions to convenience is overcome by the increasing opportunity to apply workable principles to cope with the insistent demand for such concessions.

The Board of Advisory Architects of the Restoration (of which fortunately the managing editor of this magazine is one), faithful and devoted to their trust, laid down ground rules in the early days of 1928 before the architects could go far astray. This decalogue (see page 370) is figuratively engraved in each building, roadway, garden, furnishing or decoration, however slight its relative importance.

There have been breaches in the doctrine which are apparent enough, for since the purpose of the Restoration is to recall and, if possible, to recapture the spirit of the original, it is evident and not reasonably debatable that interesting and essential buildings should now be permitted to coexist although by accident of fire they may not have so coexisted in the Colonial period.

Again it seems reasonable that if part of the spirit of the city is derived from the activity resulting from the life in it, such life should be encouraged and that such encouragement should take the form of dry cellars (as far as may be), bathrooms, heating, lighting, resistant pavements, more lamp-posts than can be justified by record, barriers to curb motor cars from doing things that motor cars do, benches for the exhausted visitor to sink upon, screened porches and camouflaged garages. The art of camouflage indeed receives a real impetus and faces a real test under such conditions.

The fortunate thing is that American history (the revolutionary part of it) was enacted in the Georgian scene. It is reasonably certain that Mr. Rockefeller would not have felt the interest which led him to include the Restoration of Williamsburg among his many educational philanthropies, had not the important events of our history taken place in Williamsburg during the premierships of Pitt, Fox and North rather than during those of Disraeli and Gladstone.

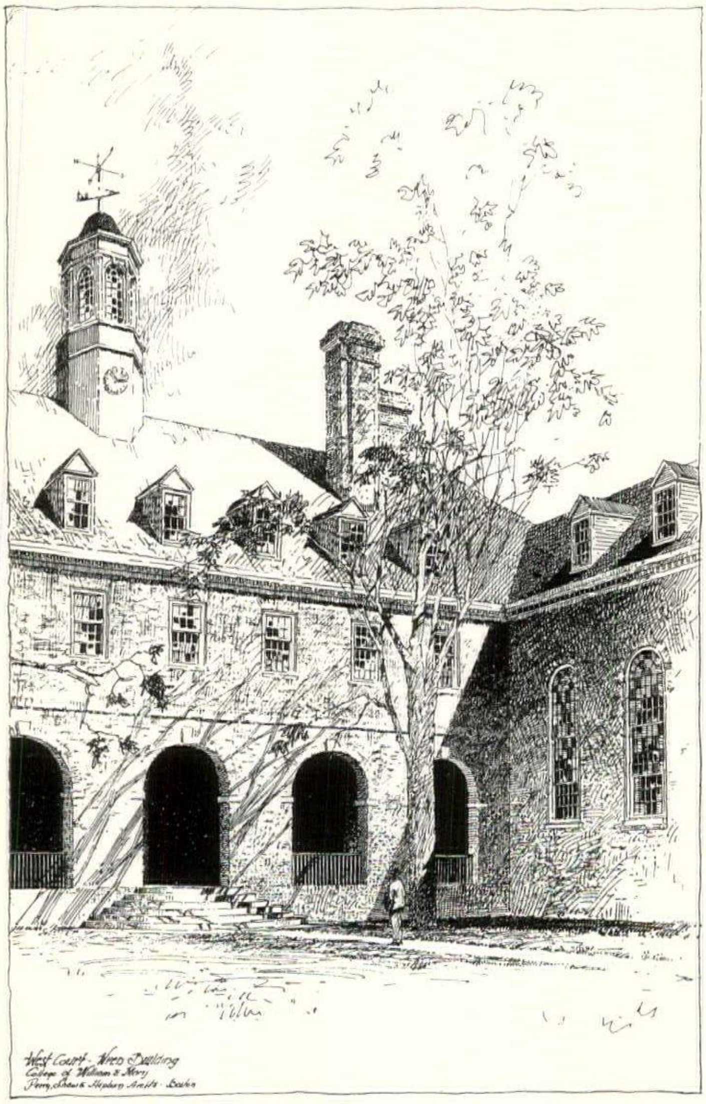
Nowhere in the English Colonies did the transplanted cutting from the mother tree of the later Renaissance flourish more vigorously than in Virginia. It developed in a manner wholly suited to its new environment, slowly and without sacrifice of character. It produced a variety of the species peculiar to its locality and recognizable as such.

This architecture in its simplicity and breadth possesses strength that is robust and articulate, scale that is imposing and generous, and dignity that is calm and eloquent. As such it speaks to us plainly as the expression of the life of a people.

¶ THE VISITOR often approaches the restored city of Williamsburg with a picture in his mind of long avenues heavily shaded against a hot sun, avenues leading to broad classical porticos and high pediments, flanked by lesser orders, balustrades and other familiar accessories.

He arrives to find many of the things that he has expected to find but in different form. Here are avenues, fine ones, the buildings are spacious and large in scale, they are placed upon important axes and there is an orderliness that one associates with monumentality. Apparently the plan of the City was expected to provide full latitude for a special purpose but with a definite limit of size.

The visitor's preconception of the appearance of the buildings is as natural as it is usually erroneous. He has expected a charm and beauty in the old architecture, and is surprised to see how really old this architecture is. He is more familiar with the later styles with which Thomas Jefferson's name is associated in Virginia. He wonders where the columns are—this Southern architecture is not that of his understanding—nor is his surprise diminished when he reads, if he has not already done so, the comments of Jefferson himself on the architecture of Williamsburg. How can the College of William and Mary be



AN EARLY (1928) *SKETCH of the west court of the Wren Building. At this time the Bodleian Plate showing three stories of brick and hipped gables had not been discovered.*

really attractive if it had been stigmatized by such an authority in 1804 as "a rude misshapen pile, which but it has a roof would be taken for a common brick kiln." He is unaware that by 1804 the conception of beauty and fitness of 1704 had undergone a great change and that he is reading the comments of a man whose education as an amateur in architecture was powerfully influenced by Palladio.

The visitor seeks the Capitol and finding no one of the orders of columns which had been described there by Jefferson in 1781, he stands incredulous. Nor is his confusion lessened by the apparent omission of the columns in the only place in Williamsburg where they had previously been intended, under the pediment of the old Court House.

He asks himself if something is radically wrong and if so, what or who. "Was Jefferson wrong, he spoke of columns; there are none, where are they?"

This visitor and many like him is having his first glimpse through the intricacies of architectural authenticity. He has come to see a restoration, he stays to see one.

¶ NOT THE PUBLIC alone, but the majority of learned architects as well, had but a meager knowledge of the qualities or characteristics of the great family of Tidewater Virginia buildings before the advent of the new highway system in the 1920's. Previously the public had nursed its Jeffersonian version and this version had been fostered in fiction and fanciful illustration. The architects had relied quite properly upon the few though good books which had previously appeared and which naturally laid emphasis upon the more important examples, the new book often repeating the examples cited by its predecessors. The draftsmen who contributed to the "Georgian Period," also Messrs. Coffin, Holden, R. A. Lancaster, Jr., Fiske Kimball, and others, had accomplished what seems today a prodigious labor.

Their journeys must have been tedious and time-consuming. The Tidewater could be examined effectively only by traveling by water. Those traveling by water were faced, however, with a 6-mile trek to Williamsburg. The steamers ignored the shallow bays upon which stood and stand some of the more interesting architectural examples. Today the steamers have ceased.

The new highway system leads one past alluring side roads, past cornfields over which paths appear to lead to something of interest. The 5 to 8 miles of exploration thus opened to the river might or might not reveal its hidden treasure. Five years ago "wattled" or "cobbed" chimneys could be found on wayside cabins, today scarcely one remains. A cabin or a group of outbuildings adjacent to the foundations upon which the main building once stood would usually reward the excursion.

But often the prize would be found; an early example, undisturbed save by neglect and the ravages of termites but still with more than a hint of its ancient arrangement of fences, quarters, barn, paneling and original color. The garden would still contain much of its boxwood. The falls or terraces would still be traceable and the axial principle would again be confirmed by the apparent effort at symmetry carried so far at times that the entrance drive would lie determinedly upon the main axis and across depressions; a severe strain on convenience. Almost invariably, where houses near the highroad are placed obliquely to it, this drive will self-consciously traverse a long hypotenuse to remain true to its tradition, although a drive placed on the short side of the right triangle would lead to the road in half the distance.

¶ THE FIRST quality that was disclosed to the architects and their ardent associates, who spent during the first three years of the Restoration every available hour in exploration, measurement and photography, and since then many of their week-ends, was this one of formality and symmetry.

This symmetry has been recognized as an essential quality of the great houses and monumental buildings of the Tidewater, but the rule had not been established until then that the same quality was shared also by the most humble dwelling of the white population. It was important to know. The general problem of restoration was at once greatly simplified.

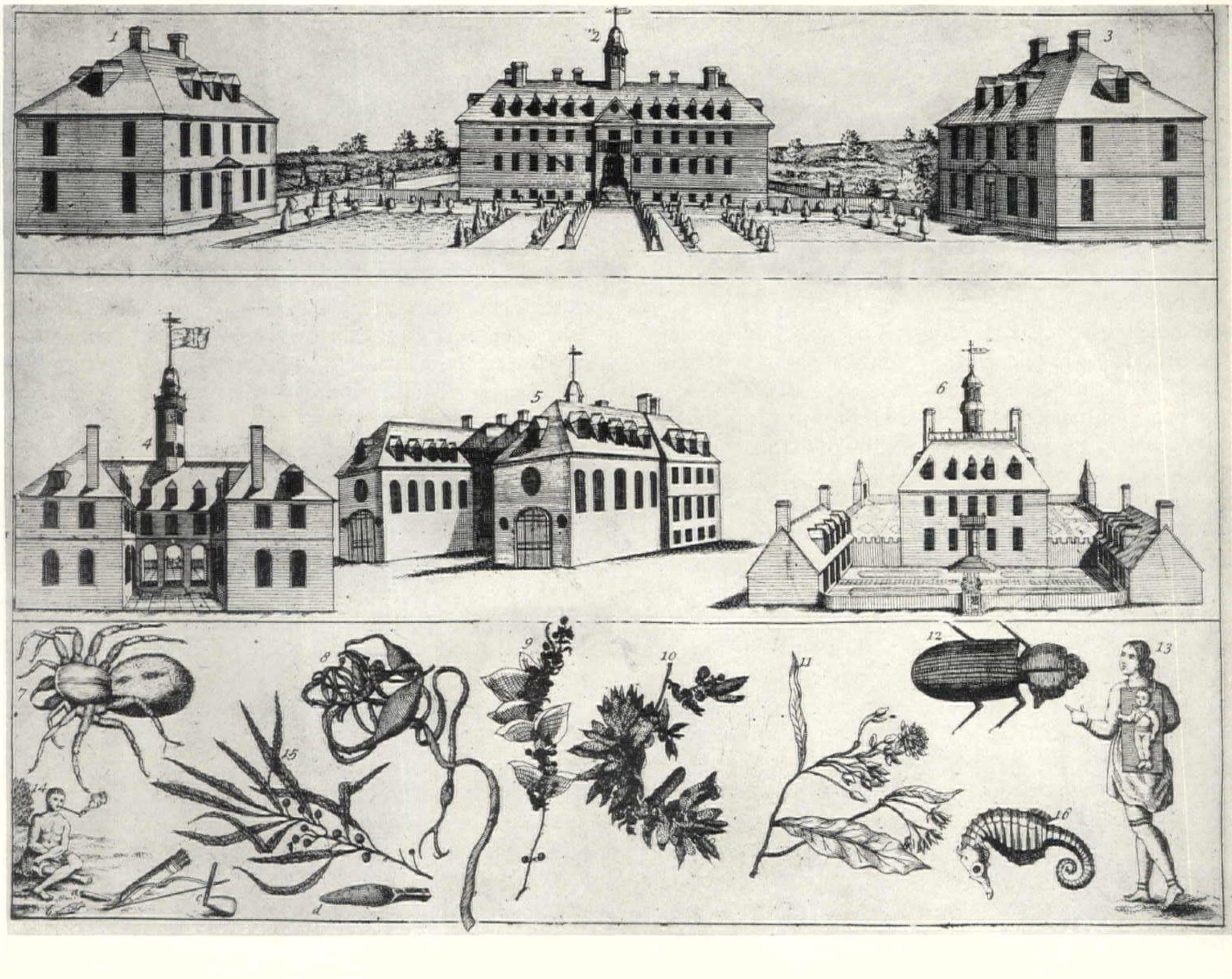
Simultaneously, the landscape architect and his assistants had gone far afield and had collected data on garden design and relationship to house through the Southern Colonies; all his data tended to bear out the evidence of nearby examples of geometrical arrangement based upon a balanced plan.

Study of distant architectural examples was revealing as a means to localize and to identify idiomatic employment of detail. It also assisted in closer appraisement of dates of buildings and the length of life of certain usages.

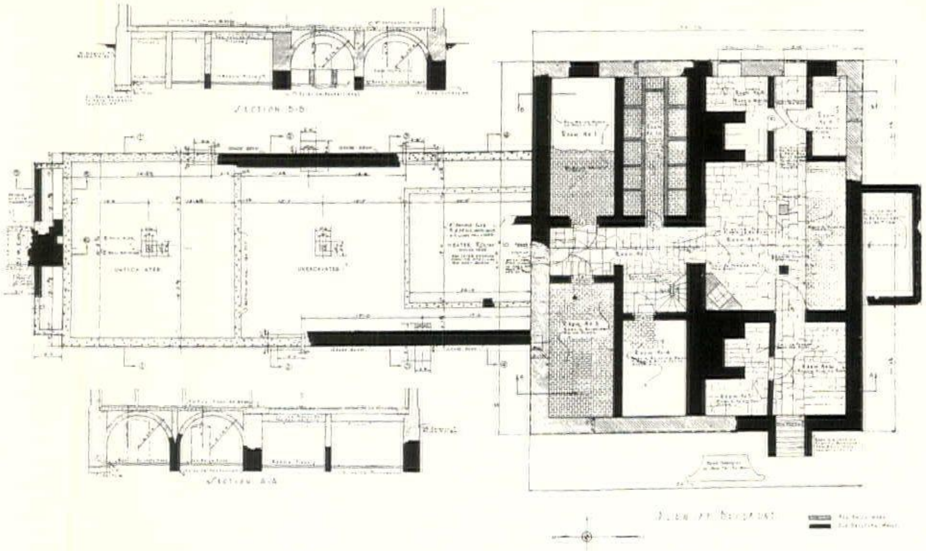
Williamsburg people built in the Piedmont and the Shenandoah Valley. Their houses stand today clearly as derivatives in form and detail from the Williamsburg pattern. Williamsburg, being a city and planned as one, imposed restrictions upon its buildings and dwellings that were unnecessary in the wide freedom of the rural countryside. A building line was established 6 feet back from the line of the Duke of Gloucester Street on both sides in 1705. While a desirable uniformity was thus achieved, the attractive approach on the axis was lost and it is only on the garden side that the familiar arrangement is to be seen.

¶ IN RESTORATION one finds simple problems solvable in the light of a measured and excavated foundation, the successive dates of the parts of which have been identified. The research worker has found, in connection with the same building, land grants, deeds, inventories, newspaper advertisements, records of loss by fire, the early insurance policy with a graph of the building on the lot and with a brief description of each building, perhaps also a photograph or a

THE "BODLEIAN PLATE"—a copper plate engraving found in the archives of the Bodleian Library at Oxford, England—represents: (1) *Brafferton Hall.* (2) *The Wren Building, College of William and Mary.* (3) *The President's House.* (4) *The Capitol.* (5) *The Wren Building from the southwest with unusual* 3-*story brick design in the court and hipped gables.* (6) *The Palace with its flanking buildings and garden. . . . This plate is later than* 1723, *the date of the erection of the chimneys on the Capitol and probably earlier than* 1746, *the date of the destruction of the Capitol; it may have been intended as an illustration for an edition of the "Dividing Line" of William Byrd of Westover.*



Layton's Studio



PLAN OF PALACE prepared by the Architects' Division of Research and Record. The parts indicated in solid black show the original existing walls. The two photographs show these brick walls as found in the excavations, as well as the Purbeck stone pavement of the Palace basement. In the upper view can be seen the fireplace walls. The lower view shows a brick bulkhead entrance; with the nosings of the steps rotted away.

report from an aged resident who remembers its appearance. The period of the house is further checked by a meticulous examination of the brick in the foundations, the mortar and, of course, the bond. A measured archaeological drawing is made and the foundation backfilled for protection while drawings of the restored building are prepared. The interesting fragments of household utensils of many kinds having been sifted from the fill by screening are plotted, cleaned, marked, catalogued and placed on exhibition.

Study of the resultant mass of excavated material establishes, by comparison of quantities and weights, the relative popularity of types of ware, utensils and the like at different periods. Such study also establishes a clear visual conception of the manner or scale of living enjoyed by the community, the degree of its dependence upon England and the Continent for its merchandise—so far at least, as metal, pottery, china and glass and even shoes are concerned. The contemporary records, advertisements, letters and manifests are thereby corroborated and defined.

In restoration one also finds problems less easily solved; for example, evidence in quantity will be available concerning both the foundations and the history of a building, and much will be known of its detail and character, but the year of its construction will antedate that of any surviving example of its type in the Tidewater.

Such was the case of the Governor's house, the first domestic building of importance in Virginia to incorporate in its parts and dependencies the characteristics of the new architectural renaissance of the era of William and Mary and Queen Anne. When completed about 1718 its design must have exerted a profound influence upon the minds of the planters who were later to become the great landowners and who came here to meet their governor. This structure, appearing to them as an example of the new fashion in England bodily transplanted, would have been studied and admired and the spirit of the design and detail would have been emulated in the construction of the great country houses of the next decade or more.

Each great house of this subsequent period in Virginia is a distinct personality in the wide relationship of a homogeneous family. No one is readily mistaken for another yet no one can be mistaken as unrelated to the others.

The Governor's House is the town residence of a person of quality. The others are country houses, each conceived in a manner best suited, as it appeared to the owner, to his needs and desires. Symmetry of plan extends in most of them to the flanking buildings and further to an exact balance of many important features. Balance of plan extends to the minor elements and is responsible for the interest which results from the balance of non-identical elements arranged for convenience and for functional purpose.

From somewhere, other than from sporadic sources such as the architectural vocabulary of different "overseers" (the 18th century architects) imported from England for the purpose, must have sprung or developed the characteristics which in their total stamp each house as a member of the Virginia family.

It has been assumed in the Restoration that some of these characteristics sprang from the Governor's

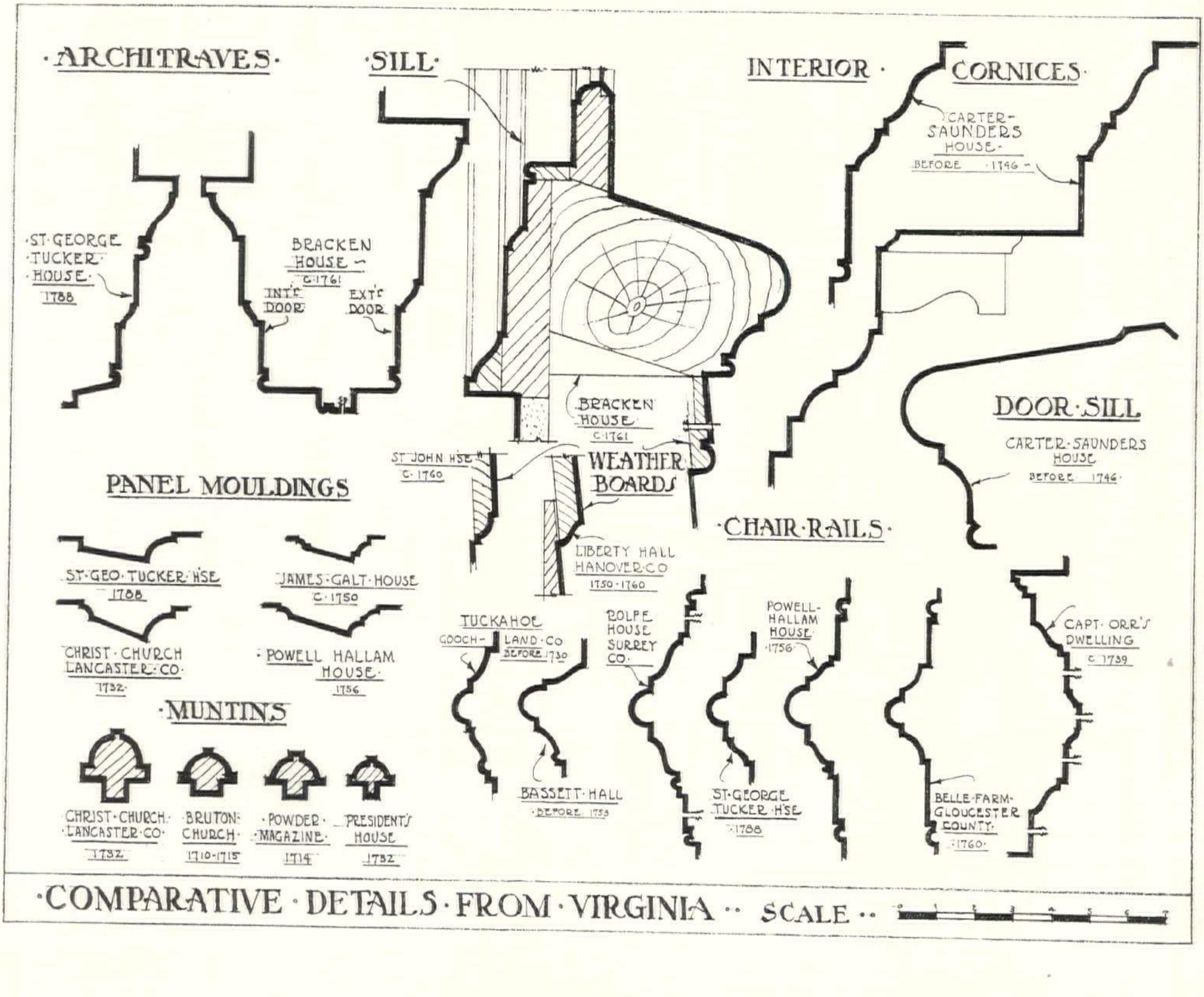
House. For example, it became fashionable to break interior cornices over pilasters, window architraves, key stones and even over brackets only. It is reasonable to suppose that this system, familiar to the builders of Bristol and other places in England, and used at other scales elsewhere in the Colonies, may have been generally admired in some frequently visited room in the first house of the Colony. The paneling of the Entrance Hall will therefore be found to be so treated.

If Rosewell, the lofty mansion of Mann Page built in 1720, achieved high quality of workmanship, it is probably because of the standard set by its elder relative across the York River. Conversely, it has been assumed that the country houses had, in return, their influence upon the design of the Ball Room and Supper Room which were added in 1751 to the Governor's House and which, in popular fancy, may have swung the conception of the building from the quality of "House" to that of "Palace." It is reasonable to suppose that the overseer of 1751, when faced with the treatment of the wide exterior wall surfaces that are indicated on Jefferson's later measured drawing of the Ball and Supper Rooms may have adapted the double gauging of the rubbed brick window jambs and the brick-moulded and gauged panels below the sash so effective at Rosewell.

From such indications the inquiring visitor to Williamsburg is shown that, in the absence of direct evidence of the former detail, replacements have been made by conjecture which is based upon such grounds as the above.

Supposition must have support. A part of the wall of the original portion of the Palace is extant showing a single system of gauging. Documents are extant which appraise the value of the interior work. Fragments of stone and marble mouldings, carvings and flagging have been excavated from the site in sufficient quantity to indicate clearly its general character.

Among the mass of documents relating to the Palace, there are also the inventories of the effects of successive governors, the description of the leather-hung wall of the governor's Upper Middle Room, the lusters or chandeliers, benches, tables and walnut chairs in the Ball and Supper Rooms, the looking glasses engraved with the arms of Queen Anne and of her Colony.



26 *The* STATE *of*

Publick Buildings here of Note, are the College, the Capitol, the Governor's Houſe, and the Church. The Latitude of the *College* at *Williamſburgh*, to the beſt of my Obſervation, is 37°. 21′. *North*.

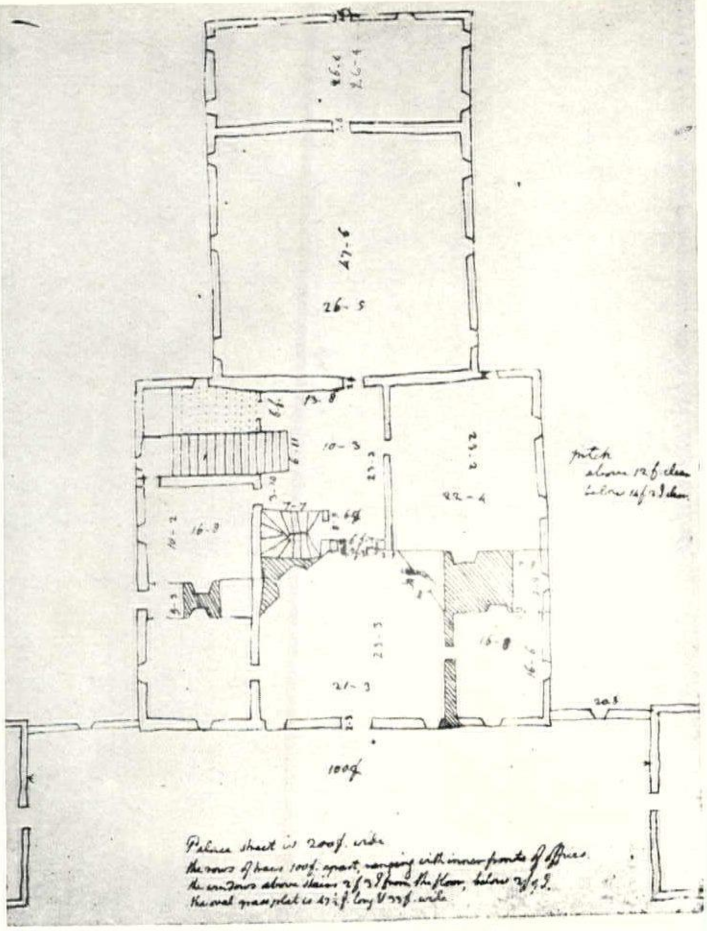
The Front which looks due *Eaſt* is double, and is 136 Foot long. It is a lofty Pile of Brick Building adorn'd with a *Cupola*. At the *North* End runs back a large Wing, which is a handſome *Hall*, anſwerable to which the *Chapel* is to be built; and there is a ſpacious *Piazza* on the *Weſt* Side, from one Wing to the other. It is approached by a good Walk, and a grand Entrance by Steps, with good Courts and Gardens about it, with a good Houſe and Apartments for the *Indian Maſter* and his Scholars, and Out-Houſes; and a large Paſture encloſed like a Park with about 150 Acres of Land adjoining, for occaſional Uſes.

