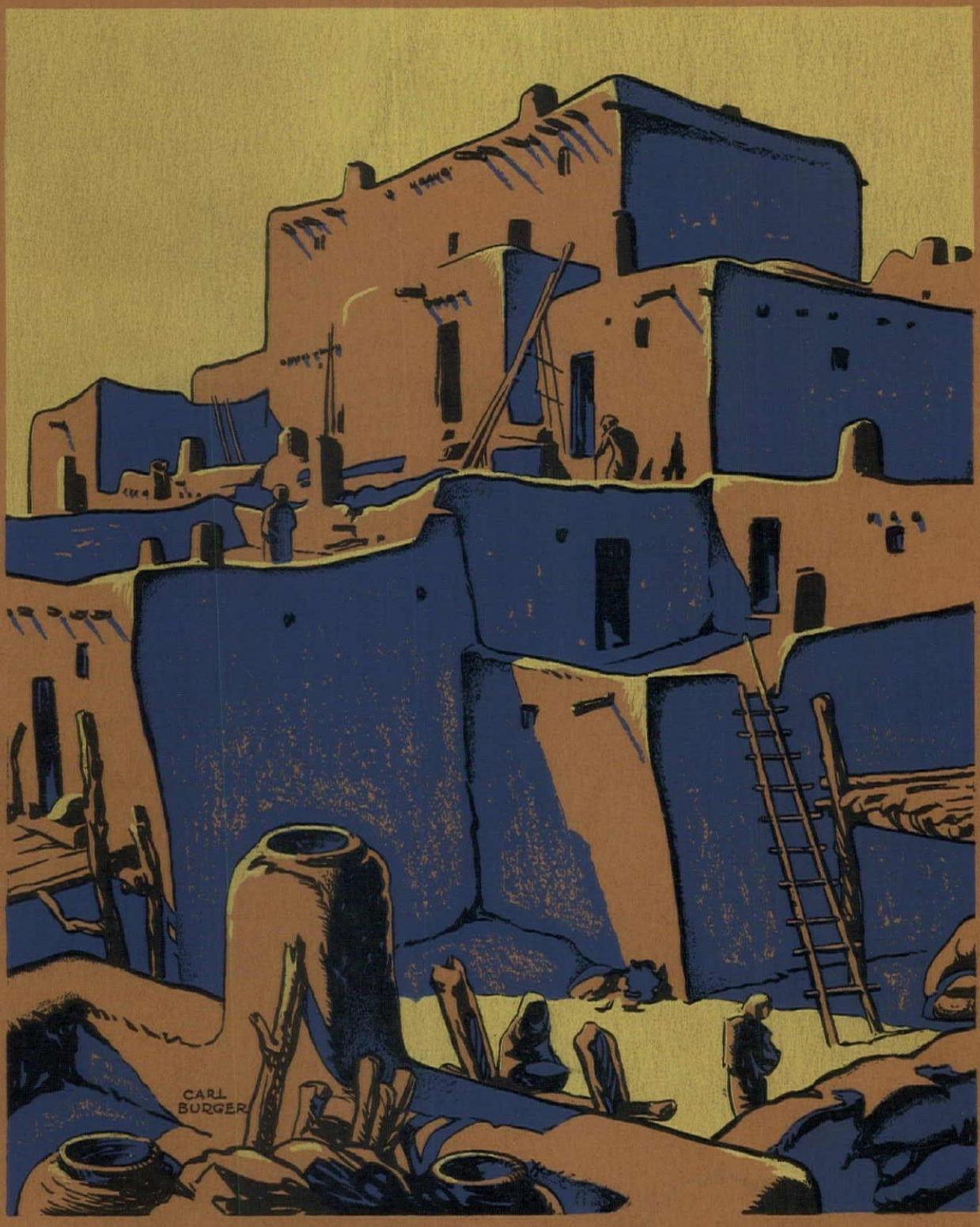

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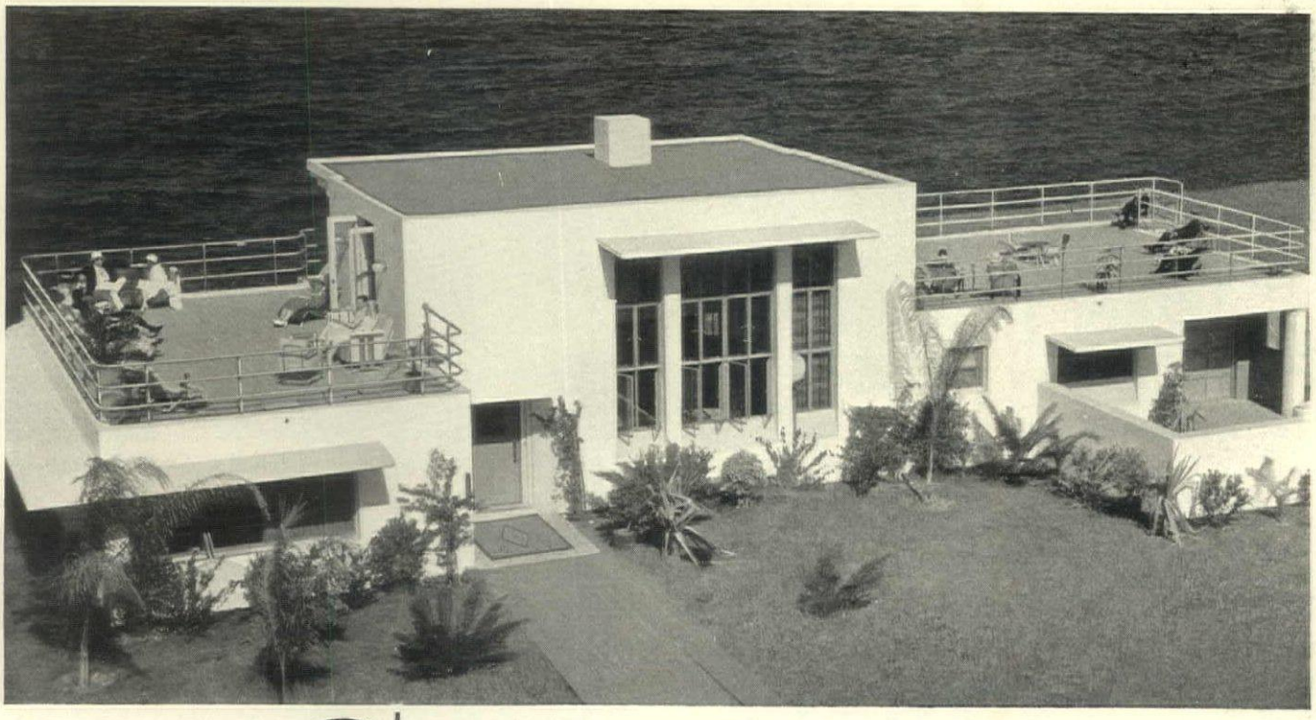

The Florida Tropical Home — built by the State of Florida. Robert Law Weed, Miami, Architect; James S. Kuhne and Percival Goodman, New York City, Associate Architects.

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Photograph of escalators in the new building of The Philadelphia Saving Fund Society

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OTIS ELEVATOR COMPANY

American Architect, published bi-monthly by International Publications, Inc., 57th Street at 8th Avenue, New York, N. Y. Yearly subscription, $1.50. Entered as second class matter, April 5th, 1926, at the Post Office, at New York, N. Y., under the act of March 3rd, 1879. Issue 2619, dated September, 1333.

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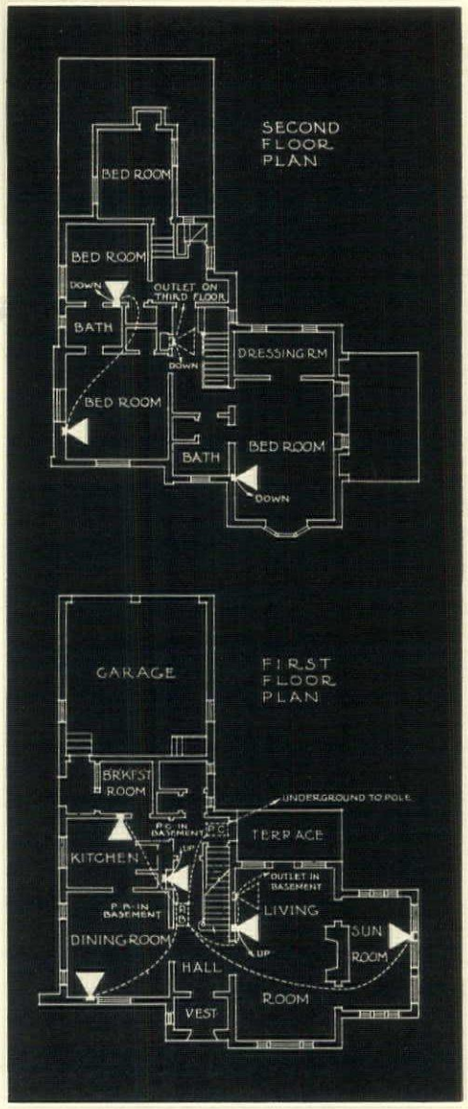

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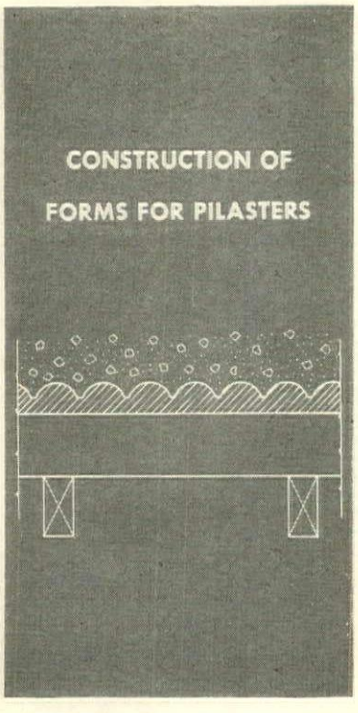

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VOLUME CXLIII

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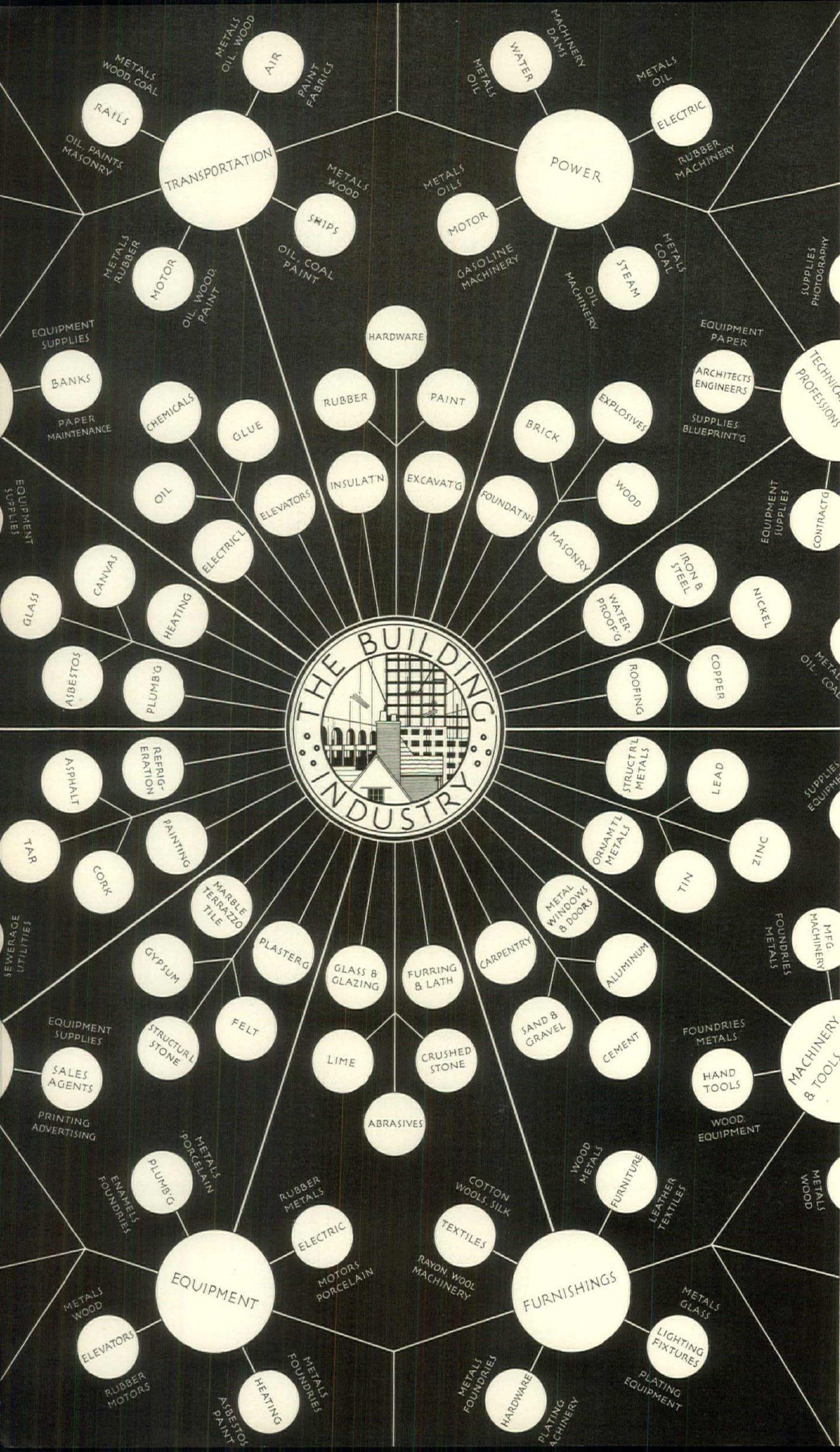

THE BUILDING INDUSTRY
TRANSPORTATION
RAILS
METALS WOOD, COAL
OIL, PAINTS, MASONRY
AIR
METALS OIL, WOOD
PAINT FABRICS
SHIPS
METALS WOOD
OIL, COAL PAINT
MOTOR
METALS RUBBER
OIL, WOOD, PAINT
POWER
WATER
METALS OIL
MACHINERY DAMS
ELECTRIC
METALS OIL
RUBBER MACHINERY
MOTOR
METALS OILS
GASOLINE MACHINERY
STEAM
METALS COAL
OIL MACHINERY
BANKS
EQUIPMENT SUPPLIES
PAPER MAINTENANCE
EQUIPMENT SUPPLIES
TECHNICAL PROFESSIONS
ARCHITECTS ENGINEERS
EQUIPMENT PAPER
SUPPLIES BLUEPRINT'G
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CONTRACT'G
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METALS OIL, COAL
HARDWARE
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INSULAT'N
EXCAVAT'G
CHEMICALS
GLUE
OIL
ELEVATORS
ELECTRIC'L
BRICK
EXPLOSIVES
FOUNDATNS
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MASONRY
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METALS WOOD
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PLUMB'G
METALS PORCELAIN
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RUBBER METALS
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METALS WOOD
RUBBER MOTORS
HEATING
METALS FOUNDRIES
ASBESTOS PAINT
FURNISHINGS
TEXTILES
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Jobs for Millions Through Revival of Building

BY BENJAMIN F. BETTS, A.I.A.

REVIVAL of private building construction is a vital factor in the general economic recovery of this country. Its importance cannot be overestimated by the industry and the Federal Government. By authority of the National Industrial Recovery Act the Administration is organizing all industries through codes of fair practice, and is providing a large program of Public Works. These measures are primarily intended to increase purchasing power through stimulation of employment. The Public Works program is a recognition by the Government of the importance of building in the economic structure. In further recognition of its importance the Administration should at the earliest possible time organize a Building Construction Division possibly as a part of the NRA.

The purpose of a Building Construction Division would be: First—immediately to stimulate private construction, both new and modernization work, that has been stopped or retarded by the depression; Second—to arouse national consciousness of the importance of building construction as a basic economic factor in recovery; and Third—to remove existing obstacles to building activity by bringing to bear the best minds of the nation on the manifold problems involved.

With the exception of the textile industry, building is responsible for the employment of more persons than any other single industry. It has been estimated that approximately six million workers depend upon the building industry for their purchasing power, and that eighty-five cents out of every building dollar is eventually paid to labor. According to the Construction Census for 1929, about 830,000 persons were employed steadily in the erection of five billion dollars' worth of construction. To this figure must be added the thousands of workers employed in the professions, mines and quarries, factories, wholesale and retail distribution of building materials and equipment, transportation, power development, communication and other activities essential to the carrying on of building activities; and to this figure must be added still another representing the thousands of persons employed in many fields indirectly benefited by building.

Putting men to work is a nationally recognized problem. Putting men to work will increase the purchasing power of our citizens and increase consumer demand for all commodities, improve living conditions and increase the circulation of money. This is the aim of the National Recovery Administration. Approximately 25 per cent of the money thus put into circulation will go back into building in the form of rents and new construction. Re-employment of building trades workers through the revival of building construction will hasten the rate of employment in other industries and speed up the wheels of the economic machine.

Building is one of three basic industries. Agriculture, textiles and building are fundamental commodities. Over a period of years farm products show a relatively constant demand, while the demand for textiles, depending more upon general economic prosperity, shows a somewhat greater variation. Building construction demand, however, is subject to violent fluctuations and while it closly parallels the trend of general business, it has higher peaks and lower valleys.

The degree to which prosperity, or the lack of it, in the building industry affects general business prosperity is significant. This is true to the point that the economic condition of the building industry is a barometer that reflects the upward and downward movement of prosperity in business generally. Private building construction is the major product of the industry. It is apparent, therefore, that it must assume a position of vast importance as an element in our national economic welfare.

IT is significant that agriculture is represented by a cabinet officer and an important department. It is more significant that emergency aid to agriculture has been a major objective of the Government during the depression. The building industry, equal in money value in normal times, and only a close economic second to agriculture at any time, needs and warrants the guidance and aid of a strong Federal organization.

The function of the suggested Building Construction Division can be summarized as the furtherance of a resumption of building and the restoration of confidence of potential owners and building investors. In furthering a revival of building the first objective should be to encourage and stimulate, through whatever means may be necessary, the construction of buildings already planned and recognized as basically sound.

A large amount of planned construction exists. The response in 1932 of more than 1600 architects to a survey conducted by AMERICAN ARCHITECT indicated at that time more than two billion dollars' worth of contemplated and planned new construction and modernization work delayed for want of building capital. This survey, obviously incomplete, is indicative of the extent of projected building. To this reported volume can be added the accumulated building shortage resulting from obsolescence and destruction. It has been stated that

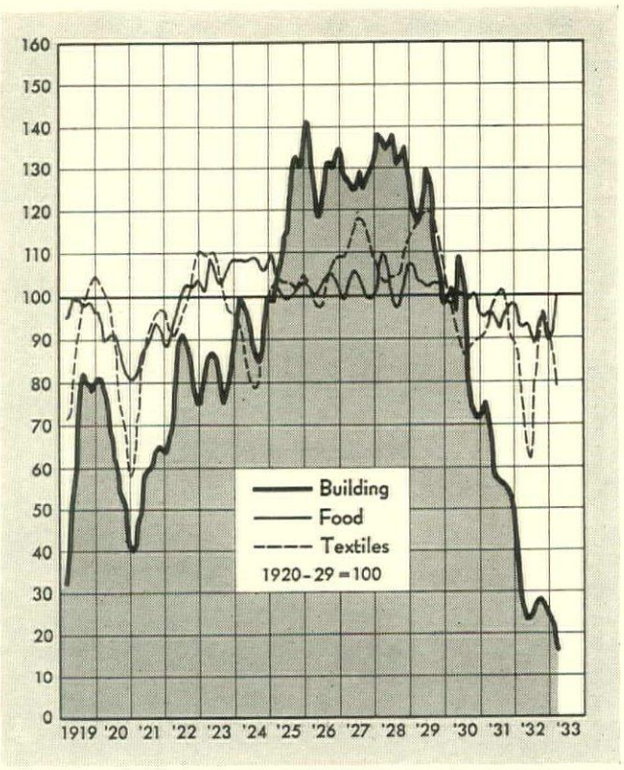
REVIVAL OF BUILDING ACTIVITY CAN PUT MILLIONS OF MEN TO WORK AND SPEED GENERAL ECONOMIC RECOVERY

This can be accomplished through coordinating action by a Building Construction Division under government leadership. Such organization could:

1. **Remove financial obstacles** to immediate building, allowing already planned-for projects to proceed.

2. **Encourage new building** by ascertaining nation-wide building requirements and publicizing advantages of planned construction programs.

3. **Promote and coordinate needed revisions** in legal, financial and technical parts of sound building activity.



yearly obsolescence accounts for a two to three months' normal volume of construction. Add to these amounts the shortage produced by the estimated annual fire loss of some $500,000,000 and the exaggerated picture of overbuilt America begins to change.

Various estimates of the building shortage have been made. One asserts that there is an existing shortage of nearly one million five hundred thousand homes, representing an annual volume of two billion dollars. "Doubling up" is said to represent a need for some 500,000 houses. Ascertaining the facts of the building shortage would go far in securing the means whereby private building construction could safely proceed.

Human nature is an important element in any consideration of building shortage. So long as human nature remains unchanged, people will always want new and better buildings. Desire to build has not been changed by the depression, it has merely been temporarily frustrated. Thousands of people would build new houses, improve existing properties, or invest their funds in sound building ventures, if their fears of the future were allayed or their judgment that it is safe and economical to build now were confirmed by high authorities.

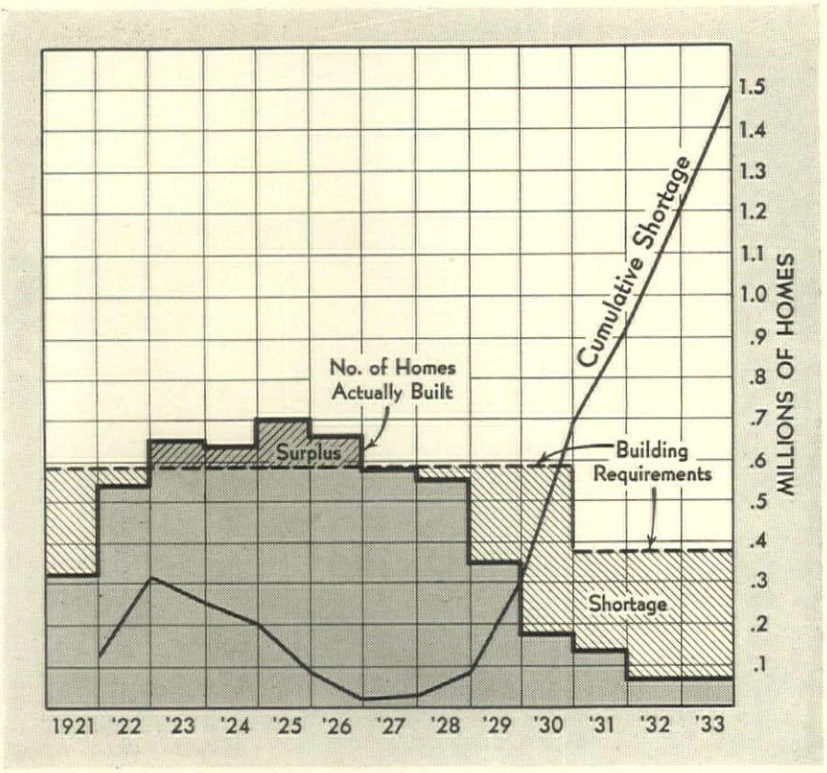
Restoration of confidence in both potential building owners and the financiers of building operations is essential to building recovery. Owners fear that the country is overbuilt; they are alarmed by the mortgage foreclosure situation and find it difficult or impossible to secure money with which to satisfy their desires for building. Sources of building capital—involved with foreclosed properties, frozen assets and uncertain that new structures will be safe income-producing properties, or that home owners will have jobs and thus be able to meet their obligations—hesitate to advance money for any kind of construction.

The fears of both owners and capital must be overcome before any impressive amount of private building can proceed. What is needed is a wide-spread campaign to publicize the country's actual building needs, to restore confidence, to stimulate the desire for new building, and to sweep away obstructions to the flow of money into the construction industry.

THE largest single obstacle to building recovery is lack of capital. Investors hesitate or refuse to advance capital because they question the safety of investments in buildings. Safety in building investments merely means that commercial structures can be operated at a profit and that the owners of property not in the commercial class have employment or profitable businesses that assure their ability to meet such obligations as rent, taxes, interest and repayment of the mortgage principal. The ability of individuals to meet their obligations is largely dependent upon general business prosperity, which in turn hinges so greatly upon prosperity in the building industry.

Increased employment in all branches of industry will automatically clarify the present mortgage and foreclosure situation. Restoration of gainful employment will provide workers with money to meet their obligations; and the necessity of foreclosures, moratoriums and forced sales with their attendant losses, so disastrous to the maintenance of economic balance, will disappear.