The Building is beautiful and commodious, being firſt modelled by Sir *Chriſtopher Wren*, adapted to the Nature of the Country by the *Gentlemen* there; and ſince it was burnt down, it has been rebuilt, and nicely contrived, altered and adorned by the ingenious Direction of *Governor Spotſwood*; and is not altogether unlike *Chelſea Hoſpital*.

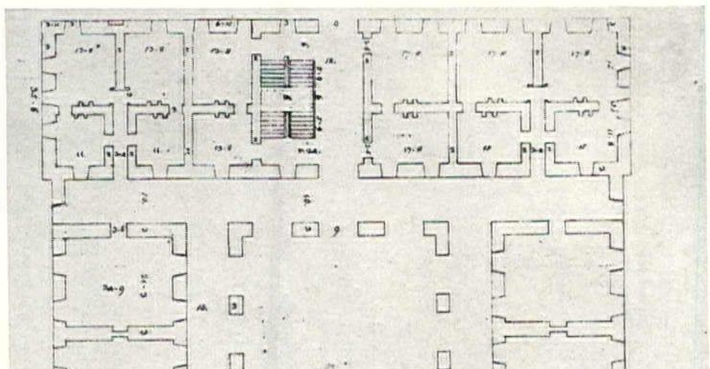
This *Royal Foundation* was granted and eſtabliſh'd by *Charter, by King William and Queen Mary*, and endowed by them, with ſome thouſand Acres of Land, with Duties upon Furs and Skins, and a Penny a Pound for all Tobacco tranſported from *Virginia* and *Maryland*, to the other Plantations; to which have been made ſeveral additional Benefactions, as that handſom Eſtabliſhment of Mr. *Boyle*, for the Education of *Indians*, with the many Contributions of the Country, eſpecially a late one of 1000 *l.* to buy *Negroes* for the College Uſe and Service.

The

(Above) REPRODUCTION of the original text of Hugh Jones' "Present State of Virginia," written in 1722 and published in 1724, which describes the Wren Building of the College of William and Mary.



(Upper Right) THOMAS JEFFERSON'S measured drawing of the plan of the Palace, used as a basis of studies for remodeling.



(Lower Right) ANOTHER MEASURED DRAWING by Thomas Jefferson showing the plan of the Wren Building of the College of William and Mary as it existed in 1772; it indicates his proposal for its extension as prepared at the request of Governor Dunmore.

¶ A CITY with such historic and social associations as Williamsburg cannot be fully explained or described by a recitation of the events which may have occurred there, even if such a recitation is made before a background of colorful early buildings, gardens and a city plan.

It is necessary to understand the origin of customs and of institutions which have made this particular architecture *inevitable* and to trace the steps of developments as closely as one can. One must visualize the palisaded Middle Plantation with its 17th Century buildings in the time of the ascendancy of Jamestown; the growing extension of the settled river sides with the gradual release of architectural style from early to late Renaissance and one must feel as well as understand the architectural and cultural influences which came to bear upon the creation of the new capital city.

There had been before the year 1700 no need for buildings of more than modest size. There were literally no means for education. The church, the Capitol and perhaps a warehouse were the dominant buildings in Jamestown. But the Burgesses were few, the Councillors fewer and though all were expected to go to church, not all could do so at once.

The choice of a site for the new College of William and Mary in 1693 was a matter of great moment—so also was the erection of a building of 136 feet in length.

¶ HUGH JONES, first professor of mathematics at the College of William and Mary makes a significant statement interesting to all architects concerning the oldest of college buildings in America, in his "Present State of Virginia," written in 1722—

"The Building is beautiful and commodious, being first modelled by *Sir Christopher Wren*, adapted to the Nature of the Country by the *Gentlemen* there; and since it was burned down, it has been rebuilt and nicely contrived, altered and adorned by the ingenious Direction of *Governor Spotswood* and is not altogether unlike *Chelsea Hospital*."

This statement, made by a contemporary of Wren within a year of the latter's death, carries the presumption of accuracy. The absence of the original drawings or of the special commission from Queen Mary to Wren does not affect the nature of the building. The plan is so reminiscent of Wren's handiwork that it seems fair that this fine old structure should bear its present name of "Wren Building." Jones' statement is interesting for another reason. In telling us that the building has been "adapted to the nature of the country by the gentlemen there" he is clearly indicating the continuance of that process of change and adaptation in the buildings of Virginia of the later Renaissance which has produced what is known to us as Virginia "character." From these changes has sprung that family resemblance which is difficult to describe but which is evident and appreciable none the less and which differentiates this family from its kin in Maryland and other Colonies.

The stamp of Wren's interpretation of the later Renaissance is clear throughout the city. As in England, the mannerisms of the Netherlands which appealed so much to the exiles of the Commonwealth, domiciled there until the restoration of Charles II, are to be seen in plan, composition of elements, scale, details of brickwork and especially in the accessory utensils and furnishings of the buildings.

Out of all these elements stands free the fine individuality of each building. No one of them needs a label nor an interpreter. The College is a college, the Capitol is a perfect example of the functional solution of a given problem and in its duo-partite plan with conference room connection is unique among surviving buildings of its character. It is most evidently the Capitol. The Palace is a residence, a composition of buildings subtly combined to conform to its unusual purpose, namely the housing of the chief of a great agricultural colony in a semi-rural city and in a dignified manner.

¶ THE PROBLEM confronting the fortunate architects in 1927 was made up of all these things and many more. The trouble was that at the time neither they nor any one else had a full realization of them.

There was little known precedent; there was no precedent in this country for a reconstruction or restoration of such scope and magnitude; there was no precedent for the reconstruction of a large group of buildings which were to represent the appearance of a complete town at a given period—and thereby hangs the tale of years of effort, conference and adjustment so to balance all considerations that the result, with its inevitable inconsistencies of coexistence and the like, would present a convincing and attractive appearance.

There were no architects, draftsmen, craftsmen and mechanics trained to put their unerring hands to the delicate task of so constructing each mass and detail at the first attempt that there would be no necessity to demolish and to try again.

It was evident that investigation and training must precede restoration and that careful choice of associates and assistants must precede both. Young men from Virginia and elsewhere, already accomplished draftsmen, joined others already associated with the architects and an office was opened in old Bruton Church Parish House in 1927. In a fertile soil of enthusiasm a beanstalk of data grew, so endowed with vigor that it seemed in its growth to refertilize itself. No house in Virginia was safe from invasion on Saturday afternoons, no owner or tenant secure from determined intrusion.

It is a great pleasure to record the many factors that made this peaceful invasion possible. The people of Virginia turned eagerly toward the newcomers, welcomed them with interest and pleasant tolerance, opened to them doors and attics, quarters and gardens; suggested that details be recorded and houses measured, assisted in the recording of lost evidences; looked forward to further opportunities to take part in the great restoration of the ancient capital of their Commonwealth that was about to be undertaken.

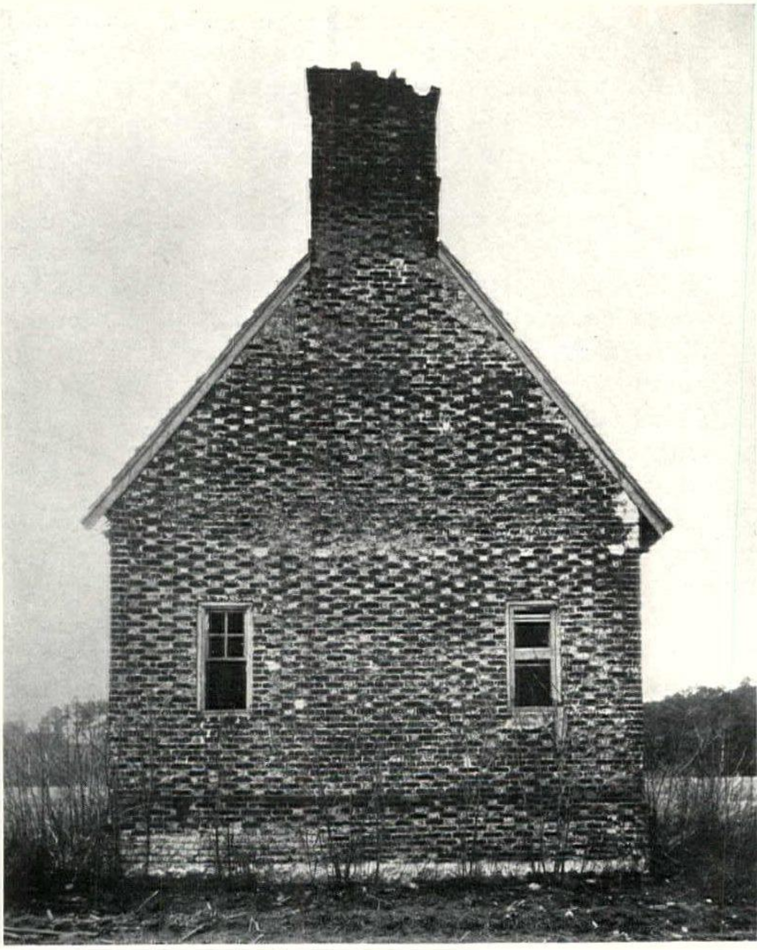
George Preston Coleman personally conducted Dr. Goodwin and the architects on a tour of the great houses of the northern Tidewater during the first few months of the enterprise.

To state that the degree of accuracy to which the Restoration has attained is due to the hospitable readiness and eagerness shown and offered by these staunch friends of historic truth is to imply but a mild implication of the fact. These kind people have placed everything at the disposal of the architects at whose door consequently must be placed the responsibility for faults and omissions which may subsequently be revealed.

The Board of Advisory Architects has been on or near the scene from the beginning. Quotations from the decalogue will indicate that principles have been laid down, that this Board has taken its duties seriously and that much that an inquiring visitor may be curious about is explainable.

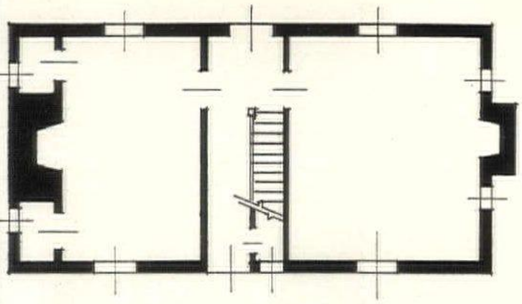
For example—

1. That all buildings or parts of buildings in which the Colonial tradition persists should be retained irrespective of their actual date.
2. That where the Classical Tradition persists in buildings or parts of buildings great discretion should be exercised before destroying them.
3. That within the "Restoration Area" all work which no longer represents Colonial or Classical tradition should be demolished or removed.
4. That old buildings in Williamsburg outside the "Restoration Area" wherever possible should be left and if possible preserved on their original sites and restored there rather than moved within the "Area."
5. That no surviving old work should be rebuilt for structural reasons if any reasonable additional trouble and expense would suffice to preserve it.
6. That there should be held in the mind of the architects and in the marking of buildings the distinction between *preservation* where the object is scrupulous retention of the surviving work by ordinary repair, and *restoration* where the object is the recovery of the old form by new work; and that the largest practicable number of buildings should be preserved rather than restored.
7. That such preservation and restoration work requires a slower pace than ordinary modern construction work and that in our opinion a superior result should be preferred to more rapid progress.
8. That in restoration the use of old materials and details of the period and character, properly marked, is commendable when they can be secured.
9. That in the securing of old materials there should be no demolition or removal of buildings where there seems a reasonable prospect that they will persist intact on their original sites.
10. That where new materials must be used, they should be of a character approximating the old as closely as possible, but that no attempt should be made to "antique" them by theatrical means.



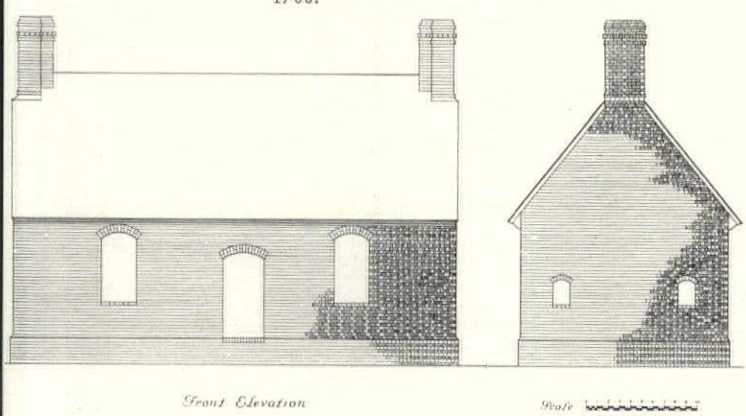
TABB HOUSE, YORK COUNTY, VIRGINIA

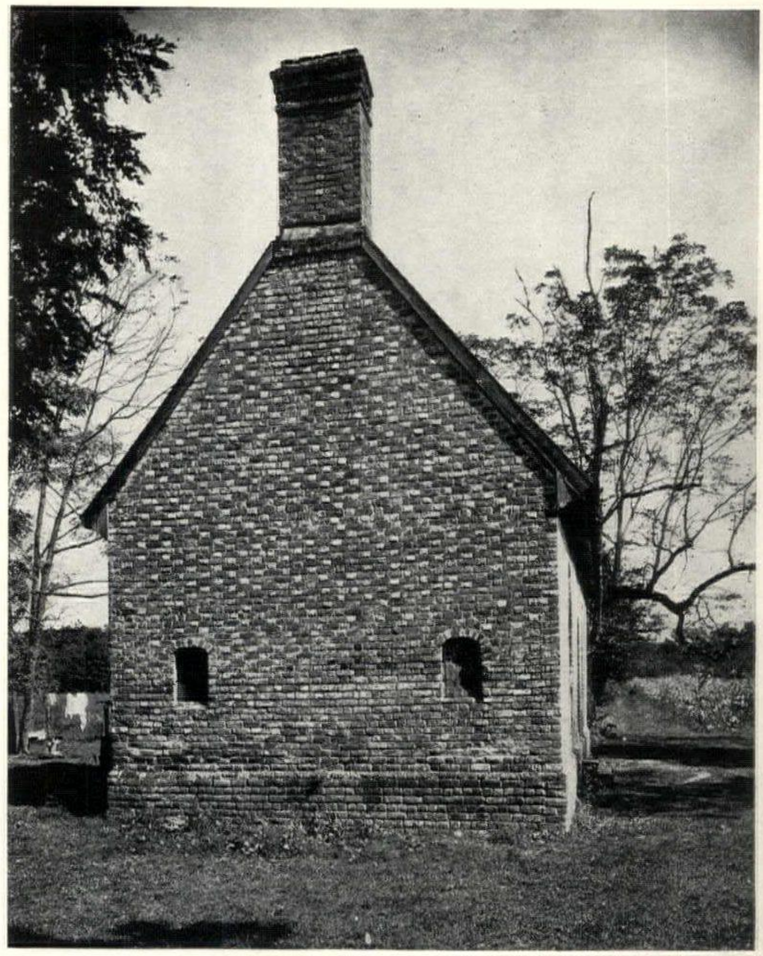
The Board has met annually and also when a particular occasion demanded. Its Executive Committee has visited Williamsburg more frequently than the full Board and especially throughout the first two years while the restoration of the Wren Building, a difficult problem in itself, was in progress. No detail, however trivial in the restoration of this building, was permitted to pass without examination and approval.



Plan of the Tabb House, built just after 1700. Note the closets at the sides of the large interior chimney and the flat lintels over the windows of the period subsequent to 1700.

Measured drawings of the Warburton House elevations, built around 1680. The plan is similar to that of the Tabb House but has closets at both ends; note the segmental arches of the perioa prior to 1700.





WARBURTON HOUSE, JAMES CITY COUNTY, VIRGINIA

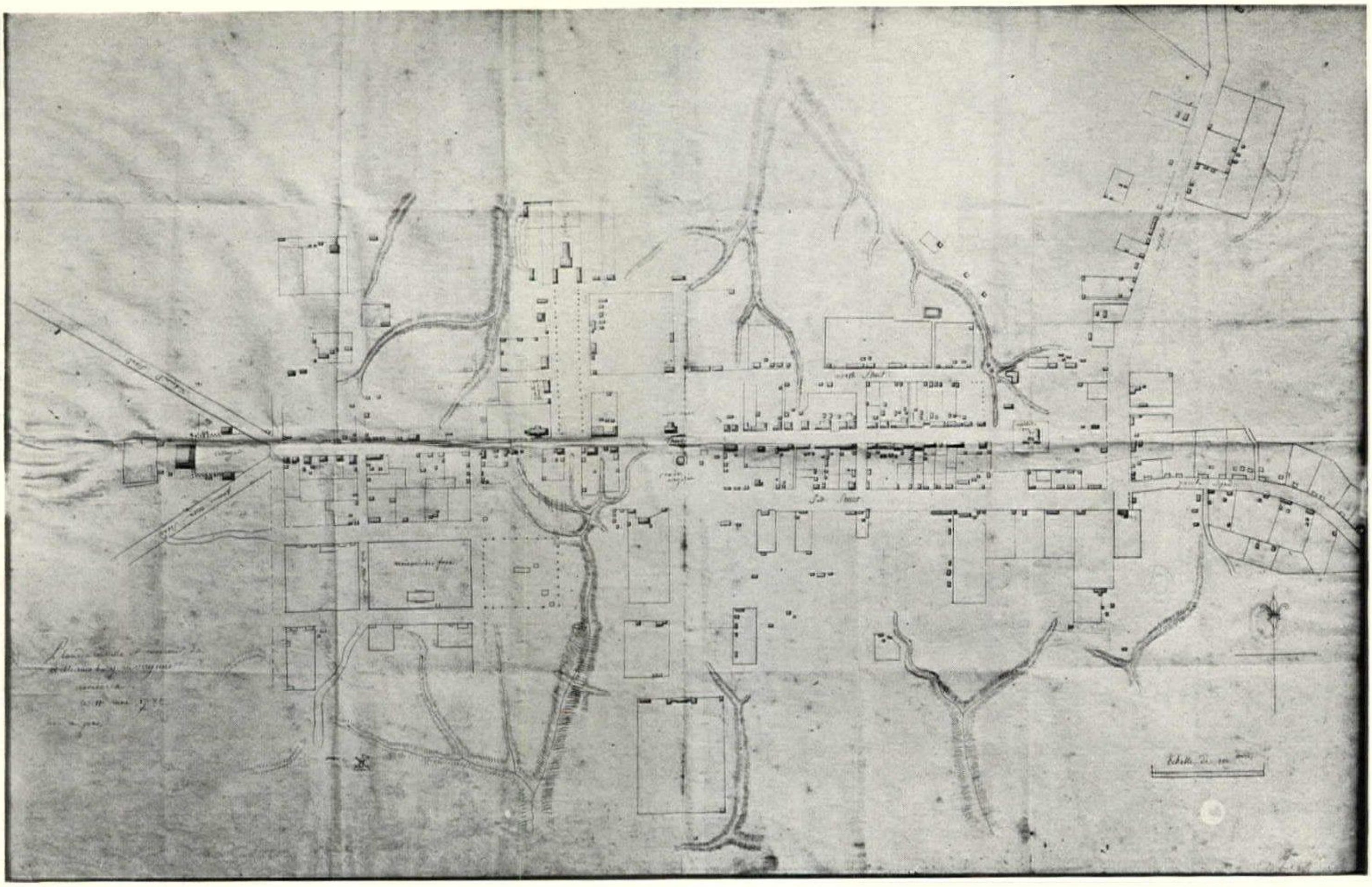
The Ladies' Advisory Board has rendered great assistance in the problems of decoration and furnishing.

As the problems of the Restoration accumulated, the necessity for specific information grew more apparent as each bit was disclosed. Dr. Swem, Librarian of the College of William and Mary; Dr. Stanard, Secretary of the Virginia Historical Society; Dr. Eckenrode, Historian of the State Conservation and Development Commission; Dr. H. L. McIlwaine, late Librarian, and Dr. Wilmer Hall, present Librarian, of the Virginia State Library, and many others placed their knowledge and their files at the disposal of the research workers who were increased in number as their fields widened.

The Clements Library at Ann Arbor, Michigan, historical and other libraries in Boston, New York, Philadelphia, and repositories at every town to which a clue would lead, were visited and with the invaluable assistance of the librarians facts were gathered and catalogued. At Williamsburg these were correlated and put into accessible form. It was at the Henry E. Huntington Library in California, that an unpublished original drawing by Jefferson showing the plan of the Wren Building and proposed addition was found, a document of definite architectural importance and assistance.

From small beginnings the architects' office grew to include not only its drafting room and the usual divisions of management and superintendence but also a division of photography and a division of research and record which assumed proportions commensurate with the scale of the Restoration and probably unprecedented in its scope in this country. Workers in England, France and the Continent brought to light documents and curiosities that have been priceless as guiding and corroborative evidence. The timely discovery of a copper plate at the Bodleian Library at Oxford, made between 1723 and 1747 and recognized by Miss Mary Goodwin at once as representing in the accurate measured manner of the 18th Century engravers the three principal buildings at Williamsburg, prevented an erroneous reconstruction of the west side of the Wren Building. One contemplates the effect upon the mind of the amazed engraver (still unknown), had he dreamed that within an hour or so of the first strikeoff of his plate a photo-radioed reproduction would have been in a drafting room in Boston across the seas.

The town plan, which had been measured by plane table (no survey existing) by Dr. Goodwin and Mr. Perry long before the most sanguine prophet would have ventured the prediction that the Restoration would be carried out, was now made the subject of a survey careful in every detail not only to plot original lot and street lines, but to reestablish those that were



THE "FRENCHMAN'S MAP," so called for lack of identity of its author. It is dated 1782 and was "Levée au pas." Probably it was the occupation of an engineer officer of the army of the Comte de Rochambeau during the period of demobilization. It is remarkably accurate and complete.

lost. The invaluable "Frenchman's Map" and those of other officers of the Army of de Rochambeau, the voluminous deeds and records at York County Courthouse, early ownership plats, insurance maps and the like added their weight of evidence to an historic survey of permanent record.

The problem of modern ownerships which is beyond the scope of an article limited to a consideration of the architectural field, served as a blessing in disguise, since it complicated the orderly procedure of excavation and reconstruction so inextricably that it provided the necessary time for the training of specialists in the art of architectural detective work.

These "detectives" became a proficient group of analysts to whom superimposed foundations, fragmentary corners, heterogeneous brick sizes and bonds, varying mortars and manners of workmanship, areas of complete destruction of previous work, became only more puzzles to be measured, weighed, compared and carefully established with instruments and finally plotted. They sifted each spadeful of excavated material, plotting also the location of each discovered fragment however small, training their laborer assistants to search and recognize, to preserve and to respect. Archaeological methods of field work tested and proven in Egypt were applied and adopted to the work in hand.

Finally the "research plans" at quarter scale have been consolidated upon a town map at a smaller scale. Today, one can refer to each lot and whether the building has been reconstructed or whether the site has been temporarily backfilled for future construction, one can note at a glance the extent, character and comparative dates of each part of the existing original and subsequent foundations.

In all of this work photography has played an important part. Hundreds of views taken progressively show the appearance of the buildings before their restoration, removal or destruction and record the status of the work through its entire progress to the time of final completion.

Since all buildings of whatever date or appearance are serious attempts of an owner to provide accommodations for his needs and therefore in most cases represent real value, each building in the "Area" was evaluated before its final disposition was determined. In addition to the existing Colonial buildings, many have been salvaged but of the remainder those which were found to be valueless from an historical point of view have been destroyed.

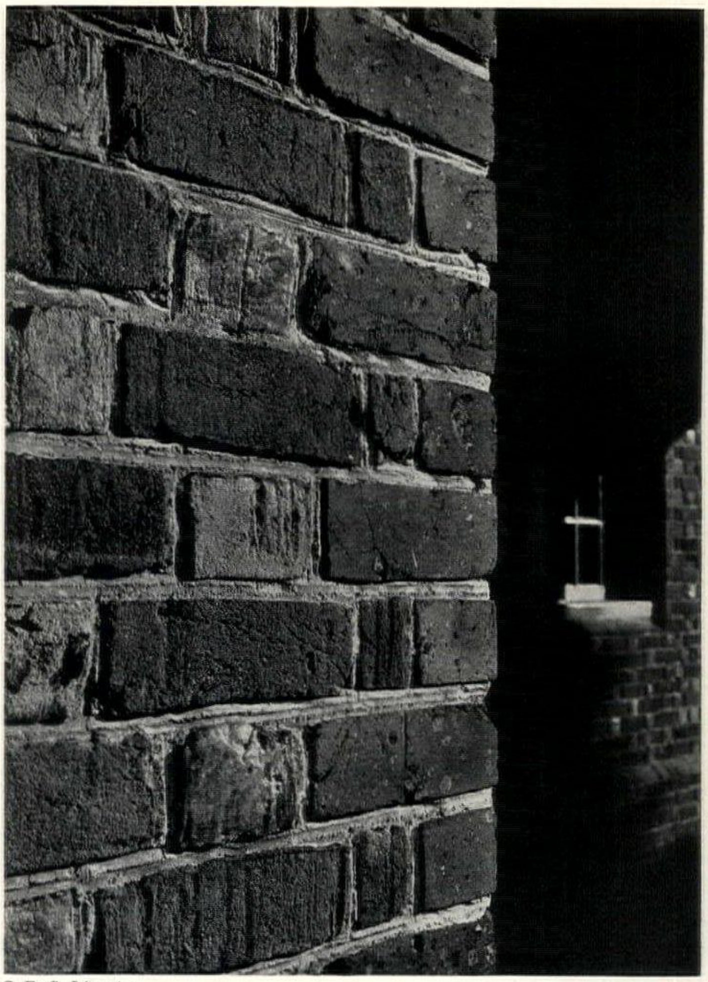
¶ THE MANAGEMENT GROUP has developed from modest beginnings and now comprises two distinct corporations. The field of duties of one of these, "Williamsburg Restoration, Incorporated," includes the management of all properties not specifically designated and classified as educational, all land purchases, tenures, publicity and relations with City, County, State and Federal Government. The second corporation, "Colonial Williamsburg, Incorporated," manages the exhibition buildings and deals directly with the problem of guiding the public to and acquainting the public with what there is to see and learn.

The spirit of the Restoration has been one of constant cooperative intercourse between these corporations, the builders, the landscape architect and the architects. Municipal services like sewers, water and pavements have been readjusted with the carefully considered consent and assistance of the City Council. The State Legislature has passed enabling acts, adjusting previous interpretation of law to the new concept of the public welfare. Visible transmission lines have been laid underground, important rearrangement of railway facilities have been made involving relocations of stations. By-pass and encircling roads have been built to facilitate travel. In each case the utility companies, the Chesapeake and Ohio Railroad and other agencies have rendered ready and patient cooperative assistance.

¶ THE SCOPE of the Restoration is strictly limited to the area included in the perimeter described by the blocks on the north and south of the Duke of Gloucester Street and the blocks abutting the Palace Green, the Market Square, Court Green and the area surrounding the Capitol. The two blocks at the west and near the College are, however, an exception and are now occupied by shops, post office, theatre, bank and offices. These buildings are new, carried out by the Restoration and the architects, and represent a group of detached buildings of an early 18th Century type joined together in some cases by low connections of a later type. It has been assumed that had the people of Williamsburg been faced with a similar problem in the 18th Century, they might have solved it in this manner and with buildings similar in appearance to these.

That such a problem did not exist in these two blocks in the Colonial period is only too apparent from an examination of the "Frenchman's Map." Logically the concentration of houses, taverns and shops was at the east end near the Capitol. The College at that time was of slight importance as a center of business activity. Today, the legislative functions of the Capitol having ceased and the College having enormously increased in size and activity, the center of gravity has made a radical change of scene.

¶ THE "LOCAL IDIOM," referred to inferentially above, is seen in the photographs which appear in the Portfolio (pages 387-446). While design and scale control the matter, as they must in all architectural composition, it is nevertheless true to a very great degree that the Williamsburg types of buildings are to be so recognized by their details.



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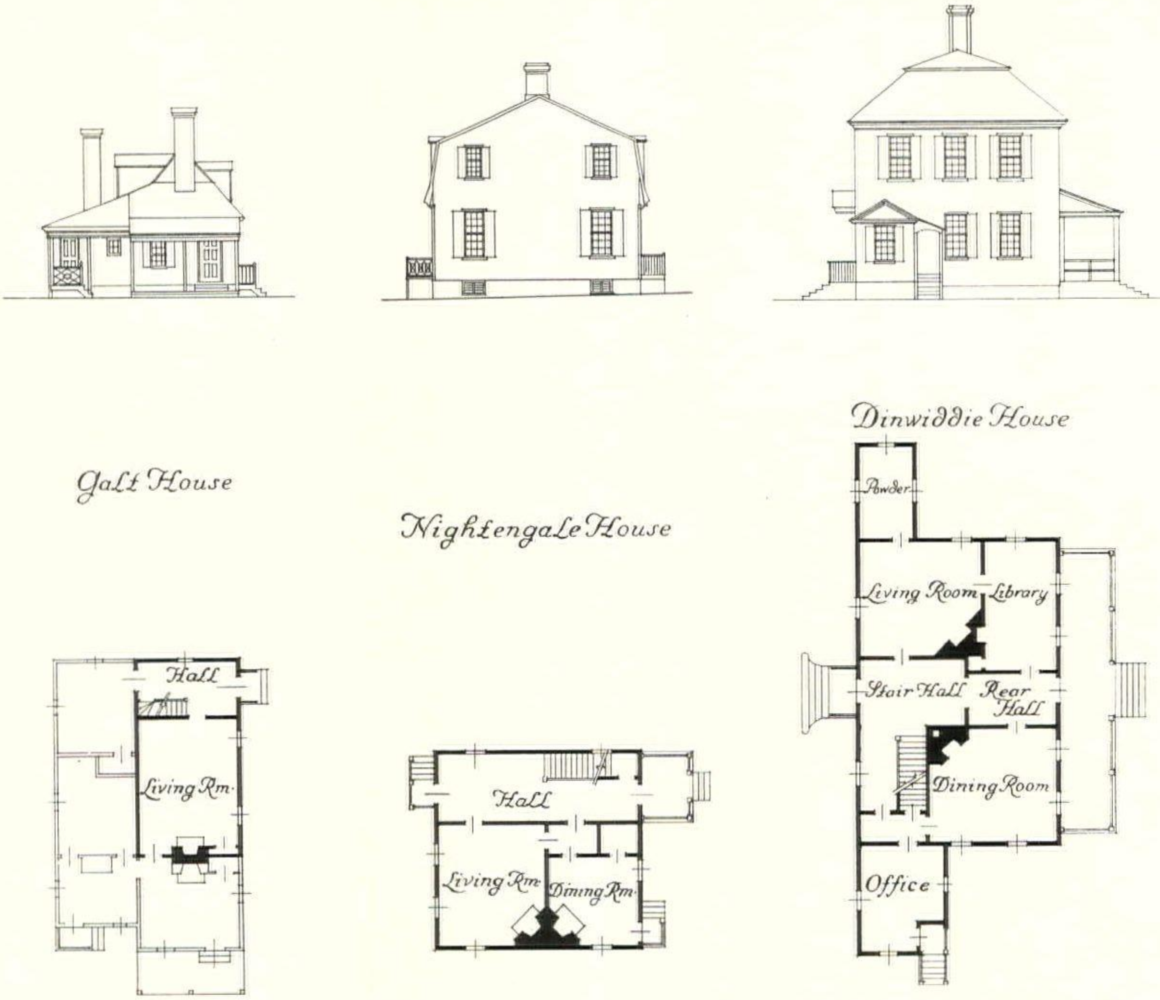
RESTORED BRICKWORK in the James City County Court House, consisting of new brick made and laid in the old manner with glazed headers.

Perhaps the most important of all groups of details are those involving brickwork. This locally made brick is large, durable, with a high but balanced ratio of absorption and of a significant and attractive salmon yellow-red color. The clay burns with success in the kiln and produces a variety of texture, glazed surface and color and hardness which opens a wide opportunity for decorative effect. All of the brick that have been used in the "exhibition buildings" and in other buildings in the "Area" where old similar brick were not available have been made in Williamsburg under the supervision of the builders and architects. The foundation of the original kiln was excavated at the Wren Building and found to conform exactly with the one set up to furnish the necessary additional brick for this building.

A year elapsed however, and many kilns were fired before it was found that the blue-green glazed header of the old work, and upon which all similar brickwork depended, could be reproduced by the simple expedient of using mostly hard wood for fuel.

The large size of the brick confers a quality upon every building, for in every structure, frame or otherwise, brick is used in the basement walls and the heavy generous chimneys.



TYPES OF COLONIAL HOUSES AT WILLIAMSBURG: (1) James Galt House (No. 11)—hall and one room. (2) Nightengale or Lightfoot House (No. 17)—hall and two rooms on one side. (3) Dinwiddie or Carter-Saunders House (No. 46)—hall and three rooms. Original construction is shown in solid black on plans. Numbers refer to Guide Map, pages 360 and 361.

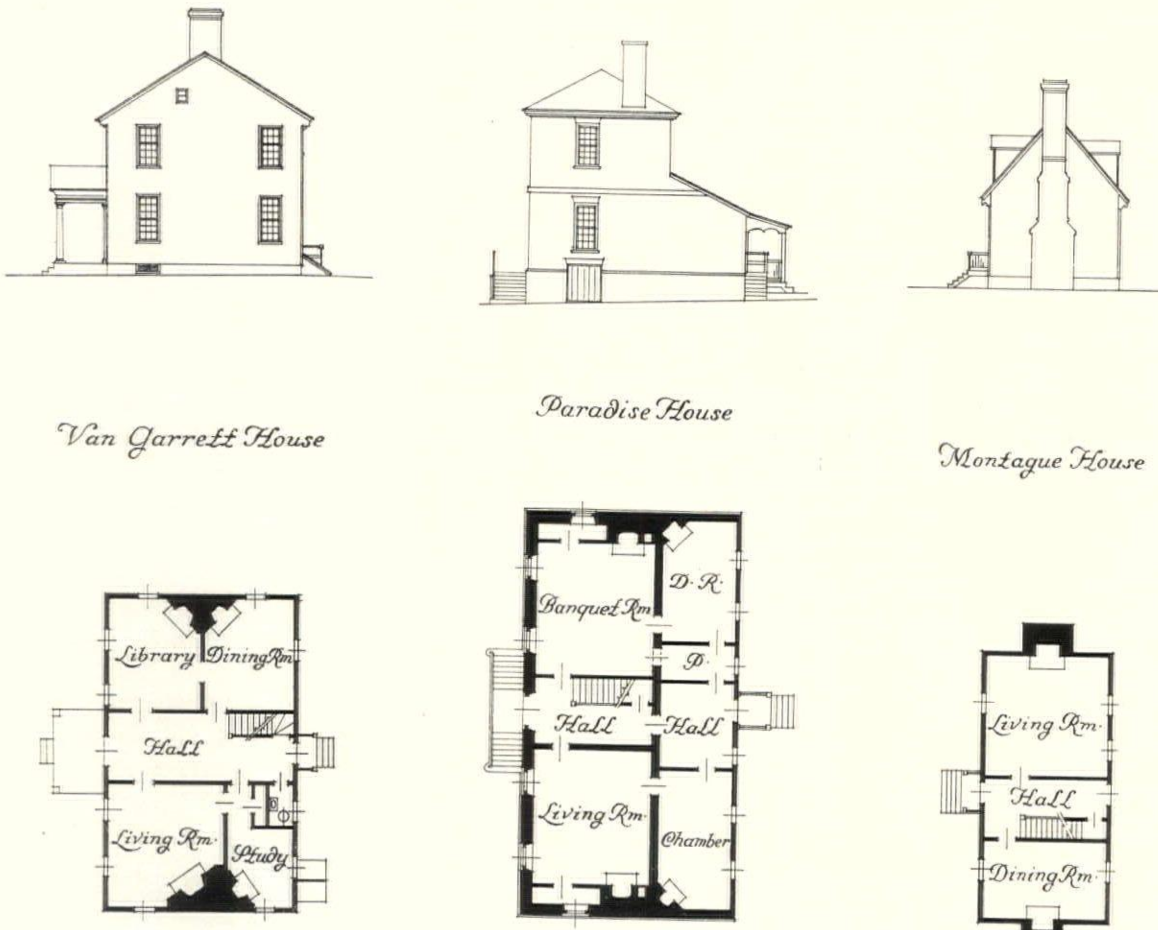
The study of the use of this brick is revealing as an indication of the wide variety that it offers.

The face bonds most used in Virginia in the 18th Century were the English and Flemish. There is no indication that one preceded the other. Common or "promiscuous" bond is to be found in the backing. There seems no way of ascribing the use of a particular size of brick to any definite period. The accompanying list of sizes and bonds, however, is of interest.

The mortars found in Tidewater brickwork of the 17th and 18th Centuries are similar in composition. It is a curious fact that the quality of this "oyster shell" mortar seems to have been higher and harder in the fourth quarter of the 17th Century than in the latter part of the 18th Century. It was a good mortar as its present condition amply attests and was only superseded by other kinds very gradually as the 19th Century advanced.

The age of the several parts of a foundation can be ascertained with some exactness from an examination of the brickwork, but such evidence must relate itself to the results obtained from other methods of investigation before conclusions are drawn. On a given site differences in mortar can be established in date sequence but such conclusions are applicable only to this particular site.

Period	*Building*	*Coursing*	*Bond Below Water Table*	*Bond Above Water Table*	*Size of Brick*
1699-1702	Wren	12 courses in 35¾"	English	English on three courses of Flemish	9" x 4" x 2½"
1732	Wren	11 " " 33½"	English	Flemish—glazed headers	8⅞" x 4¼" x 2½"
1702-1706	Capitol	12 " " 36"	English—random glazing	Flemish—glazed headers	8⅞" x 4¼" x 2½"
1704-1715	Palace (main building)	11 " " 34⅜"	Flemish—random glazing	Flemish—glazed headers	9⅜" x 4⅜" x 2¾"
1717	Paradise House	12 " " 35"	Flemish—glazed headers	Flemish—glazed headers	8½" x 4⅛" x 2½"
1755	Wythe House	11 " " 33¾"	English—random glazing	Flemish—random glazing	8⅞" x 4" x 2⅝"
1770	Court House	11 " " 36"	English—random glazing	Flemish—random glazing	8¾" x 4" x 2⅞"



TYPES OF COLONIAL HOUSES AT WILLIAMSBURG: (4) *Van Garrett or Archibald Blair House* (No. 52)—*hall and four rooms.* (5) *Paradise or Ludwell-Paradise House* (No. 33)—*hall and four rooms with two storeys in front part only.* (6) *Montague or Bracken House* (No. 77)—*hall and two rooms, one on each side.*

Indeed, the theory that the larger the particles of oyster in the mortar the more crude or older the mortar, is quickly exploded by the simple knowledge that the larger pieces settle to the bottom of the mortar boat and are those that appear at the end of each batch of mortar.

The mortars used in restoration to simulate this ancient oyster shell mortar and which seem to have the requisite qualities for longevity are composed as follows:

Face Brick:	
Oyster Lime	10 shovels
Sand	10 shovels
White Cement	8 shovels
Superfine Lime	1 shovel
Gauged Brick:	
Lime Putty	14/15 parts
White Cement	1/15 part
Common Brick Backing:	
Portland Cement	1 part
Lime	1 part
Sand	5 parts
Hydrated Lime	1/10 part

The joints of the work of the 17th and 18th Centuries were similar and were generally "struck," that is, the surface of the joint inclined inward at the lower edge, the reverse of the "weathered" joint. The joint was "rodded" or ruled with an iron jointer to produce a concave joint line.

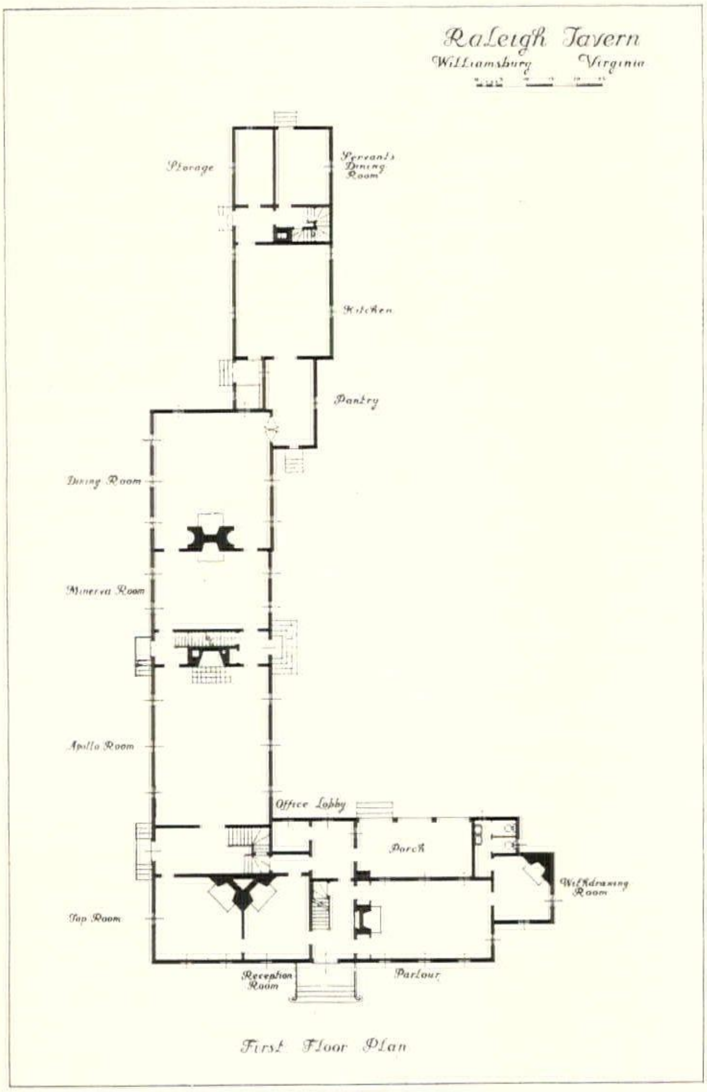
The use of gauged or ground bricks and the flat brick arch seems to have been adopted generally in the Tidewater during the first years of the 18th Century. During the 17th Century the masons generally laid their corners with untreated bricks but at times with a full knowledge of the decorative quality of the glazed header.

The Warburton House of about 1680 as well as the Public Gaol at Williamsburg of later date show glazed headers and even glazed closers at the corners and jambs.

¶ THE PHOTOGRAPHS reveal many characteristics of Williamsburg buildings which may be classified broadly as "local." The illustrations show com-

SKETCHES *of the Colonial buildings on the lot between Botetourt Street and Capitol Street on the north side of the Duke of Gloucester Street. Of these, the "Sign of the Golden Ball" (28), the Raleigh Tavern (27), the Lee House (25) and the Public Record Office (24) are the only ones now standing or restored.*

parative plans and gable ends. The plans seem often to have been laid out on a commonly accepted dimension of rectangle. The plans of simple gable roofed houses were 16 by 24 feet and 20 by 40 feet, plus or minus, and those of gambrel roofed houses about 30 by 30 feet. There are several dormer types and varied but significant manners in which the mouldings framing the sash are jointed and disposed; there are the dormer cheeks sheathed with beaded and flush siding running parallel to the roof line; there are the weather-boards with wide exposure to weather and usually beaded at the lower edge. This bead varies greatly and adds a pleasant variety of minute shadow in the strong sunlight.



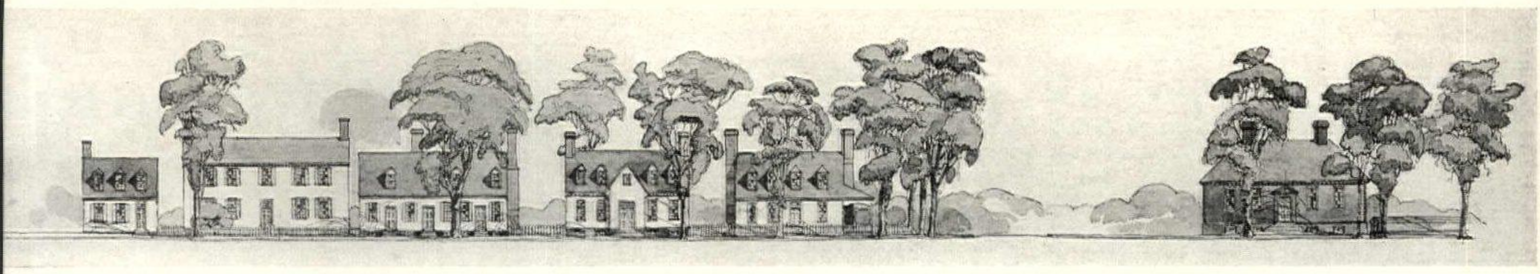
RALEIGH TAVERN: The Parlour shown in this plan was the original building, the chimney being on the exterior. The first enlargement consisted of the Reception and Tap Rooms and placed the door on axis. The Apollo and Daphne (or Minerva) Rooms were added successively from 1750-1770. The Dining Room was added during the Revolution. It is four inches wider than the building it adjoins; probably it was an old building moved in and the roof made to conform. Its interior is treated therefore as much earlier than the Daphne Room.

The windows are high in relation to their width and the muntins substantial, the sash are generally of 18 lights on the first and second floors of two-story buildings and the glass, often "Crown glass," varies in size from 9″ x 11″ to 10″ x 12″ on the first and from 8″ x 10″ to 9″ x 11″ on the second floor. The dormer sash have 8 or 12 or 15 lights and the glass sizes vary from 7″ x 9″ through 8″ x 9″ and 8″ x 10″ to 9″ x 11″.

The outside trim is simple and of generous scale; the corner board of frame buildings which rarely turns the frame is also beaded. In brick buildings the window frame is again beaded and the architrave either single or double moulded. Here one finds the attractive moulded window sills returning against the brick and in fine scale; this feature supplanted the beveled brick course under the sill that will be noted in the segmental arched window openings of the Warburton House. In such early examples as the latter, the sill was plain and straight of the "slip" type.

The window frames were pegged with tenons which project at the side of the stiles and which are let into the adjoining studs. Inside the windows were often framed with double moulded architraves which surround the sash like a frame, the chair rail returning against itself over the paneled dado. Chair rail and cornice mouldings are bold, although in simple buildings or rooms where neither dado nor cornice occur the chair rail will consist of a 3″ or 4″ board beaded above and below. This board like the window architrave is nearly flush with the face of the plaster, leading one to suppose that the interior trim of these buildings was set in place in advance of the plaster work. The panel mouldings are usually raised and of good large scale, the width from panel face to rail reaching the width of 2¾-inch or more.

Flooring was universally of the local short-leaf pine "Pinus Echinata" and laid in 4- and 6-inch



Greenhow from a photograph · Lee · Red Lion Inn from a sketch and insurance policy No 385 8 · Burdette from York records · Walthoe · Clerk's House

Gloucester Street

widths in edge grain. These floors are very hardy and take on a good color with careful treatment of wax.

The chimneys, particularly those on the outside of the end gables, are a notable feature of Williamsburg and are in much variety. Perhaps the most important outside chimneys are those on the Montague house, although those on the Blair, Orr and St. George Tucker houses are very interesting. Their characteristics are many. Among these is a device which may have been first adopted here, so far as Virginia is concerned, to prevent fire from entering the attic from fissures in the brickwork. The chimney in a 1½-story frame house clings closely to the house until it reaches the top of the second floor fireplace and then stands free and sturdily upon its base. The only place where the common bond can be found in exterior brickwork is above the upper shelf or shoulder of such chimneys.

The gable angles vary but little, the general pitch being 52½° from the horizontal.

Decorative ironwork is mentioned in early descriptions of the Governor's Palace and the front gate is shown on the Bodleian Plate. Although the gates and grilles have long since disappeared, a fragment or two were excavated and give a key to the style.

Somewhat contemporary work stands at Westover on the James and an effort has been made to emulate the quality of this work. The motives excavated on the lot have been incorporated in the designs.

The stone and lead work mentioned in the 18th Century refer in their design to contemporary examples. Fragments of stone vases found at the Palace show floral ornaments, ram's heads, and so on.

Inside the Palace, Delft tiles, marble ornaments over fireplace openings and the like found in the excavations have been utilized again. Each marble mantel and piece of stonework is designed to incorporate only mouldings actually found on the site.

¶ FROM THE RICHES of the past there is always to be found a precedent of a kind for something that is good looking. We do not have to search here for examples. Most Colonial buildings in America are good looking. The appreciation of the artisan which is based upon respect for the great resource and skill of his predecessor through the ages is responsible for this in large measure.

The visitor leaves Williamsburg with a clearer conception of the life of the people of the 18th Century City. He has found that restoration based upon archaeology and historic fact is more the result of an effort to be truthful than to be plausible. He has been graciously conducted through many of the buildings, which had been the scene of notable events in the past, by ladies of Williamsburg attired in the dress of the period. He has perceived that in such surroundings contemporary dress does not imply costume and he appreciates that the architecture with the furnishings that he has seen were built and fabricated originally with the dress of the time in mind and that the two are definitely interrelated.

He has become aware of the significance of the motto chosen for the new seal of "Colonial Williamsburg" and in noting the dignity, comfort and composure of these surroundings he concurs "that the Future may learn from the Past."

If by good fortune he has remained in town long enough to feel as well as to see, he will have gained other impressions as lasting as these. He will appreciate that the character of antiquity that has been produced in some of the reconstructed buildings by the use of old materials has not been attained by the despoliation of other Virginia buildings, which in their turn might have been preserved elsewhere.

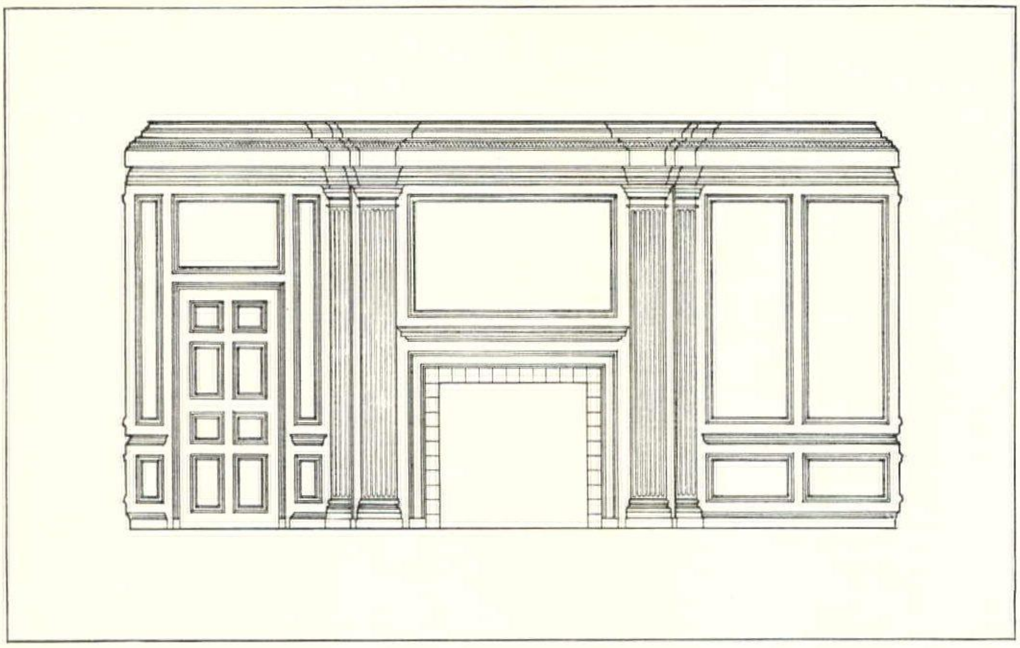
He will be aware of the patience of the donor and of his administrative assistants who have recognized the necessity for exhaustive investigation; and will be thankful for the inspiration that underlies the enterprise to which Dr. Goodwin gave first expression and to which Mr. Rockefeller, in the guidance of the expenditure of his great gift, has added impetus and force.