America is not financially "broke." Money still exists,



On facing page: Comparative trends of three fundamental commodities—building, food and textiles. Short seasonal fluctuations have been eliminated. Plotted from research data compiled by Thomas M. McNiece, Market Analyst, the curves reflect relative variations in constant demand. That of building most closely follows conditions of general business

Left: 1,500,000 homes will be needed in 1934, a shortage unparalleled since 1922. Though building requirements have decreased since 1930, small construction volume and annual fire losses have developed a cumulative shortage that would require a yearly expenditure of more than $2,000,000,000 for the next seven years to overcome. Data were compiled by the research staff of Building Supply News

but it is not finding its way into building channels. Under proper safeguard and stimulus it would. The liquidation of distressed properties; formulation of reasonable mortgage laws which will make financing of building construction safe, easy and equitable; and determination of interest rates fair and attractive to both borrower and lender are matters for experts. These things are not beyond solution. They *are* problems that confront the sources of building capital. They require a coordination of factors that will provide a coherent program for both real property and construction.

As an aid toward restoration of confidence, assurance of building as a good investment, and a guide to an intelligent construction program, a national building inventory is recognized by technically trained men as highly desirable. This inventory is not visualized as a long-drawn out fact-finding procedure. If correctly organized by regions, communities and districts, it can be obtained in a relatively short time by unemployed technical men. Existing agencies can be utilized in obtaining such essential data as existing properties, occupancy-vacancies, new construction and demolitions, deed transfers, mortgages, foreclosures, and population movements. In some cities such surveys are now available in whole or part; other cities have started surveys or are contemplating making them.

A Building Construction Division under government leadership would properly take cognizance of the legal measures necessary to modify existing mortgage laws or to secure uniformity in such laws. It should also obtain and interpret a national building inventory. Through qualified committees, studies leading to a solution of other related problems can have important bearing on the economics of building. One in particular is the serious economic liability which exists in antiquated building codes. Not only do many building codes saddle an unnecessary cost burden on the building industry—a cost ultimately paid by the purchaser—but, through specifying construction methods instead of demanding performance, present a distinct handicap to progress in building construction.

Further there is need of much educational effort to inform the public and those concerned with building as to economic liabilities of improper financing and poor construction created by unscrupulous or uninformed individuals. It cannot be shouldered by the building industry alone; and there is an urgent need for some centralized agency which by disseminating information will finally effect many needed reforms.

THE machinery for a Building Construction Division, initiated by the Federal Government, is already at hand. Throughout the United States there are trained individuals who need only direction to spur them toward the solution of such problems as have been indicated. Coordination of the best minds in architecture, engineering and real estate, contracting, manufacturing and finance can promote a safe, sound and immediate revival of private building construction. For the first time in the history of the United States an agency exists wherewith economic disturbances can be removed. If the power of this agency is applied it will permit the building industry to contribute as can no other, to the welfare and early economic recovery of the United States.

The Private Architect's Part In

BY L. W. ROBERT, JR.

Assistant Secretary of the Treasury
in Charge of Public Buildings

" . . . I would have it understood that the present Assistant Secretary is in favor of using private architects to the fullest extent that such practice is consistent with the general policies of the Department."

ONE of the interesting things about the Treasury Department is that it has under its supervision a variety of activities, which, on first blush, the average citizen would not expect to find. Among other duties with which the Department is charged, for instance, is the construction and maintenance of Federal buildings. The direction of this work falls largely upon the Supervising Architect, who in turn is responsible to the Assistant Secretary of the Treasury in Charge of Public Buildings. It is the set-up and policies of the Office of the Supervising Architect and the relation of this office to the architects of the country that the editor of AMERICAN ARCHITECT has asked me to discuss in this article.

OFFICE OF SUPERVISING ARCHITECT

FOR the benefit of those who are not acquainted with the Office of the Supervising Architect, let me say that it is a distinct executive bureau of the Treasury Department. Briefly stated, its function is to design, construct, and maintain Federal buildings in the District of Columbia and elsewhere such as post offices, courthouses, mints, border inspection patrol stations, and Public Health Service hospitals. Excepted from its jurisdiction are the hospitals controlled by the Veterans' Bureau, Army and Navy buildings, buildings under the control of the Indian Bureau, Department of Interior, and a few others.

It may be appropriate also to state that the Supervising Architect is selected through Civil Service and holds office through successive administrations, thereby insuring a continuity of action and policy which would be impossible were the office an appointive one.

The way in which the Supervising Architect's office functions may be best illustrated perhaps by following a building project from its inception to its completion.

Suppose, for example, that the building contemplated is a post office structure. A survey is made to ascertain the requirements for such a building, based on the size of the town or territory served, probable postal revenue, and similar factors. Before the passage of the National Recovery Act, approval for the inauguration of a building project was obtained from Congress, the recommendation for the project being submitted through the Budget Bureau. Under present arrangements, such recommendations are submitted to the new Public Works Administration, headed by Secretary of the Interior Ickes, for approval and allocation of funds.

If the project is authorized, the government architects —or private architects, if they are selected—prepare tentative sketches to meet the approval of the authorities in the city in which the building is to be erected as well as the heads of the departments at Washington interested in the project. In the meantime a survey of the building site and test borings are made.

For purposes of administration the office is separated into seven major divisions—architectural, architectural engineering, structural, mechanical engineering, maintenance, repairs, and law and records. The Architectural Division prepares the architectural designs, working drawings, and full-size detailing for all architectural work performed by the Government personnel. The Architectural Engineering Division carries the program a step further and prepares the preliminary estimates based on the requirements for the structures under consideration, prepares the specifications, handles the technical correspondence, and directs the technical field service. But before the building can be erected, the Structural Division must prepare designs for the foundations, walls, floors, columns, and roof construction. Mechanical equipment such as heating, lighting, plumbing, and elevator systems, is the special responsibility of the Mechanical Engineering Division.

The responsibility of the Supervising Architect's office does not end, however, with the erection of the building. That is the reason the office has a Maintenance Division

The Federal Building Program

and a Repairs Division to take over this phase of the Public Building Program. Legal questions which arise in public building projects in connection with contracts and other factors are, of course, handled by the Law and Records Division.

The next step in the program is the preparation of cabinet sketches showing a finished design of the building with the exterior rendered in color or monotone, to give a picture of the building as it will look when completed. Approval of the sketches having been obtained from the Cabinet officers concerned, working drawings and specifications are prepared by the Supervising Architect's office or the special architect selected for the job. When plans are prepared by a private architect, they are checked in the Office of the Supervising Architect and are corrected to make them conform with Government suggestions or criticisms. This done, the drawings and specifications are advertised for bids. Sealed proposals are received on a specified date and are opened publicly.

Analyses of these bids are made by the private architect and the Supervising Architect's office and the lowest responsible bidder whose bid falls within the amount available for the building is awarded the contract. He is given ten days in which to file a performance bond. This condition having been complied with, he receives notice to proceed with the construction of the building.

While a private architect employed on a Government building is required, according to the contracts now in force, to furnish all necessary full size details, check shop drawings, approve samples, criticise models, and make interpretation of drawings and specifications, his job does not extend to detailed supervision of construction. This is the job of the Government engineer assigned to it. Included in the engineer's duties also are the settling of any wage scale disputes which may arise during construction and the preparation of the building for occupancy after it is completed.

With the completion of a building the Maintenance Division of the Supervising Architect's office gets on the job. Before the building can be occupied, furniture must be ordered and installed, a custodian appointed, and a maintenance force selected. This the Maintenance Division, which now has almost 2,000 structures under its control, takes over. Repairs are the special responsibility of the Maintenance and Repairs Divisions.

PUBLIC BUILDING POLICIES

SO much, then, for the outline of the way in which the Office of the Supervising Architect functions in specific cases. And now just a word about the policies of the present administration in respect to certain phases of the public building program, in which architects have a particular stake.

As Assistant Secretary of the Treasury in Charge of Public Buildings, I favor the requirement set up by the National Recovery Administration that a greater proportion of the construction work on public buildings be accomplished by the general contractor's own organization. It is my feeling that the practice which many contractors have followed since the war of farming out different items of construction to subcontractors should be abandoned, and that the old practice whereby contractors handled 30 to 50 per cent of the construction themselves, should be adopted again. To my mind, such a policy will insure the maximum of satisfaction to contractor and client alike. Isn't it reasonable to suppose, for instance, that the contractor who agrees to do as much of the job as possible through his own organization, will take an interest and a pride in the work which he might not take if he follows the "brokerage" plan?

Considerable dissatisfaction has arisen in the past by reason of changes in specifications after construction on a building has started. This is not necessarily a reflection on the contractor. As a matter of fact, neither the Government nor the contractor has been entirely blameless in this respect in the past. The Government, in its attempt to spread work as far as possible, has at times specified materials that exceeded the capacity of the units producing them—quarries, brick and terra cotta manufacturers, and others—to supply. The private architect, moreover—frequently new to Government requirements for full and open competition—sometimes specifies products with patented features. Unless a very careful check is made on specifications in advance, therefore, a number of changes may be necessary after the contract is in force.

A firm policy of refusing to modify specifications after the contract is in force will preclude criticism, expedite administrative and contractual work, and provide a more equal basis for competition in bidding.

To my notion, construction specifications frequently provide far too many alternates in materials and mechanical equipment. This is another factor which may readily lead to dissatisfaction. In a job on which the bidding is close, the selection of the alternates may determine the low bidder. For instance, if either stone or brick is specified, the contractor may reduce his cost by using brick. If either stone or terra cotta is specified, the cost may be reduced by using the latter. Or the specifications may permit the use of either bronze or steel window frames. Using steel in that case will lower the cost. A wide choice of alternates, also, may result in charges that the Government is juggling the alternates in order to make the award to some favored bidder.

There is a difference, of course, between the option and the alternate in specifying construction. Under an option, two or more materials or types of construction

that are designed or produced to give equivalent results and that are so nearly equal in cost as to be competitive, are allowed to be used, at the option of the contractor. I am in favor of options.

The option method of spreading work among various industries has been in use by the Supervising Architect's office for a number of years, and the specifications prepared in that office carry many such options. This method necessitates only one bid and the final selection of the particular material rests with the contractor.

Under an alternate the materials or types of construction considered are many times so different from each other that it is necessary to give a separate price or bid for each of the two or more materials or types of construction permitted. This means that before awarding a contract the Government must decide what alternate is to be used, whereas experience shows that the time to arrive at a decision on materials or types of construction is during the development of the project.

PRIVATE ARCHITECTS FOR GOVERNMENT BUILDING

I HAVE some rather definite ideas concerning the employment of private architects on public building projects. In this connection it may be well to review briefly what the policy of the Department has been on this question in the past.

From 1853, when the Supervising Architect's office was created, until the passage of the Act of May 25, 1926, public buildings were designed generally by Government technical personnel, except in unusual cases where special legislation authorized the employment of private architects.

Under the Act of 1926, the passage of which marked the beginning of the Federal Building Program now being carried out by the Government in Washington and throughout the country, authority was granted the Secretary of the Treasury to employ private architects for limited services only.

Under this first authority, five private architects were employed to prepare designs for certain departmental buildings in the District of Columbia. The need for public buildings increased. To expedite the building program and to aid in relieving unemployment, the act of 1930 was passed, permitting the employment of private architects to any extent deemed necessary by the Secretary of the Treasury. During the ensuing three years, therefore, 378 architects were commissioned for projects aggregating close to $350,000,000. At the present time private architects are engaged in preparing plans for 174 projects.

The attitude of the present administration is that during periods of unemployment the Government should utilize private architectural and engineering services in order to expedite a large volume of construction. Stagnation in the building trade usually extends to the architectural and engineering professions. The use of such services not only helps to relieve unemployment, but enables the Treasury Department to secure a greater variety of design and to get new ideas with respect to modern architectural and engineering practice.

An entirely different policy is recommended for periods of prosperity, however. It is the belief of this administration that in such periods the Government should construct only those buildings which are absolutely essential to the public business. Such construction, it is believed, could probably be handled by a small Government construction force, which could be used as a sort of spark plug for private firms when an emergency arose. It is believed, further, that such work as repairs, remodeling, and alterations can be done to better advantage by the Government force. The members of this force handle the plans for buildings on which repairs or alterations are needed and are familiar with the details of their construction. The private architect, on the other hand, would find it necessary to give considerable time to familiarizing himself with details, which are at the finger tips of Government architects.

Heretofore the practice of the Treasury Department has been to divide the work involved in the building program, giving as many large projects to outside architects as was deemed necessary in order to complete an authorized program within a given time.

The future policy with respect to the employment of private architects must depend largely upon the size of the construction program entrusted to the Treasury Department under the Public Works legislation, as well as upon the urgency of the unemployment situation. In all candidness, however, I would have it understood that the present Assistant Secretary is in favor of using private architects to the fullest extent that such practice is consistent with the general policies of the Department.

Selection of private architects for public buildings is now being carried out on a different basis from that formerly used. In the past the practice has been to permit architects who desired to be considered for employment on Government contracts to file their applications, and to select qualified applicants from this list as contracts were to be awarded. This plan has now been changed. With the assistance of the American Institute of Architects and the American Engineering Council a prequalification form was recently sent to every registered architect in 33 states having registration laws and to all listed architects in the remaining 15 states. As these qualification forms are returned, they are filed, and from these selection will be made of architects for future government building projects. Under this plan an attempt will be made to distribute contracts by selecting in each case an architect in or near the city in which a building is to be erected, who is qualified to undertake the work. It should be pointed out however, that the selection of architects will not be governed by their affiliation with professional organizations.

Exactly what the Federal Building Program for the ensuing year will embrace cannot as yet be announced with certainty. It is altogether likely, however, that some decision on this question will be forthcoming at an early date. As plans materialize and as further procedure on the program is formulated, I shall hope to give the architects of the country more complete information through the columns of AMERICAN ARCHITECT.

Atrio-entrance to St. Francis' Chapel

Additions to Mission Inn, Riverside, California

G. STANLEY WILSON, ARCHITECT

Photographs by Field Studios

THE work illustrated here is the latest development of a building program that started soon after 1875 about the nucleus of an adobe brick guest house and has continued intermittently up to the present. Almost every element of building operations has been influenced by the policies of the owner, Frank A. Miller. These have made the Mission Inn known from coast to coast as an hostelry unique in appointments and rich in the tradition of its locale.

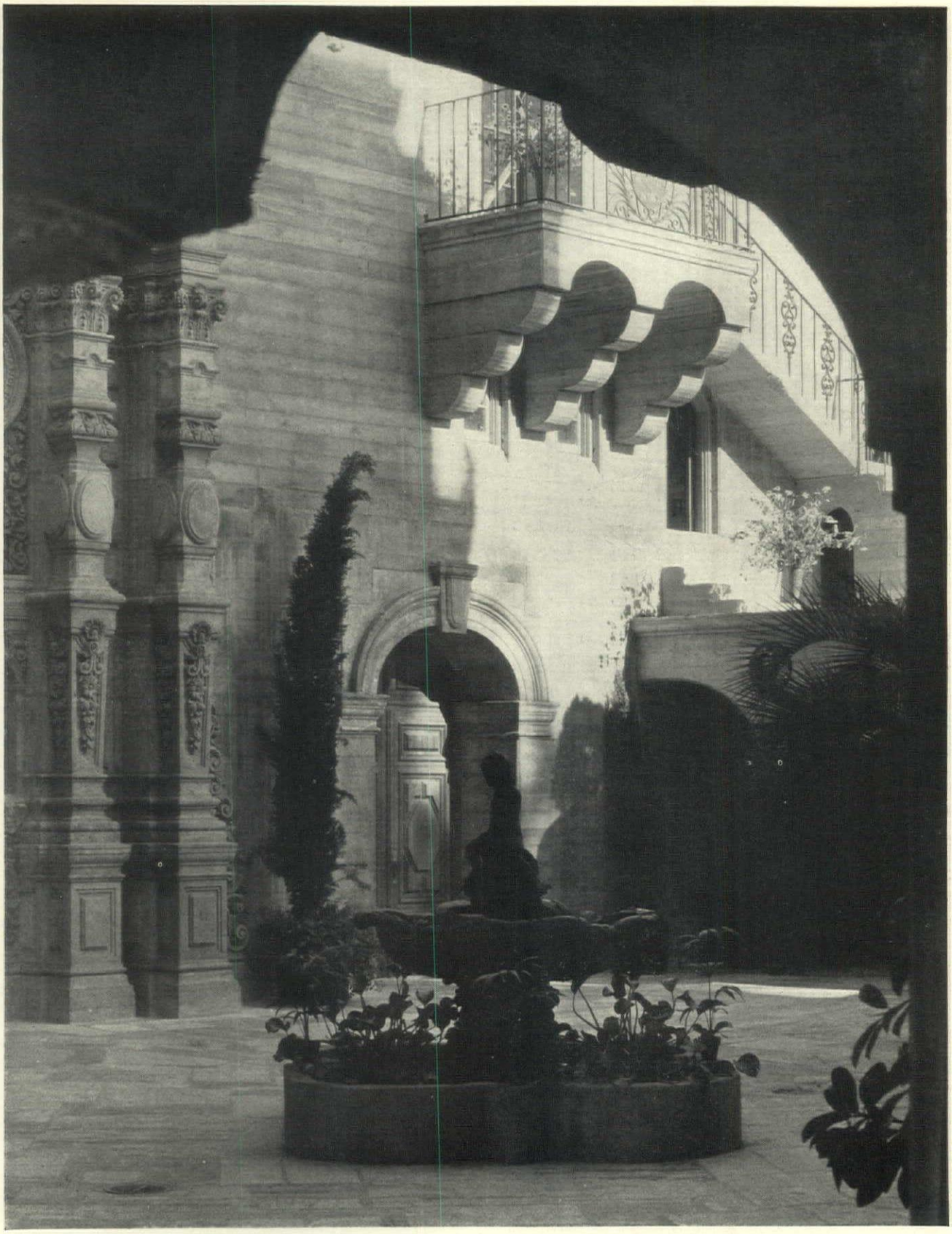
The structure now covers an entire city block. The atmosphere of old California in the days of the Spanish missions was early incorporated as a major influence of its design. The style of subsequent alterations and additions grew from an attempt to preserve the integrity of the existing structures and to achieve an architectural harmony as a setting for the owner's large and unusual collection of fine arts and archaeological fragments.

This explains the ecclesiastical character of the work illustrated here, for the collection now housed in the museum and actually built into the structure of the addition includes many examples of early church art and architecture.

Practically all of the structure is of reinforced concrete which was left as it came from the forms. The material made it possible to develop ornament as integral parts of the structure and offered a practical method of incorporating the many grilles, columns, windows and bits of old statuary that formed an important part of the owner's collection.

On the two following pages are parts of the atrio showing the rich contrast between plain wall surface and sculptured ornament, both of them reinforced concrete.

ADDITIONS TO MISSION INN, RIVERSIDE, CALIFORNIA. G. STANLEY WILSON, ARCHITECT



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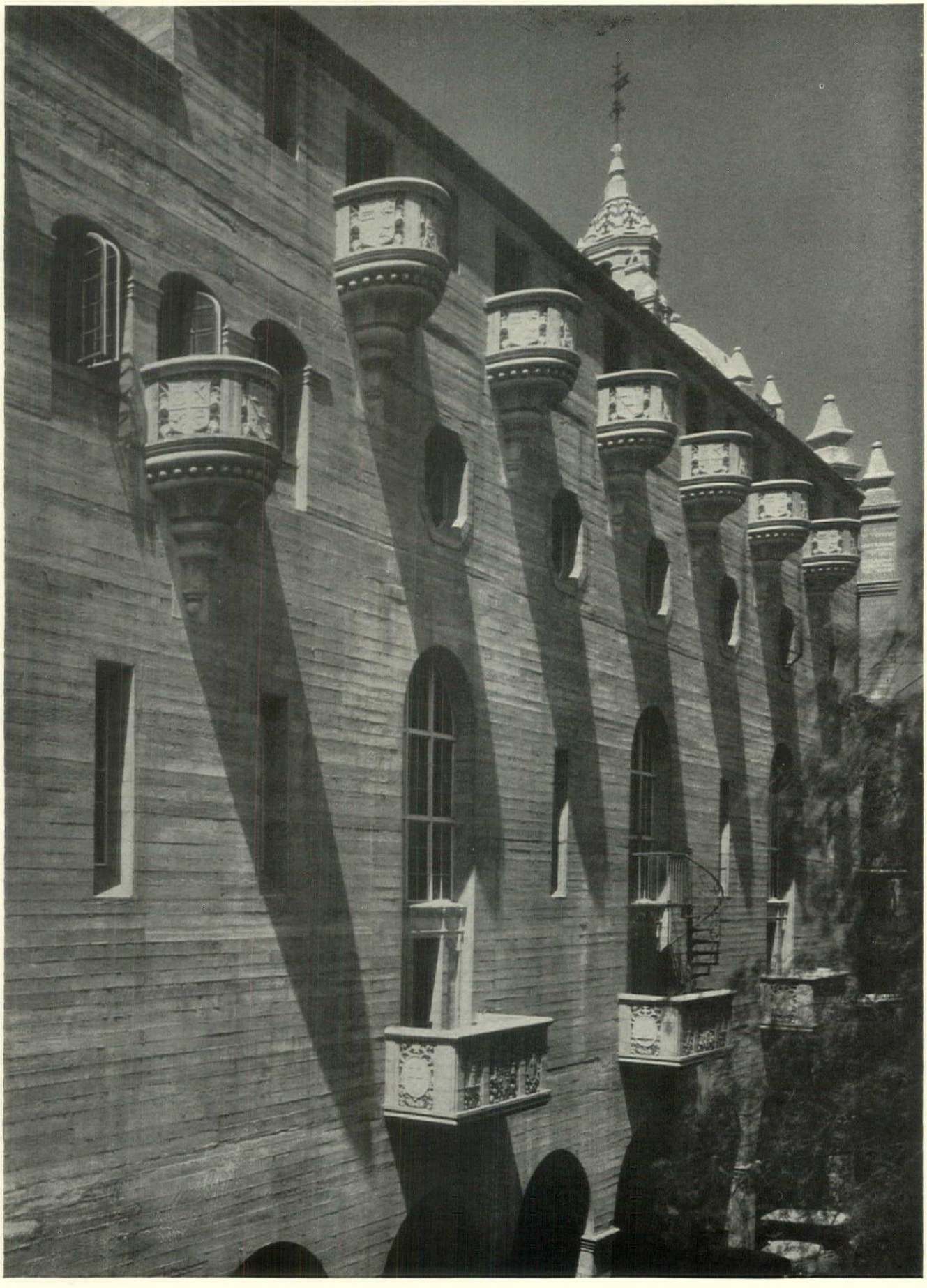
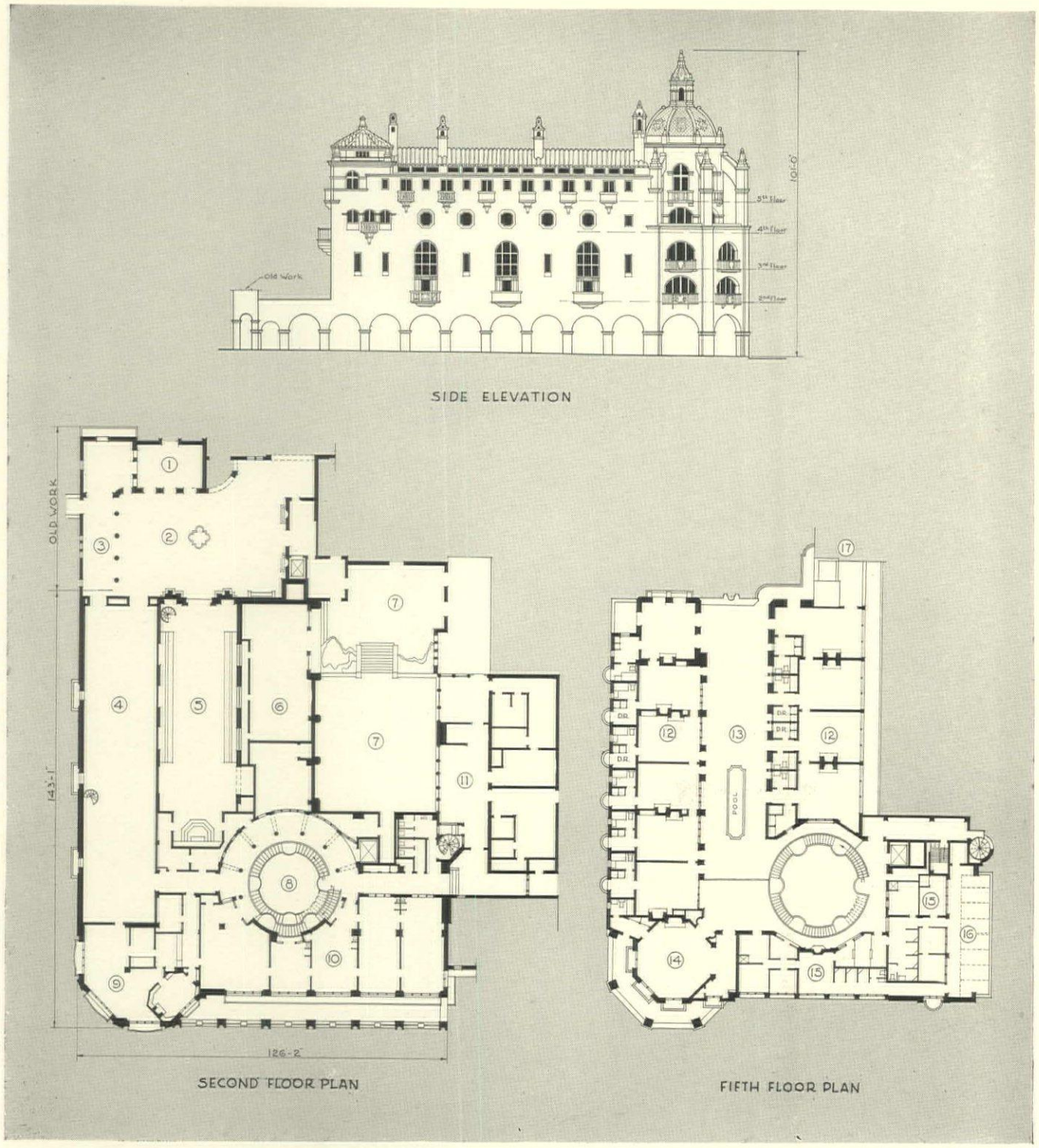