He will, it is hoped, also be impressed by the quality of fine craftsmanship of the builders in all the trades and will be confirmed in his belief that architecture cannot stand by itself alone but must, if it is to achieve harmony with nature, lean heavily upon the resource and appreciative skill of the landscape architect and the experienced gardener.

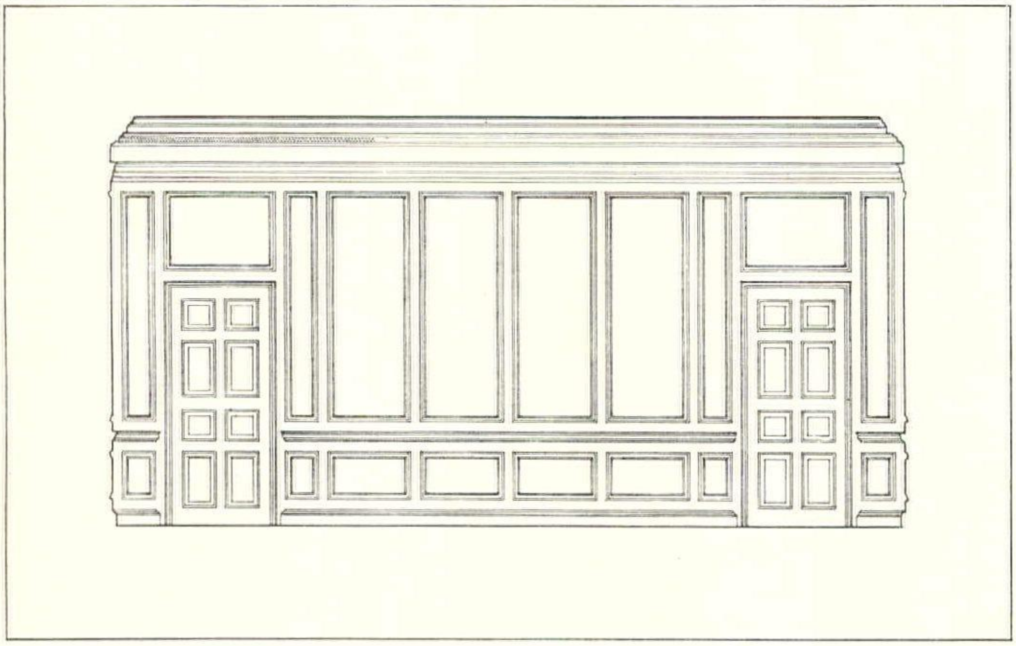
May he also tell others of his thoughts and as years go by, visit Williamsburg with the double purpose in mind of refreshing his memory and of encouraging an enterprise which has been undertaken for his benefit alone.

MEASURED DRAWINGS

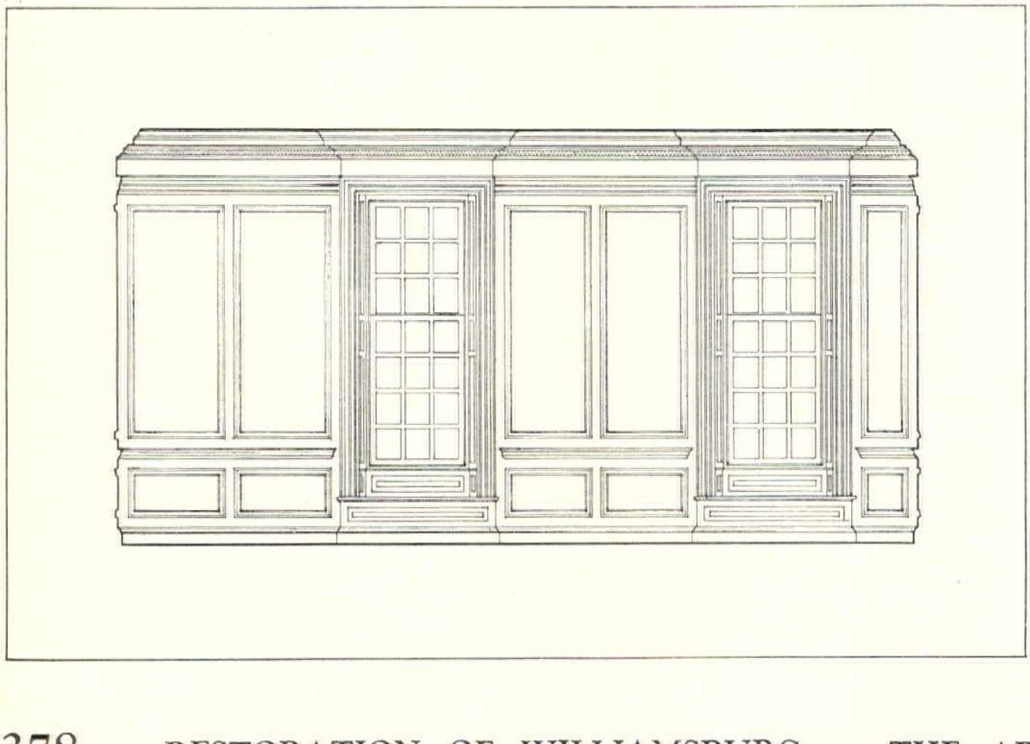
ROOM 206



South Elevation



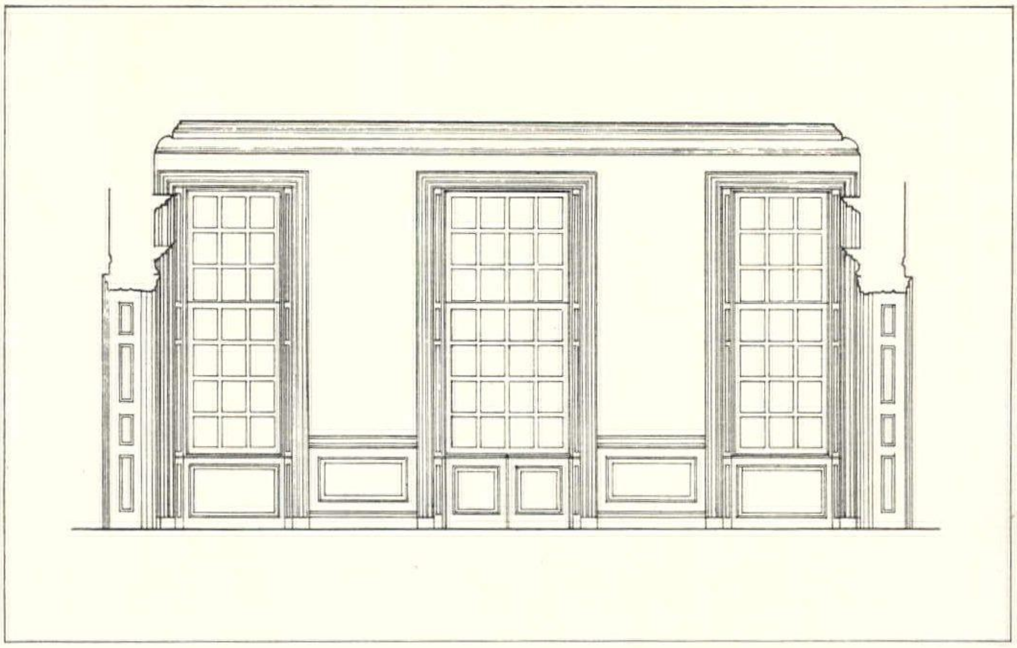
West Elevation



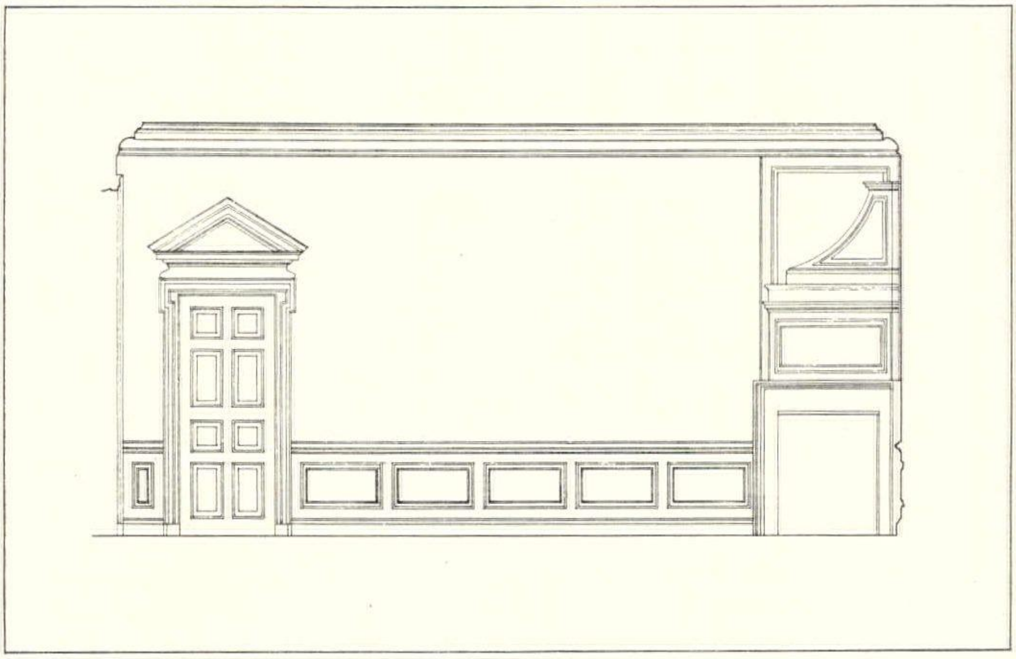
East Elevation

GOVERNOR'S PALACE

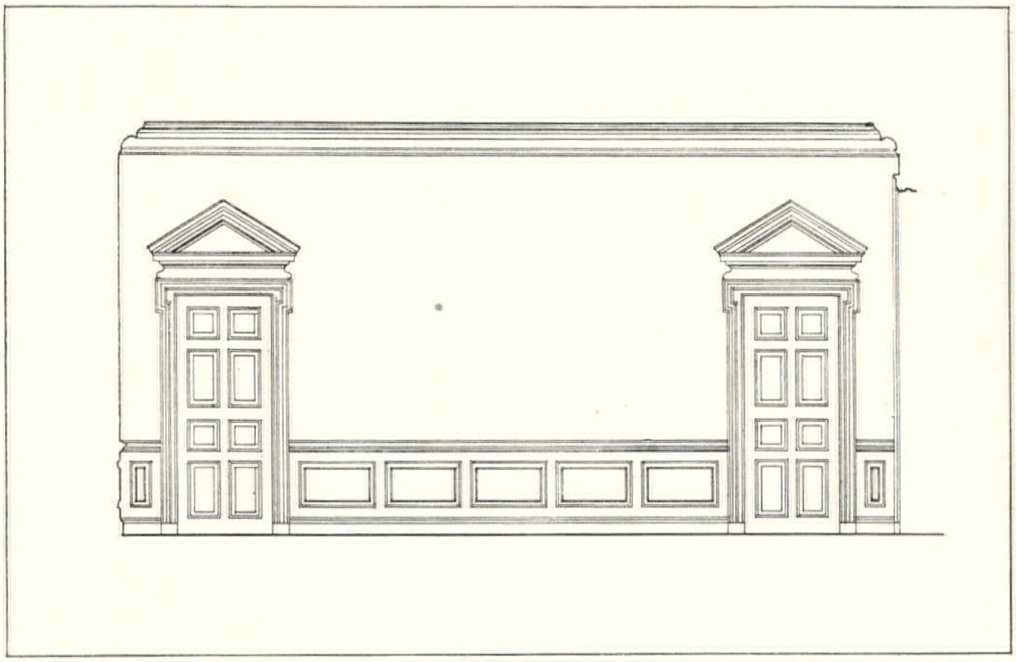
UPPER MIDDLE ROOM



South Elevation



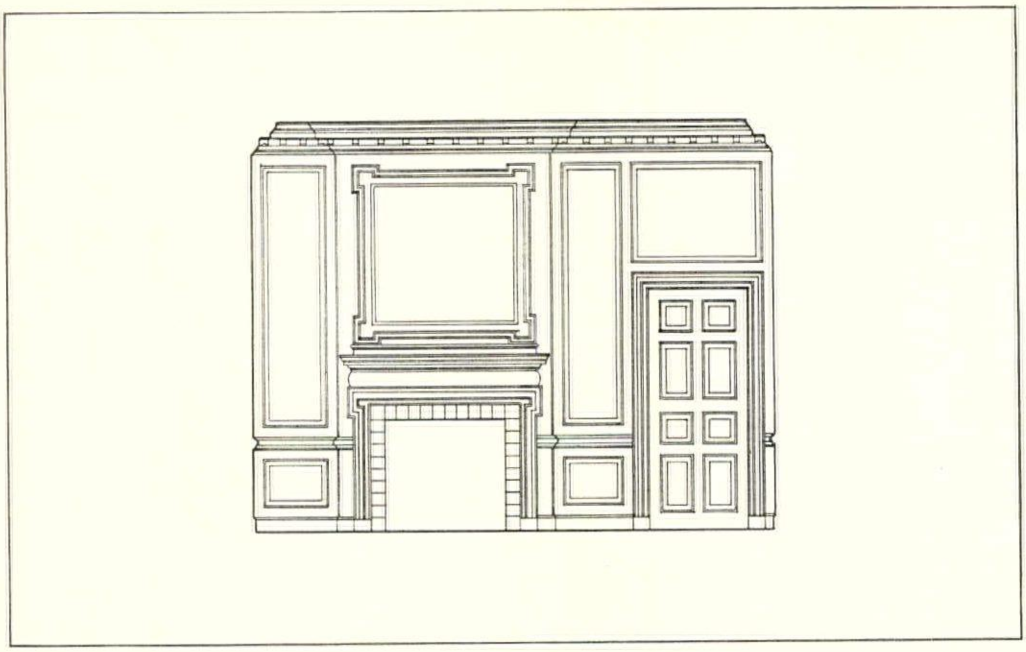
West Elevation



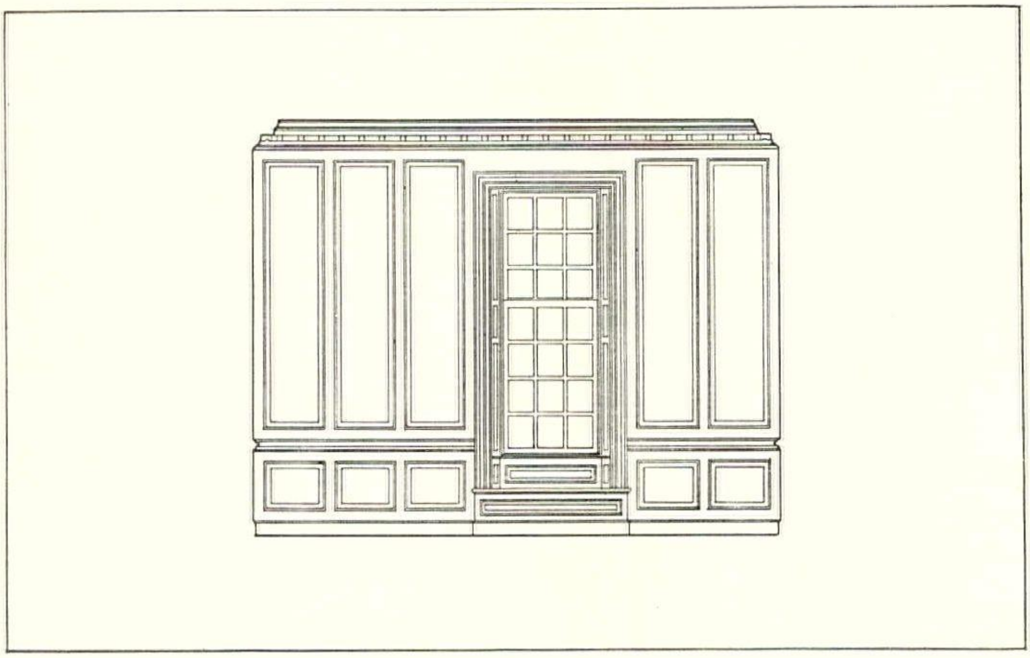
East Elevation

MEASURED DRAWINGS

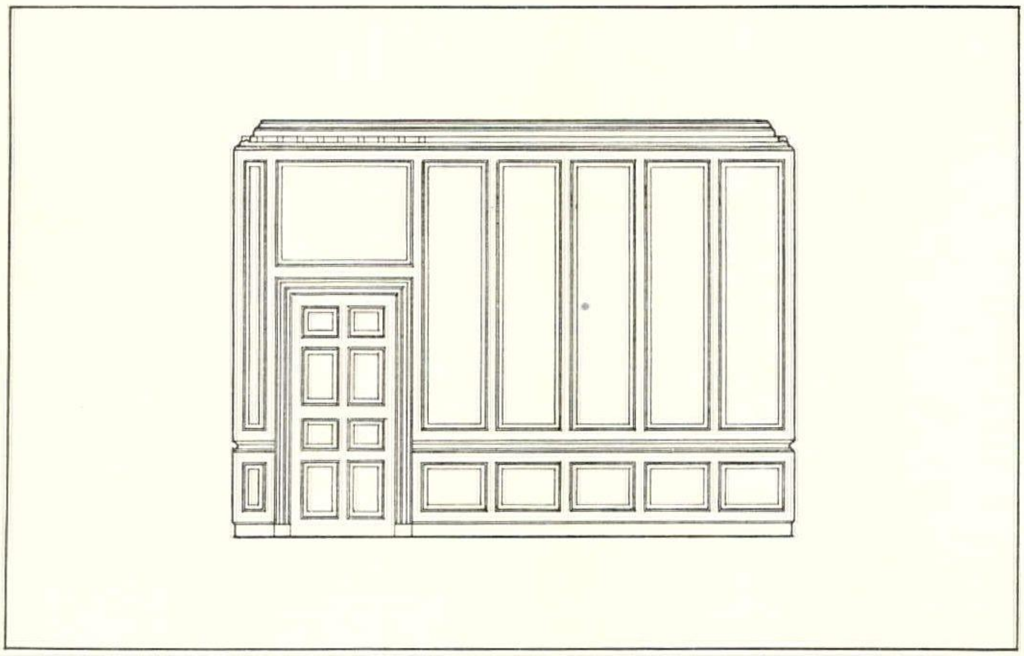
CHAMBER 200



North Elevation



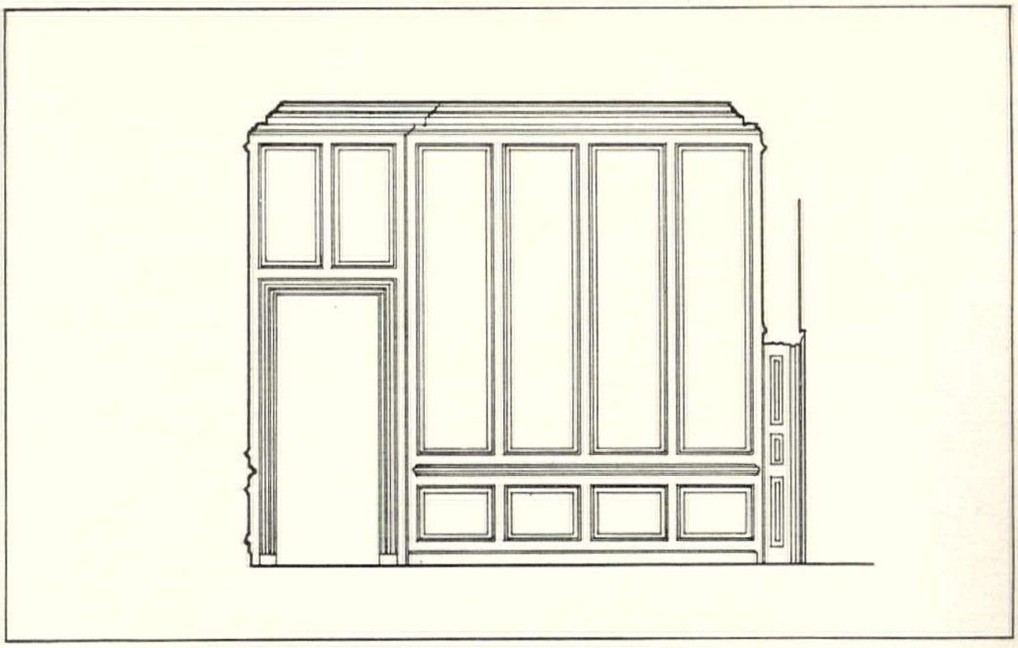
South Elevation



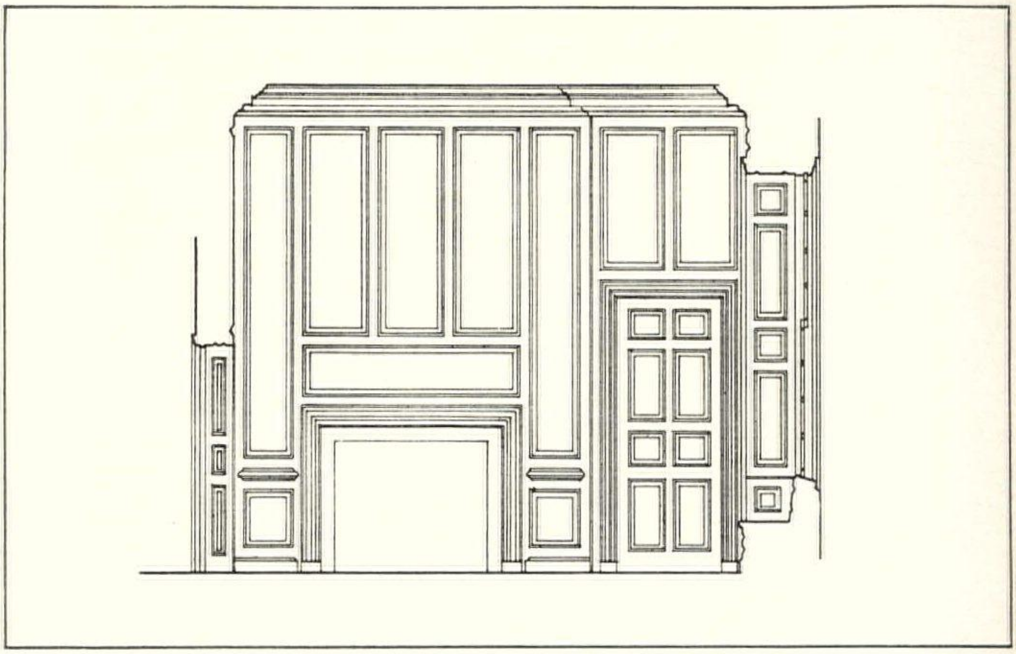
West Elevation

GOVERNOR'S PALACE

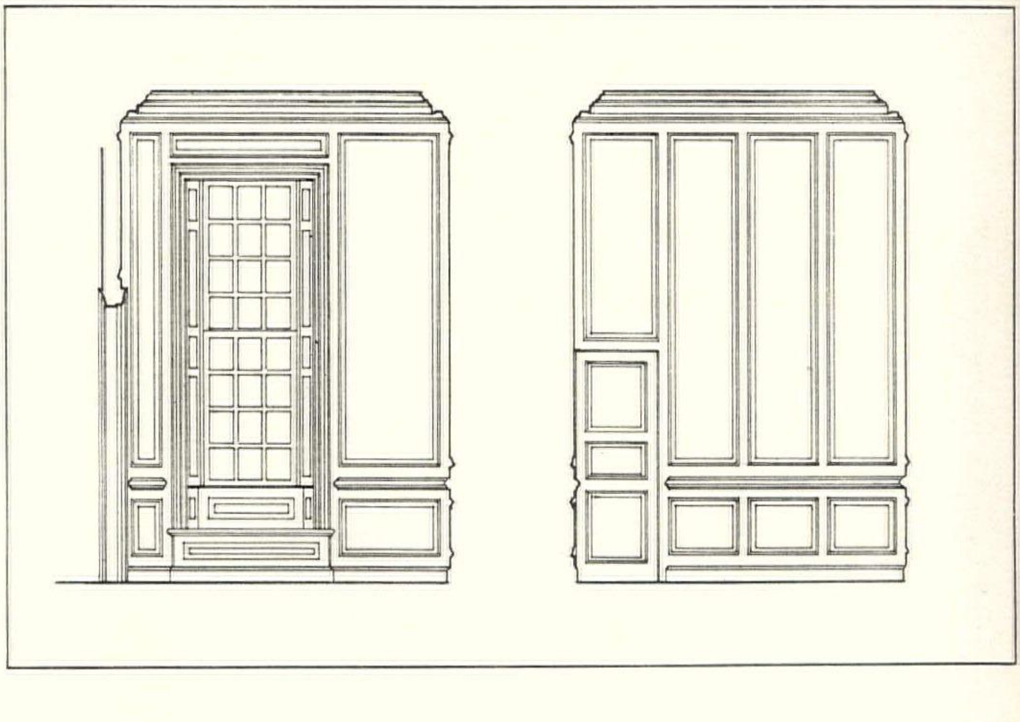
LITTLE MIDDLE ROOM



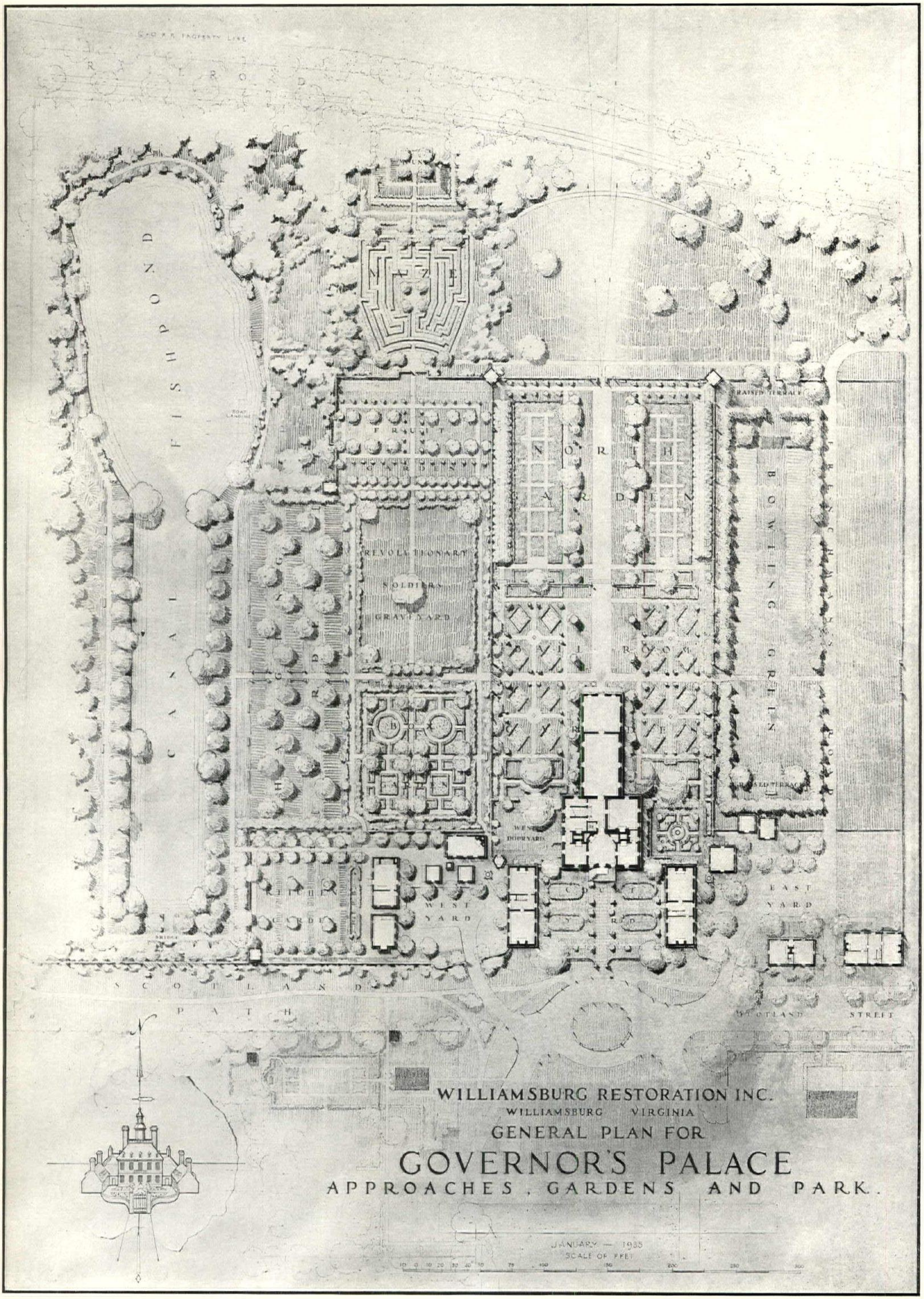
North Elevation

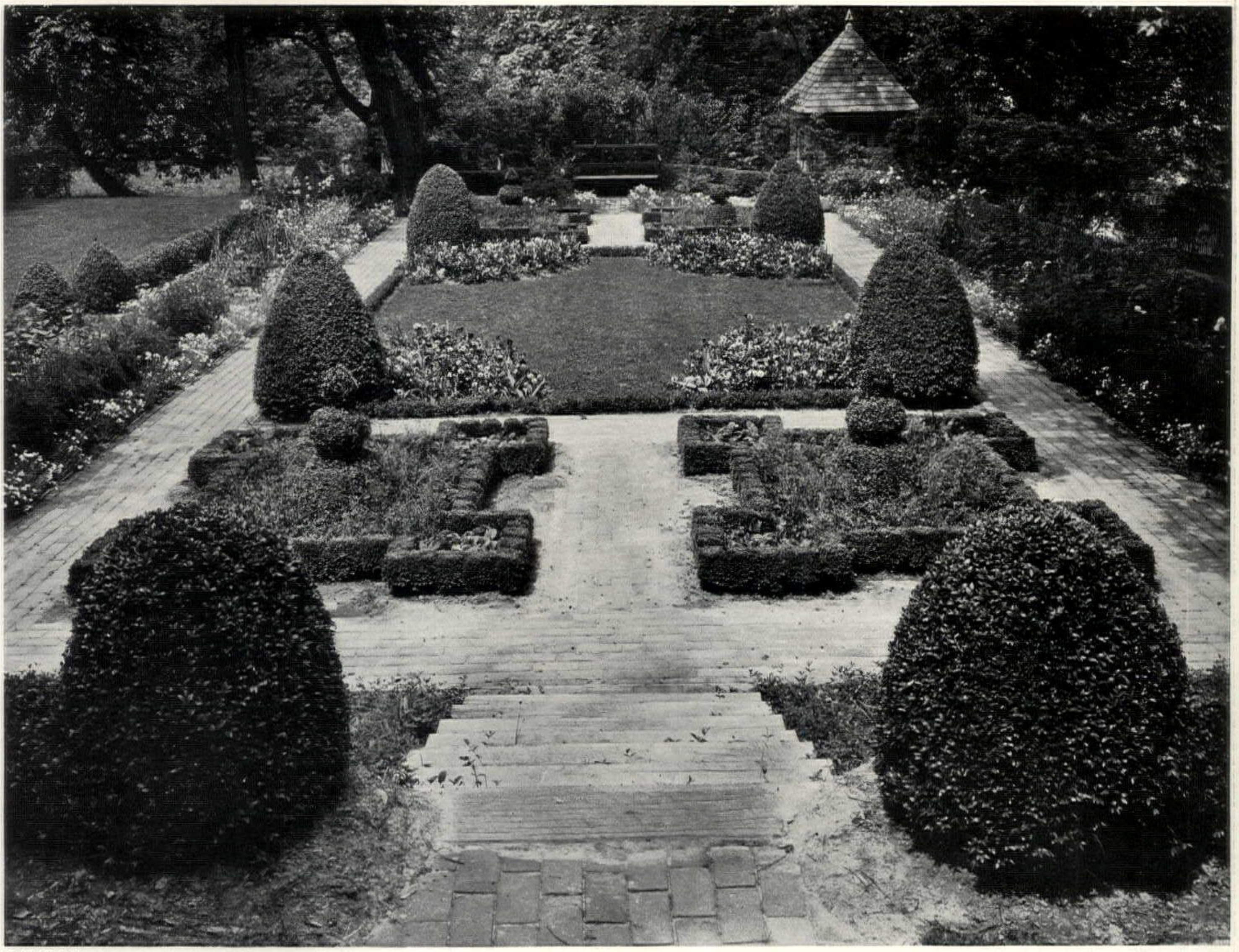


South Elevation



West and East Elevations


FISHPOND
CANAL
MAZE
FRUIT GARDEN
NORTH GARDEN
BOWLING GREEN
REVOLUTIONARY SOLDIERS GRAVEYARD
RAISED TERRACE
WEST DOORYARD
WEST YARD
EAST YARD
SCOTLAND PATH
SCOTLAND STREET
WILLIAMSBURG RESTORATION INC.
WILLIAMSBURG VIRGINIA
GENERAL PLAN FOR
GOVERNOR'S PALACE
APPROACHES, GARDENS AND PARK.
SCALE OF FEET


© F. S. Lincoln

GARDEN OF THE CARTER-SAUNDERS HOUSE

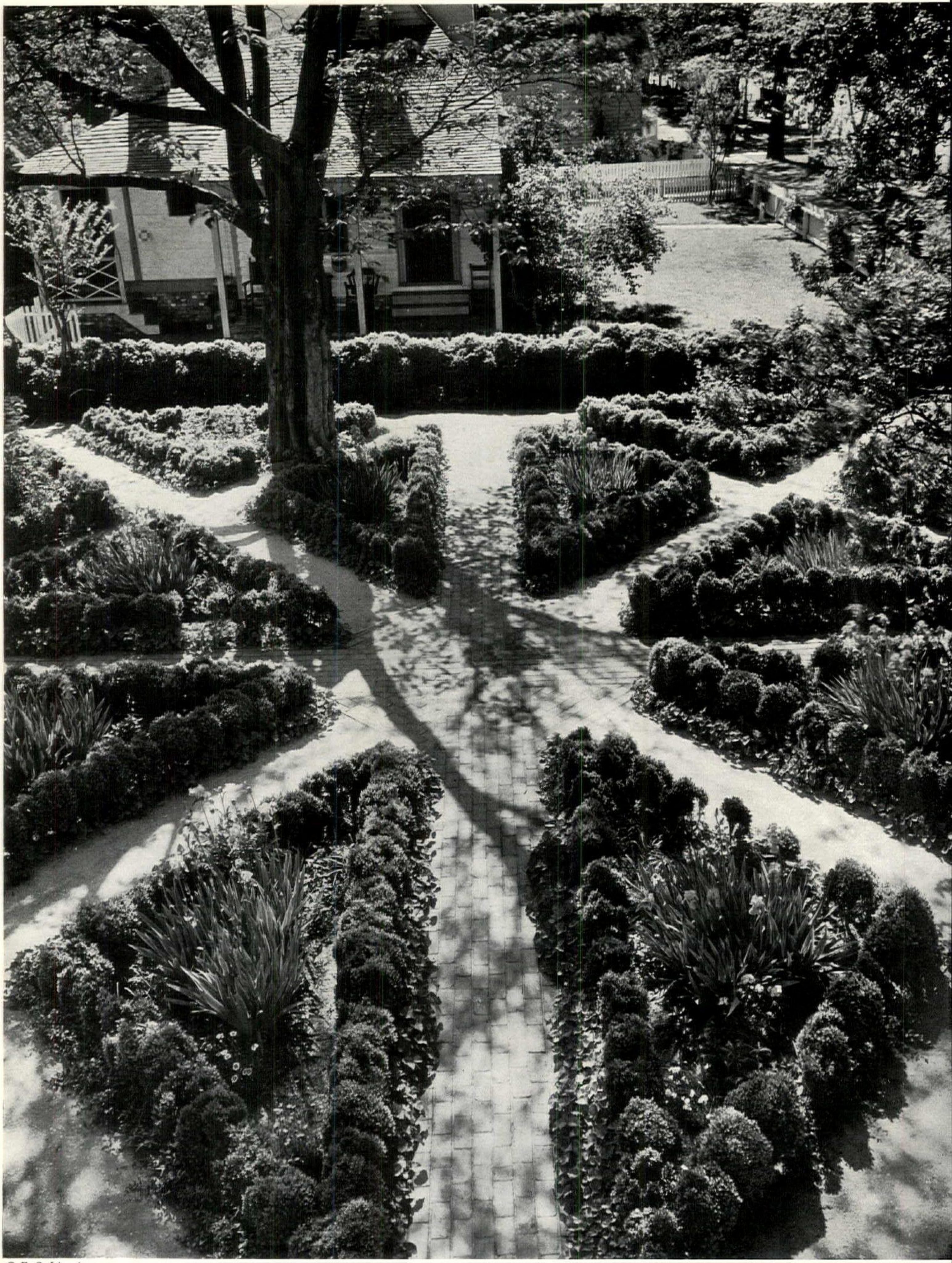
CITY PLAN AND LANDSCAPING PROBLEMS

By ARTHUR A. SHURCLIFF, Landscape Architect

¶ FOR THE CITY PLAN we were fortunate in having some reliable old plans and maps and written descriptions. We soon discovered that the old plan was not a mere gridiron of streets like that of New York, Philadelphia, or most of our cities, but a modified gridiron in which every block bore a relationship to its use and to its appearance in the whole length and breadth of the city.

A modulus of about 250 feet runs through the whole scheme and determines the blocks, the ratios of the vista lengths, the size of the two large parks or "greens," and many other elements. Longitudinal and transverse street vistas are stopped by buildings and do not run through interminably as in most of our modern cities. The long central vista of the main street is terminated at one end by William and Mary College and at the other end by the Capitol. To prevent the vistas of the other longitudinal streets from competing in importance with that of the main street, these lateral streets are offset about midway in their length.

We soon found that the design of the individual lots included in this modulated gridiron depended on the gridiron itself. The orientation of buildings, the setbacks, the position of outbuildings, and dependencies were determined by the street plan. We learned the details of place layouts in part by excavations which showed the position of old paths and wells, but the ravages of time were severe and therefore we looked wide and far for old family letters, insurance maps, and the few descriptions which were available in books.



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Finding this data to be insufficient, however, we then went through the countryside and measured more than a hundred places of all sizes. Many of these, although well known, had never been measured accurately and these measurements astonished us by the existence of ratios of proportion. It became clear that not only were the early designers exceedingly good choosers of sites but no site was accepted which did not lend itself to development on generous stately lines controlled by ratios, considered more or less invaluable in those days.

We were fortunate in finding some accurate ancient maps of Edenton and other Southern cities. These were made by French engineers in the latter part of the 18th Century and showed details of the individual lot designs. The relation of the plan of the grounds to the plan of the houses was always intimate; in some instances the grounds were laid out with a lack of relation to the house, but with a close relation to the boundary lines of the lots. Some of the garden patterns were indicated by old paths discovered during the course of excavation, some from contemporary maps of the period, and others from the gardens of contemporary plantations.

¶ TWO CHARACTERISTIC town place plans are shown in the plots of Captain Orr's place and the Paradise place (page 386). Both designs were determined by actual findings on the ground or by documentary evidence and show an effort toward symmetry governed by the needs of daily use and the nearness of property lines. These layouts indicate the climatic conditions which precluded the use of long ells or other compact groupings of dependencies. Ample space for circulation of air was important in these towns where, except for a few days in winter, the thermometer rarely fell below freezing.

In the outskirts of Williamsburg there are three larger places which were not limited in extent by the layout of the city. These places, though hardly large enough to be called plantations, were laid out with a generous gesture characteristic of the hospitality and gracious life of the South, and the scheme of approaches and the arrangement of outbuildings recalled the Virginia grand manner.

¶ AT FIRST it seemed a simple matter to find the names of trees, shrubbery and flowers which were used in Colonial times. We thought we could depend on English gardening books. We soon discovered, however, that many plants unknown in England were used in Virginia, and many well-known English plants did not reach the Colonies. Researches carried on in the libraries of the South, also at the Library of Congress and the Boston Athenaeum, and the several branches of the Department of Agriculture throughout the country gave us much valuable data. This was supplemented by old Williamsburg letters and the catalogues of nurserymen who are known to have dealt with the

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THE JAMES GALT HOUSE (Building No. 11) adjoining the garden of the John Custis Tenement (a house to rent) shown on the opposite page.

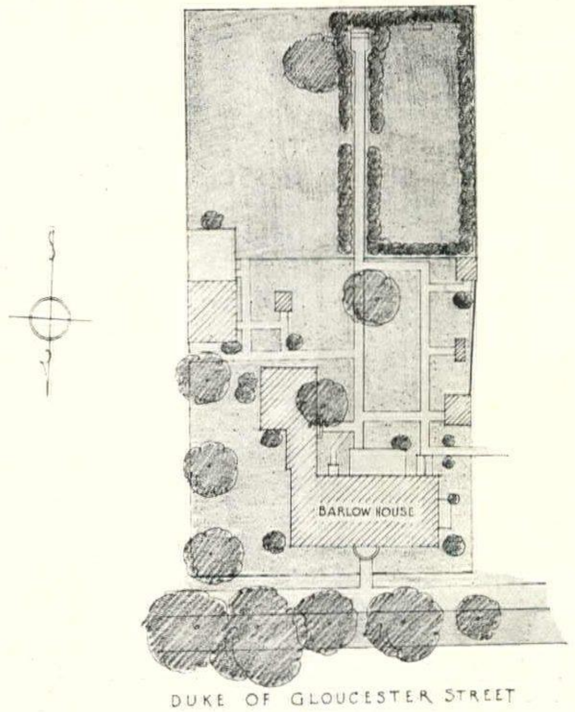
South. The ladies in charge of Mount Vernon kindly gave us valuable aid. Little by little we gathered a check list of plants which we could depend on as "authentic."

We searched the records on both sides of the Atlantic for the date of introduction of the Crapemyrtle. It may have come from England soon after the middle of the 18th Century, but actual dates are wanting except of its arrival in England about that time from the East. We also believe this tree may have come to America direct from the East in trading ships via the South Seas and around Cape Horn.

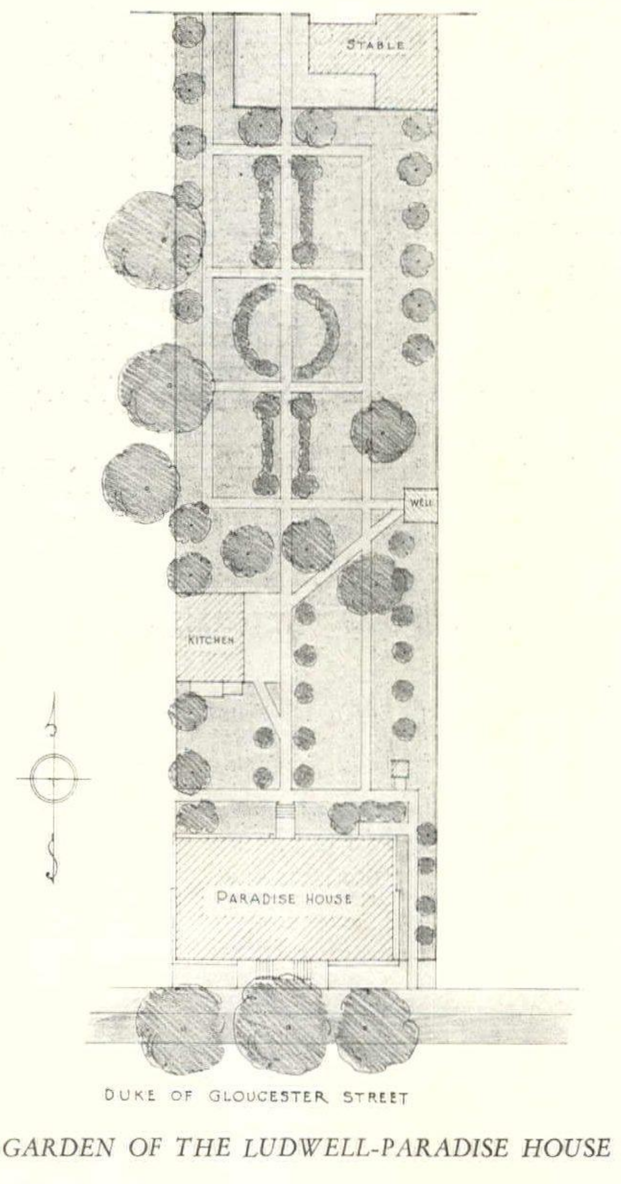
Visitors to Williamsburg are impressed by the Paper Mulberry trees and frequently are led to believe that these were used in the Colonial silkworm culture. The fact is that the silkworms were reared in the true Mulberry, the Black and White, of which there are relatively few specimens in Williamsburg, one of the finest being the ancient one which overhangs the east wall of the Capitol.

Before our research we thought that the Japanese Quince, familiarly known in the South as "Japonica" and found extensively today, was known to the Colonists through England. We now believe the Colonists did not know this attractive shrub and we are removing it from "authentic" places. We have unearthed the interesting fact that the beautiful Mountain Laurel, known to the Colonists, was not fully appreciated, although specimens taken to England attracted much attention there. We have found native Azaleas which were unknown in England and these are being used in the Palace grounds in the belief that they were used in Williamsburg gardens.

Hedges were widely used in Colonial Virginia, just as they were in England. Box was popular because clipping did not become necessary for many years owing to the small annual growth. Hedges of more rapidly growing material required clipping very early to prevent the plants from clogging the paths and overshadowing the adjacent beds. Records show that English Yew was brought over to Virginia in the



GARDEN OF CAPTAIN ORR'S DWELLING



GARDEN OF THE LUDWELL-PARADISE HOUSE

hope that it would make satisfactory hedges. The Colonists recorded their disappointment in discovering that the climate in this country is too dry for Yew. In fact there is no country in the world in which it thrives so well as in England.

We know that English Holly was brought over to this country early, but with difficulty, as it is not easy to transplant. Most of the old specimens of Holly which we have found in Virginia, and the oldest Holly hedges are native. This Holly thrives in the hottest sun and when established will resist drought, but nowadays requires much spraying to keep insect pests away. To transplant native Holly successfully, very large balls of earth must be taken with the roots, and for hedges the plants must be cut back very severely, otherwise the leafage at the base of the hedges will be thin. Holly is shade-enduring.

English Privet came to this country very early and was known later to George Washington. Today it is found widely distributed through the South and through New England, and grows in the fields as a "native" shrub. This is the Ligustrum Vulgare. It makes excellent hedges, but not as brilliant in leafage or as luxuriant as the Privets which have come from southern Asia and from Japan. We eliminated these modern Privets from the restored places in Williamsburg and are using the ancient kind.

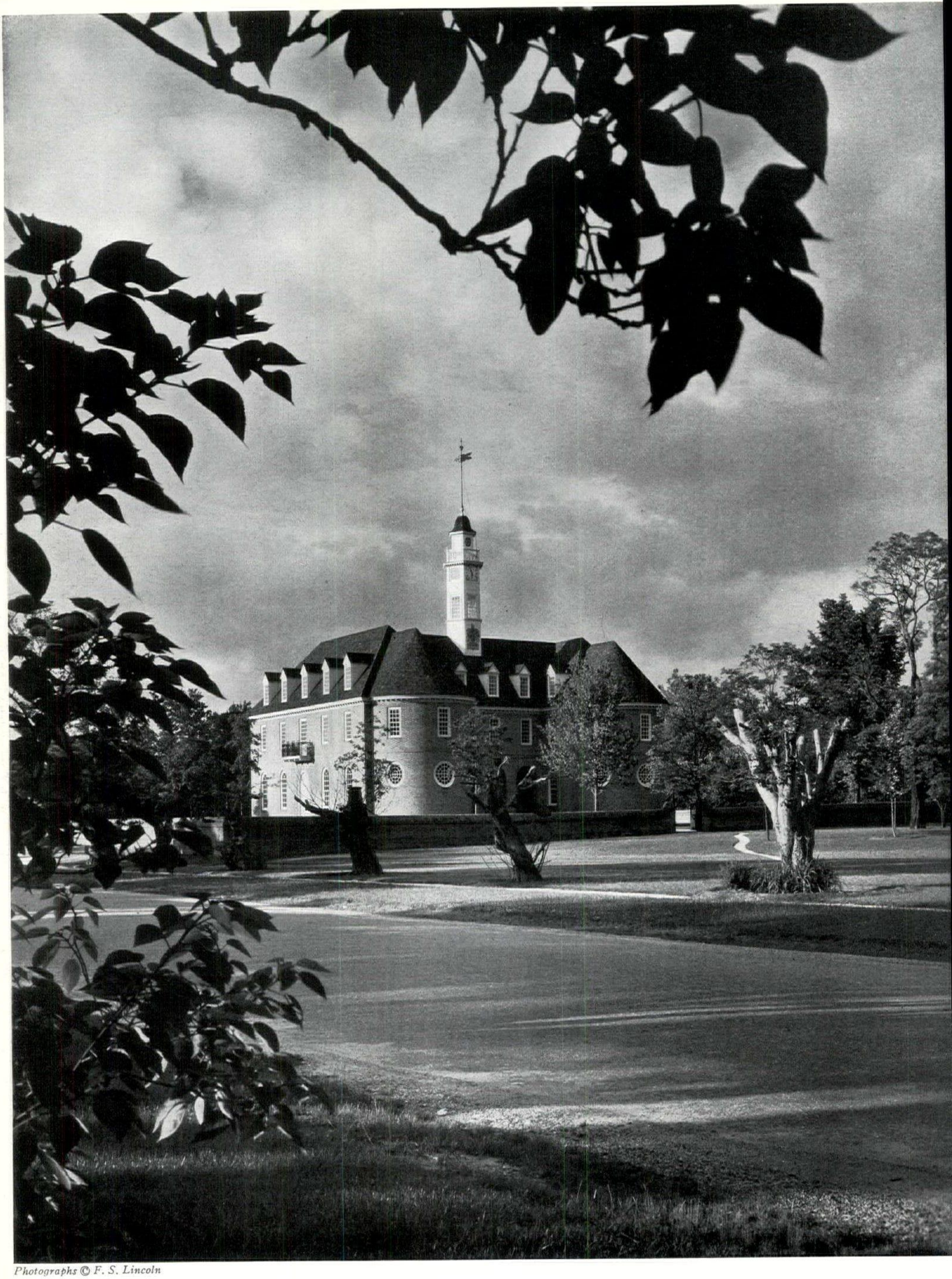
¶ THE CULMINATING PLACE design in Williamsburg is the Governor's Palace. The clues to all parts of the design were found either by documentary evidence or excavations or by ground forms. For example, the canal and its terraces stand essentially as we found them and it was only necessary to build a dam at the lower end to take the place of the ancient dam. Foundations revealed the position of all important walls, the vinery garden, the position of the steps leading to the canal, the chief transverse axis, the outbuildings, the steps of the main axis, the exact form of the courtyard walls, the forming of the ground making separate levels, and other features. All these findings tallied with English work of a slightly earlier period. (We learned that the place designs in America lagged behind those in England by about twenty years.)

¶ IN CLOSING, I wish to say that the work of cooperation with the architects was exceedingly pleasant and in every phase of the work we were inspired by the enthusiasm and patience of Mr. Rockefeller and his staff. The aid we had from friends in the South was sympathetic and constant. The help we received from researches which had been made by the Government, the State, the County, the City, and the private and public organizations interested in historical and technical matters was of inestimable value. I also wish to add that the aid which came through the American Institute of Architects and the American Society of Landscape Architects was most sustaining.

F. S. Lincoln

The Capitol (Building No. 23 on the Guide Map, Pages 360, 361) Seen from the Southwest

n 1705, after the seat of government had been moved from Jamestown to Williamsburg, the original Capitol was ompleted on this site. It burned in 1747 and a second building was erected on the foundations in 1751. Here the General Assembly of Virginia met until the seat of government was removed to Richmond in 1779. This second uilding was destroyed by fire in 1832. . . . The Capitol of 1705 has been reconstructed on the old site and foun- ations, which were preserved and presented to Colonial Williamsburg, Incorporated, for that purpose by the Association for the Preservation of Virginia Antiquities. The building has been completely refurnished in accordance with original records. . . . The east wing was occupied by the House of Burgesses, with an assembly room on the irst floor and committee rooms on the second. The west wing housed the General Court on the first floor and he Governor's Council on the second. A piazza on the first floor, between the two wings, served as a meet- ng place before and after assembly; over it, on the second floor, was a common room for prayers and conferences.