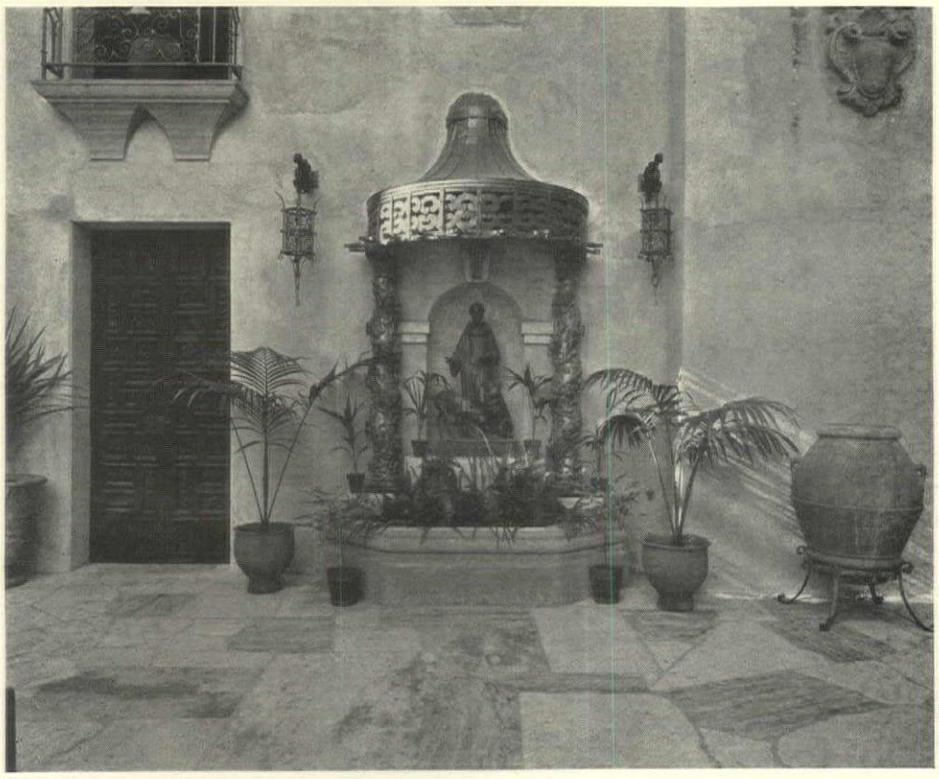


1. Signature Room
2. St. Francis' Atrio
3. St. Joseph's Arcade
4. Art Gallery
5. Chapel
6. Oriental Art
7. Court of the Orient
8. Rotunda
9. De Anza Suite
10. Suites
11. Studio
12. Bed Rooms
13. Open Deck
14. University Club
15. Hydrotherapy Suite
16. Sun Bath Cubicles
17. Old Work

ADDITIONS TO MISSION INN, RIVERSIDE, CALIFORNIA, G. STANLEY WILSON, ARCHITECT

THE CHAPEL is illustrated on facing page. Floor: red cement. Walls and ceiling panels: acoustical plaster, buff colored. Ceiling beams: solid, hand-adzed and finished with rotten stone and water. Choir loft: concrete, antiqued with asphaltum stain and rotten stone. Stalls, oak, finished in weathered dark brown to match carved wall medallions. Altar (not shown) is hand-carved, in the Mexican Churrigueresque style, covered with plaster size and heavy gold leaf. THE ART GALLERY, above. Floor: oak, filled and waxed. Ceiling: natural surface concrete, stained with asphaltum, finished with rotten stone and wax. Walls: buff acoustical plaster with concealed metal picture moulds at 2'6" vertical intervals. Woodwork: mahogany finished with cherry stain and rotten stone

ADDITIONS TO MISSION INN, RIVERSIDE, CALIFORNIA, G. STANLEY WILSON, ARCHITECT



ROTUNDA INTERNATIONAL, on facing page, extends from basement to fifth floor. Stairway, arcade, walls and columns are of poured concrete left as they came from the forms. Railings are iron. In ST. FRANCIS' ARCADE, above, columns are old, decorated in red, green and gold. The SHRINE OF ST. FRANCIS, left, contains a bronze group designed by Ruth Sherwood. Canopy is copper, with a frieze of old, rusty iron. Colonettes, of Mexican origin, are wood, covered with gold

Made from a plaster of Paris mould, this plaque of concrete is integral with the wall

ADDITIONS TO MISSION INN, RIVERSIDE, CALIFORNIA, G. STANLEY WILSON, ARCHITECT

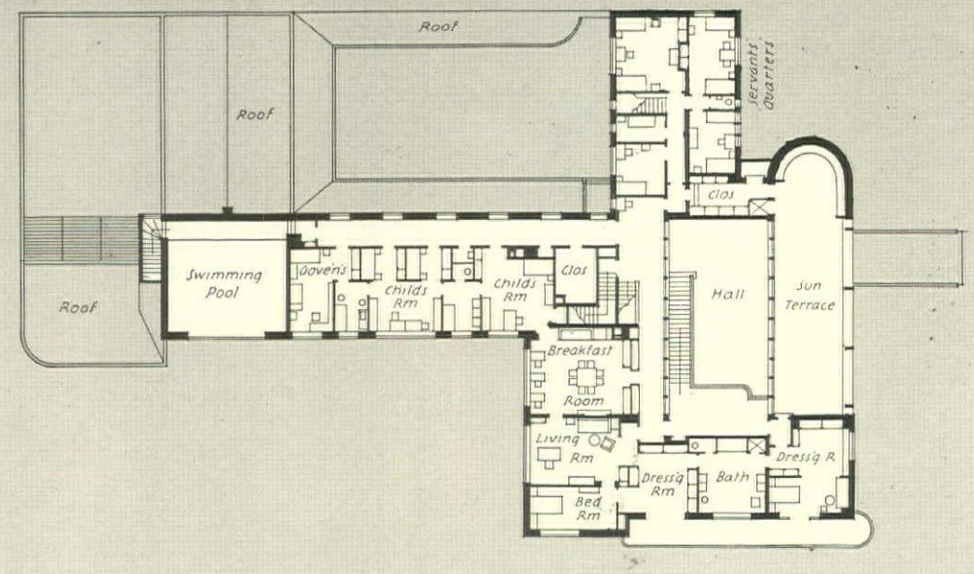
Living room wing from terrace

Placed in a broad, open park, House K in O is but one portion of an almost ideal architectural problem. The estate includes a porter's lodge, garage, stables, servants' cottages, a large riding paddock and a great sweep of open land dotted with old trees. Solution of the entire problem is untraditional in all respects. The house indicates the extent to which an open-minded client allowed architectural ideas to become realities

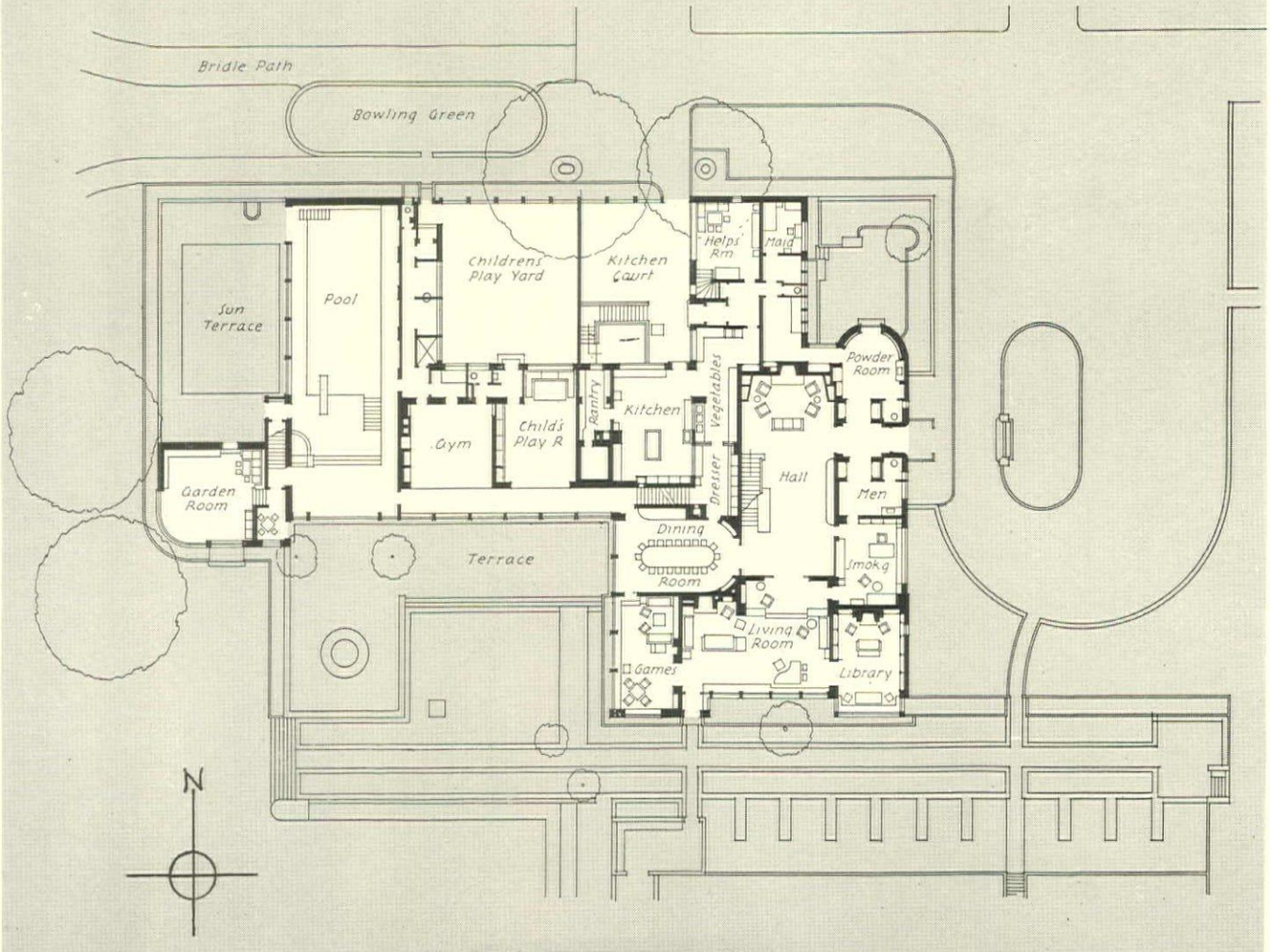
HOUSE K IN O, BERLIN, GERMANY

MARTIN ELSAESSER, ARCHITECT

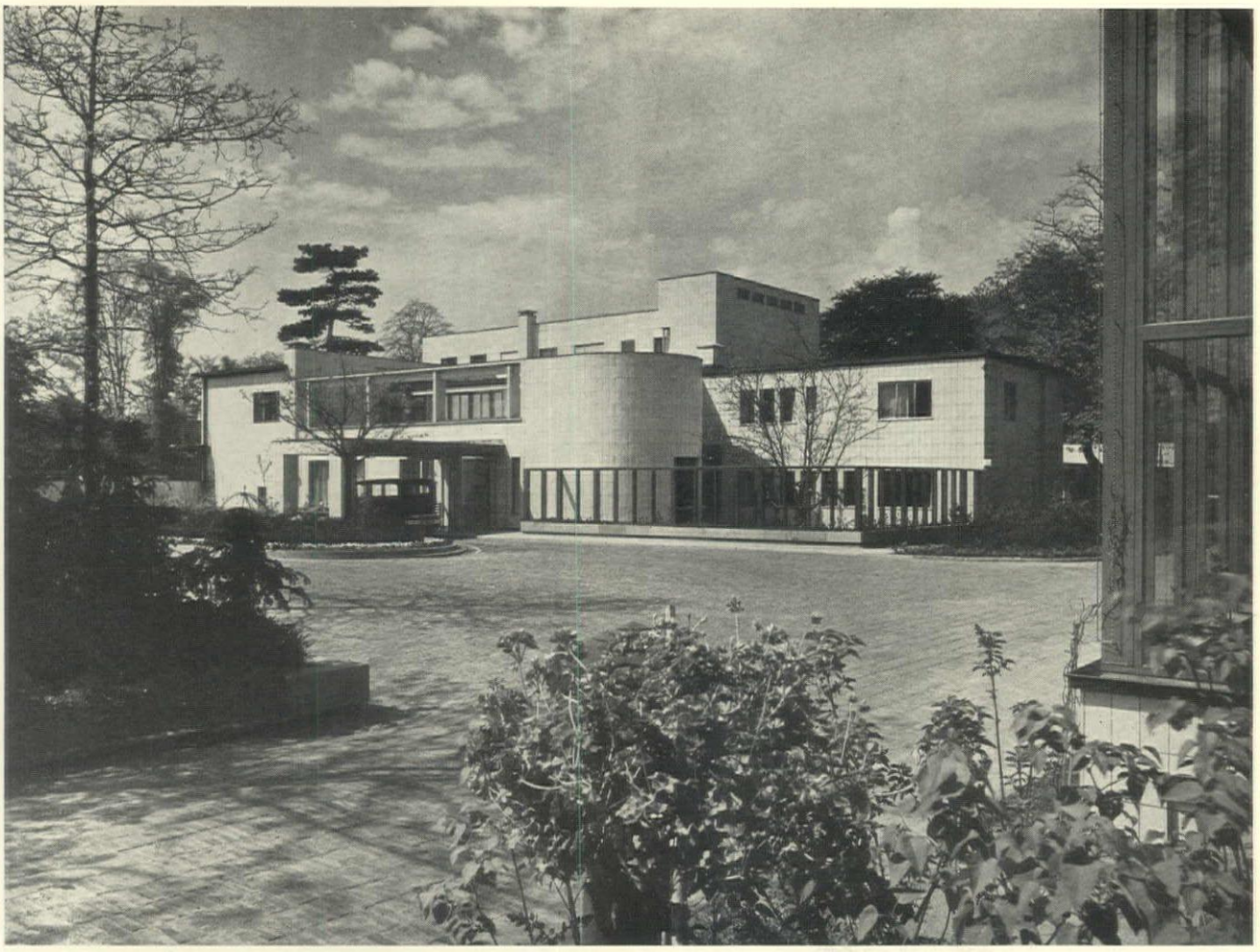
Photographs by M. Gollner



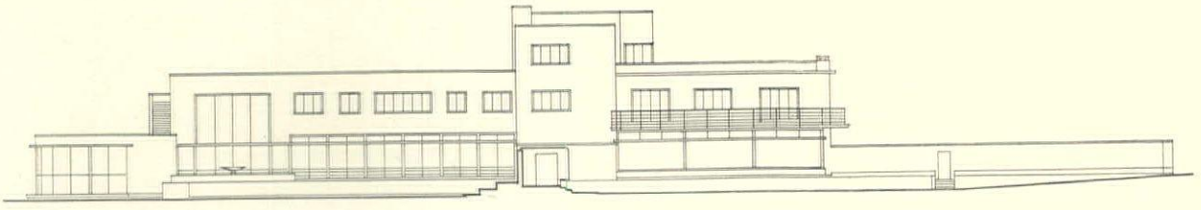
Second Floor Plan



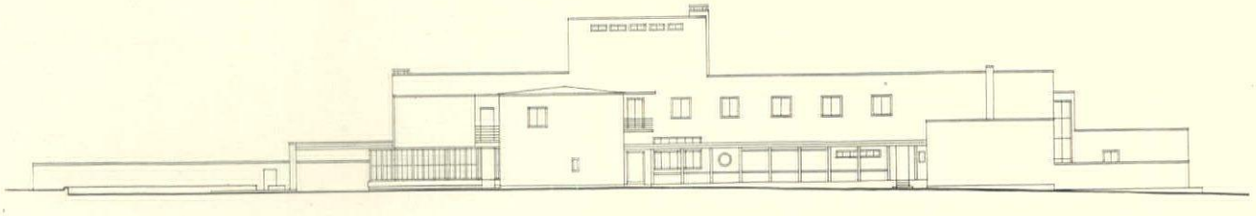
First Floor and Part of Plot Plan



Above: Main entrance to house from the east. Grounds have been laid out to supplement functions of the various rooms within. The plot plan shows a grouping of outdoor areas that is practical and attractive, though not usual to American practice

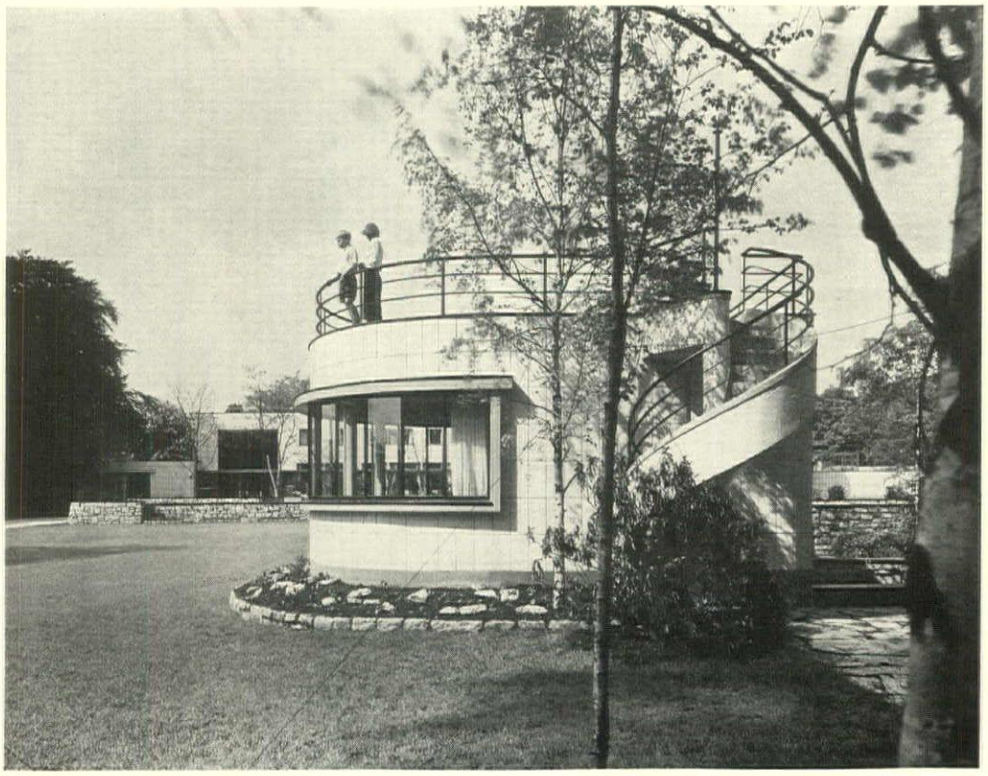


South Elevation



North Elevation

HOUSE K IN O, BERLIN, GERMANY, MARTIN ELSAESSER, ARCHITECT

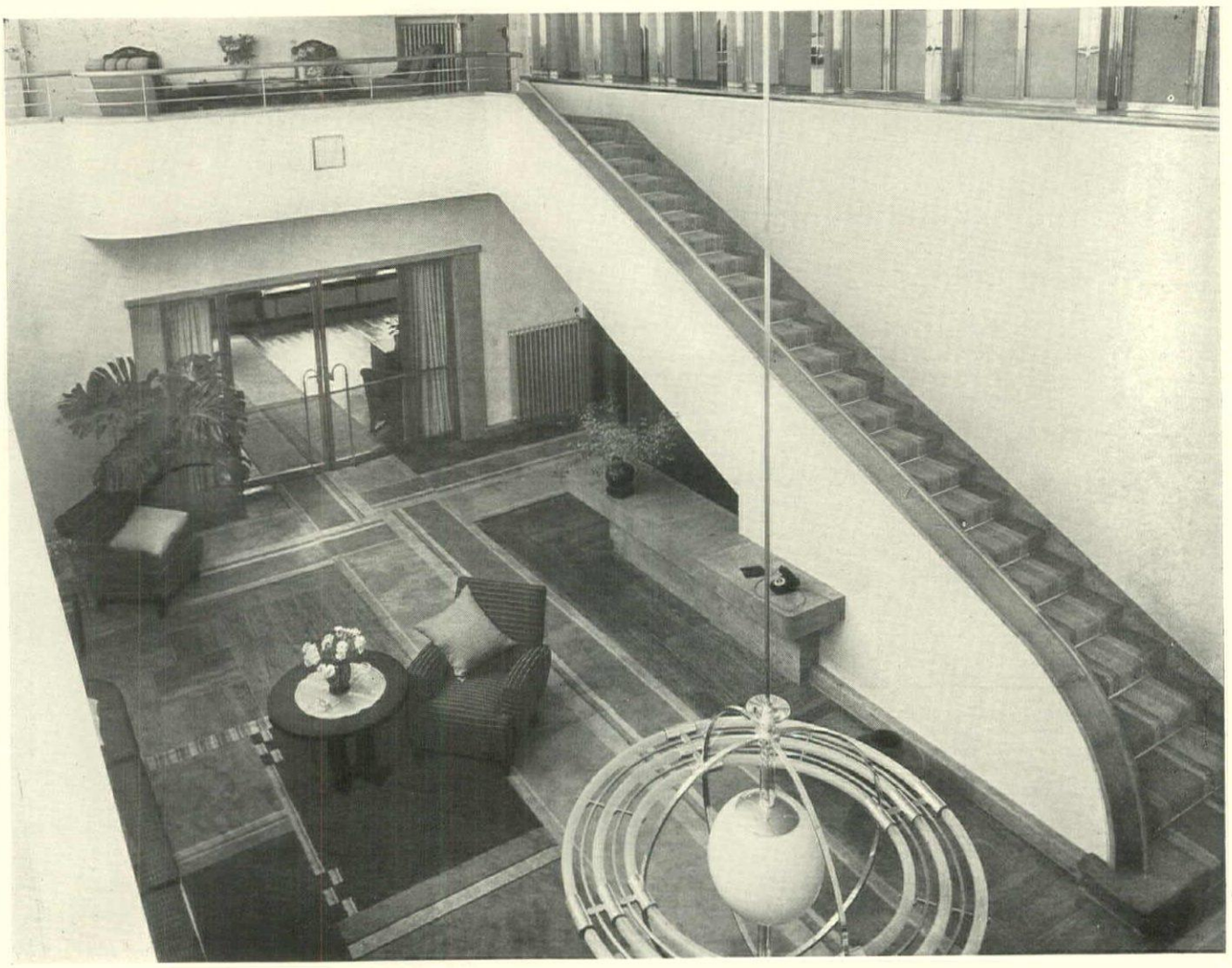


The garden room above can be enclosed with windows electrically operated from pockets in the sill. Right, tea pavilion, reached through a long sheltered passage from terrace near the living room

HOUSE K IN O,
BERLIN, GERMANY
MARTIN ELSAESSER
ARCHITECT

Above, living terrace and wings containing living and recreation rooms. The large window on the extreme left lights one end of the swimming pool. Left, living terrace from the dining room