Photographs © F. S. Lincoln

Capitol Seen from Blair Stree

North Entrance of Capitol

Photographs © F. S. Lincoln

Council Chamber in the Capitol

House of Burgesses in the Capitol

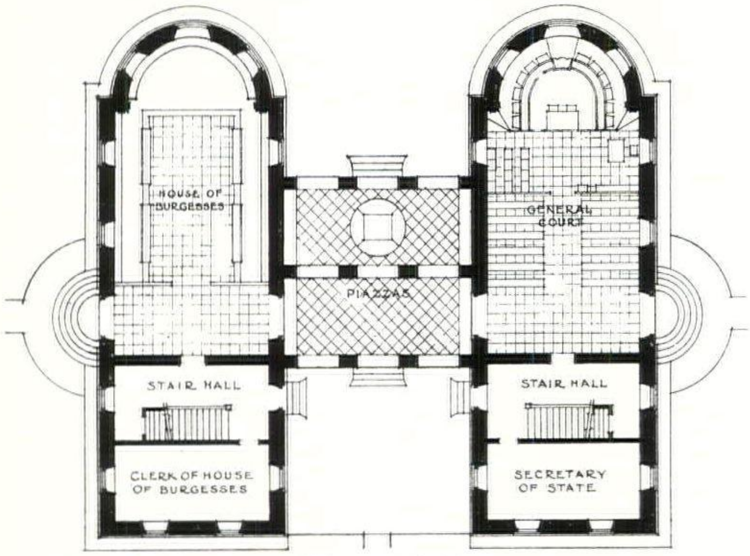
RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

Photographs © F. S. Lincoln

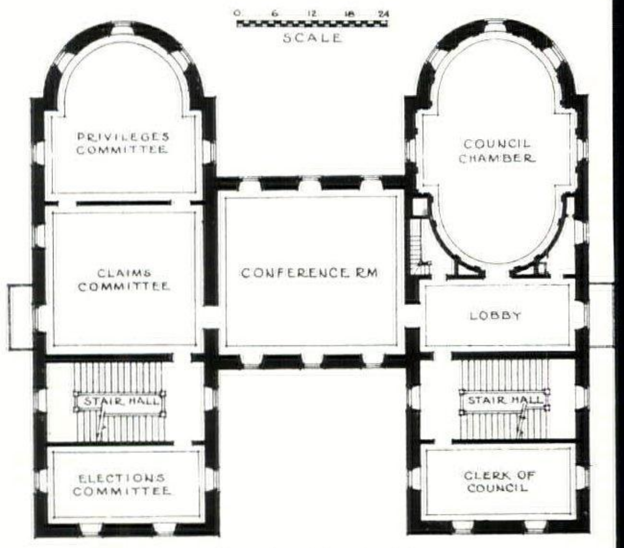
House of Burgesses in the Capito

Original Speaker's Chair in the Capitol

No means of heating are indicated on these plans of the Capitol of 1705. Candlelight and fireplaces were forbidden by law as hazardous. In 1723 the records were found to be deteriorating from dampness, and fireplaces and chimneys shown on the Bodleian plate (page 365) were then added. Later the building burned.



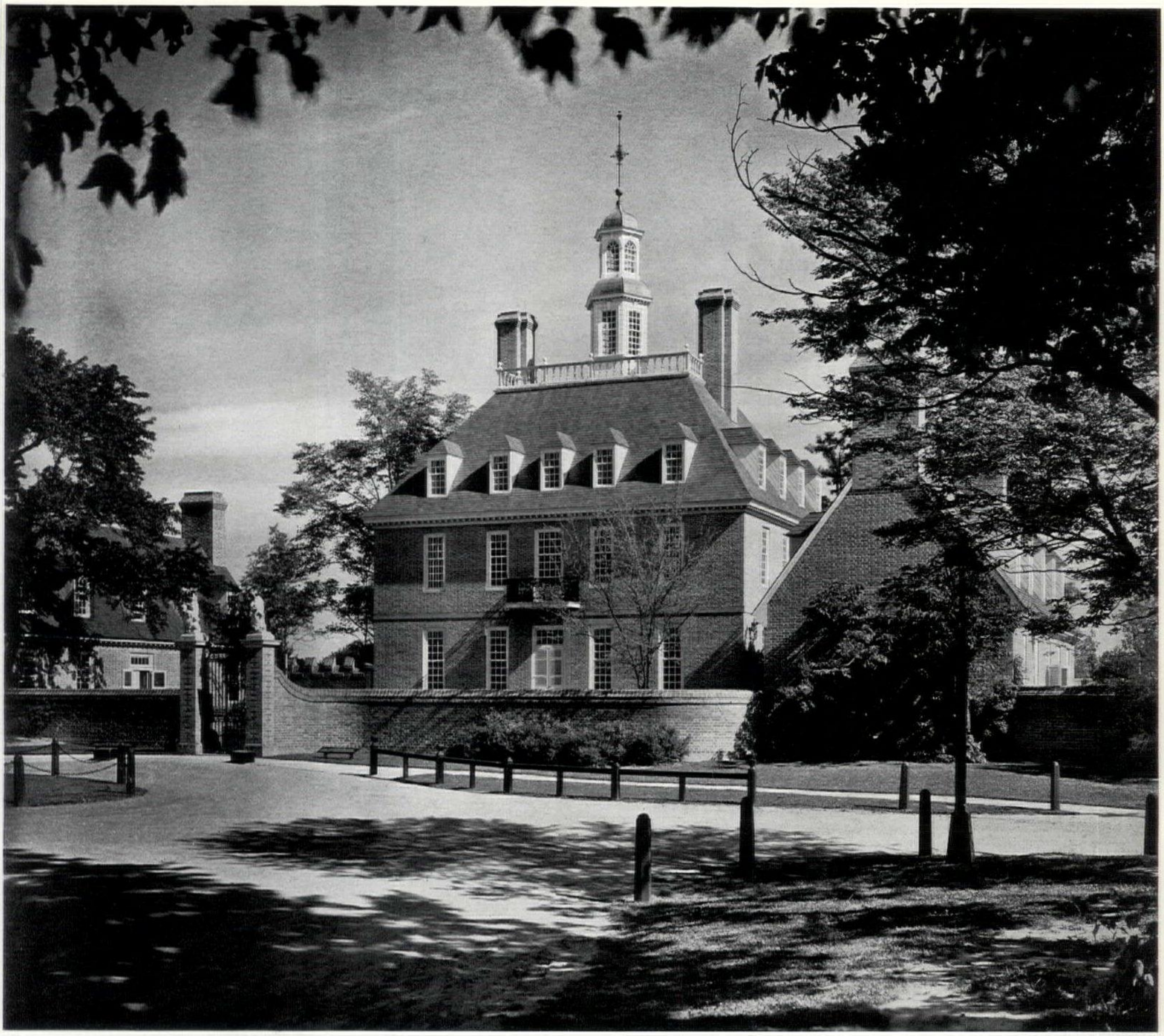
FIRST FLOOR



SECOND FLOOR

Photographs © F. S. Lincoln

Burgesses' Committee Room in the Capitol



A house for the Royal Governors of Virginia was ordered built in 1705. During its erection the building came to be known as the Palace. It was completed on this site between 1713 and 1720. The Palace was the center of the social life of the Colony until the outbreak of the Revolution in Williamsburg in 1775 when it became a fortress for Lord Dunmore until his departure from the Colony. It was later used as a hospital for American soldiers during the Yorktown Siege; while serving this purpose, it burned in December, 1781. More than 150 Revolutionary soldiers were buried in the Palace grounds. The Palace has been reconstructed upon its original foundations. As an example of residential architecture, it shows the influence of the Low Countries on the early American Colonists. (For general plan of the Governor's Palace, approaches gardens and park, see page 382.)

The Governor's Palace (Building No. 47)

Photographs © F. S. Lincoln

Revolutionary Burying Ground in Palace Gardens

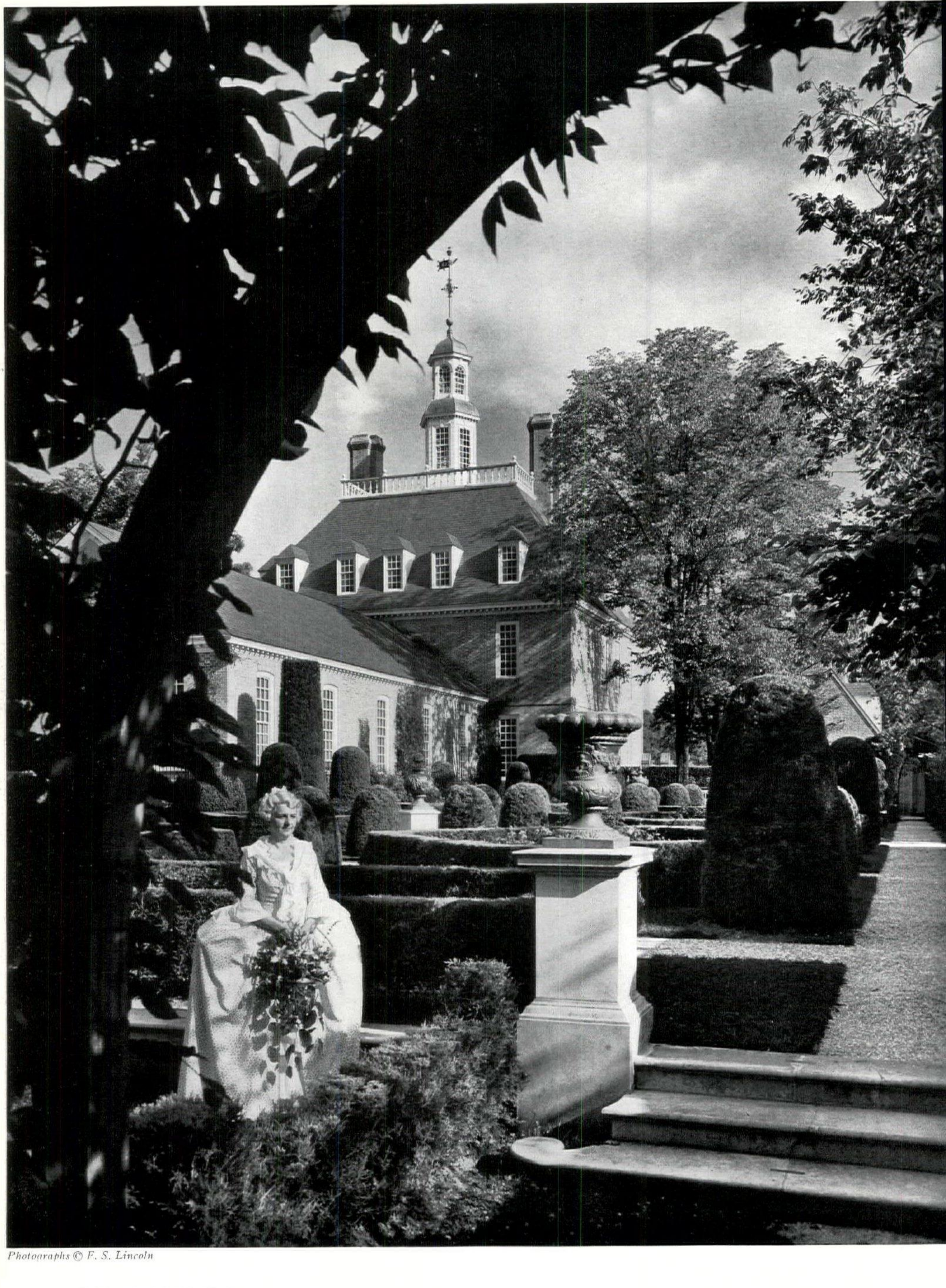
Palace Green as Seen from the Palace

Photographs © F. S. Lincoln

At East Wall of Palace Garden, Looking South

Formal Garden Seen from Roof of Palace

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS



Photographs © F. S. Lincoln

At West Wall of Palace Garden, Looking South

Ball Room Wing of Palace Seen from Northwest

Photographs © F. S. Lincoln

North End Ball Room Wing of Palace

Detail of Gable of Ball Room Wing

Photographs © F. S. Lincoln

Palace Kitchen and Scullery Seen from Canal

Canal Steps and Terraces in Palace Gardens

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

Photographs © F. S. Lincoln

Kitchen Garden Seen from Kitchen

Outbuilding in Kitchen Garden of Palace

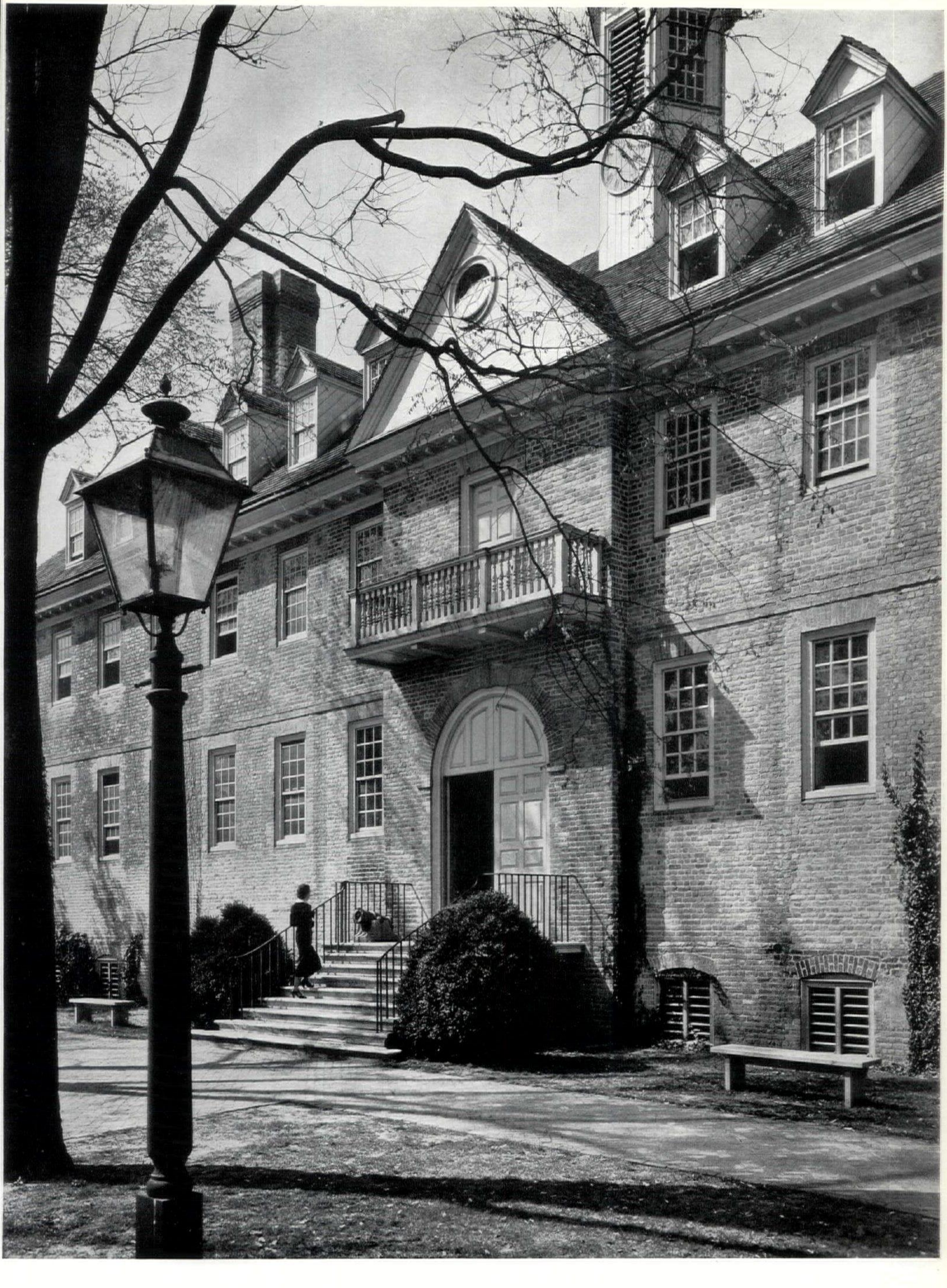
Photographs © F. S. Lincoln

Detail of Fireplace in Hall of the Palace

Interior of the Palace Kitchen Building

Photographs © F. S. Lincoln

College of William and Mary—Botetourt Statue



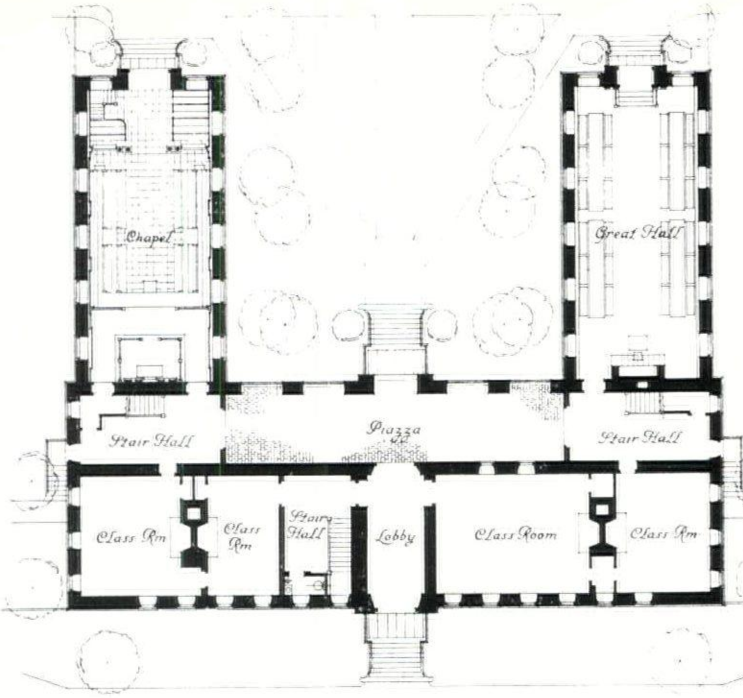
The Wren Building (Building No. 1)

Photographs © F. S. Lincoln

Interior of Chapel in the Wren Building

Interior of Great Hall in the Wren Building

The Wren Building is the oldest academic building in America and the principal building of the College of William and Mary. In the course of its extensive history it has been called "The College," "The Great Building of the College," "The Main Building," and "The Sir Christopher Wren Building." The foundations were laid in 1695. The building was damaged by fires in 1705, 1859 and 1862, but the outside walls are largely original. . . . The present building is an adaptation of the original design by Christopher Wren. The plan shows the central stair hall in its original position; the two end stairways, which conform to the law governing fire exits, were not in the original building.



Photographs © F. S. Lincoln

Blue Room in the Wren Building

Early known as "The Brafferton" and later as "Brafferton Hall," this building was erected in 1723 with funds contributed by the executors of the estate of the Honorable Robert Boyle of England. The endowment, consisting of the income from Brafferton Manor in England, was used not only for the construction of the building but also for the support of an Indian school to be conducted in it. This school, though not particularly successful, continued up to the period of the Revolution. After the Revolution the building was used for other purposes by the College of William and Mary. The Brafferton Building has never been damaged by fire, but from time to time it was altered and repaired. It has been restored.

Brafferton Building (Building No. 2)

Photographs © F. S. Lincoln

The first Colonial court house was built on this site (No. 79 on Guide Map) in 1715. It was superseded by the Court House of 1770 which still stands on the Duke of Gloucester Street (No. 34 on Guide Map). A new building of Colonial design has been erected on the original site; it serves as a Court House for James City County and as a City Hall for Williamsburg. The old foundations and a chimney, which were all that was left of the original structure, have been incorporated in the new group. . . . The Court House of 1770, though damaged by fire in 1911, continued in use up to the time of the Williamsburg Restoration. It now contains the Restoration Archaeological Exhibit. Columns were originally intended for this building but were never installed; for the sake of authenticity they have been omitted in restoration.

Original James City County Court House (restored)

Williamsburg-James City County Court House of 1770

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

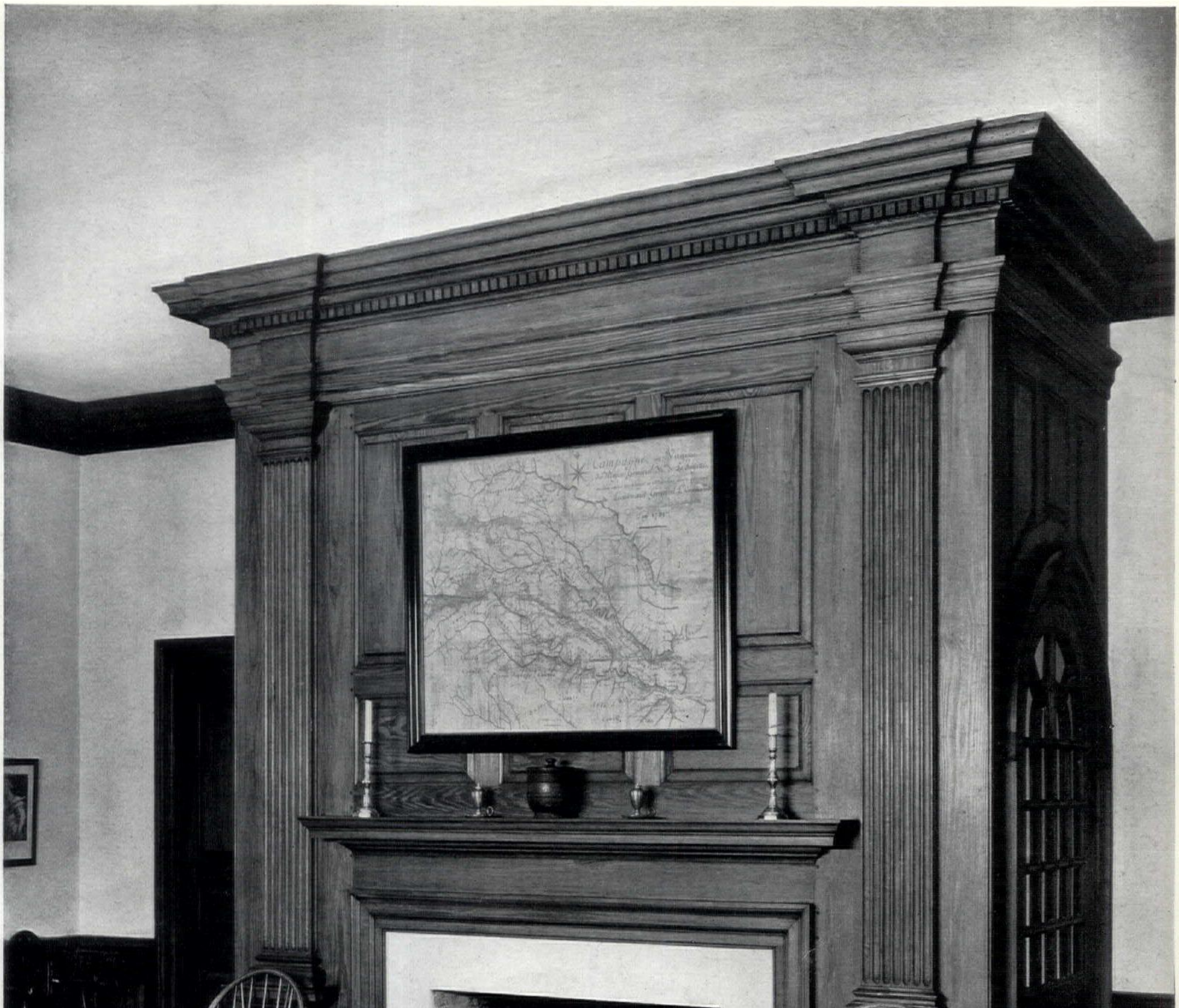
Photographs © F. S. Lincoln

Building on East Flank of Original Court House

Raleigh Tavern (Building No. 27)

Photographs © F. S. Lincoln

Apollo Room in the Raleigh Tavern



Dining Room in the Raleigh Tavern

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

Photographs © F. S. Lincoln

Daphne Room in the Raleigh Tavern

Detail of Fireplace in the Daphne Room

Photographs © F. S. Lincoln

Kitchen of Market Square Tavern (Building No. 16)

Stable Yard of the Market Square Tavern

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

Photographs © F. S. Lincoln

Fireplace in Great Room of Market Square Tavern

Taverns and inns were numerous in Colonial Williamsburg, being necessary to accommodate the many visitors who flocked into the city when the assemblies were held and the courts sat. . . . The Raleigh Tavern, erected prior to 1742, was the outstanding hostelry of its day. It was destroyed by fire in 1859. It has been restored upon its original foundations as originally designed. . . . The Market Square Tavern was built by John Dixon about 1749. At first it served as a residence and shop, but was later enlarged and became a tavern. It has been used continuously as a tavern and still serves this purpose.

West End of Great Room in the Tavern

Night View of the Travis House (Building No. 13)

The Travis House was moved bodily to its present location and restored upon the foundations of a Colonial house which had disappeared. The building, which originally stood on the northeast corner of Francis and Henry Streets, was presented to the Williamsburg Restoration by the Eastern State Hospital. It was erected on its original site in 1765 by Colonel Edward Champion Travis, who was a member of the House of Burgesses for 25 years. The foundations on which the Travis House now stands (fitting remarkably accurately) are those of a house owned by John Greenhow, a wealthy merchant of Williamsburg in the last half of the 18th Century.

Looking East on Duke of Gloucester Street

The Semple House (opposite page) was owned in 1799 by Judge James Semple, who represented Williamsburg in the House of Delegates of Virginia. He was a judge of the General Court and a professor of law at the College of William and Mary. The property continued in his ownership and that of his heirs until 1850. The house has been restored.