HOUSE K IN O, BERLIN, GERMANY
MARTIN ELSAESSER
ARCHITECT

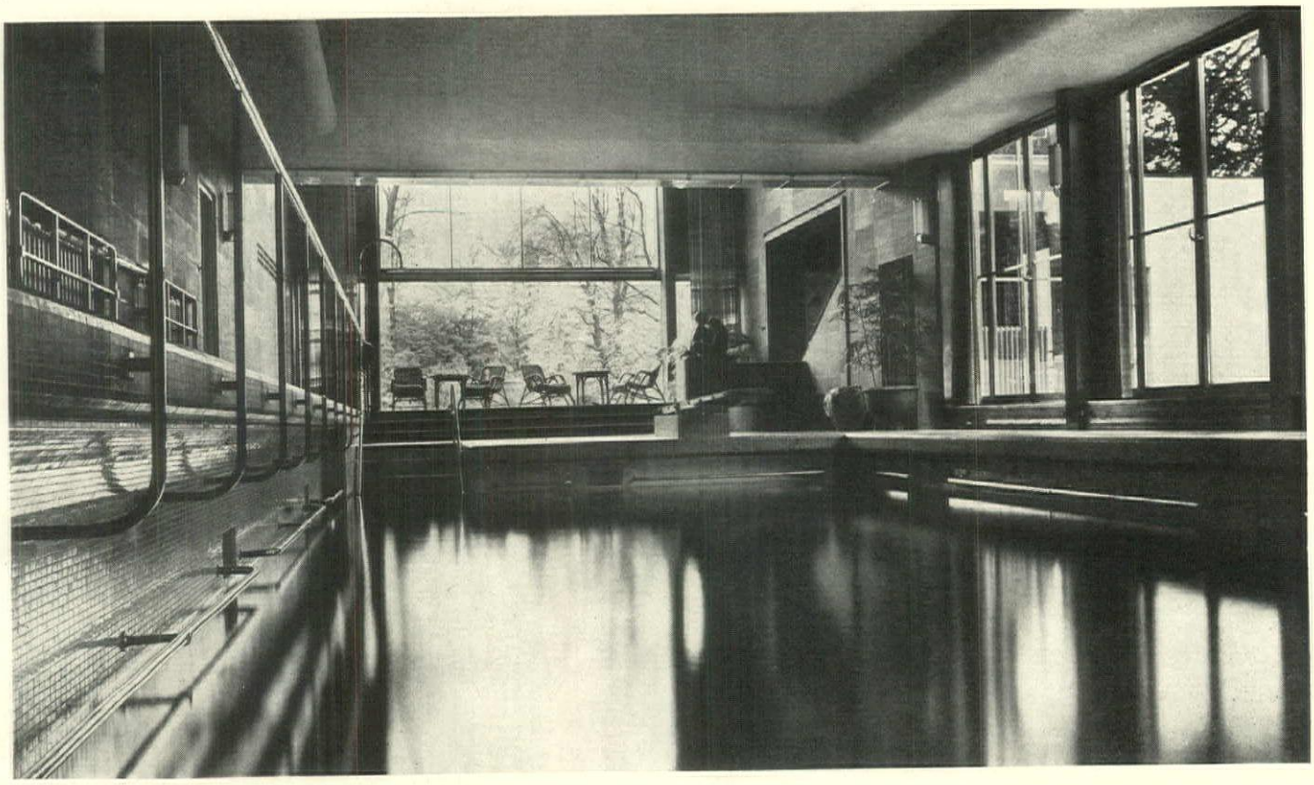


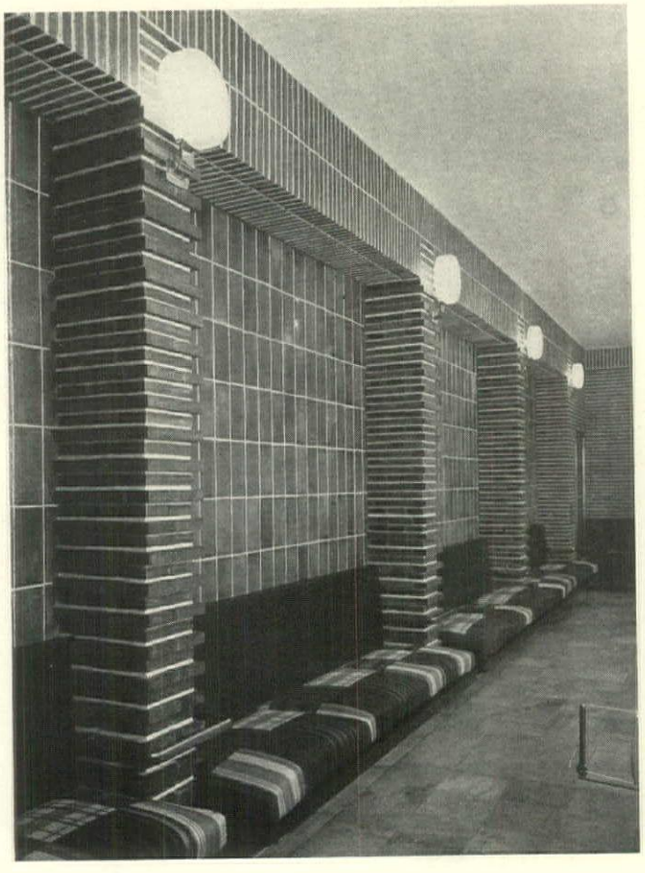
Above, main hall. Floor and trim: polished gray limestone with red veining. Walls: hard, gray-white plaster. Carpets: black, brown, gray and yellow. Furniture: macassar and walnut with inlays. Railing of balcony and windows of sun terrace are polished chromium plate. Right, hall from living room

HOUSE K IN O
BERLIN, GERMANY
MARTIN ELSAESSER
ARCHITECT

Above, dining room. Furniture: macassar and walnut with inlays. Tapestry behind buffet-bar is a Gobelin. Grilles and door frames: polished chromium plate. Left, interior of tea pavilion. Walls: plaster, decorated with fresco. Floor: flagstone and briquettes. Furniture is of polished chromium

HOUSE K IN O
BERLIN, GERMANY
MARTIN ELSAESSER
ARCHITECT





Above: Swimming pool looking toward living terrace. Below, left: Wall and seats in basement games room. Ceiling: white. Walls: dark red tile with white joints. Below, right: Corner of card room. Tapestry is a Gobelin

HOUSE K IN O, BERLIN, GERMANY, MARTIN ELSAESSER, ARCHITECT

How to Design Practical Curved Driveways

In which the hard work is removed by diagrams and tables

BY ERNEST IRVING FREESE

IF the course of a moving automobile swerves in the slightest degree from a Euclidean straight line, then the rear wheels will not "track" with the front wheels. Obviously, with a human being at the steering wheel, an absolutely straight course is practically unattainable; a certain amount of "weave" will be evident in the wheel tracks. With the car in forward gear, it is impossible to run the rear wheels off a straight driveway unless the front wheels also are run off, because, regardless of the direction communicated to the front wheels, the tracks made by the rear wheels are corresponding *curves of pursuit*. The tracks generated by the rear wheels are determined by the action of the front wheels; and the action of the front wheels is controlled by the action of the driver. Moreover, tracks made in forward gear may be exactly retraced in reverse gear. If the driveway is not straight, then the inner rear wheel *may* leave the driveway in pursuit of its quarry *unless* the width of driveway on the turn is correctly predetermined. If the outer radius of a curved driveway is less than the turning radius of the fully-cramped outer front wheel, then the outer front wheel will be forced off the pavement.

The above elementary conception of the action of an automobile in motion is in accord with the facts; namely, that the driver of an automobile is not a piece of mechanism geared to the steering wheel, but a human being with enough practical experience to keep the car on any pavement, straight or curved, that is wide enough to contain the correctly projected plans of the moving machine plus a sufficient clearance factor to allow "weaving" and yet avoid fender-swiping contiguous shrubbery or bumper-scraping an enclosing wall. The problem then is the determination of the required width of driveway on a *curve*.

The basic diagram, Figure 1, records the simple geometry and mathematics of the circular driveway, and shows that to determine its proper radii and width, three factors must be either known or discriminately assumed. Namely, the *wheelbase B*, the *tread T*, the *turning radius X*.

When the front wheels of a car are cramped to the utmost, then the value of X is the minimum and this *minimum* value of X is a property of the car; it is listed in car specifications and varies widely for different makes of cars. It sometimes varies for the same car depending upon which direction the car is turned. This minimum turning radius X, of the outer front wheel, is often confused with the minimum *clearance* radius of the outer front fender or bumper wing, this latter radius being sometimes listed in specifications instead of the *wheel* radius X. The clearance radius is of no help in fixing the width of the driveway, that is, in locating point C about which the car turns. Since this clearance radius is always somewhat greater than the wheel radius X it may in lieu of X be safely assumed as X.

The tread T of a car is about standardized at 4′8″; but on at least one large car it is 5′0″; and on some of the other large cars it varies for the same car, the normal tread of the front wheels being different from that of the rear wheels.

The wheelbase B is also a variable quantity. It varies with almost every make of car and between different models of the same make.

In view of the foregoing variables, it behooves us to design the circular driveway in accordance with a discriminately assumed set of limiting minimum conditions; that is, to "standardize" the driveway to allow for variable standards and dimensions of automobiles.

The following values are recommended as a *minimum standard* for the design and layout of circular driveways:

Tread T	4′8″
Wheelbase B	12′0″
Turning Radius X	27′0″
Inside Clearance allowance E	1′6″
Outside Clearance allowance F	2′0″

From the above values, using either the graphical or the mathematical methods of solution shown in Figure 1, the required dimensions of the critical circular driveway are found to be:

Outer radius R	29′0″
Width W	11′0″
Inner radius r	18′0″

In other words the *least* outer radius, R, that can safely be used for any circular driveway or any driveway compounded of circular arcs is 29′0″; which calls for a corresponding width, W, of 11′0″. But, as the turning radius X is increased, so also is the riding comfort increased while the required corresponding minimum width W of the driveway is decreased; the working values of T, B, E and F, remaining the same. The maximum limit of X is infinity. Hence, between the minimum

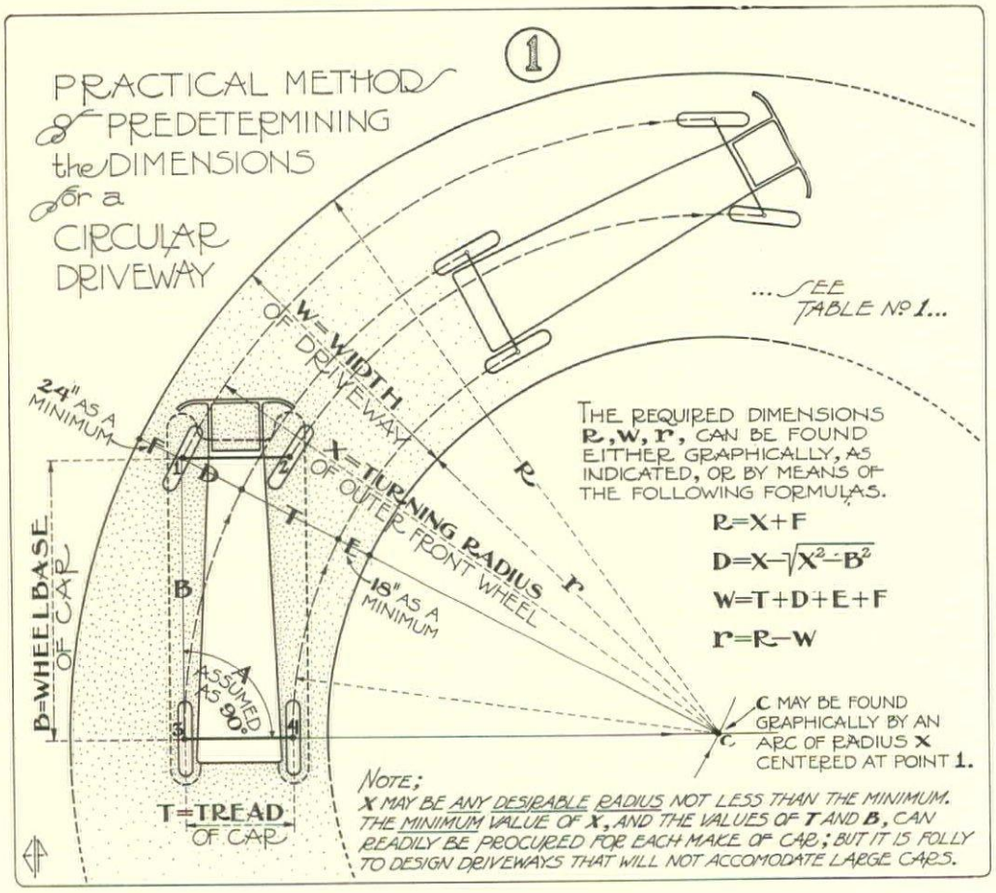


FIGURE 1. The front wheels of an automobile do not pivot about a common point. The rear wheels do not follow the front wheel tracks on curves. Here is shown the geometrical method of plotting the tracks of an automobile on a curve. Table 1 gives recommended minimum dimensions for circular curves

TABLE 1—MINIMUM STANDARD DIMENSIONS FOR CIRCULAR DRIVEWAYS

R Outer Radius of the Driveway	W Minimum Width of the Driveway	r Inner Radius of the Driveway
29′ - 0″ to 30′ - 0″	**11′ - 0″**	**18′ - 0″** to 19′ - 0
30′ - 0″ to 31′ - 0″	10′ -11″	19′ - 1″ to 20′ - 1″
31′ - 0″ to 32′ - 0″	10′ -10″	20′ - 2″ to 21′ - 2″
32′ - 0″ to 33′ - 0″	10′ - 9″	21′ - 3″ to 22′ - 3″
33′ - 0″ to 34′ - 0″	10′ - 8″	22′ - 4″ to 23′ - 4″
34′ - 0″ to 35′ - 0″	10′ - 7″	23′ - 5″ to 24′ - 5″
35′ - 0″ to 36′ - 0″	**10′ - 6″**	**24′ - 6″** to 25′ - 6″
36′ - 0″ to 37′ - 0″	10′ - 5″	25′ - 7″ to 26′ - 7″
37′ - 0″ to 38′ - 0″	10′ - 4″	26′ - 8″ to 27′ - 8″
38′ - 0″ to 39′ - 0″	10′ - 3″	27′ - 9″ to 28′ - 9″
39′ - 0″ to 41′ - 0″	10′ - 2″	28′ -10″ to 30′ -10″
41′ - 0″ to 43′ - 0″	10′ - 1″	30′ -11″ to 32′ -11″
43′ - 0″ to 45′ - 0″	**10′ - 0″**	**33′ - 0″** to 35′ - 0″
45′ - 0″ to 47′ - 0″	9′ -11″	35′ - 1″ to 37′ - 1″
47′ - 0″ to 49′ - 0″	9′ -10″	37′ - 2″ to 39′ - 2″
49′ - 0″ to 51′ - 0″	9′ - 9″	39′ - 3″ to 41′ - 3″
51′ - 0″ to 54′ - 0″	9′ - 8″	41′ - 4″ to 44′ - 4″
54′ - 0″ to 57′ - 0″	9′ - 7″	44′ - 5″ to 47′ - 5″
57′ - 0″ to 61′ - 0″	**9′ - 6″**	**47′ - 6″** to 51′ - 6″
61′ - 0″ to 65′ - 0″	9′ - 5″	51′ - 7″ to 55′ - 7″
65′ - 0″ to 70′ - 0″	9′ - 4″	55′ - 8″ to 60′ - 8″
70′ - 0″ to 75′ - 0″	9′ - 3″	60′ - 9″ to 65′ - 9″
75′ - 0″ to 82′ - 0″	9′ - 2″	65′ -10″ to 72′ -10″
82′ - 0″ to 89′ - 0″	9′ - 1″	72′ -11″ to 79′ -11″
89′ - 0″ to 99′ - 0″	**9′ - 0″**	**80′ - 0″** to 90′ - 0″
99′ - 0″ to 111′ - 0″	8′ -11″	90′ - 1″ to 102′ - 1″
111′ - 0″ to 126′ - 0″	8′ -10″	102′ - 2″ to 117′ - 2″
126′ - 0″ to 147′ - 0″	8′ - 9″	117′ - 3″ to 138′ - 3″
147′ - 0″ to 176′ - 0″	8′ - 8″	138′ - 4″ to 167′ - 4″
176′ - 0″ to 219′ - 0″	8′ - 7″	167′ - 5″ to 210′ - 5″
219′ - 0″ to 300′ - 0″	**8′ - 6″**	**210′ - 6″** to 291′ - 6″

and maximum values of X, that is, between the critical circular driveway whose minimum width is 11′0″, and the critical straight driveway whose minimum width may be taken as T plus twice E or 7′8″, there exists an infinite number of standard circular driveways whose widths and radii are correspondingly proportionate.

It is conducive both to economy and to riding comfort to have the outer radius R of a circular driveway as great as the imposed restrictions of the site will permit. By means of Table 1 of *minimum standard dimensions*, computed by the formulas given in Figure 1, any circular driveway can be selected that best suits the purpose or that conforms to the limitations of the site. For instance: A circular driveway is desired having an outer radius R of 39′0″. What is the safe minimum width W? The R column of the table shows that radii from 39′0″ up to 41′0″ require a minimum width of 10′2″ in the W column. Again: Conditions fix the *inner* radius r of a proposed driveway at, say 41′5″. How wide should it be? In the r column, radii from 41′4″ to 44′4″ call for a minimum width of 9′8″ in the W column.

The distance between the trunks of two trees is 10′7″ on a line normal to a proposed circular driveway between them. What are the minimum required radii for this driveway? Find 10′7″ in the W column of the table. The corresponding minimum outer radius R is 34′0″. The inner radius r must be 34′0″ minus 10′7″ which is 23′5″, as listed in the r column.

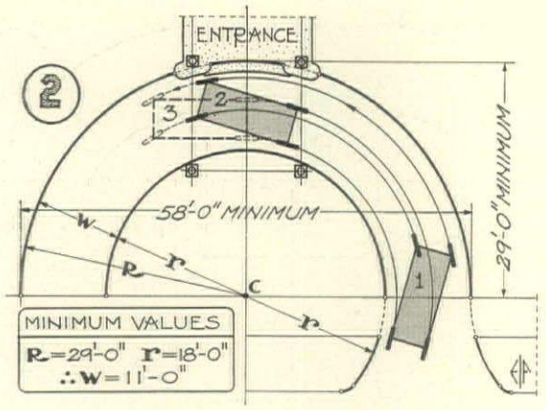


FIGURE 2. On a circular curve, automobiles stop in a raking position with respect to the landing. In an entrance driveway of this type the splay from property line to curb should have no greater radius than the driveway

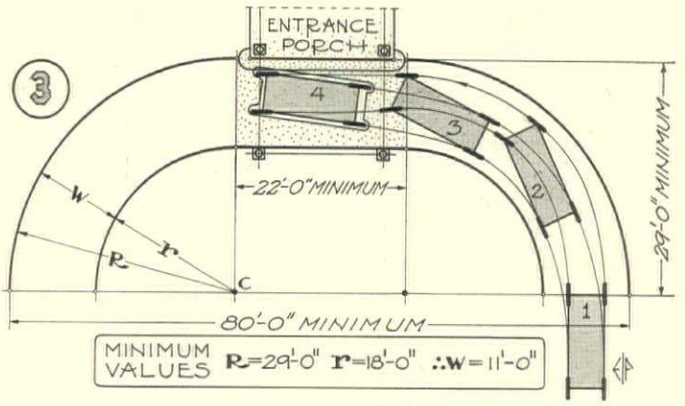


FIGURE 3. A straight section at the landing point lessens the raking position of the car. The longer the tangent in advance of the landing the nearer the automobile may be brought to the curb without "jockeying"

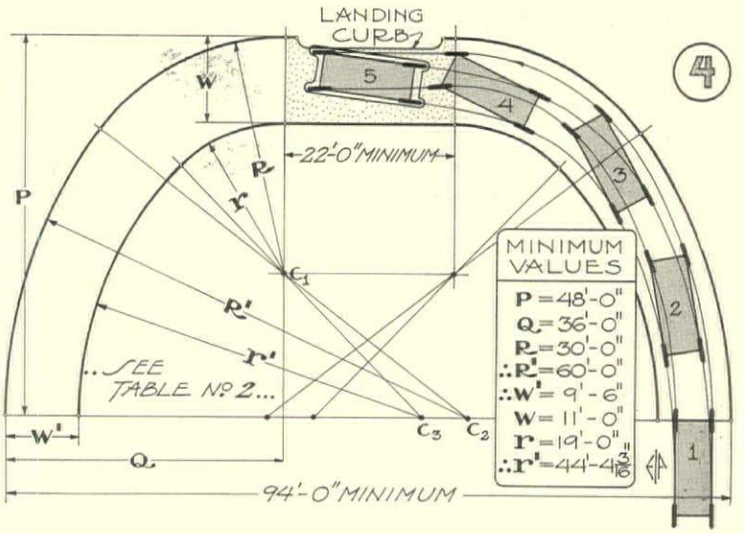


FIGURE 4. Compound curves permit greater speed but require more manipulation of the steering wheel. The minimum radius is nearest the landing point, where speed is least important as a factor of practical design

To lay out a double driveway and assuming that conditions fix the maximum outer radius of this driveway at 62′0″ we find that the table shows that a single driveway of this outer radius should have a minimum width of 9′5″. Add an allowance of 2′0″ to this as clearance between two imaginary concentric single driveways, and, 9′5″ plus 2′0″ equals 11′5″; and 11′5″ from 62′0″ leaves 50′7″. The table indicates that this imaginary outer radius 50′7″ of the inner single driveway calls for a minimum pavement width of 9′9″. Adding 11′5″ to 9′99″ gives 21′2″ as the required total minimum width of this double driveway. Its inner radius becomes 62′0″ minus 21′2″; or 40′10″.

The remaining diagrams cover practically the entire gamut of driveway design. Figure 2 shows that a simple semicircular entrance-exit driveway is economical and practical. Aprons from street to property line should be flared to the inner radius of the driveway. On this driveway the car merely stops at the landing place in its natural raking position. High running boards and stepping blocks are things of the past. There appears to be no valid reason, other than tradition, for now bringing a car "alongside the curb" at a private entrance or under a carriage porch canopy.

However, Figure 3 bows to this tradition. A straight portion of driveway is interposed between the two circular quadrants, thus allowing the car to be straightened out somewhat and brought "alongside" as shown. The interposed straight landing could extend to infinity and yet the car could *never* become quite parallel with it and snug to the curb without "jockeying" the car into position.

In Figure 4 compound circular quadrants are shown instead of simple ones; an expedient that, theoretically, makes for easier driving and greater speed. Practically, however, vigilance is required to negotiate such a curve. Ease of driving depends primarily upon uniformity of curvature. Speed depends primarily upon radius of curvature. This type of driveway is a compromise between these two factors. From the standpoint of riding comfort this form of driveway is practically ideal. So is Figure 8.

Various ready-to-use sets of dimensions for compound driveway quadrants of the type shown in Figures 4 and 8 are given in Table 2. No explanation is needed: the required values are found by inspection.

A complete driveway loop of the most economical design is shown in Figure 5. This layout is analogous to that of Figure 2, and therefore subject to the same comments. Figure 5 brings out a new point: namely that a reversal of curvature does not necessitate greater width than that required for simple curvature. As a matter of fact, a one-way driveway could be made narrower in the vicinity of reversal.

In Figure 6, a straight landing is interposed between the half loops so as to allow the car to come "alongside"

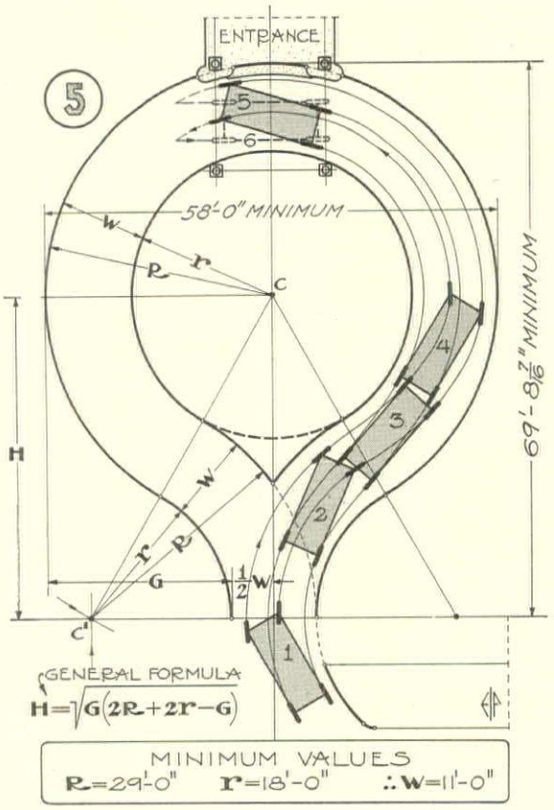


FIGURE 5. A minimum circular turn-around requires sharp turns of the steering wheel from one extreme to the opposite at points of reversal of curvature. The car stops as in Figure 2. Uniform pavement width is permissible even at the point of reversal

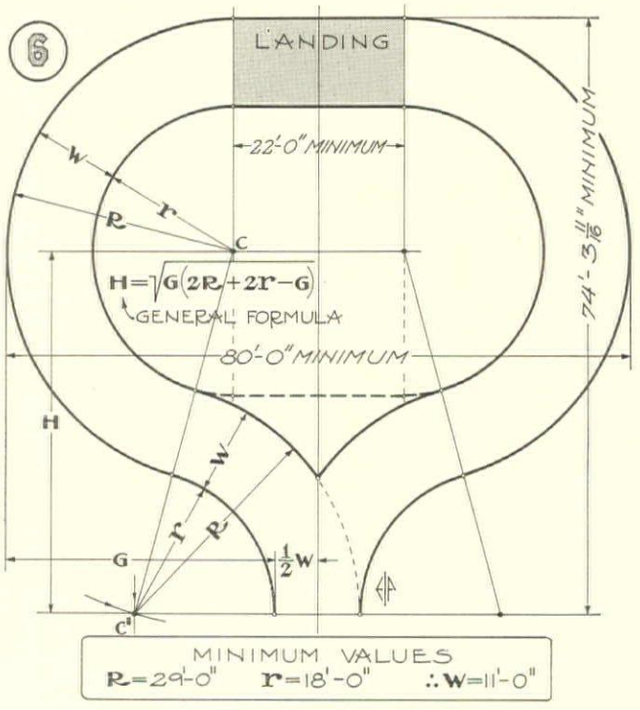


FIGURE 6. A minimum turn-around similar to Figure 5, except for the tangent at landing point. Over-all depth and width of forecourt is increased by the use of the straight landing section, as compared with the preceding plan

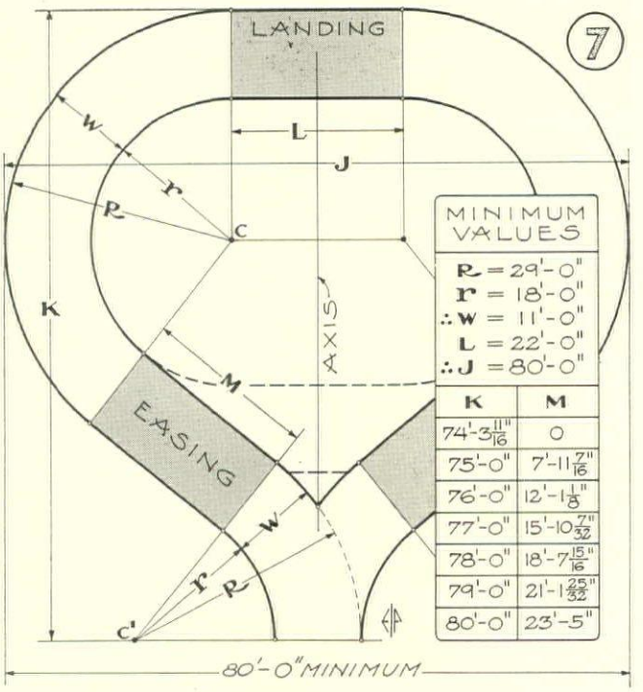


FIGURE 7. Driving is made easier by "easing" tangents at points where direction of curvature is reversed. Inserted table shows that depth K is only slightly increased by extending the easing tangents M. Compare with Figure 6.

as in Figure 3. Otherwise Figure 6 is subject to the same comments as Figure 5.