Photographs © F. S. Lincoln

A Dining Room in the Travis House

The Semple House (Building No. 64)

RESTORATION OF WILLIAMSBURG
PERRY, SHAW & HEPBURN, ARCHITECTS

Photographs © F. S. Lincoln

The Ludwell-Paradise House (Building No. 3

Erected about 1717 by Col. Philip Ludwell, II

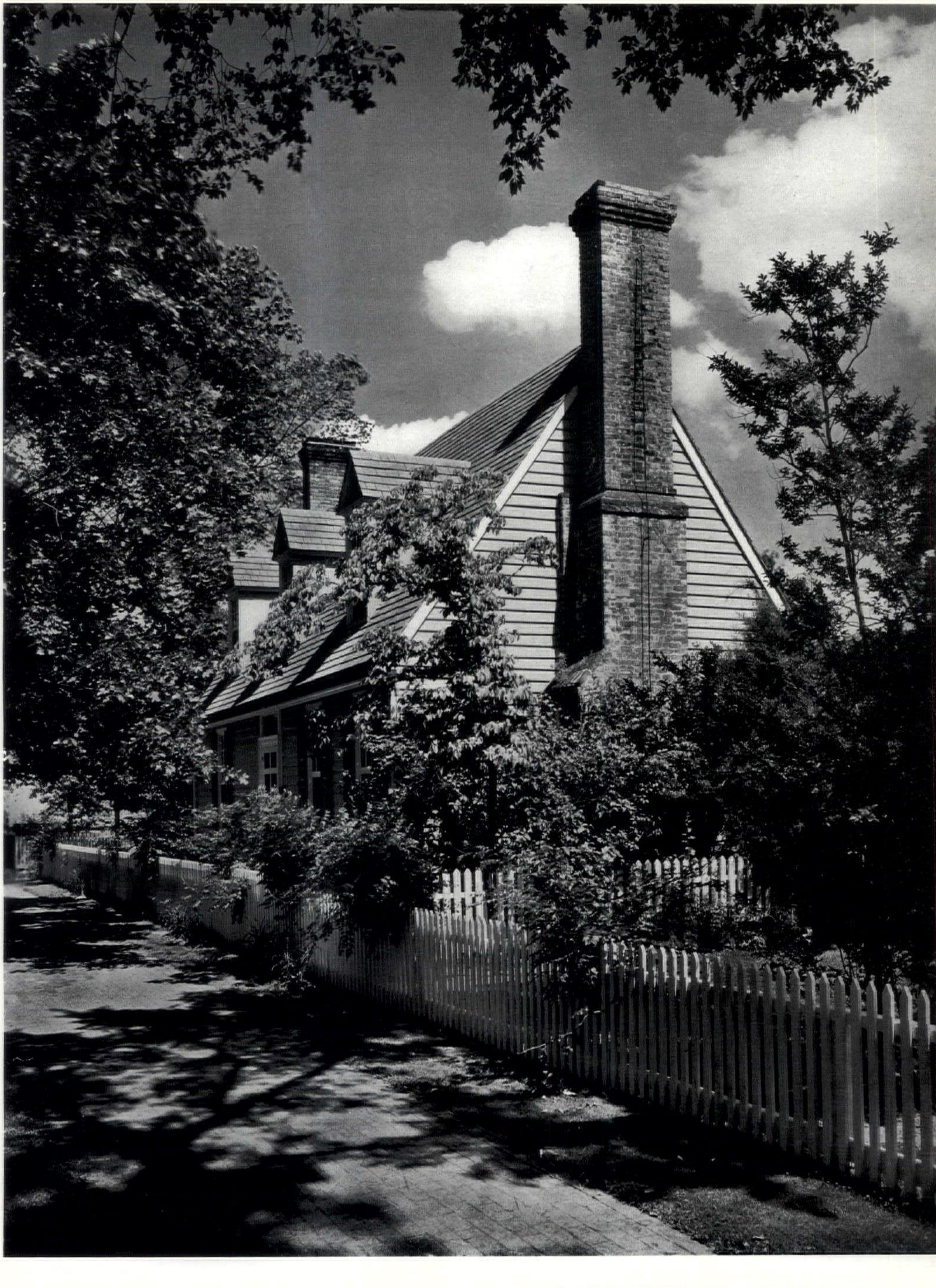
Photographs © F. S. Lincoln

Kitchen of the Ludwell-Paradise House

Purdie's Dwelling (Building No. 21)

Photographs © F. S. Lincoln

Kitchen of the Kerr House (Building No. 22)



Captain Orr's Dwelling (Building No. 18)

Photographs © F. S. Lincoln

This house was built about 1788 by St. George Tucker, who succeeded George Wythe as professor of law at the College of William and Mary. He was an accomplished author in the fields of law and letters, and for his legal works was called "the American Blackstone." His descendants continue to live here. The house has been restored.

The St. George Tucker House (Building No. 51)

Entrance to St. George Tucker House

Photographs © F. S. Lincoln

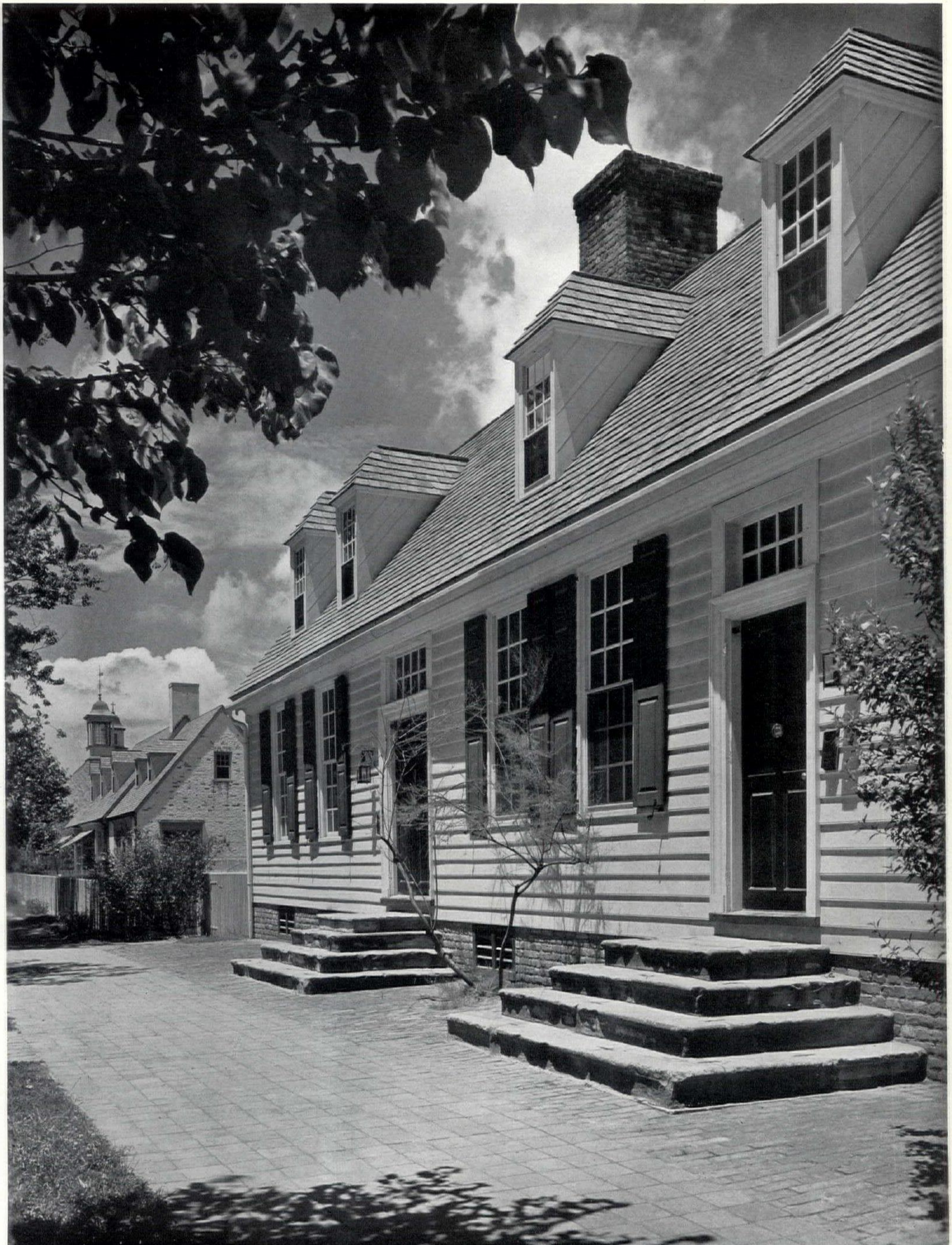
The Coke-Garrett House (Building No. 57)

This house was owned about the middle of the 18th Century by John Coke, a silversmith, goldsmith and jeweler. Its garden served as a landmark in the court records for York County. Soon after the Revolution, the house came into the possession of the Garrett family, and continued in their ownership until recent years. It has been restored.

Coke-Garrett House View from Garden

Photographs © F. S. Lincoln

Ayscough's Shop on York Road (Building No. 63)



The Blair House (Building No. 39)

Photographs © F. S. Lincoln

The Sign of the Golden Ball (Building No. 28)

Post Office in Group of New Shops (No. 42)

Above: Davidson Shop (Building No. 29) — Below: Teterel Shop (Building No. 30)

Photographs © F. S. Lincoln

PAINTS, FURNITURE AND FURNISHINGS

By MRS. SUSAN HIGGINSON NASH

¶ THE ACTORS in the Colonial scene have gone. But this does not mean that the restoration of their surroundings must therefore be devoid of life. The problem of re-creation of the interior of the buildings is solved in direct proportion to the success achieved in producing an effect of continued life, and of settled repose.

On the care with which furniture and furnishings are chosen, with which they are related to one another, and with which their character and scale are studied to produce the effect of momentarily interrupted use, depends the success of the effort of interpretation.

The background of this interior scene is made up of the wall treatments, hangings, window treatments and the vistas from one room or hall to another. The wall treatments in Williamsburg include full paneled walls, plastered walls with and without dados, and in some cases walls covered above the chair rail with paper, leather or fabric.

The color and texture of this background give it meaning, life and variety. Thus, the study of this color and texture must precede execution and be so considered that it shall include the scheme of the foreground, and the scheme of sequence from room to room.

It is impossible to place too great emphasis on the importance of the proper handling of this color and texture in the effort to produce effects that are essential to authenticity. The successful application of modern paint to simulate old paint depends upon many factors. Of these, the first is the matter of the pigments themselves.

In Colonial Virginia, the painter's range in choice of colors was restricted. In comparison with the wide range at his disposal today, the painter could depend only upon such pigments as those mentioned in the informative papers of William Allason, a wholesale merchant of Falmouth, Virginia, 1760-1790. Allason's numerous orders to his London and Glasgow merchants are definite proof of the pigments available then. For example, he lists as sold to one of the various people:

Linseed Oil
Fig Blue
I Bble. Lampblack
1 Cask Spanish Brown Paint
1 Cask of White Lead
Prussian.

In his "invoice book" are listed from time to time such inventories as the following:

On hand—Copperas, 16 pounds
Indigo
Light Blue
Chalk
10 Casks White Lead
1 Cask Red Lead
1 Cask Spanish Brown
Red Paint from Maryland
Linseed Oil 10 gall."

As well as many repetitions of these same paint ingredients, and a few others.

The use of these paints as staple commodities is established by the facts—first, they were ordered and re-ordered; second, they were advertised for sale; and third, by their actual sale as attested by their existence upon the buildings that have survived to this day.

The recent generous loan to the Restoration of the papers of John Norton and Sons of London and Virginia, by their owners, Dr. and Mrs. Hatley Norton Mason, brings to light a letter from John Page, Jr., of Rosewell, in 1771:

"As my house is very much out of repair . . . I shall . . . be much obliged to you if you will send me the following articles . . .

100 lbs. White lead
20 lbs. yellow ochre
A Barl of Oyl
20 lbs. of Venetian Red
2 gallons of Spts of Turpentine
5 lbs. of Red Lead
3 lbs. Lamp Black
2 lbs. of White Coperass"

There is also an invoice to Littleton Savage, merchant, Northampton County, Virginia, September 4th, 1772:

"20 lb. Fig Blue
6 lb. Indigo
400 lb. white lead in Oyl
3 Ct. Red Lead
2 Ct. Spruce Yellow
2 lb. Lamp Black
100 gals. Linseed Oyl
2 lb. Spanish Whiting
2 lb. Prussian Blue (dry)
28 lb. Allom
28 lb. Copperas"

William Beverley sent to England for the following*:

"July 24, 1739—

10 gals. Linseed Oyl in a jarr

½ Qt. Wte Lead

¼ Qt. Red Lead

½ Qt. Spa Blue

"As much paint of a deep olive col[r] ready ground with linseed oyl as will paint 200 yds. wainscott."

On May 22, 1752, the *Virginia Gazette* carried this advertisement:

"Just imported . . . by the subscriber in Williamsburg, a fresh assortment of drugs and medicines, oil of turpentine, copperas, Prussian Blue, Red and White Lead, Verdigrease, Yellow oaker, Spanish Brown and Umber Paint, Vermillion, Linseed oil, gold leaf, Dutch Metal. . . ."

And on October 17th, 1776, the following:

"To be sold . . . two dwelling houses, kitchen, storehouse, dairy and meat house, all painted with ochre. . . . "

¶ JUST AS the architects have attempted to place themselves in the position of the original builders and to act as proxies for them, I have tried to adapt my experience with colors to the usages of Colonial times and to learn from documents and actual examples as much as may be gleaned from them. The judgment and taste of the Colonial painters are as apparent as the same qualities in the craftsmen builders. They achieved harmony and contrast and used their colors meaningly with a full comprehension of fitness. The colors themselves had fine body and lasting quality, as evidenced by the existing examples at "Ampthill," "Wilton-on-the-James," "Sarah's Creek" or "Little England" on the York, and many other places in Virginia. They possessed vivacity and vitality. The salient characteristic of the earlier colors is the intensity of tone. They were often used in their pure form (especially the ochres and reds), but a great variety of colors resulted from the mixing of the pigments and the use of lampblack.

Often only one coat of paint was used on woodwork and, as at the Ball Room at Ampthill where care would naturally be exercised, it has been thought to be sufficient even until today. This coat could not be considered, therefore, as a primer. It was used with a decorative intent in mind. Few of us have patience today to wait for the years to pass that are required to age both the paint and the woodwork to the mellow tones which we admire so much today. The appearance of one coat on the wood that is procurable today is not that of the one coat on the fine old woodwork of these houses.

At Williamsburg, it has seemed wise not to attempt to produce an aged effect of painted surface by artificial means. Time only will mellow and soften the color of painting that is done with well selected, well mixed paint, well applied upon a prepared surface.

Time for deliberate application of paint is most essential. Haste has spoiled more paint jobs than any number of poor painters or poor ingredients. Nor should interior paint be applied until the work of the other trades is completed. Dust clinging to fresh wet paint produces in the very beginning that quality which is least excusable—a dirty or "muddy" appearance.

Certain of the early paints have the quality of stains and are only recognized as paints by analysis—despite their appearance and deeply penetrating effect on woodwork. Again, the texture of many old paints presents a baffling problem until it is understood that the early colors were ground and mixed by hand and that, whether applied with water or oil, they dry out with an interesting surface that is more crude than that procurable otherwise.

The best way, therefore, to simulate the old effect has been found to repeat the methods of Colonial painters and to reproduce their materials as closely as possible. These methods include overlays of successive colors, sometimes, of course, as dictated by fashion from time to time. The result of these overlays is often startlingly beautiful—a result that seems procurable by no other method. The sequence of successive over-painting has naturally followed usage and one finds generally a first coat of gray green or of red ochre or Spanish brown, and superimposed coats of blues, yellows, greens, grays and, finally, pastel shades and white. It is unsafe to generalize—if one did so one would classify white as a treatment appropriate only to later work; no such error should be made. The balustrade of the original Slave Gallery of Bruton Church is white today. Originally it was red. During its life it has been painted alternately white and red eight separate times.

Allowance for change is perhaps as important a consideration as any other and one which demands a tax upon one's judgment.

Firstly, in examining existing color it has been found that the color must have greatly changed since its application. Soil, cleaning, oxidization and overpainting can alter a tone very greatly. Secondly, reproduction of the color must be done with an estimate in mind of the change that will take place in it as the years go by.

No paint surface in the exhibition buildings at Williamsburg has resisted this inevitable process. In the four or five years since the application of the first of them, the change in tone and texture has been noticeable. It is hoped that visitors may find that the mellowing process is under way.

No amount of modern effort or of chemical skill has yet been able to give the superb effect of the paint surface that has been exposed to years of liv-

*New York Public Library, Manuscript Division.

ing, to strong light and deep shadow, to soiling, cleaning, handling, which one finds in the rooms at Marmion and Ampthill.

The last coat, being the one which the observer believes that he sees, is the coat which must be considered most for texture and durable quality. This coat may be the last of successive coats of the same color. It may contain more varnish than the others or not. It may, on the other hand, overlay colors that are not its exact counterpart. The observer will then wonder, perhaps, how the effect is produced, whether the coat is a thin one and transparent.

All in all, a fascinating problem is there to be solved in every opportunity to simulate the effects produced by the early painters in Colonial Virginia. Whether they were conscious of their craft tradition and attempted special effects for special purposes is debatable. They must have realized, however, that they were producing a background for the furnishings and the life of the owners—for they followed fashion as strictly as did the dressmaker, tailor and wigmaker.

They have proven their conception of fitness and may have yearned to use paint more lavishly than its value and price permitted. They knew that contemporary London was following the French fashion in building up many coats, each one carefully rubbed and prepared for its successor. Their conception of fitness precluded the use of certain colors in certain places and suggested those that would be appropriate. The wing of the Capitol which was to be used by the Burgesses was to be trimmed out with wainscot color. The wing to be occupied by the Council and General Court was to be "painted like marble."

Today one attempts to apply this sense of fitness to the re-creation of the Colonial background. A green suitable in the Raleigh Tavern might not be suitable in any of the rooms of the Governor's Palace. A color or tone of color suitable for moulded woodwork, where intensity of light and shade varies in each part of the room, is seldom suitable on flat unbroken surfaces. Here the reflection of light from objects or surfaces outside the building brings its influence to bear upon the selection of color and its application. The reflections from buildings, brick walls, trees, are all absorbed by responsive paint colors carefully chosen.

It seems wise always to choose and to mix a color in the room in which it is to be used. Colors seem to grow, and only gradually, as a combination of reflections of light and of reflected light. They rebel at abuse and at unskillful blending.

¶ IN THE RESTORATION of the furnishings of a building it is important to keep certain thoughts in mind to assist one to overcome the temptations which one feels at times, either to acquire an object for its own sake or to attempt some decorative scheme of interest simply because the means seem ready to hand. One of these thoughts is that furniture and furnishings which are rare and valuable today were more commonplace and only comparatively valuable then. Another is that in the course of their lives all houses and buildings become repositories for objects of many periods and styles, and of varying intrinsic and artistic merit. Another is that pieces which are most rare today are so not only because of their comparative antiquity, but because of the inevitable discount at which they were held as fashions changed, a discount which resulted in the destruction of most of them.

One would be interested today to appraise the present value of the pieces that had been relegated to the Cook's Chamber at the Governor's Palace in the time of Lord Botetourt, 1768-1770.

Cook's Bed Chamber:

Field bedst. 2 Matrasses, 3 blankets, 1 Quilt, 1 Bolster & pillow Red check Curtains
1 Round mahog^{y} table with leaves
1 d^{o}. d^{o}. Tea d^{o}.
1 Green easy chair with green cover^{g} & cushion
1 Arm Chair—leather bottoms
6 Mahog^{y} chairs Hair bottoms
1 Walnut Desk
3 Pr. red check'd window curtains
2 pokers, 1 Fender, Tongs, Shovel & hearth brush
1 dust pan hang^{g} trivet
1 Copp^{r}. tea kettle
15 Prints, 2 Teapots, 3 Cups & Saucers
1 Sug^{r}. Dish & 2 bottles of Staffordshire ware
2 Black japann'd Canns
7 Canisters, 1 Sieve, 1 Basket
6 Artificial flowers
1 glass tumbler

Obviously an inventory must be considered in the light of the date that it was taken. Hence, if 1770 be the date at which the last inventory of the possessions of the landlord of the Raleigh Tavern was made, one must eliminate from one's mind all idea of replacing the pieces that are mentioned with pieces of later date than 1770. If the Tavern, however, persisted beyond that time, other later presumptive pieces may be added. If the Palace burned in 1781, obviously no pieces should be introduced into the building that postdate 1781, under any circumstances. Obvious as these matters seem, it is not wholly simple to observe them.

Vessels of large burthen plied the Virginia waterways, picking up bulky cargoes of tobacco in hogsheads at the landings and public warehouses. These vessels on their return to Virginia had ample space for articles of English manufacture, from coaches to White Chapel needles. The shipping rates were so favorable to the Virginia tobacco planter that his natural incentive was to purchase articles made in England rather than to engage in domestic manufacture.

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INTERIOR VIEW OF DINING HALL IN THE RALEIGH TAVERN

Interchange of goods between the colonies, however, included furniture among many other things, as is attested by the following:

Virginia Gazette, September 5, 1766—
"July 15, Polly, William Douglass, from Rhode Island with . . . 4 desks, 6 tables, 24 sugar boxes, 24 wooden bowls, 4 doz. house chairs, &c."

Moreover, the existence of fine pieces made of Southern woods and of an engaging character all their own bears witness to the patronage given to many cabinet makers of Williamsburg and elsewhere by their fellow townsmen. These artisans found a prosperous trade in making and repairing fine furniture.

Virginia Gazette, July 25, 1776—
"B. Bucktrout, cabinet maker, from London, on the Main Street near the Capitol in Williamsburg, makes all sorts of cabinet work, either plain or ornamental, in the neatest and newest fashions. . . . "

Virginia Gazette, January 8, 1767—
"Mr. Anthony Hay having lately removed to the Rawleigh Tavern, the subscriber has taken his shop, where the business will be carried on in all its branches. He hopes that those gentlemen who were Mr. Hay's customers will favour him with their orders. . . . He likewise makes all sorts of Chinese and Gothick paling for gardens and summer houses.
N.B. Spinets and Harpsichords made and repaired.

Benjamin Bucktrout"

Thus, English furniture, and Colonial pieces from both the North and South, may be seen in the restored buildings. Also, it will be noted that while each antique piece is selected for its authenticity, form, condition and color, it is not necessarily chosen as the best obtainable or rarest of its kind, and certainly not as the most elaborate. It is chosen because it has seemed to be the most appropriate piece available for a particular place and because it con-

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DETAIL OF DINING ROOM FIREPLACE IN THE RALEIGH TAVERN forms to an inventory or requirement. The same observations apply also to all forms of furnishings, from carpets, curtains, fabrics through lighting fixtures, candlesticks and Venetian blinds to utensils and accessories of every sort.

¶ INTERIOR PAINTING forms most of the background. The furnishings form a part of this background and most of the foreground. The people in their daily life complete the picture. The picture is the setting for events whether important or unimportant. But the setting is always important.

Interior painting and furnishing should therefore always be considered together as interrelated and both as related to the costume or dress and habits of the persons who will use the rooms.

The ladies of Williamsburg in their Colonial dress seem accustomed to the buildings and the buildings to them. They seem to be pursuing, and are pursuing, the natural manner of their lives. The colors of the rooms and the furnishings of the rooms once harmonized, spring into being as they are so used, just as a music score becomes audible when played.

The invaluable information collected during the early visit to the Northern Tidewater with Mr. Coleman and the architects, as elsewhere referred to, laid a basis for further intensive study. The owners of the great houses in the neighborhood of Williamsburg have been among the Restoration's greatest friends. I do not know how to thank them for the generosity, friendliness and interest that they have shown in helping us to solve the problems which they in turn have adopted as their own. As members of the Ladies' Advisory Committee they have joined others from Williamsburg, Richmond and elsewhere, also members of this Committee in practical and enthusiastic cooperation. Copies of the paint evidences have been procured at "Shirley" with Mrs. James Oliver's kind assistance, from "Ampthill" by the kindness of Mr. and Mrs. Hunsden Cary, from "Argyle" and "Sarah's Creek" on the York River by the kindness of Mr. and Mrs. Irving Campbell in the one case and Mr. and Mrs. Cutchins in the other. The owners of all the houses in Williamsburg placed everything at our disposal with the same eagerness that they still continue to feel and show. Scores of small outlying neglected houses (one must acknowledge the debt that one owes to the colored people for preserving so much in them) were visited and "depositions" taken in the form of samples. The architects' division of research and record, whose work is now carried on by Williamsburg Restoration, Incorporated, became the repository for source material.

On the many excursions, the frequent use of the ochres, greens and blues was established. Plaster walls were to be found as often whitewashed* as painted.

*Journal of the House of Burgesses—December 12, 1720: "Whitewashing the passage and private stairs and mending the plaistering in the Billiard Room. 1:5:0 Palace)."

Ledger of Humphrey Harwood—August 19, 1779: "To whitewashing 2 rooms at the Palace @ 36/ 3:12:0."

Wall paper, owing to the dampness at certain seasons, was seldom to be found.

In a word, the architects and I have tried to study and reproduce a balance of color, of furnishing, of texture and of lighting—with recognition of the pitfall that lies between awkwardness and ease, and we have endeavored to introduce that element of surprise which brings life to a room and to its occupants the contentment of understanding.

¶ THE PROBLEMS which presented themselves in the interior finish of the three principal restored buildings at Williamsburg are typical of the many problems encountered elsewhere in the city.

The College of William and Mary had been burned on three occasions. The Capitol had wholly disappeared, as had also the Palace after the fire of 1781.

College of William and Mary

At the College the "Blue Room" had become a tradition. The old Faculty Room had contained the portraits of James Blair, the first Commissary, of Thomas Boyle and others of merit and interest. The new "Blue Room" contains these same portraits fortunately—and is painted with a color that was found still to exist in early houses in Williamsburg.

The general character of the rooms is indicated by the letter from William to Edward Hawtrey, March 26, 1765:

"You have two rooms, by no means elegant tho' equal in goodness to any in the College unfurnished and will salute your eyes on your entrance with bare plaister walls. However, Mr. Small assures me they are what the rest of the Professors have and are well satisfied with the homeliness of their appearance, tho' at first sight rather disgusting. . . .

"You may buy Furniture there, all except bedding and blankets, which you must carry over; chairs and tables rather cheaper than in England. He says his Furniture consists of 6 chairs, a Table, grate, Bed and Bedstead, and that is as much as you'll want."

The furnishings of this building are reproductions taken from Virginia examples in some cases and from examples in contemporary colleges and schools in England. The Great Hall and Chapel are paneled in Edge Grain Pine and finished natural.

Governor's Palace

Fortunately there are records of two of the paint colors at the Palace during its early years:

Virginia Council Journals, May 2, 1727:

"And it is further ordered that the great Dining Room and Parlour thereto adjoining be new painted, the one of pearl colour the other of cream colour . . ."