In Figure 7, a straight "easing" is inserted between the reversed simple curves, thereby easing the abruptness of reversal to any extent desired and allowing higher driving speed. Note that a very slight increase in the over-all dimension K results in a surprisingly great increase in the length M of the straight easing. This is clearly brought out in the tabulated values of K and M on this drawing.

In Figure 8, as in Figure 4, the compound quadrant is utilized. This is the "grand" style for a forecourt loop or entrance driveway. It is suitable for country estates and can be managed on a city lot of 120 foot frontage. As has been said about Figure 4, the compound quadrant as here worked out represents the ideal form for riding comfort, and is a compromise between the simple circular driveway and the simple straight driveway when ease of driving and fast driving are considered. By means of Table 2, any suitable set of dimensions can readily be found. This layout represents the minimum advisable conditions for this type of loop. Note that the width of driveway at any one point is practically proportionate to the average of the outer and inner radii at that point. The same is true of Figure 4. Yet both layouts are simple and thoroughly practical.

The basic principles of Figure 1 are applied to a Y turn or back-around in Figure 9. There is an almost endless variety of such layouts, but they are all governed by the same simple principle. The plan shown takes the minimum space. The car goes straight into the garage in forward gear; backs straight out from posi-

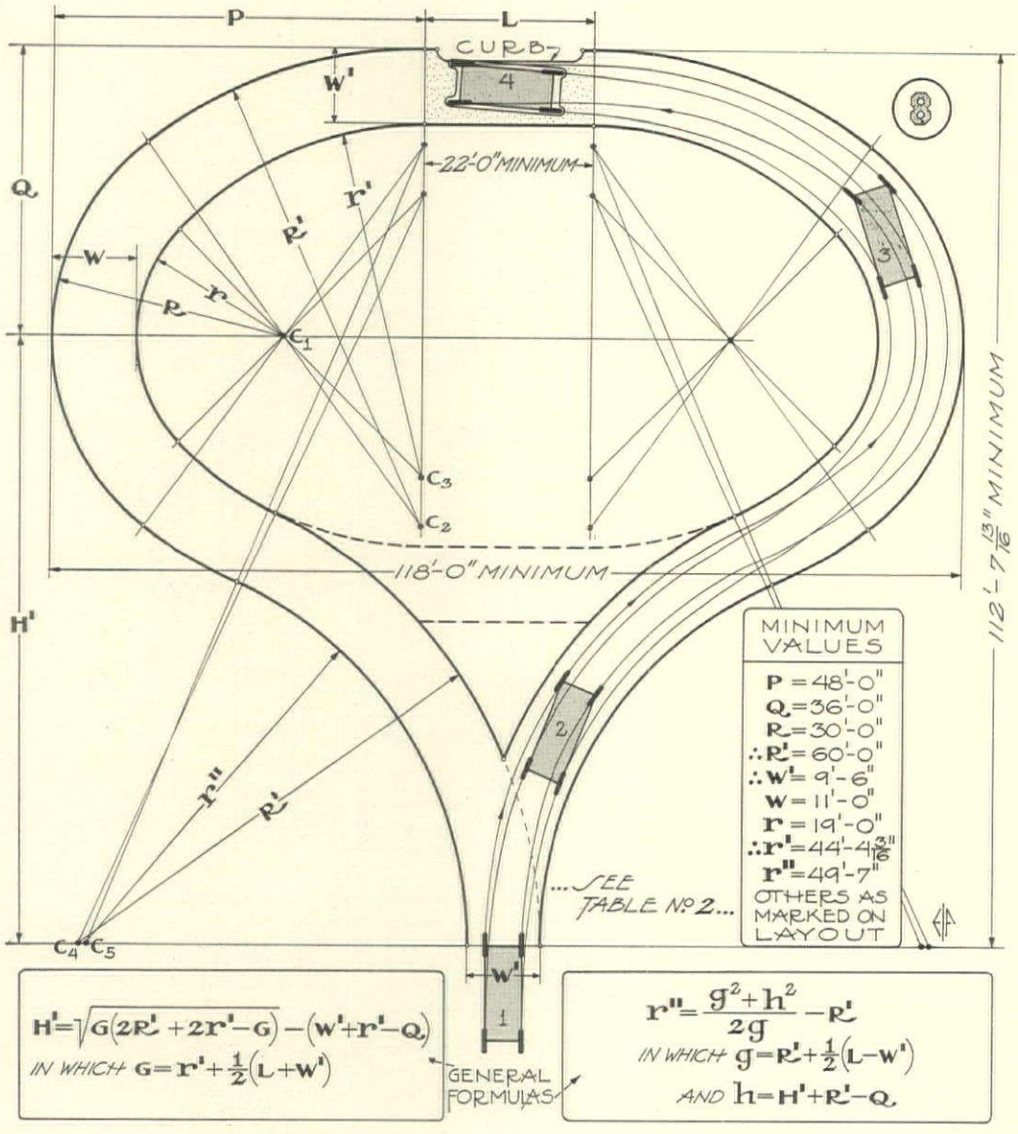


FIGURE 8. A compound curve designed for maximum speed and comfort and considerable driving ease, with a substantially parallel landing at a curb on the main axis. Minimum radii are still used at the ends of the oval, requiring full cramping of the front wheels. Values for larger turn-arounds of this type are given in Table 2

TABLE 2—DIMENSIONS OF COMPOUND DRIVEWAY QUADRANTS

(See Figures 4 and 8 for applications and reference letters)

Rectangular dimensions of compound quadrant		Outer radii of compound quadrant		Limiting widths of driveway (From TABLE 1)		Inner radii of compound quadrant	
P	Q	R	R'	W	W'	r	r'
48' - 0"	36' - 0"	30' - 0"	60' - 0"	11' - 0"	9' - 6"	19' - 0"	44' - 4 3/16"
50' - 0"	**37' - 6"**	**31' - 3"**	**62' - 6"**	**10' -10"**	**9' - 5"**	**20' - 5"**	**47' - 2⅛"**
52' - 0"	39' - 0"	32' - 6"	65' - 0"	10' - 9"	9' - 4"	21' - 9"	49' - 8 11/16"
54' - 0"	40' - 6"	33' - 9"	67' - 6"	10' - 8"	9' - 4"	23' - 1"	52' - 5⅞"
56' - 0"	42' - 0"	35' - 0"	70' - 0"	10' - 6"	9' - 3"	24 - 6"	55' - 4 7/32"
58' - 0"	43' - 6"	36' - 3"	72' - 6"	10' - 5"	9' - 3"	25' -10"	58' - 1 23-32"
60' - 0"	**45' - 0"**	**37' - 6"**	**75' - 0"**	**10' - 4"**	**9' - 2"**	**27' - 2"**	**60' - 8 15/32"**
62' - 0"	46' - 6"	38' - 9"	77' - 6"	10' - 3"	9' - 2"	28' - 6"	63' - 6 3/16"
64' - 0"	48' - 0"	40' - 0"	80' - 0"	10' - 2"	9' - 2"	29' -10"	66' - 4"
66' - 0"	49' - 6"	41' - 3"	82' - 6"	10' - 1"	9' - 1"	31' - 2"	68' -10 27/32"
68' - 0"	51' - 0"	42' - 6"	85' - 0"	10' - 1"	9' - 1"	32' - 5"	71' - 4 23/32"
70' - 0"	**52' - 6"**	**43' - 9"**	**87' - 6"**	**10' - 0"**	**9' - 1"**	**33' - 9"**	**74' - 2 11/16"**
72' - 0"	54' - 0"	45' - 0"	90' - 0"	9' -11"	9' - 0"	35' - 1"	76' - 9 9/16"
74' - 0"	55' - 6"	46' - 3'	92' - 6"	9' -11"	9' - 0"	36' - 4"	79' - 3 15/32"
76' - 0"	57' - 0"	47' - 6"	95' - 0"	9' -10"	9' - 0"	37' - 8"	82' - 1⅝"
78' - 0"	58' - 6"	48' - 9"	97' - 6"	9' -10"	9' - 0"	38' -11"	84' - 7 17/32"
80' - 0"	**60' - 0"**	**50' - 0"**	**100' - 0"**	**9' - 9"**	**8' -11"**	**40' - 3"**	**87' - 2 15/32"**

Note: The values of r^1 in the above table were computed by means of the following general formula:

$$r^1 = \frac{(P - W)^2 - (Q - W^1)^2 - 2r\,[(P - W) - (Q - W^1)]}{2\,[(Q - W^1) - r]} + (Q - W^1)$$

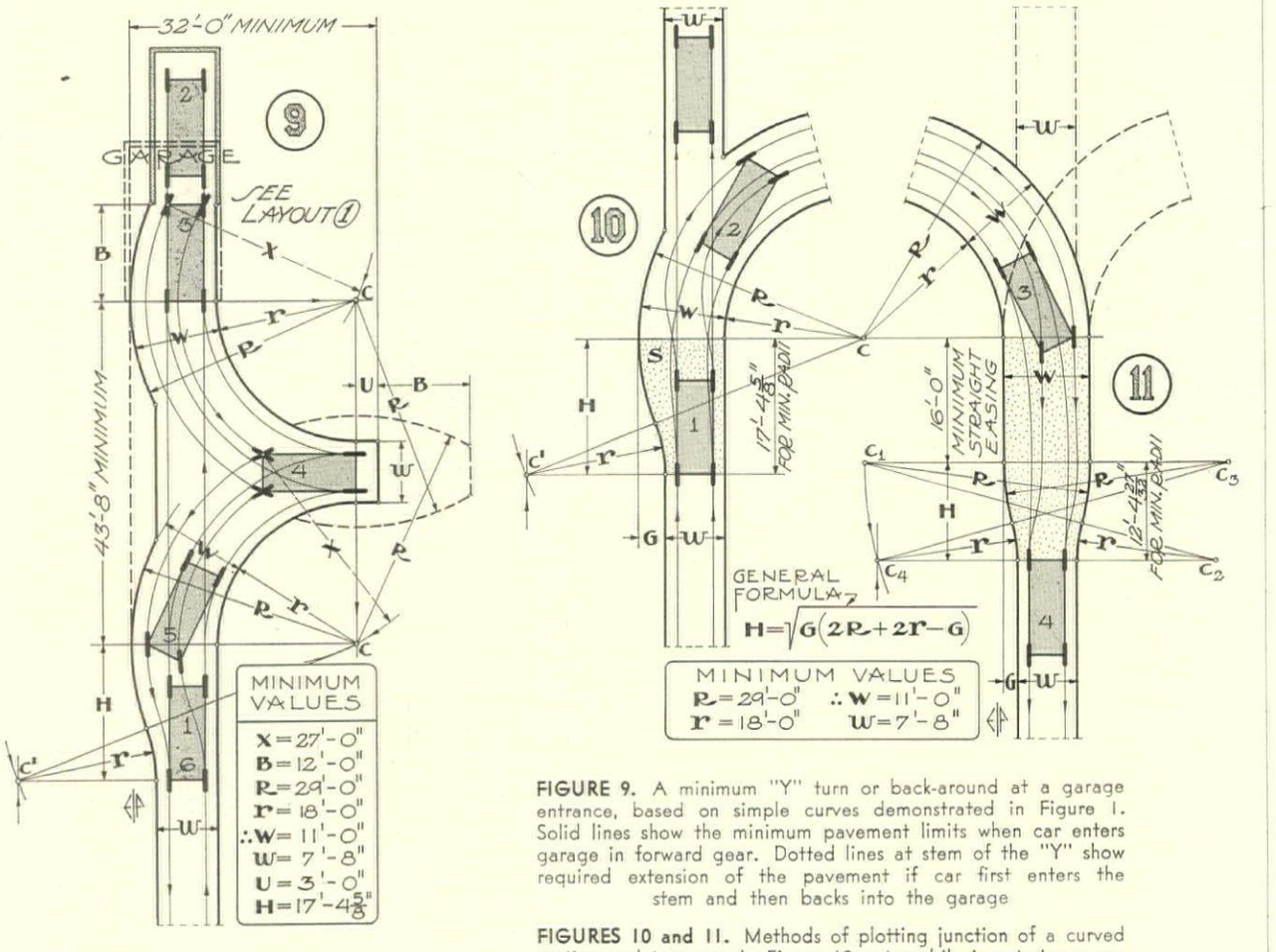
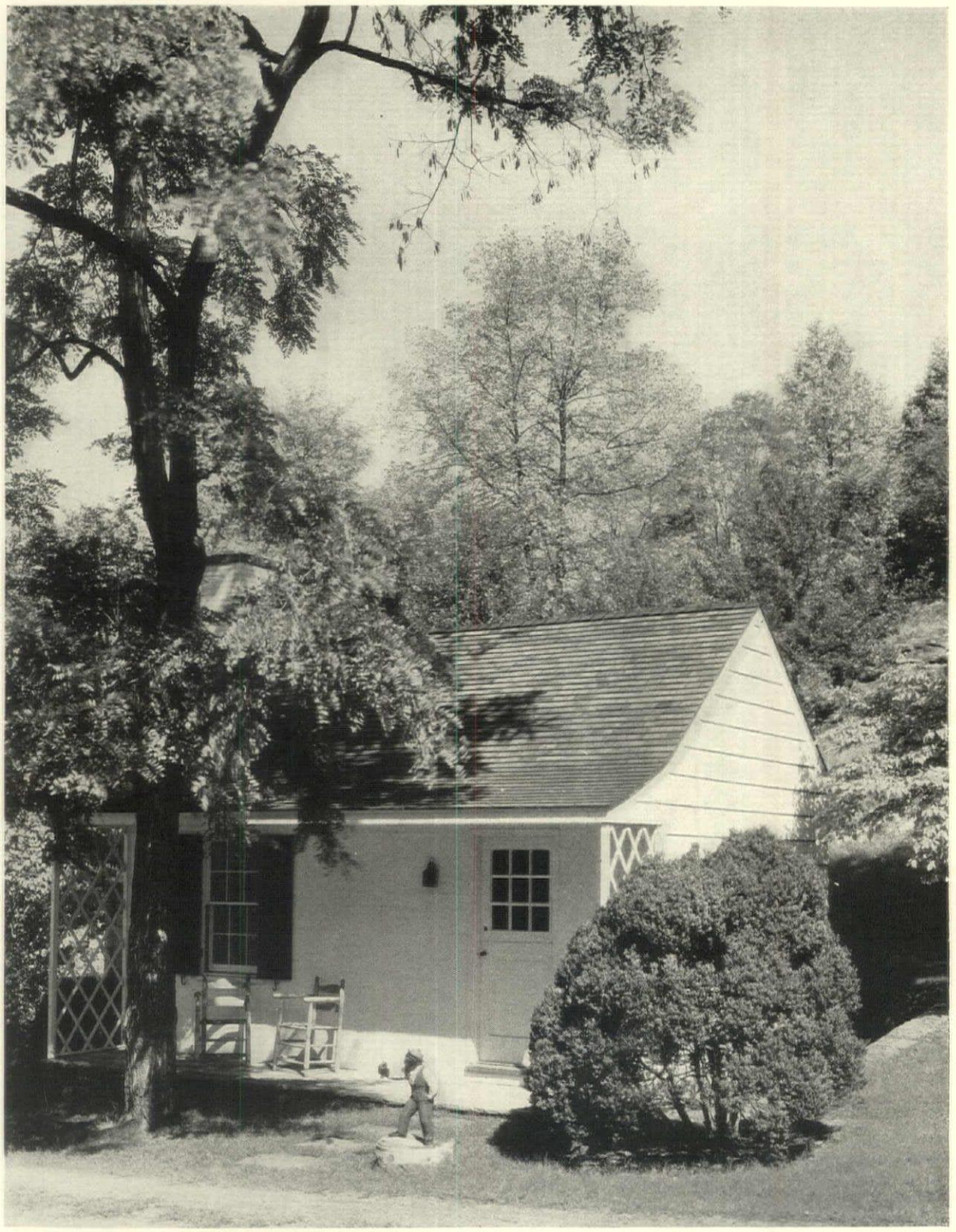


FIGURE 9. A minimum "Y" turn or back-around at a garage entrance, based on simple curves demonstrated in Figure 1. Solid lines show the minimum pavement limits when car enters garage in forward gear. Dotted lines at stem of the "Y" show required extension of the pavement if car first enters the stem and then backs into the garage

FIGURES 10 and 11. Methods of plotting junction of a curved section and tangent. In Figure 10 automobile is entering curve from straight section; space S being required for ease of driving and for cars moving in other direction. Figure 11 shows car leaving curve and entering tangent of minimum width

tion 2 to position 3; backs from position 3 to position 4 with front wheels fully cramped; goes forward from position 4 with front wheels cramped to the other extreme, to position 5, and then gradually straightens out into position 6, completely reversed in direction from the initial incoming position 1. When making a layout of this kind *get in the car and drive* at ¼" scale! When space is at a premium, if the garage doors are made the width of the circular portion of the driveway, then the garage can be brought forward a distance equal to the wheelbase B of the car. This expedient merely utilizes a part of the driveway as a part of the garage floor. If the car goes into the garage in reverse gear after turning into position 4, then the stem of the Y must be extended a distance equal to the wheelbase B as indicated by the dotted curves of this layout.

Figures 10 and 11 indicate alternative methods of properly designing the easements, or transition portions, between straight and curved driveways. The junction at Figure 10 takes the least room, and is perfectly satisfactory. Space S is not waste: it is required in the reverse direction of travel, as is shown at Figure 9. In Figure 11, however, the requirements are less severe when the direction of travel is opposite to that indicated here. This will be fully appreciated by an inspection of Figures 3, 4 and 8, where the cars swing from the straight-away onto the curve, whereas, in Figure 11, the swing is made from the curve onto the straightaway. Figures 10 and 11 take care of all possible contingencies, where a straight driveway continues a circular one, or vice versa. When other conditions obtain, it becomes merely a problem of working out the Y principle typified at Figure 9, combined with the requirements shown at Figures 10 and 11.

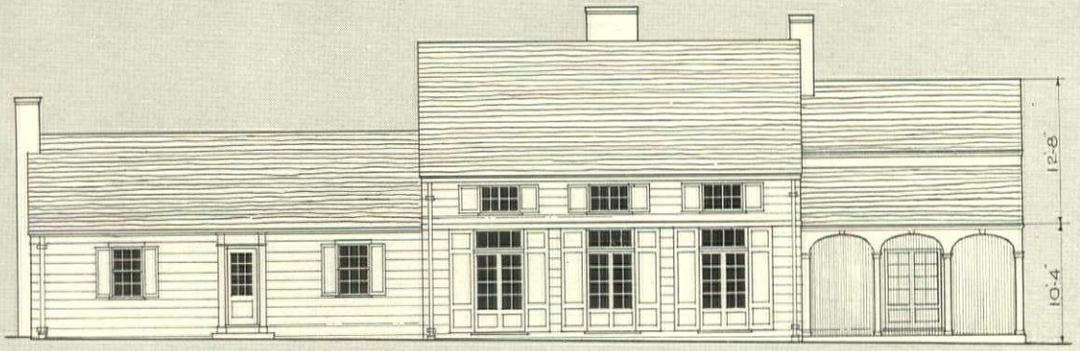


The office shown above is located at the entrance to the property. The house is situated about 800 feet beyond on a gently sloping wooded hill. The living room faces a long vista of the Kanawah River valley below

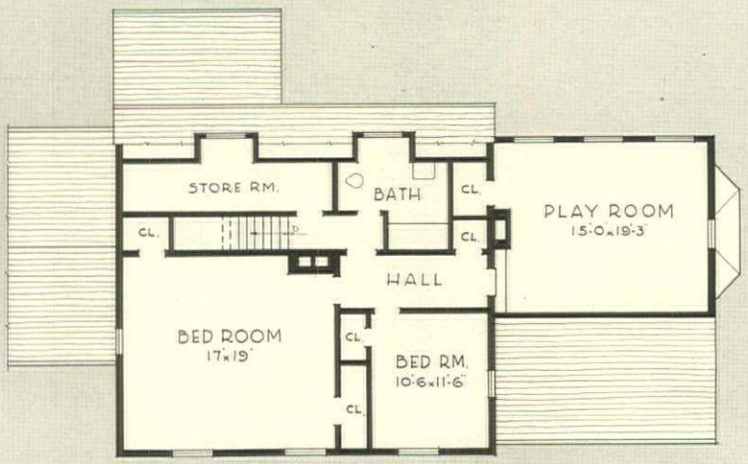
HOUSE OF PLUS R. LEVI, CHARLESTON, WEST VIRGINIA