Later, Robert Beverley wrote to Samuel Aphawes on April 15, 1771: "I observed that L[d] B. (Lord

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INTERIOR OF APOLLO ROOM IN THE RALEIGH TAVERN

Botetourt) had hung a room with plain blue paper & border'd it with a narrow stripe of Gilt leather w[ch] I thought had a pretty effect." He refers here (as other records affirm) to the Ball Room. Provision was also made for hanging a paper in the Supper Room over "Osanabrigs."

These keys open certain of the closed doors. Many other locks have to be "picked" where the key is lost, by instruments made up from the wealth of corroborative material at hand.

Leather was hung upon the walls of the Upper Middle Room at the Palace.*

If we may judge from the curious half timber framing of one of the rooms in the Carter-Saunders house next to the Palace, and by the evidence of a piece of linen fabric found tacked to this framing, leather paper or fabric was hung upon the walls of this room as well.

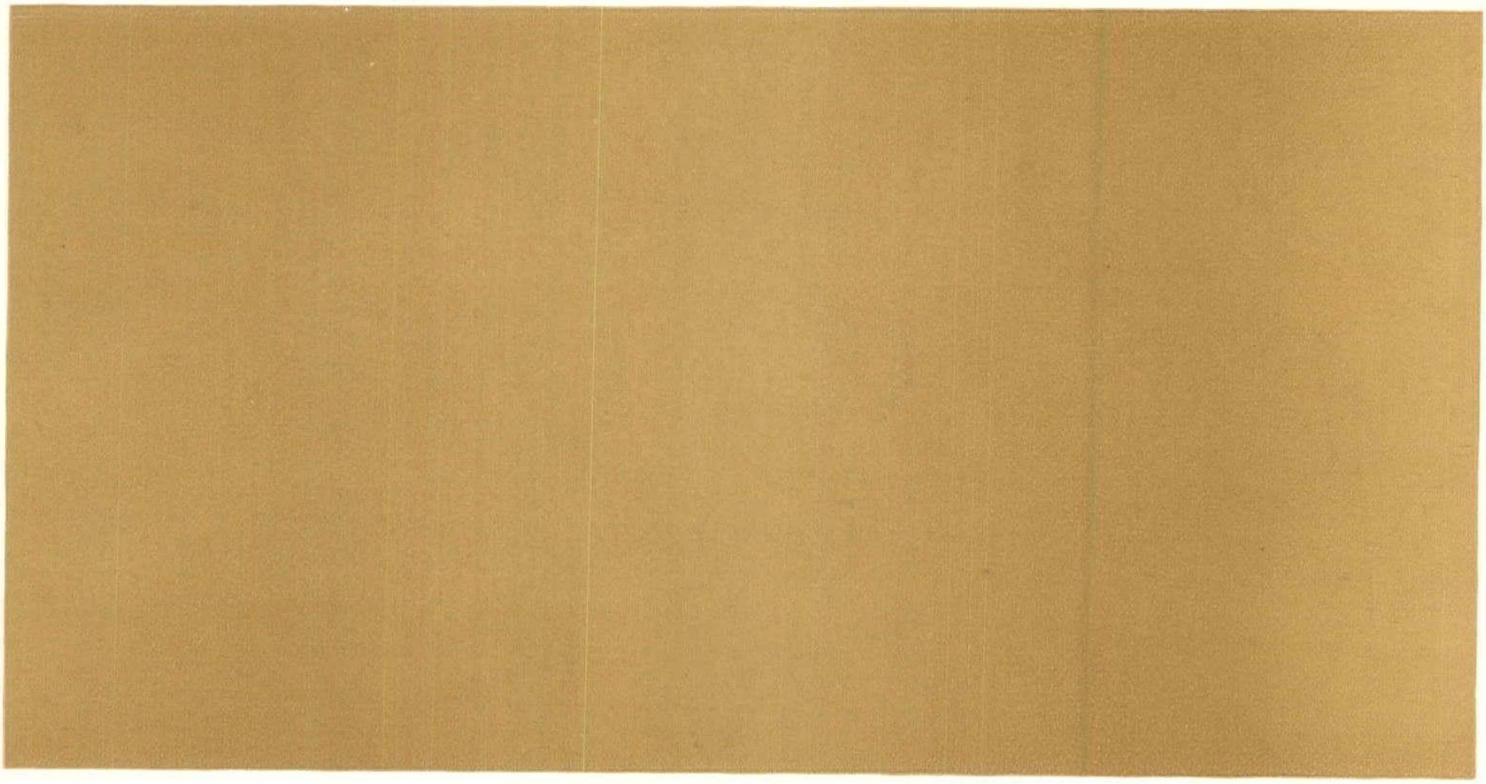
*Journal of the Council of Virginia—A Proposal of 1710: "That the great Room in the second story be furnished with gilt Leather hangings. 16 chairs of the same."

The furnishing of the Palace (at the present time incomplete) has followed the voluminous inventories of the various successive Governors, whose many household articles are enumerated at great length and in some detail. As early as 1710 are listed "3 dozen chairs, strong and fashionable," " 3 tables, large," "2 large looking glasses with the arms of the colony on them according to the new Mode," "4 chimney glasses," "1 Buffette, marble or sideboard with cistern and fountain to be provided in this country or sent for from Great Britain."

Later, in 1760 and 1770 are listed:

"7 mahogany chairs, 2 Venetian Blinds, 11 China Figures, Green Damask, 2 Card Tables Mahogany, 160 Musquetts, 2 Mahogany Chairs, red Damask, Elbow Chairs covered with checks, 4 mahogany chairs, leather bottom, 1 bird cage with balance weight, 7 card counters in 3 Damask Silk Bags, 1 Chest of Drawers oak, 1 wine press oak, 1 Dining Table, Mahogany large, 1 Table marble slab, 1 writ-

SAMPLES OF PAINT COLORS USED IN RESTORATION

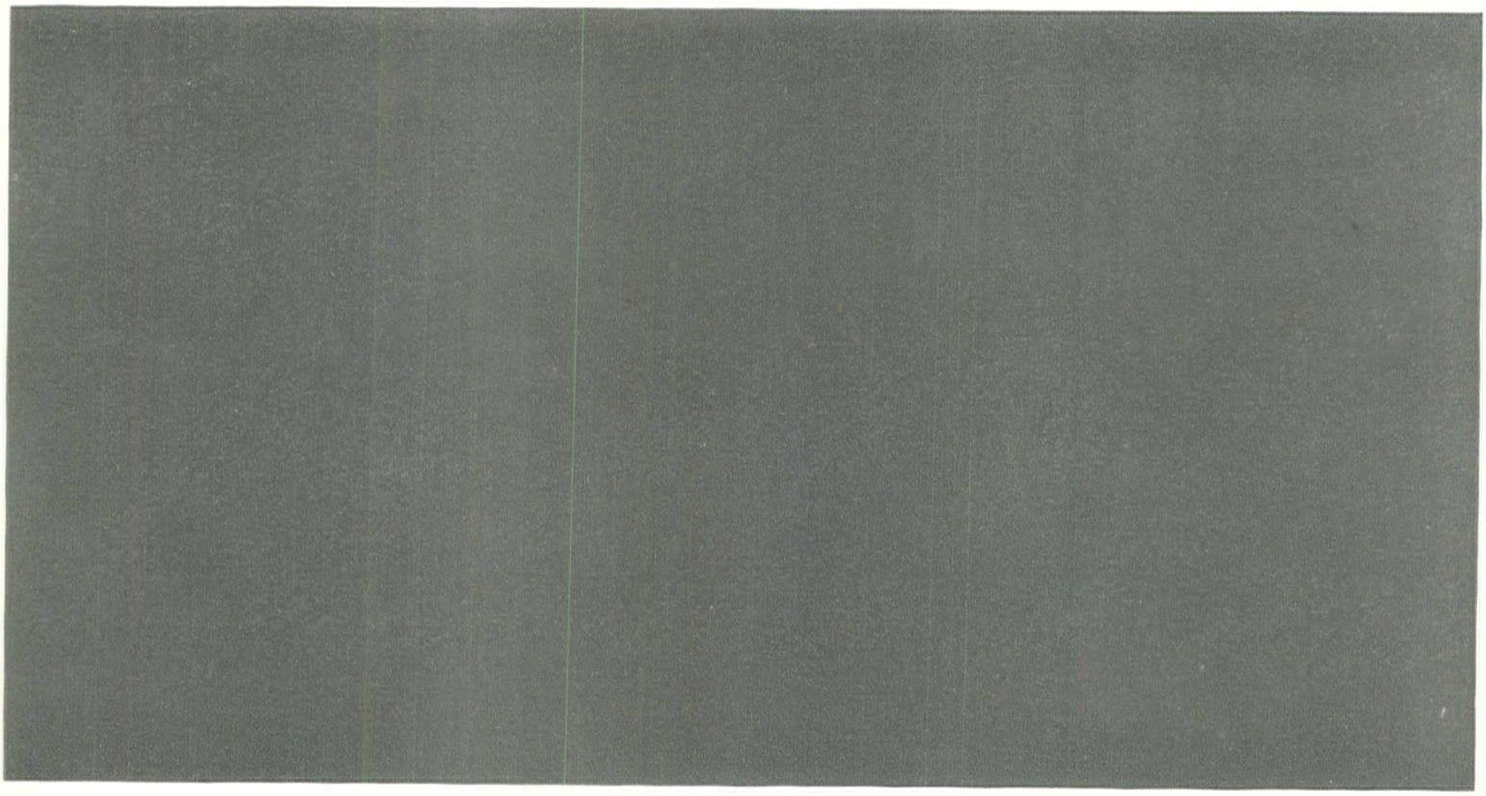


Panels in North Room, First Floor
GOVERNOR'S PALACE, EAST BUILDING

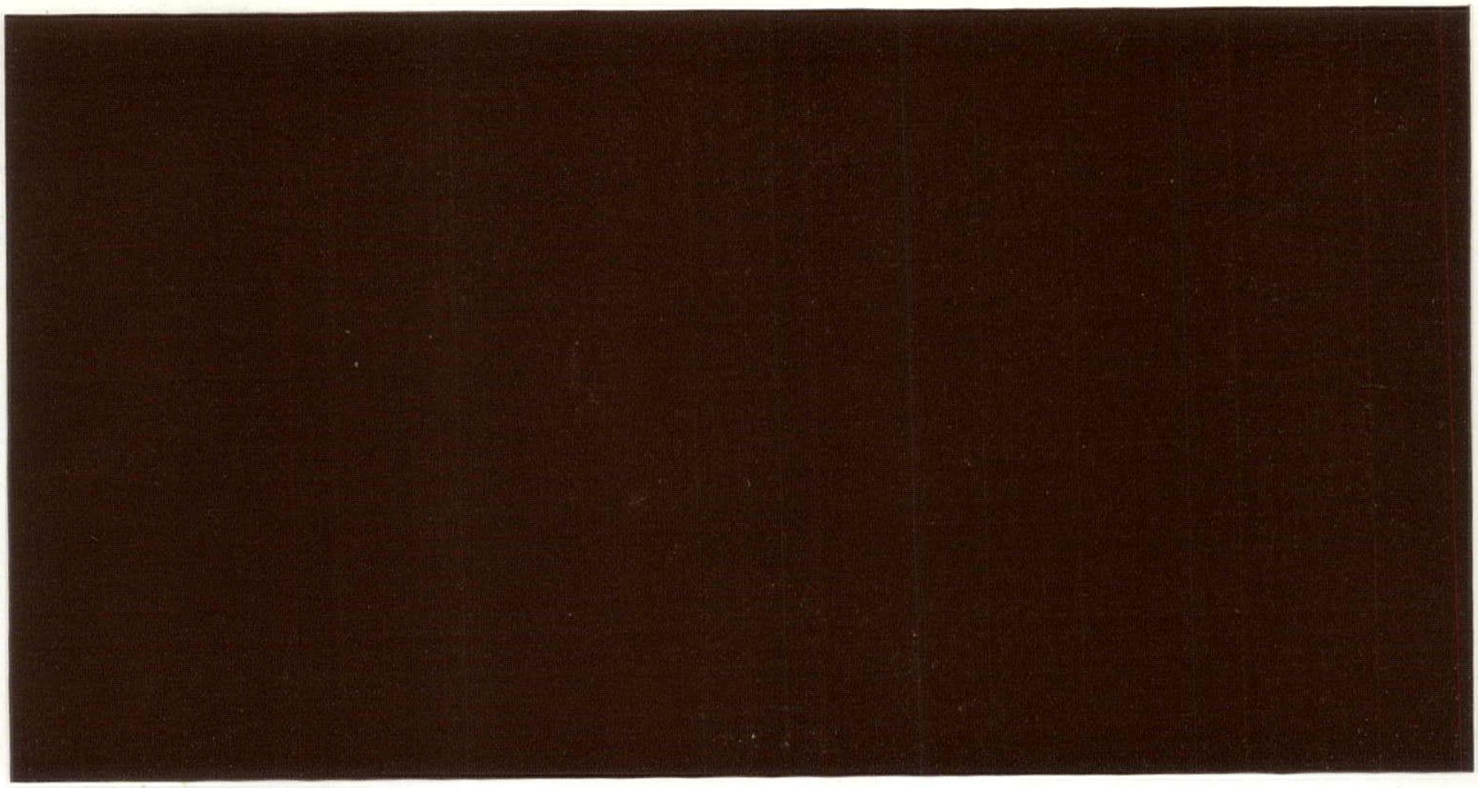
Yellow Ochre, Black, White Lead

RALEIGH TAVERN
Woodwork in Apollo Room

Flat Lead, Prussian and Ultramarine Blue, Ivory Drop Black, Van Dyke Brown, Raw Umber



OF ROOM INTERIORS IN COLONIAL WILLIAMSBURG

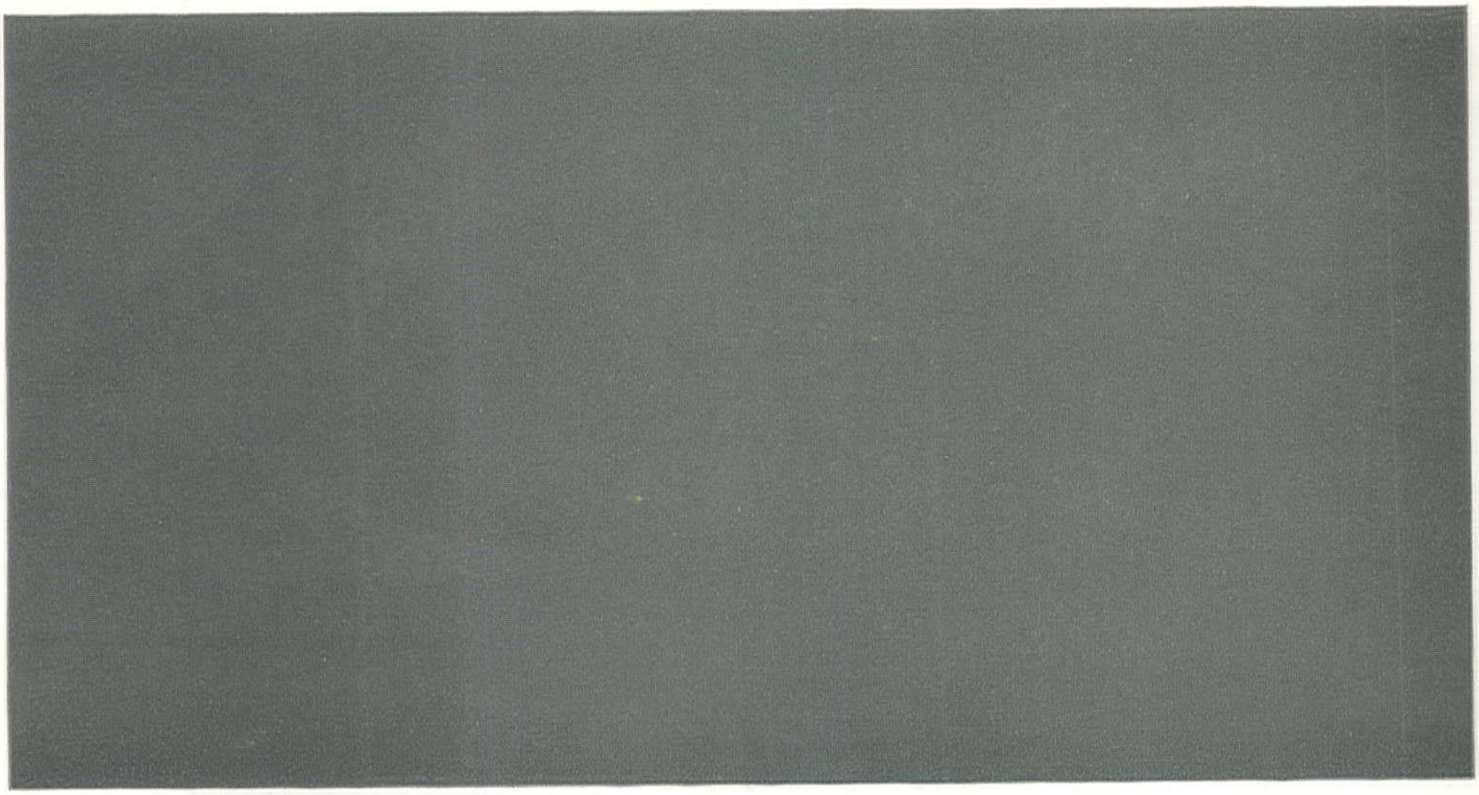


Indian Red, Raw Umber, Black, White Lead

Woodwork in Room No. 302
GOVERNOR'S PALACE

Flat Lead, Prussian and Ultramarine Blue, Raw Umber

ST. GEORGE TUCKER HOUSE
Woodwork in Parlor



ing table walnut, 12 chairs mahogany with hair bottoms, 1 lustre glass with twelve branches, 3 lustres, glass with 6 branches each, 1 bedstead oak with white calico curtains, 1 carpet for bed, 4 chairs green bamboo, 1 clothes press mahogany, suits of curtains, bedstead mahogany, 2 mattresses, 1 bolster, 2 pillows, 2 blankets white, 8 chairs yellow bottomed, 1 chest of drawers walnut large, 1 stand of shelves, 1 Wilton carpet, 6 Globe Lamps."

The choice of pieces has been guided by the voluminous inventories of the possessions of Governor Fauquier and Lord Botetourt and by the frequent mention of pieces purchased to add to the State-owned "Standing Furniture." These inventories list hundreds of items, even such inconsequential ones as the unconsumed food in the kitchen and larders.

The present "lustres" in the Ball and Supper Rooms and in the Upper Middle Room correspond almost exactly to the description of the originals and conform to the periods of notes. A burl olive wood secretary of the time of William and Mary has four brass escutcheon plates embossed with the lion and unicorn that are such exact counterparts of one excavated at the Palace that they are believed to have been made in the same mould.

Damask curtains are hung from antique carved crestings and from valance mouldings covered with curtain material, in accordance with the fashion of the middle of the century as indicated on prints and paintings. They correspond to the declaration of "Suits of curtains."

Raleigh Tavern

The Raleigh Tavern (begun c. 1735), one of the many inns and hostelries in Williamsburg, is brilliantly painted, and furnished in accordance with the probable taste of the innkeepers and the acknowledged records of their possessions as evidenced by the the wills of two of them—Henry Wetherburn and Anthony Hay. Contemporary evidence as to colors used in the Tavern is lacking except in regard to the colors of the Apollo Room, the woodwork of which was variously described as "lead" or "blue" and the walls "whitewashed."*

Henry Wetherburn and Anthony Hay, both well-to-do men** and keepers of the Raleigh during most of the years 1736 to 1771, offered excellent accommodations to the Burgesses and to their ladies, as well as to all other travelers who desired to pass a night in the City, and we find Wetherburn's Tavern in Williamsburg used as a standard of high merit by which comparison was made in 1751 by one George [Daniel] Fisher, a traveler, who upon his arrival at a tavern in Leedstown wrote:

*The Pictorial Field Book of the Revolution, by "Benson J. Lossing."

**"The ordinary keepers were at this time (1770) important men, and James Barret Southall had succeeded Anthony Hay in control of the Raleigh Tavern." (Williamsburg—by Lyon Gardiner Tyler, LL.D., page 57.)

"Anthony Hay was the father of the famous lawyer, George Hay, who married Eliza, daughter of President Monroe, who prosecuted Aaron Burr." (Williamsburg—By Lyon Gardiner Tyler, LL.D., page 234.)

"I put up at one Mr. T—s, esteemed the best ordinary in town, and indeed the house and furniture has as excellent an appearance as any I have seen in the Country, Mr. Finnay's or Wetherburn's in Williamsburg not excepted. The Chairs, tables, etc., of the room I was conducted into was all of mahogany, and so stuft with fine large glaized copper plate prints that I almost fancied myself in Jeffriess' or some other elegant print shop."

The inventory of the possessions of Anthony Hay, 1771, is worthy of careful examination. Mr. Hay had been a cabinet maker by trade and had acquired a considerable fortune. The furnishings of the tavern as enumerated in this inventory, supported by the reference from Fisher quoted above, indicate the high quality and extent of the furnishings of the best taverns at that time.

Consequently, the Raleigh Tavern has been furnished in such a manner as to afford a proper setting for such entertainment as is noted in the *Virginia Gazette* of February 26, 1779:

"On Monday the 22nd instant a very elegant entertainment was given at the Raleigh Tavern by the inhabitants of this City to celebrate the anniversary of that day which gave birth to General Washington."

And again, in 1780, on a similar birthday there was an "elegant Ball at the Raleigh . . . the entertainment was grand."

The windows have been hung with damask, chintz and printed linen. Mahogany and walnut pieces have been used to represent those listed in the inventories.* Prints of the twelve Caesars are to be found in the dining room and many other prints and maps have been hung upon the walls. As faithfully as possible, the Raleigh of 1935 is furnished according to the dictates and fashions and inventories of 1740-1800.

The Capitol

The definite instructions concerning the painting of the Capitol make this restoration the most inter-

*Wills and Inventories, Bk. 21, 24, 1760. Extract from the inventory of Henry Wetherburn, Tavernkeeper:

"1 dozen mahogany chairs
1 mahogany tea table
1 round table
1 oval table
1 large table
Desk and bookcase with glass doors
8 Day Clock
Pierglass
Chimney Glass
8 prints
1 dozen walnut chairs
9 leather bottom chairs
3 beds
10 maps
19 brass candlesticks, etc."

Wills and Inventories, Bk. 22:9, dated 1771. Extract from the inventory of Anthony Hay, Tavernkeeper:

"4 bedsteads
1 pine table
looking glass
1 chest
11 old prints (the Caesars)
3 white window curtains
2 beds and blue check curtains
2 silver punch strainers
glass lamp
6 silver punch ladles
2 pairs snuffers
2 four-foot square walnut tables
mahogany card tables
10 chairs, etc."

GENERAL COURT ROOM IN THE CAPITOL

esting of the buildings to Williamsburg from the point of view of color and the effect that it produces.

The House of Burgesses on May 10, 1705 "Resolved that the wanscote and other Wooden Work on the first and Second ffloor of that part of the Building where the General Court is to be painted Like Marble and the wanscote and other wooden work on the two first floors in the other part of the Building shall be painted Like Wanscote. . . . "

Evidences of marbleized woodwork are fortunately still to be found in Virginia. The most notable survival is the decoration of the well-known room that once stood in "Marmion" on the Rappahannock and now is to be seen at the Metropolitan Museum in New York. The paint samples which we made in this room with the kind assistance of Mr. Herbert Winlock, the Director, have served as guides for the decoration of the Council Chamber.

Other examples of marbleizing existed in Williamsburg—one of the most valuable, a baseboard in the Coke-Garrett house. "Argyle" on the York has also evidences that have served for the stair halls and the General Court.

These latter evidences are of later date than that of the building of the Capitol, but that such marbleized treatment exists there at all is indicative of the continuance of this early Scandinavian craft tradition.

It was probably through Holland that the fashion found its way to England and thence to Virginia. Contemporary examples of marbleizing are of interest. There are:

"*The Grange*"—Farnham Survey, 1710, wherein "The architectural features (of the Staircase) are treated in grisaille with enrichments in gold, but the fluted 'marble' pilasters are carefully colored and veined."

—Country Life, London, July 28, 1934, p. 90.

"*Blenheim Palace*" Oxfordshire, 1709, wherein "These great figure subjects with their framing columns, are represented as resting on a base painted in imitation marble. . . . "

Sir James Thornhill's house, 45 Deane Street, London, and *Belton Park, Lincolnshire* (c. 1685).

The *McPhaedris-Warner* house (before 1728) in Portsmouth, N. H., contains a dining room, the original painting of which simulated marble.

Weddillsborg Castle, in Denmark.

The *Maryland Gazette* of June 26, 1760, carries the following advertisement:

"House Painter . . . can imitate marble or mahogany very exactly. . . . "

The furnishing of the Capitol in reproduction has been done in strict accordance with the careful specifications of 1702-1722 as ordered by the Legislature. Large oval tables of specified size have been copied from examples in St. Paul's Cathedral Chapter House, London; in Herriot Hospital, Edinburgh, by the kind permission of the Dean of St. Paul's and the Governors of the hospital. Other chairs and tables have followed exactly examples loaned for copy through the generosity of their owners, Mr. Luke Vincent Lockwood, Trinity College, and the Wadsworth Athenaeum at Hartford, Connecticut.

The strict account taken by the representatives of the people in the expenditure of monies for the furnishing of this new important building is indicated by the many resolutions pertaining thereto, of which the following are two examples:

Journal of the House of Burgesses—Wednesday, June the 6th, 1722:

"That the Sum of thirty pounds . . . be laid out in providing the following particulars for the use of the Council and the General Court viz a Gown for the Clerk of the General Assembly, a Lustre for the Council Chamber, a Lustre of less Size, a large Glass Lanthern and four glass branches for the General Court and thirteen Cushions of Green Cloth and that the said Sum be accounted for to the next Assembly."

Journal of the House of Burgesses of Virginia, Friday, 9th April, 1703:

"Agreed—That the room be furnished with a large Armed Chair for the Speaker to sit in, and a cushion stuft with hair Suitable to it, and a table eight foot long and five foot broad. . . ."

THE

ARCHITECTURAL RECORD

INDEX TO VOLUME 78

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THE ARCHITECTURAL RECORD

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