LEWIS E. WELSH, ARCHITECT

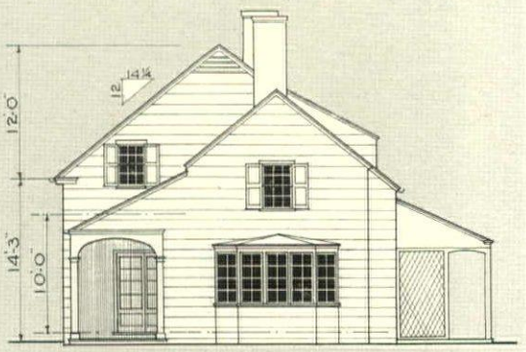
Photographs by Charles E. Knell



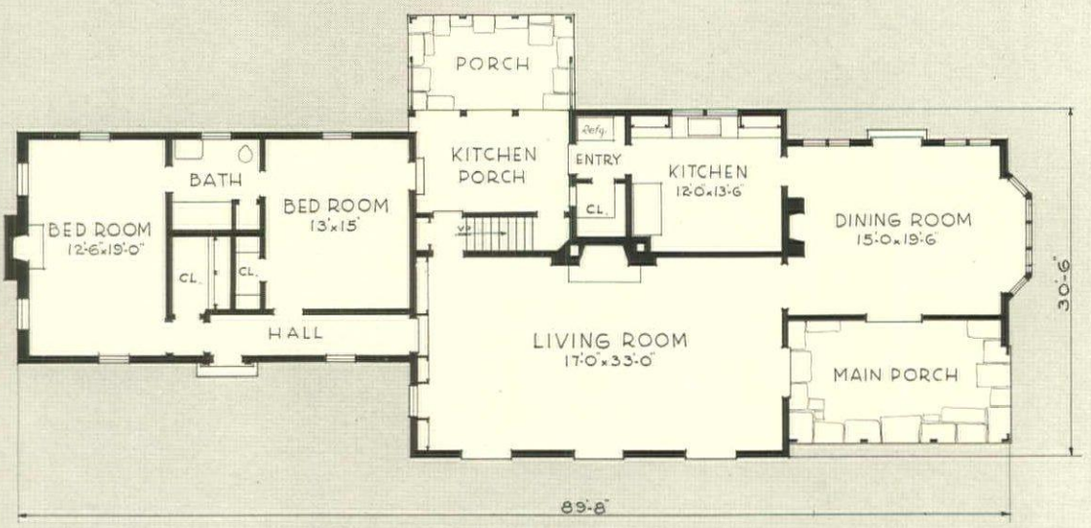
FRONT ELEVATION



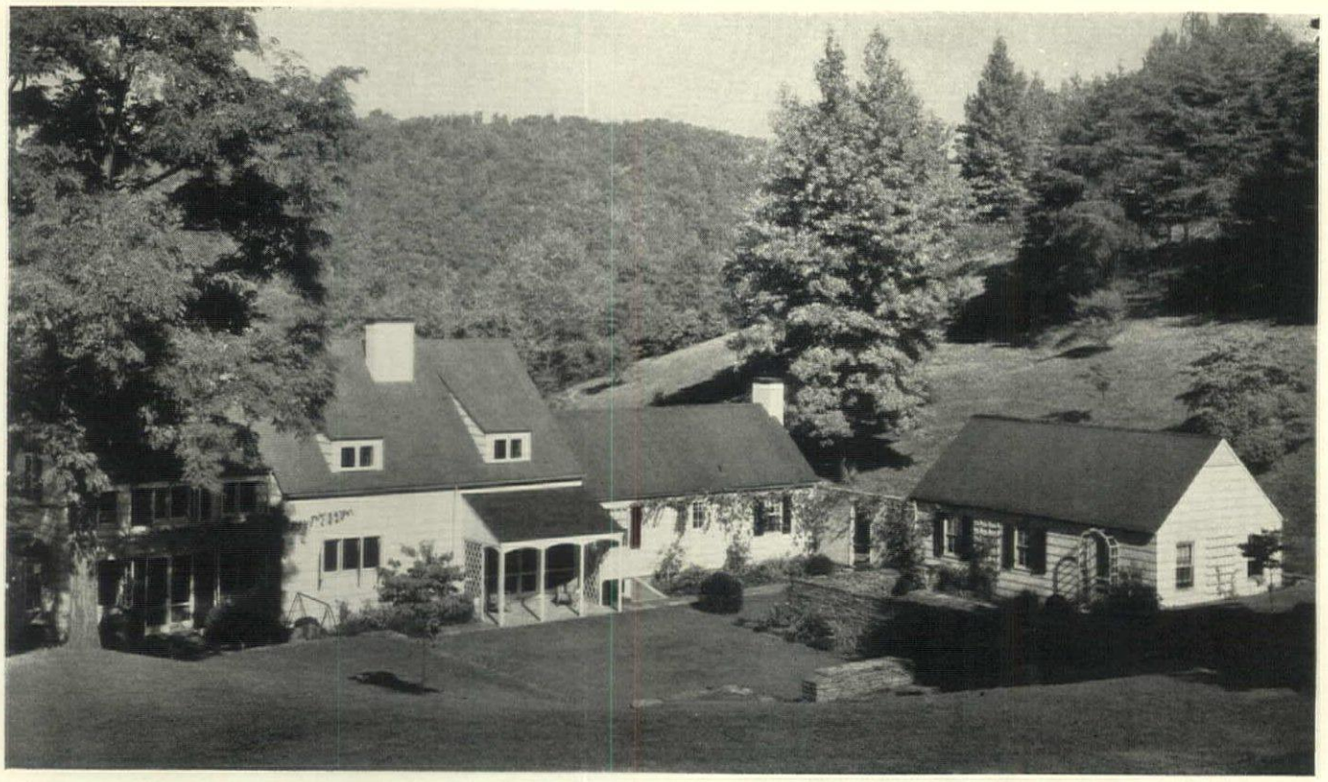
SECOND FLOOR



END ELEVATION



MAIN FLOOR

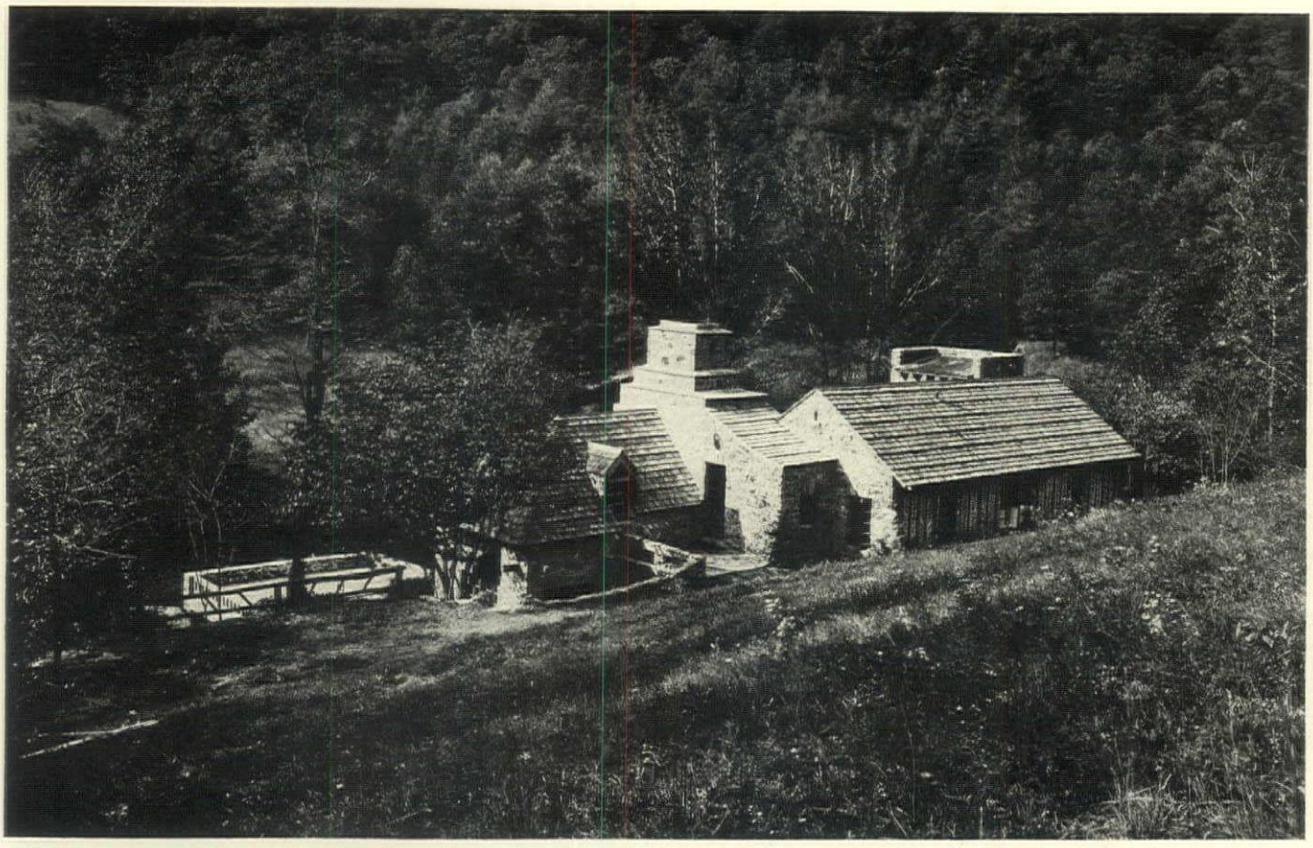


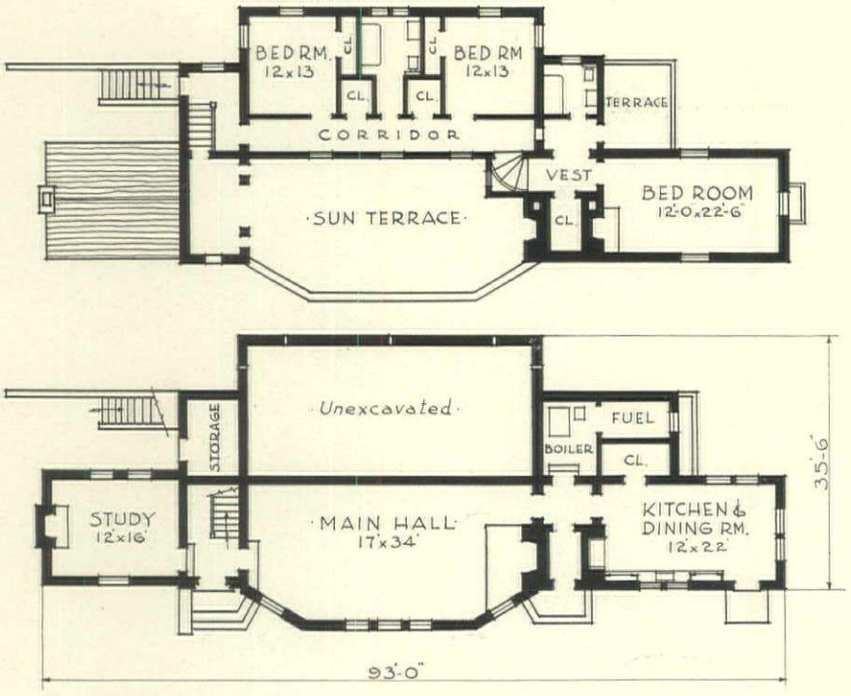
Construction: House is frame with shingled exterior painted white. Roof, shingles stained brown. Blinds painted dark green. Interior walls, plaster, painted and papered. Floors, oak, with linoleum in kitchen and baths. House contains 42,160 cu. ft. Illustrations show garden at the rear of the main house. The small building is a two-car garage that includes a chauffeur's room and bath

HOUSE OF PLUS R. LEVI, CHARLESTON, WEST VIRGINIA
LEWIS E. WELSH, ARCHITECT

Detail of bay in Dining Room

HOUSE OF PLUS R. LEVI, CHARLESTON, WEST VIRGINIA, LEWIS E. WELSH, ARCHITECT

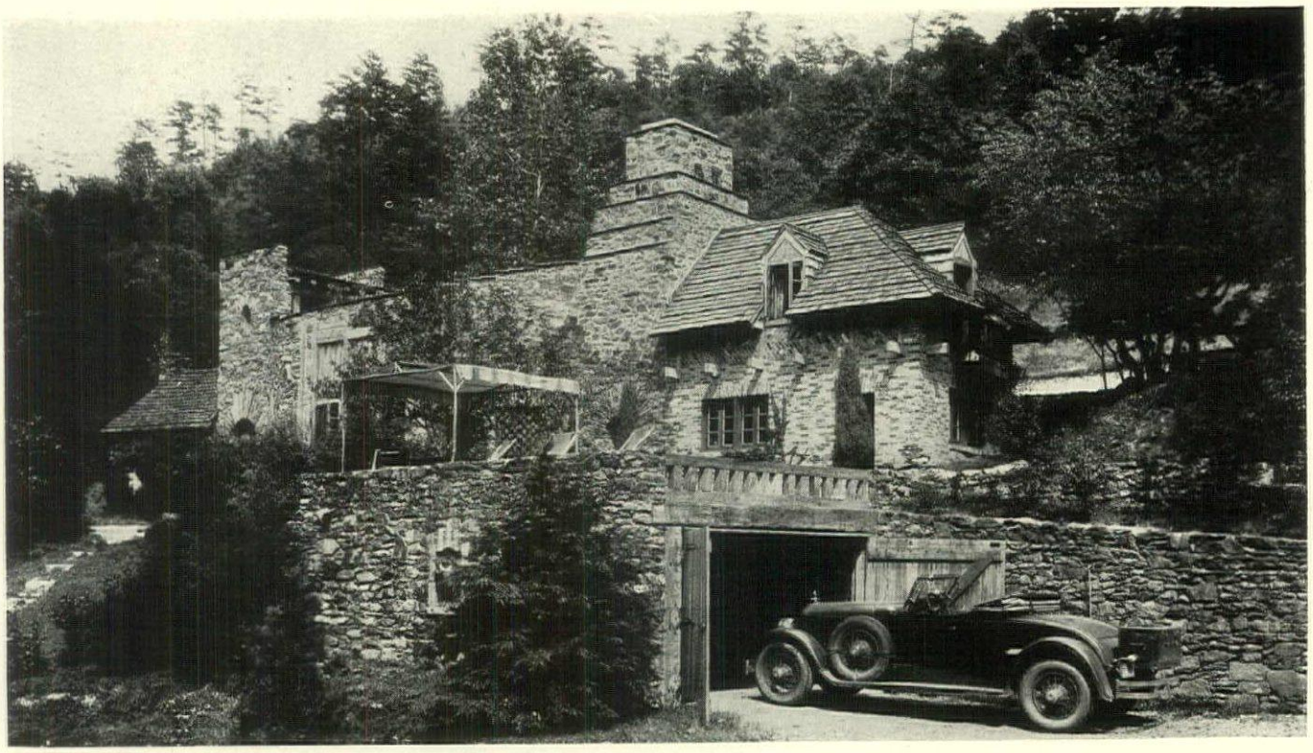




HOUSE OF DOUGLAS D. ELLINGTON
ASHEVILLE, NORTH CAROLINA

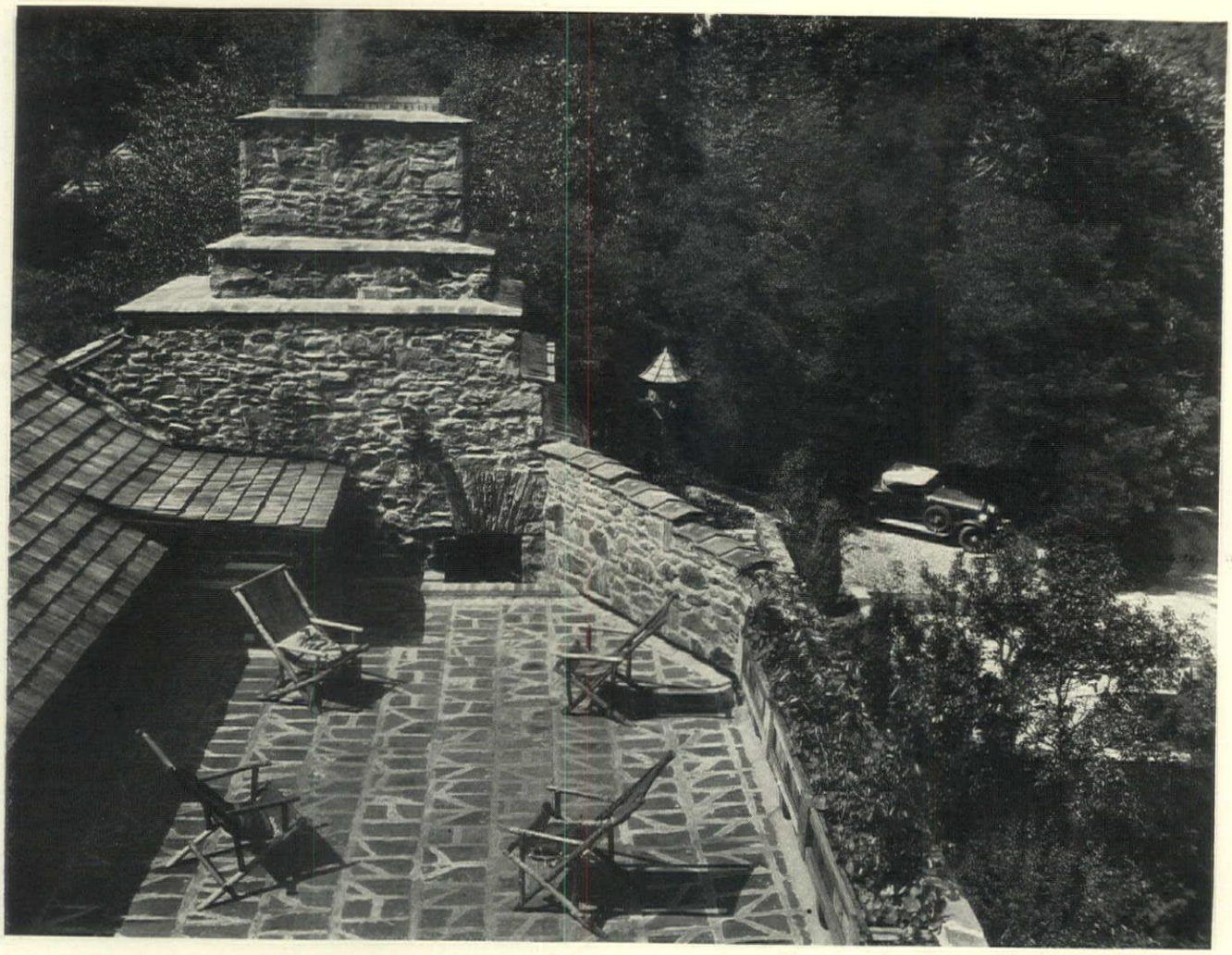
DOUGLAS D. ELLINGTON, ARCHITECT

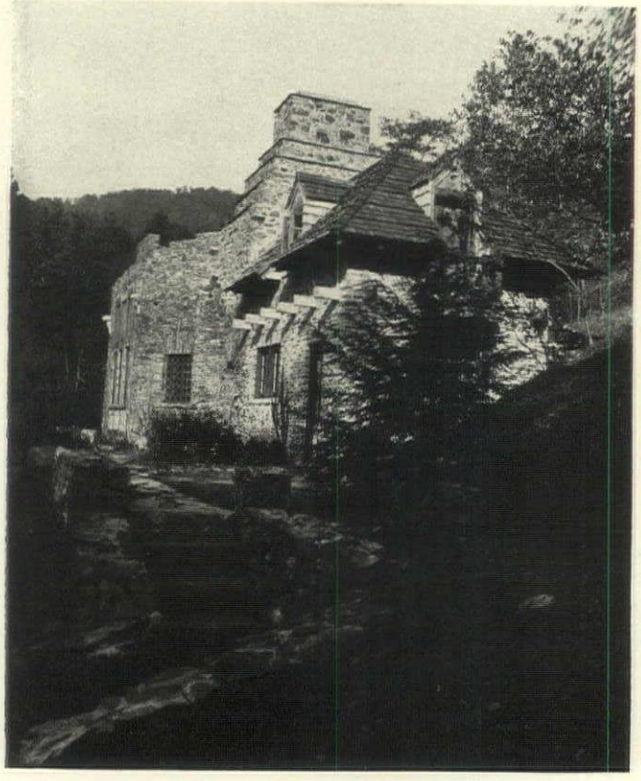
Photographs by Ball

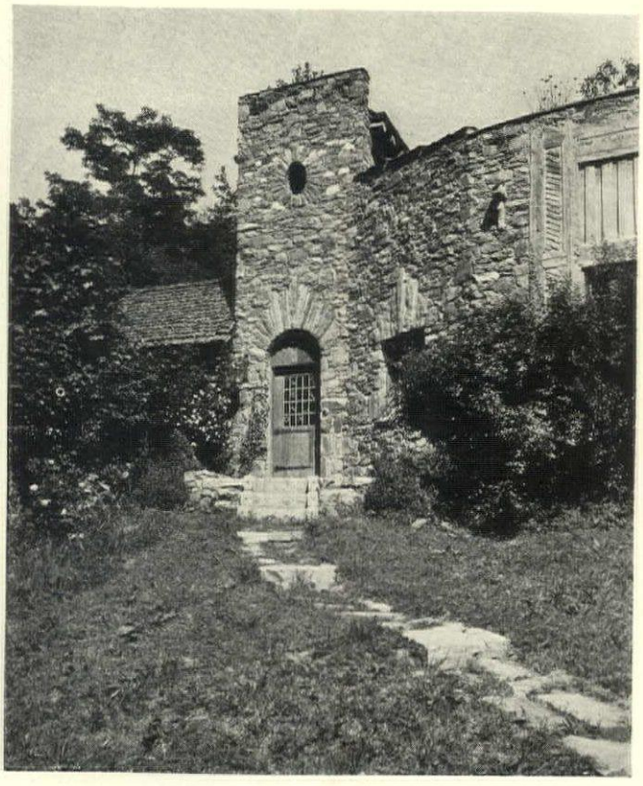


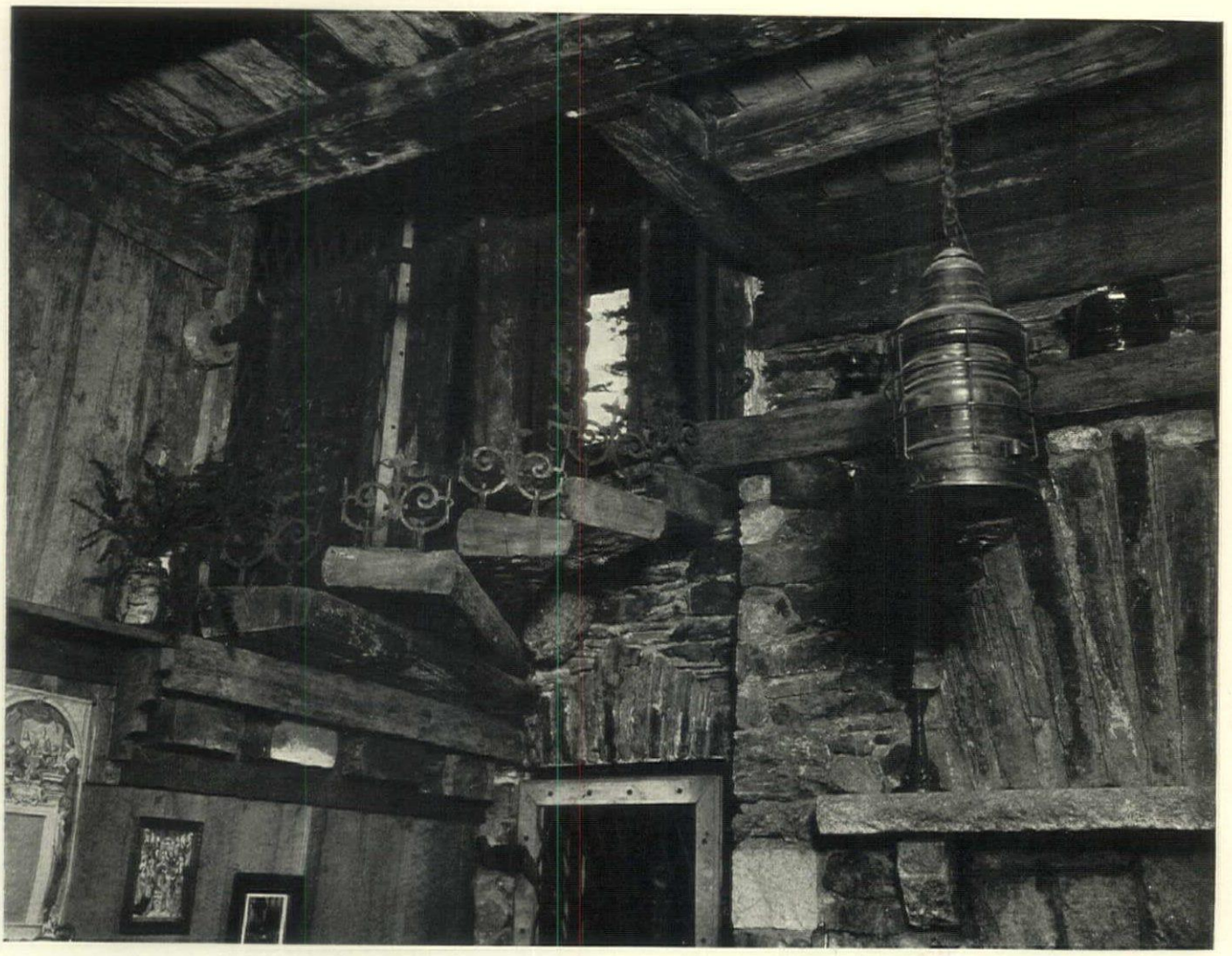
Unskilled labor built this house with native and old materials. Walls, salvaged brick and stone picked up on the site. Heavy timber framing, hand-hewn shingles, hand-forged hardware. Above: house from the drive; below, old log cabin, now used as study. Facing page, above: sun terrace; below, right, entrance detail

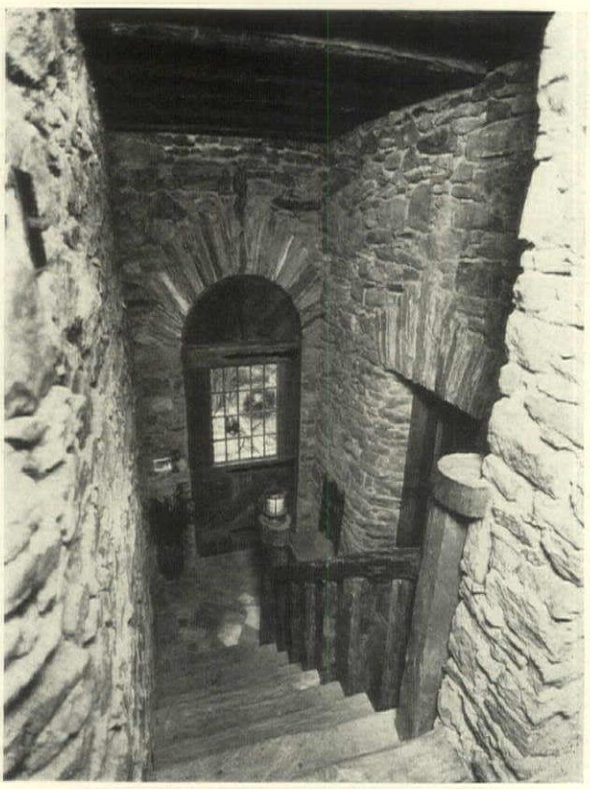
HOUSE OF DOUGLAS D. ELLINGTON, ASHEVILLE, NORTH CAROLINA, DOUGLAS D. ELLINGTON, ARCHITECT









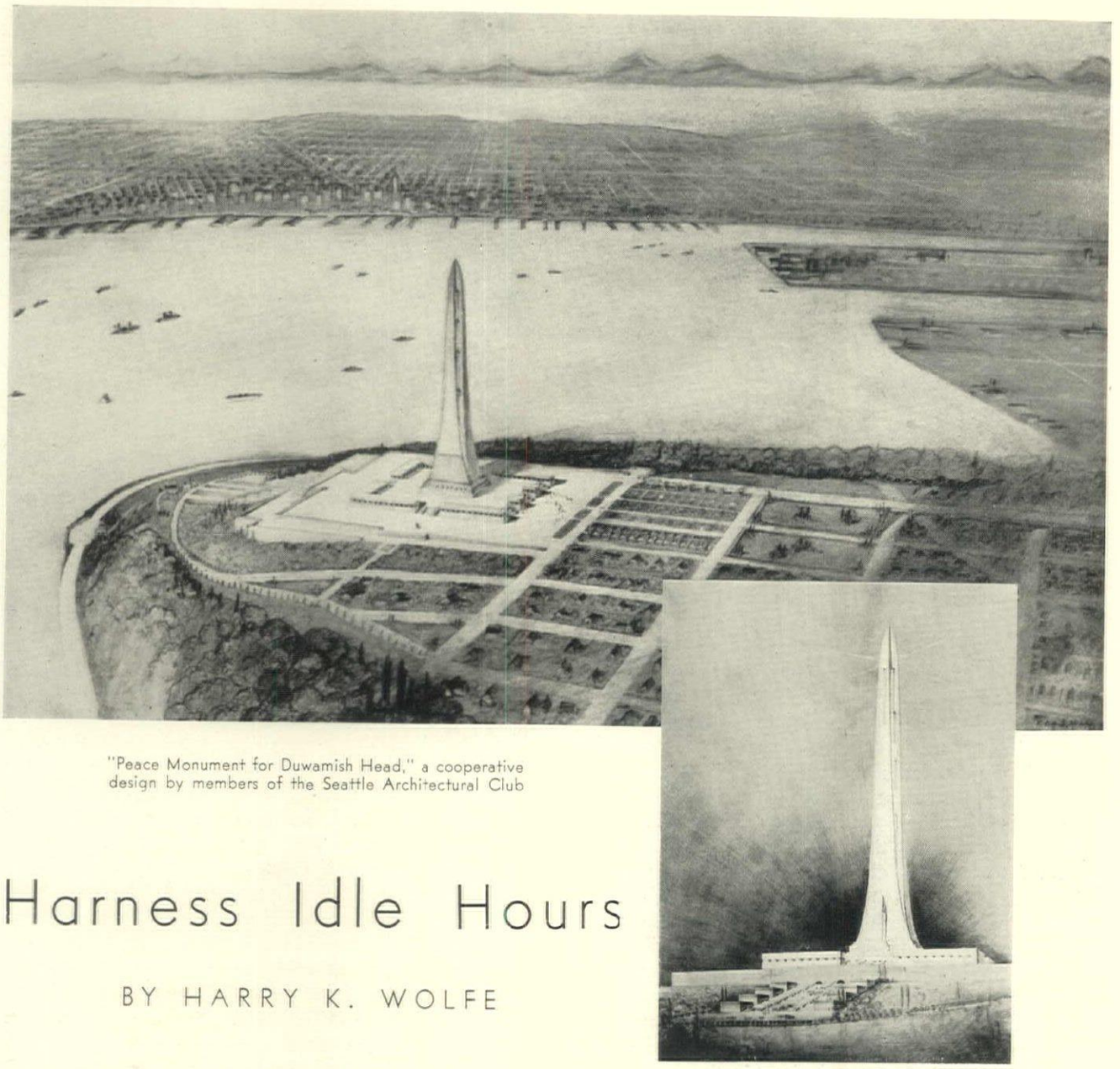


Walls and framing are solid throughout the house, most rooms being unplastered. Stonework is gray, flecked with tan, red and yellow. Brick are variegated in high colors, toned by age. Timber framing and plank sheathing are silvery gray. Above, detail of living room ceiling and gallery stair. Facing page shows main hall

HOUSE OF DOUGLAS D. ELLINGTON
ASHEVILLE, NORTH CAROLINA
DOUGLAS D. ELLINGTON, ARCHITECT

Above: kitchen, also used as a dining room. Right: bedroom over the kitchen and dining room wing

HOUSE OF DOUGLAS D. ELLINGTON, ASHEVILLE, NORTH CAROLINA. DOUGLAS D. ELLINGTON, ARCHITECT



"Peace Monument for Duwamish Head," a cooperative design by members of the Seattle Architectural Club

Harness Idle Hours

BY HARRY K. WOLFE

IN contrast with formal schools of architecture or even individual study, it is the atelier—informally and cooperatively conducted—that seems to serve best the needs of young architects and draftsmen for practice in advanced architectural design.

What type of problem should be conducted by the atelier? The Seattle Architectural Club has answered the question by a program that benefits the designer, gains considerable public recognition for the architectural profession and is useful to the community in promoting interest in civic improvements. Instead of executing purely theoretical studies, the members of this organization relate their work to reality. Their programs deal with the architectural development of Seattle.

The project illustrated is a typical one completed this year as a major project of the club. Though improbable of early realization, it was presented to the city for future consideration, was described in the leading local newspapers and exhibited in the windows of a prominent department store. The program proved that designs for actual sites are interesting to the public, however monumental they may be. Pictorially presented they have news value and do much to keep the work of architects before the public.

From the standpoint of the individual designer such projects as "A Peace Monument for Duwamish Head" stimulate interest in civic planning and unusual monumental design. A program related to an actual site approximates in study the conditions of office practice. Visits to the site give a greater appreciation of the city's architectural potentialities.

This particular problem was first studied individually and the sketch solutions judged. The winning design was then developed as a cooperative group project.

Economics—The New Basis Of Architectural Practice

The **art** has become the **science** of building. Architects must lead the way in the orderly solution of new economic problems or become merely subservient decorators of the practical innovations evolved by others

BY ELMER ROSWELL COBURN

"ARCHITECTS Launch Nationwide Survey of Construction Needs" was undoubtedly the most important news item bearing on the future of Architecture as a Profession that has appeared for years. The item continues that Ernest J. Russell, President of the American Institute of Architects, urges a national survey of our building needs in anticipation of a general revival of business; and the development of some form of national construction council is advocated. In its essence, Mr. Russell's pronouncement calls for the substitution of orderly planning in the future for the disorderly and wasteful methods of the past; and in the change that this predicts, the future of the individual architect depends upon how well he grasps the underlying factors and how well disposed he is to relinquish past conceptions of the profession.

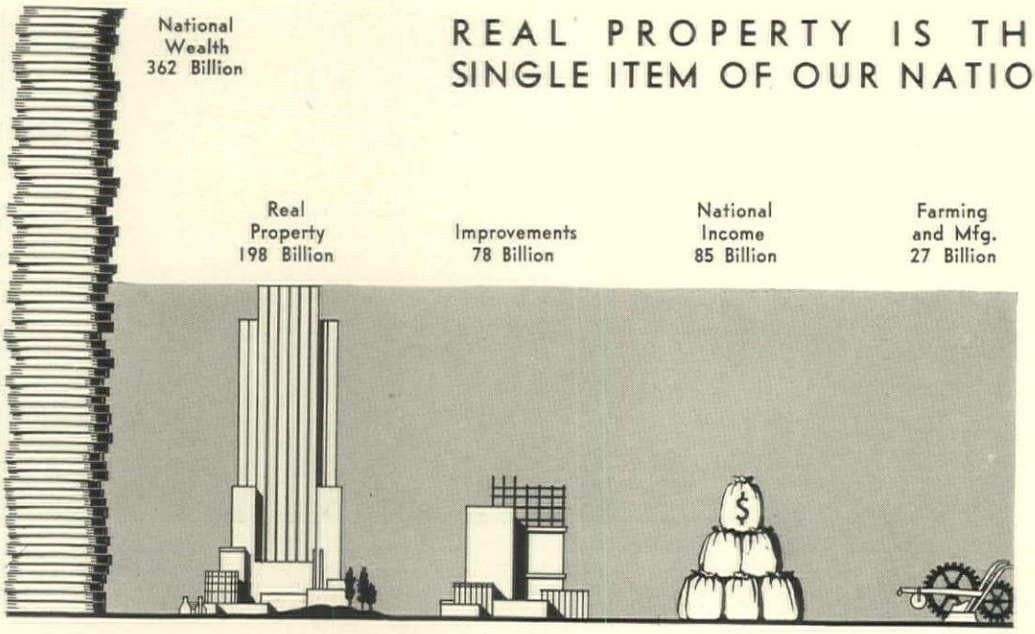
Events of the past few years have emphasized the folly of considering architecture as a thing apart from the commerce and industry of the nation, for when we realize that real property is by far the largest single item in the national wealth of the United States we are better able to appreciate the part in the economic structure that the architect should rightfully occupy.

That real estate had been overextended is a familiar story to every architect, but few recognize the full significance of this overextension and its relative importance in the affairs of the nation. We have factors in building at our command today, which, if not placed under some form of control, can produce a volume of building that far overreaches our requirements and, while maintaining a money and profit economy, can result only in throwing our economic structure out of balance. The past few years have brought to light the weaknesses of former methods of developing property and constructing buildings which demand radical revision. When we "look at the record," it is not difficult to understand that the real estate burden which resulted from this uncontrolled and unwarranted development could not have been carried.

In 1929 real property, as computed by the National Industrial Conference Board, totalled 198 billion dollars, which was well over 52 per cent of the total national wealth of 362 billion dollars. This was an increase of nearly 100 per cent above the real property valuation of 1912 of 109 billion dollars. Of the 1929 estimate, about 78 billion dollars represented the value of improvements. This is more than three times the 27 billion dollar valuation placed on the whole farming and manufacturing equipment of the nation. Circumstances which have prevailed since 1929 have, of course, further aggravated what was already a serious condition, for the national income declined from a high of 85 billion dollars for that year to about 40 billion dollars at the present time.

During the period 1920-29 the volume of new construction for 120 principal cities of the United States totalled about 25 billion dollars. These cities are located in various sections of the country and may be considered as giving a representative cross-section of the total national building for this period. The unreasonable proportions which this construction volume had assumed may be readily seen when compared with an average previous decade. We cannot consider the war years, since necessity had forced the abandonment of many projects during this period, but taking the five year period 1912-16 inclusive, the identical 120 cities had a total volume of 4 billion dollars in new construction. This would indicate a total construction volume for a normal ten year period of about 8 billion dollars. While the housing shortage which occurred after the war and commercial expansion both accounted for a considerable increase during the 1920-29 period, such an unduly large building program was not warranted. When we turn to the figures of New York City alone, we find that variations in the same period are even more startling. Total new construction in the 1920-29 period was 7¼ billion dollars as against 1½ billion dollars in the previous decade—an increase of almost 400 per cent. Here again, as in the group estimate, the construction

REAL PROPERTY IS THE LARGEST SINGLE ITEM OF OUR NATIONAL WEALTH



Few recognize the importance of real property or the significance of its enormous overextension. Unwarranted real estate development has overreached our requirements. The burden has been too great, and continued uncontrolled building volume can only throw our entire economic structure out of balance

volume's great increase was entirely unwarranted.

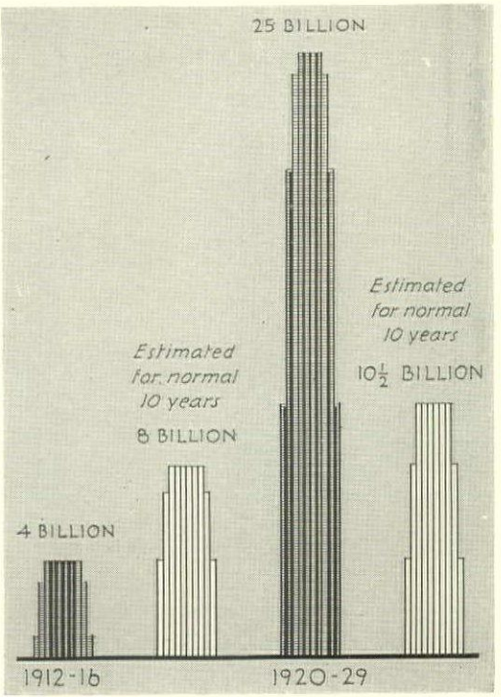
The parts that structural steel, the real estate bond and the speculative builder played in creating this unbalanced condition are also familiar to every architect. Antiquated building codes and other factors have also contributed. But these three major constituents crept imperceptibly into our building progress and projected new buildings and land developments at a rate unknown before and without a reasonable foreknowledge of the demand. In New York City, for example, during the 1920-30 period, the population had increased by 1,309,098 persons while the new multi-family houses alone provided 1,637,467 rooms—an excess of 328,369 rooms. Considering the rooms in new single dwellings, hotels and apartment hotels the excess probably amounted to well over 500,000 rooms. Much of this oversupply is directly traceable to the speculative builder and the mortgage bond.

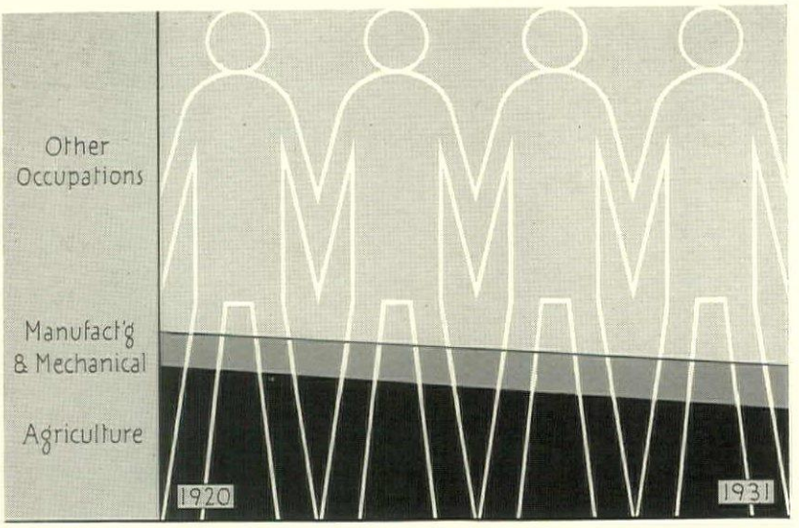
Oversupply of space was in itself a heavy burden, but it was further intensified by the excessive construction costs of individual buildings. There has been a wide and growing gap for several years in the directions taken by the forces creating shelter and other major industries. In the first the trend was not only toward overproduction, but also to higher unit costs. In the others, while there was also overproduction, the trend was decidedly toward lower unit costs. All indications today are that this latter trend is necessary in all branches of industry including that of building. The automobile industry in this respect has made far greater strides than the building industry. Considering the passenger car output as a whole there has been a progressive decline in unit costs since the year 1900. In that year the average wholesale cost per car was about $1,160. It had fallen progressively to $940 in 1912 and to $620 in 1929. In 1931, despite an output less than half of that in 1929, there was a further drop to $560. The old Model T Ford touring car sold for $600 f.o.b. in 1912, whereas the new eight-cylinder model sells for something under $500. In a span of twenty years Mr. Ford has been able to produce a far better car with most of the latest gadgets and sell it considerably under the price of the old model. Just the reverse has taken place in the building industry.

While it may be argued that the average building has mechanical improvements which a building of twenty years ago lacked, it is nevertheless true that construction costs have increased tremendously. Of the multi-family houses erected in New York City since 1915 there has been a sharp rise in construction cost. In that year the average cost per room was about $510. In 1921 the average cost was $1,370 and in 1929 the average was about $1,460.

One important factor that has been largely responsible for the unreasonable rise in construction cost is the fixed wage rates of the labor unions. The past twenty years saw an increase that amounted to 100 per cent in many of the skilled manual trades and yet it seems a paradox that during the 1920-29 period especially the movement revolved in such a way—losing ground in some branches of industry, but gaining wage increases and other advantages in the building trades—as to throw a heavy burden on real estate. President Hoover's Committee on Social Trends noted that the zenith of the organized labor movement was reached in 1920 when the total membership was 5 million. Since 1920 it has steadily declined to about 2½ million members at the present time. This is a small percentage of the 48 or 49 million persons normally gainfully employed; and the higher wage rates that have accrued to these manually skilled members tended to raise the cost of housing beyond the reach of the unorganized wage earners. There has not been the compensating factor of increased efficiency by improved machines to offset the wage rise such as has occurred in the automobile industry.

Building codes, formulated many years ago and added to piece-meal as each new problem presented itself, have also been a contributing factor in increasing construction





OCCUPATIONAL TRENDS away from agriculture and manufacturing indicate that less labor is being required to produce goods. The trend will probably continue

ABNORMAL VOLUME of construction has increased the already large burden of real estate. During the period 1920-29 actual construction was almost two and one-half times the volume estimated for a normal ten-year period

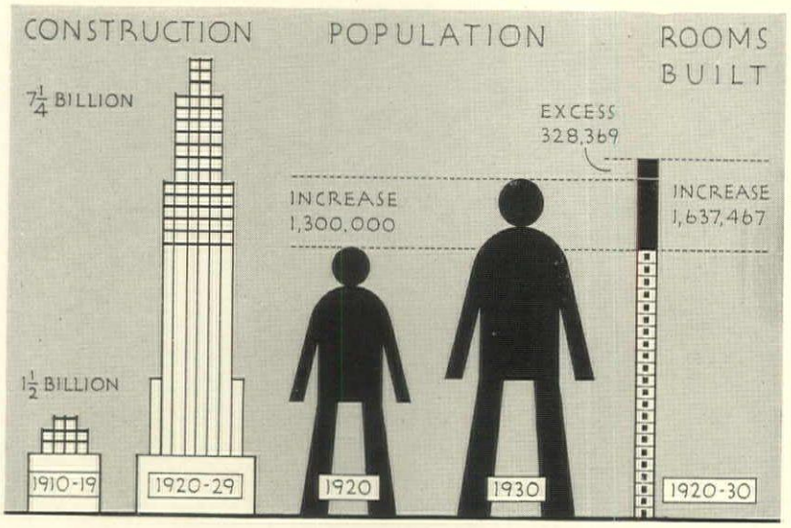
costs. While much effort has been put forth in recent years to secure changes in these antiquated codes, it is significant that most of the suggested changes revolved around lowering the safety factor on old construction forms—not toward obtaining approval of new forms. In this respect we have to consider that authorities charged with the responsibility of drafting and enforcing these codes have merely been in the position of protecting the public against unsafe construction practices designed by others. Many of these codes will ultimately have to be scrapped to make place for more modern forms, after such forms have given assurance of being safe as well as economical.

Housing for the masses has never had the benefit of group study that other major necessities and many luxuries have had. It is true that millions of sketches have been made and prize competitions held, but they have always concerned the plan or exterior design. These studies have never gone into the fundamentals with any idea of conceiving new and cheaper methods of construction. Thousands of six-story, non-fireproof apartment houses have been built with brick self-supporting walls, wood floor beams and wood stud partitions. This combination under proper circumstances some years back produced a fair construction. Under the hurried conditions of more recent years, however, it produced buildings that soon deteriorated. With proper forethought an entirely different method of construction could have been evolved.

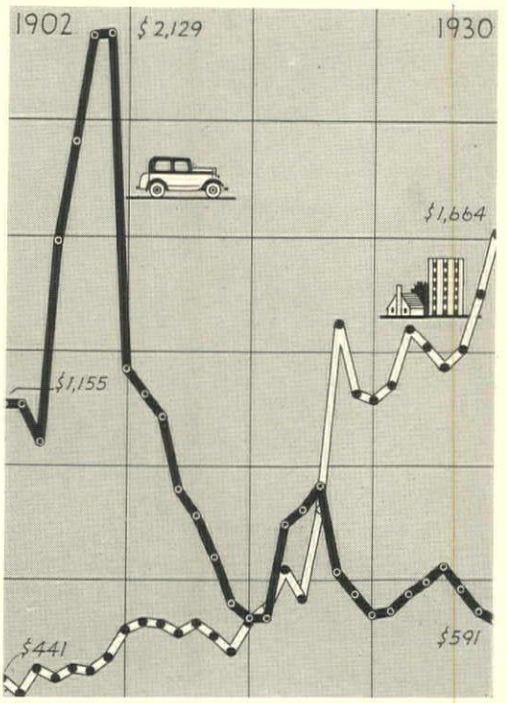
An analysis of the three principal entities in speculative building will help to throw some light on the weak points of its mode of operation and why better solutions to these problems of building have not come into existence. (1) The speculative builder views a building only from the commodity standpoint and is not visionary enough to perceive necessary changes in methods. (2) Lending institutions do not consider their scope beyond that of lending money. (3) The architects for a large proportion of this speculative work were men content to make drawings only sufficiently detailed to satisfy the local building departments. Nowhere along the line has there been a coordination of forces to struggle for any objective excepting to make money—and this without vision. Other major industries have centered the creation of a product in the hands of a few who usually applied terrific pressure to give all the product possible at the lowest price. The building industry, composed of many units of varying sizes, has not had the benefit of such collective action.

The proper solution of the problems involving shelter is of vital importance in our national affairs today. The maintenance of a fair balance between supply and demand is only one part of the problem. That part necessitates the survey that has been proposed, followed by strenuous efforts to control the production of all types of space. The second part necessitates cutting construction costs to bring building practices into harmony with our industrial life. This is necessary not merely because unit costs in other major industries have been decreasing steadily, but because *the general economic trend dictates it.*

The progressive shift of population away from farming and into manufacturing assumed an important form during the 1920's; and while the 1930 Census revealed a further decline in the proportion engaged in agriculture, it also indicated a decline in the proportion of mechanical workers and an increase in the proportion noted as being in the service trades. This is of major significance, for as technological improvements required less workers to produce more goods, the service trades spread and absorbed many of the displaced workers. Despite present unemployment and the shift of some



UNWARRANTED INCREASE in New York City construction during 1920-29 was the result of speculation that produced an excess of rooms over actual needs



CONSTRUCTION COSTS per room have risen greatly. Trends in the automotive industry are toward lower unit costs in spite of improvement in product. In building the reverse seems to be true, due largely to fixed wage rates of labor

families to farms, most economists are agreed that the main trend still holds and will continue to hold: that is, less workers will be required on farms and in manufacturing. This is cited merely to indicate that when some balance of the economic structure is attained, it will be necessary, in order to remain stable, that a decreasing amount of the workers' income go for living expenses and an increasing amount for luxuries and the service trades. When the mass of the workers are loaded up with burdensome debt such as excessive home maintenance, etc., the flow of purchasing power for the products of a considerable part of the population is necessarily stopped. This also applies to other parts of the real estate picture. In the amount of liquidation of commercial properties and in the large numbers of enterprises that have been forced into bankruptcy because of high rentals, etc., the folly of building costs and realty values that required too large a share of the income is clearly seen.

The solution to these problems requires the coordination of all constructive forces under a competent and far-seeing leadership. The future of architecture is integrally bound up with these solutions. Architects have gained nothing from the experiences of the past few years if they have not learned that the depression has unceremoniously catapulted the real part of architecture from *art* into the *science* of building and that architectural thought, instead of drifting aimlessly from one historic precedent to another, must be remoulded to form to the pattern of our industrial life.

Architects are at the point in human affairs where, according to the course they choose to follow, they shall be either vital leaders in solving these real problems or retire into the background, being asked occasionally to decorate something evolved by others. Architecture as a fine art has limped along without being anchored to any base. Regardless of the type of building to be designed the prime objective in the architect's mind was beauty. And yet, when we survey the cumulative results of these efforts to make beautiful buildings, an honest analysis shows but a very small proportion of creditable productions, a larger proportion of lifeless reproductions or adaptations that were not worth the money and effort expended on them and a predominance of hybrid buildings—most of them speculative projects—that have had little or no serious study. Today, in any of our large cities, these unstudied speculative undertakings form the bulk of the group picture; and buildings generally admitted to be in good taste can be found only with difficulty.

Architectural standards for the United States cannot be set by the corporation that throws excess profits into a monumental building nor by the wealthy man who builds a vast country estate. These are exceptions in the money and profit economy. Opportunities to maintain architecture as a fine art alone — so far as wealth is concerned — are steadily becoming fewer. Even today's spread of wealth does not necessarily mean wider opportunities for individual architectural projects. The thousands who occupy high priced city apartments would have provided just so many individual town houses, in McKim's generation. Under the changed mode of living today such commissions are comparatively few.

The genesis of a logical American architecture will be found in solving the problems that have hitherto fallen in the main to the speculative builder, for it is the great mass of the people, upon whom we have to depend to keep up a fair balance of exchange, that will set the standard. Considering this there should be a more open-minded attitude on the part of more architects towards better housing for the masses and particularly towards ways and means of providing well-built

housing low enough in cost to absorb only a small part of the worker's income. We are not moving into metal or pre-fabricated houses for the masses as a fad, but as a necessity—as part of the struggle toward a more balanced life.

Present activities in the manufacture of pre-fabricated housing raise an interesting point regarding the future. So far, the design and conception has rested for the most part with individual manufacturers — working toward standardized types. Does this forecast an evolution of our communities into unrelated mazes of various manufacturers' products, extending not only into housing but into our business buildings, or will our architects grasp the opportunity at this psychological time to guide each community as a harmonious whole?

This does not mean that our communities are to be made over in a day. A nation that has the accumulated evils of many years of planless growth cannot be changed that quickly. The process of evolution into a better ordered state will, for a few years at least, be a gradual one. Much of that which was ill-conceived and high in cost has, after passing through many hands in foreclosure sales, descended to a value that may now return a profit. Such buildings will stand for a while and serve as examples of what not to do. However, architects should assume leadership now before the new movement takes definite steps in the wrong direction.

With resumption of business stimulated by the Public Works Program many architects should be able to resume (or revive) their practises. Undoubtedly the individual will feel disposed to proceed with his commissions as was his usual custom. It cannot be put too forcefully that architects in a collective capacity should formulate a program of action having as an objective the establishment of order in the growth of our communities. To do this, former customs cannot pertain and architects will find that one necessity is a thorough analysis of the economic questions involved. Such an inquiry, from a broad viewpoint, should trace the incomes of various wage and salary groups, listing the amounts spent on rent or home maintenance and the parts that trickle through to the local government as taxes, etcetera. From such inquiry it should be possible to determine the steps necessary to balance the budgets of municipalities overburdened by the disordered growth of the past.

Probably a major step in the desired direction could be accomplished by securing the cooperation of lending institutions. In view of the dilemma that guaranteed mortgage companies find themselves facing today, coordination of effort seems to be the only feasible solution. Through the organization of a central bureau operated jointly by lending institutions and aided by a committee of architects, it should be possible to extract much information that would reveal in detail the weak points of investment building. A basis could then be established for designing new construction forms.

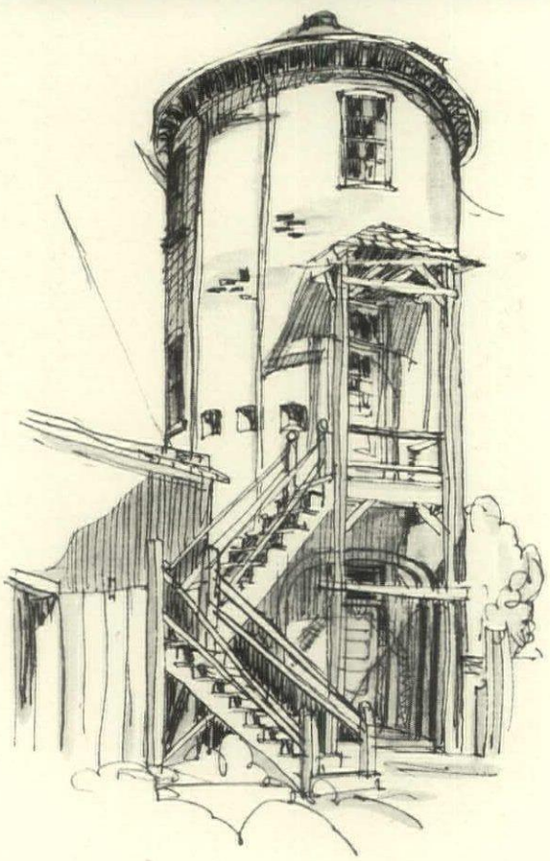
A cooperative movement of this kind should permit planning on a broad scale not possible under the hectic methods of yesterday. The block plan of New York City, for example, demands block development; and the foresight of the bureau would show that in many cases it might be better business for some of the loan companies to group finance a well-planned block rather than fifteen or twenty individual buildings of varying sizes. Probably all authorities would be agreed that blocks devoted to multi-family housing should be planned so that the buildings do not occupy more than fifty per cent of the ground. This has been tried, of course, in various isolated instances, but usually at a cost that required too high a rental. With the study suggested a type of construction might be devised to bring the cost of building within the reach of the masses without destroying its value as a paying investment. Paralleling this analysis should be a wider inquiry into land utilization from studies now being made by various bodies.

Those members of the profession who are prone to consider architecture only as fine art may view the suggested changes as the relegation of pure art to the machine shop and foundry and the death of creative thinking. To them it should be pointed out that these changes call for an entirely different type of creative thought. Hitherto we have thought too much in terms of individual buildings. Today, in 1933, while some individual buildings are optically pleasant, the group picture is far from satisfactory. If architects take the initiative in this period of flux, perhaps by 1943 or 1953 many, if not all, communities will be orderly and harmonious compositions—compositions with new beauty in color and texture. Architects will then occupy a more active position in the nation generally and in their respective communities in particular, not as politicians, but in the broader sense as guides in the *Art of Living.*

HOW CAN IT BE DONE?

AS pointed out in "Jobs for Millions Through Revival of Building" on page 9 of this issue, the building industry exerts a powerful influence on American business. Close to the heart of the industry, architects are vitally concerned with the formation of any plan to promote construction activity. In this issue AMERICAN ARCHITECT begins a campaign to get building started. The editors of AMERICAN ARCHITECT invite correspondence from all who are interested in any phase of building construction. That revival of building has many angles of approach is obvious; and correspondence upon any one of them is urged as an individual contribution to the end that the building industry may do its part in creating a new, sound and immediate general business prosperity.

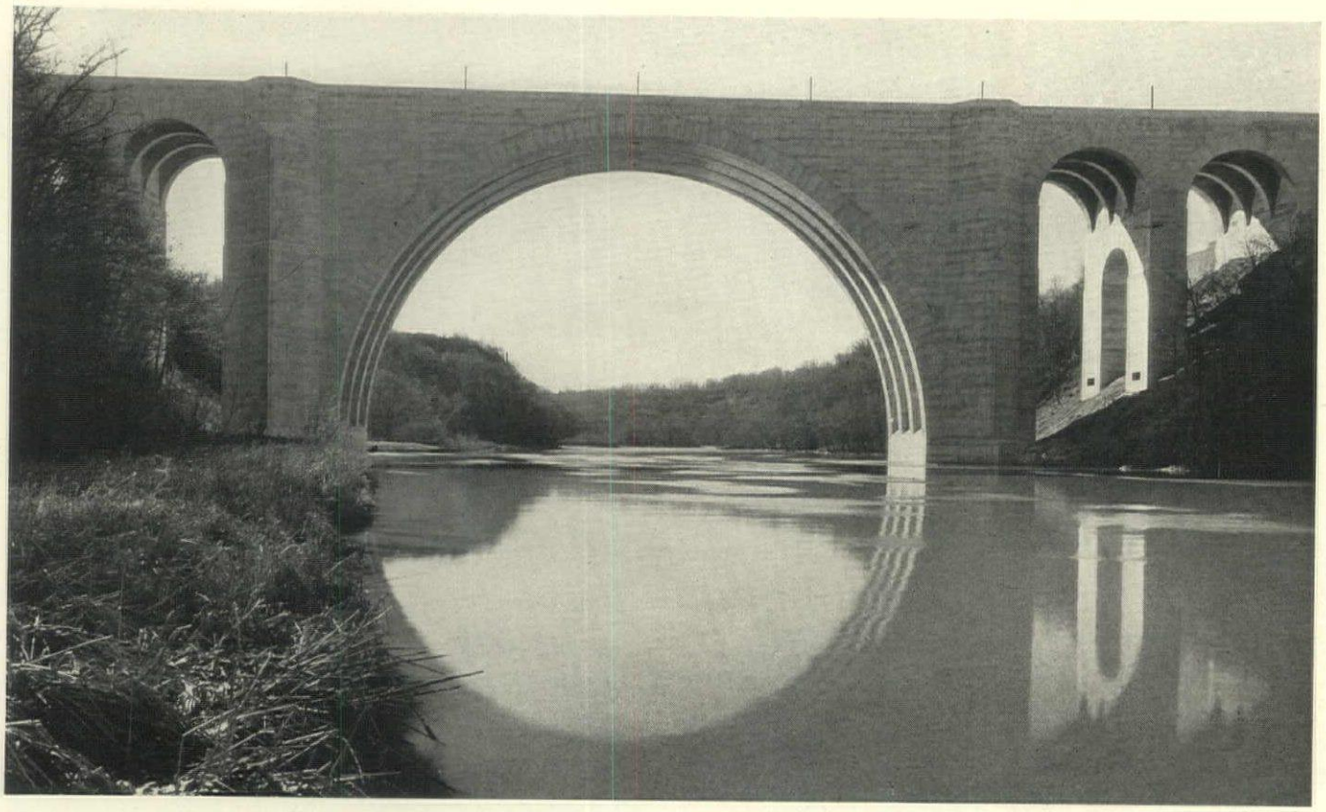
NORTH BROADWAY STREET BRIDGE, LOS ANGELES
By Stanley Johnson



FROM LOS ANGELES AND NEW ORLEANS

Sketches by
STANLEY JOHNSON
and
W. A. FOLLANSBEE

NEW ORLEANS
By W. A. Follansbee



Veterans' Memorial Bridge, Rochester, N. Y. Gehron & Ross, Architects; Frank P. McKibben, Engineer

GOTTSCHO

New Bridges Mean Opportunity for Architects

BY GILMORE D. CLARKE

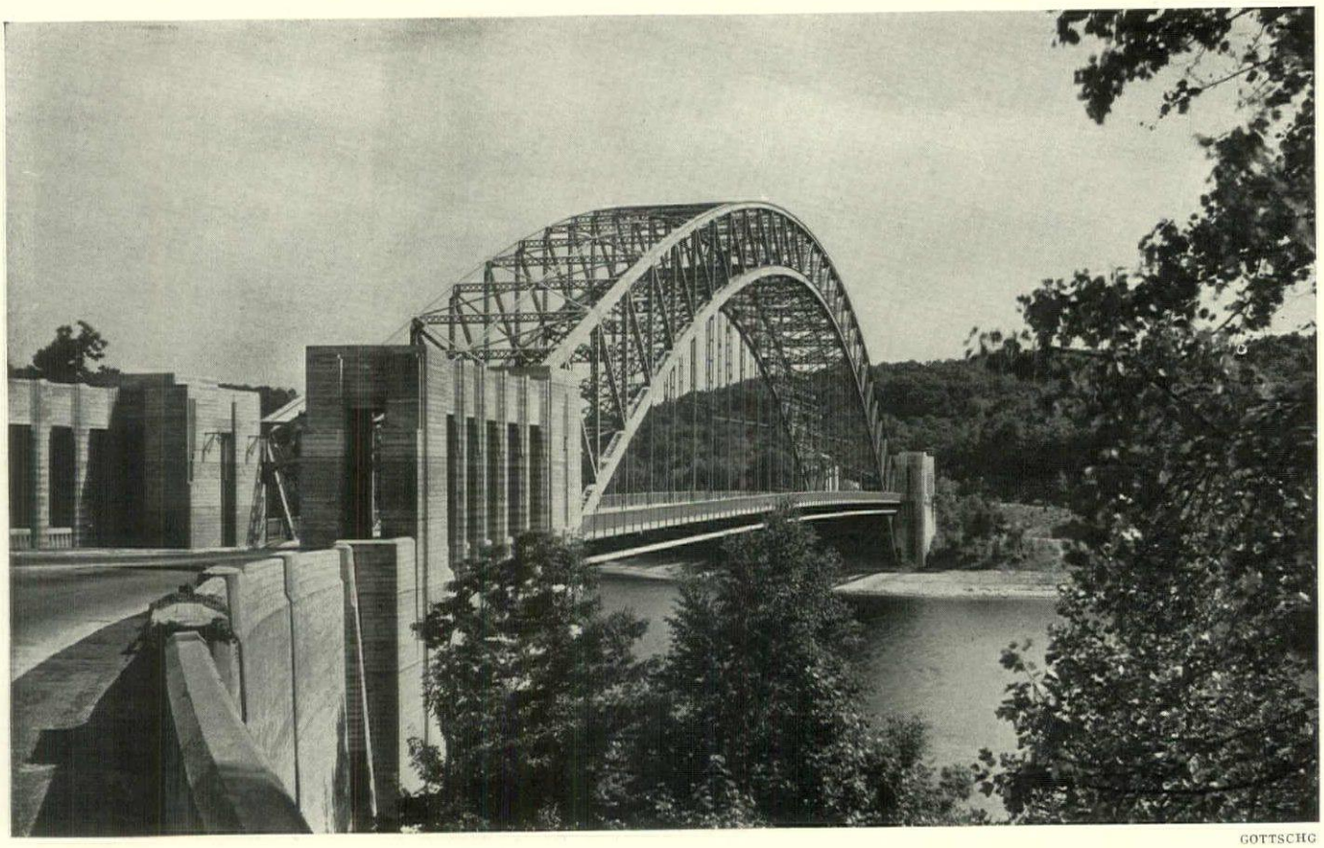
Landscape Architect, Westchester County Park Commission, New York

ONE important activity of the National Public Works Program now under way is the improvement and extension of the nation's roads, part of which activity will concern the development of bridges. Exactly what this means in terms of money cannot be stated, for the Federal policy has been established to work through regional directors who will supervise the construction of projects specifically recommended by local Public Works Commissions.

Architecturally speaking, however, this portion of the Public Works Program signifies opportunity in bridge design and in architectural supervision of approaches and structural accessories. Through the Bureau of Public Roads, the government has gone on record to the effect that adequate attention must be paid to the amenities of highway and bridge design. This means, of course, architectural participation which, in addition to the new policy of the Office of the Supervising Architect, opens a door to what will be an increasingly wide opportunity for members of the profession in private practice.

Even a short tour of travel in almost any section of the country will demonstrate the need for architectural skill in development of all types of bridges. That so many important spans have been erected without benefit of architectural advice has been due partly to the attitude of Public Works Commissioners trained in too narrow schools of structural engineering. In the words of one of them, "Architects are not necessary. We can design bridges as well as they can. We don't need any help from them!" His statement is true and yet false at the same time. From a strictly engineering standpoint, an architect is probably not essential to the erection of a structure that will carry loads safely and provide necessary clearances and traffic areas.

But more and more the public is requiring beauty



GOTTSCHO

A successful example of collaboration between architect and engineer. This bridge at Kitchawan, N. Y., satisfies the need for beauty of form as well as utility. C. F. Loyd, Westchester County Park Commission, designer; Howard Baird, engineer

of form as well as utility, and there is adequate proof that engineering requires architectural assistance if a structure is satisfactorily to fulfill this dual demand. Municipalities are being forced to recognize the commercial value of good design from a sorry contemplation of expensive properties ruined in purpose and utility by public condemnation of misconceived aesthetics. Hence there is practical significance in the pronouncement of government agencies regarding architectural amenities.

One other reason for a lack of architectural participation in bridge design may be found in the attitude of the architects themselves. In all fairness it must be admitted that too often architects have laid themselves open to charges of impracticality with grandiose schemes that were economically impracticable and even impossible to build. Too great an insistence upon form and style has often excluded an architect from a problem which might have been brilliantly solved by the application of imagination and open-minded cooperation.

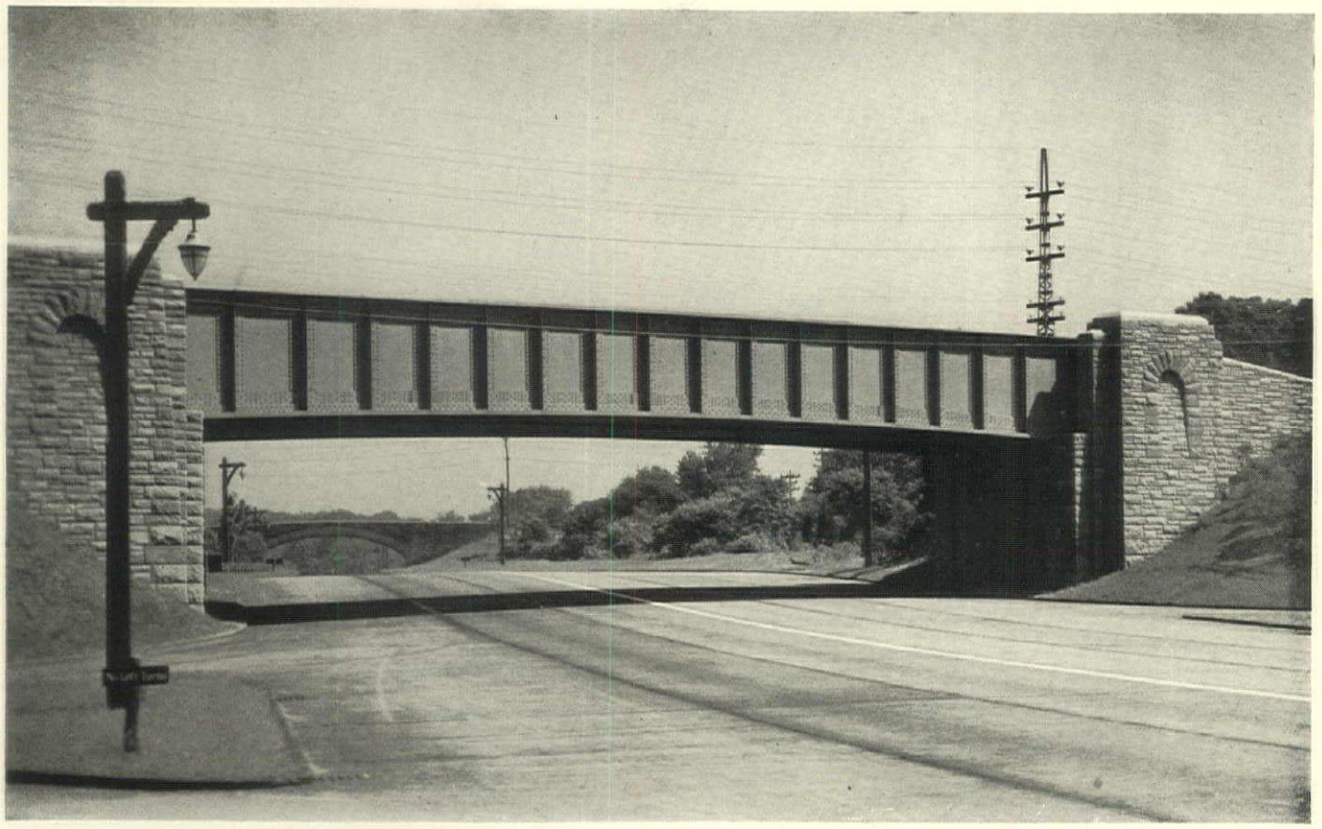
These two qualities—imagination and ability to cooperate—constitute a key to the door of architectural opportunity in bridges. Each is important, but cooperation with technical bridge designers is often of more practical use to an architect in obtaining work. Enough examples of architect and engineer collaboration exist to indicate what the term really means.

First among the requirements of such an arrangement is an understanding by each individual of the fundamental duties of the other. It is obvious that the engineer is a necessary specialist in structural design. Many prominent ones have admitted that collaboration with architects is necessary to produce bridges possessing desirable aesthetic qualities. Often this means that an engineering layout must be revamped and key members redesigned. It may even mean that an entire scheme is discarded as unfitting to a site from various standpoints of form, material or approach.

Always the architect must work within limitations of a budget that is more often than not fixed at the lowest possible limit. He must work also within strict limits of material possibilities, and often he must design under the handicap of political interference that can be eliminated only by proving that the means employed have been chosen to satisfy most completely the various factions involved.

In effect, the architect works as a coordinator of economic, engineering and aesthetic problems. His approach should be from no preconceived notion of his own aesthetic importance, for it is such an attitude that calls forth derogatory remarks from technically minded Public Works officials. Rather it should be that of a judicious executive who, weighing the importance of the various factors carefully, fits his design by trial-and-error to effect a practical balance between all of them.

It is difficult to draw the line where architecture stops and engineering begins. In almost every stage of bridge design it is the fused functioning of the two individuals



KNELL

Architectural opportunity exists even in a utilitarian structure like this railroad bridge over a Long Island parkway. Long Island State Park Commission, designers

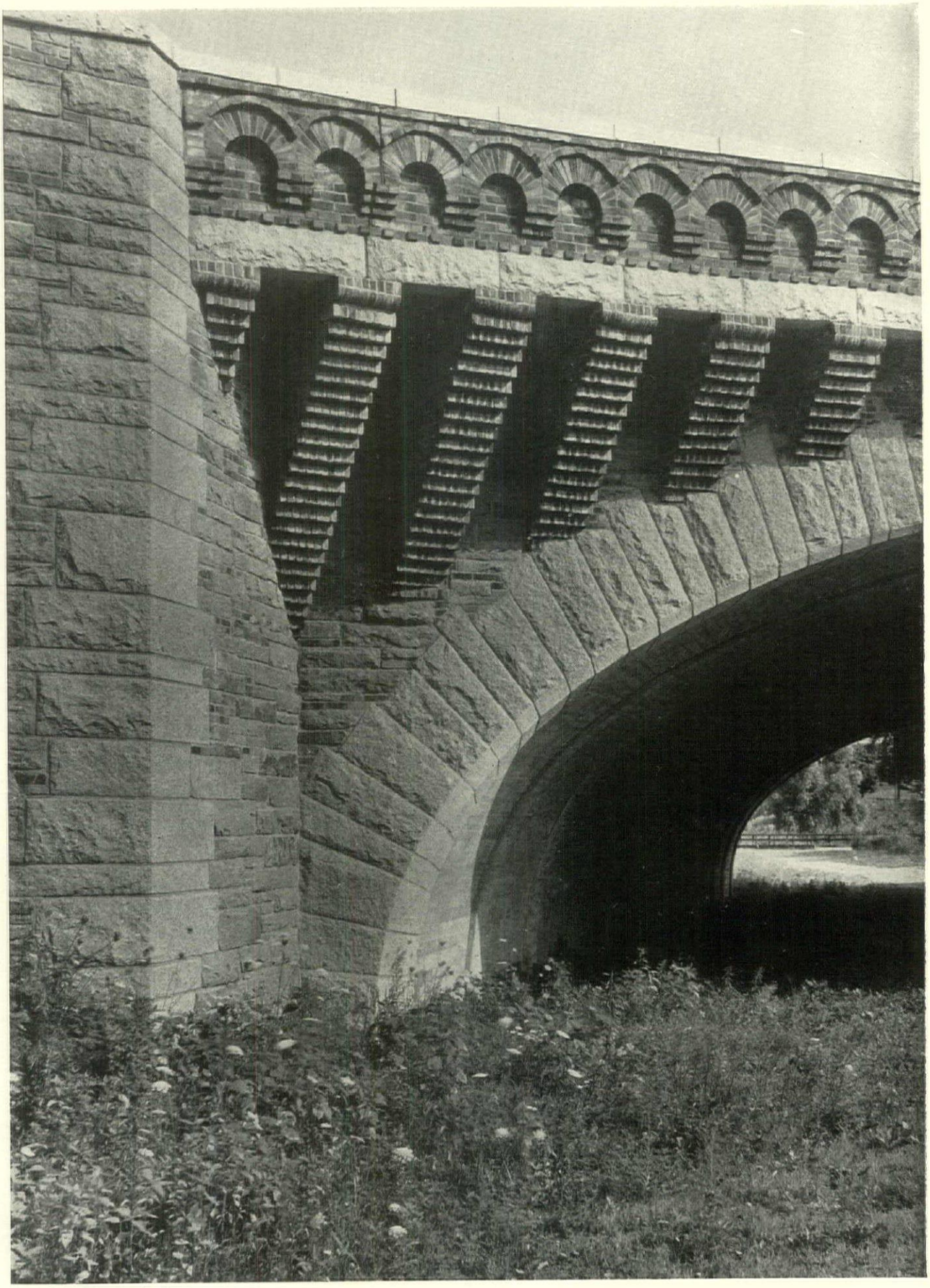
that is more to be desired than independent action on the part of either. The brunt of a fusion process will probably fall upon the architect, for his work requires at least a broad appreciation of engineering principles, a thorough knowledge of economic and transportation problems, and a considerable ability in tactful criticism and resourceful salesmanship.

Upon the architect also will undoubtedly fall the responsibility of recommending a general scheme presented in terms of site and approach planning, basic materials and appropriate form. With proper collaboration this *parti* becomes a basis for technical development by the engineer who will be guided architecturally in proportion and detail consistent with safety requirements of the structure.

Two examples from the writer's experience are apt illustrations of the architect's place in bridge design. In one instance, a capable engineer had been retained to design a bridge rather close to an existing one, the latter comprising a series of concrete arches springing from wide plazas at the bridge heads. The engineer proposed a long steel arch span for the new bridge. Though adequate from all technical standpoints, the scheme took no account of future developments and was architecturally out of harmony with the surroundings and with the existing concrete structure. Further study by an architect in collaboration with the engineer produced a design that fitted the problem in all respects and permitted a desirable future development of the approaches.

KNELL

Imagination as well as technical ability is necessary to fit a bridge properly to the site. Another bridge designed by the Long Island State Park Commission



Above and on facing page: Bridges in the famous Westchester County Park System. Both were architecturally designed in the office of Gilmore D. Clarke, Landscape Architect. Arthur G. Hayden, Engineer

This case was concerned primarily with aesthetics. The other shows how architectural judgment may often secure economies of structure while assuring improvement in both utility and appearance. An engineer presented a design for a highway bridge over a body of water. Approaches were long and the road was supported on massive concrete posts. The center span was about 600 feet in length and required a greater clearance for water traffic than the others.

In his design the engineer had treated the entire bridge as a series of segmental arched trusses, excepting only the center span which was a huge through flat truss out of harmony with the other four arch-decked spans. It was structurally adequate, but aesthetically unpleasant. An architect suggested that the center span be made a through arched truss with suspended roadway and that the concrete piers supporting the approaches be changed to steel, in order to give more uniformity through the use of one single material of construction. He argued that the latter change might save enough money to permit the slightly more expensive construction of a more pleasing design for the center span. The engineer agreed to follow his suggestions and the result was an amazing improvement in appearance of the finished structure at an estimated cost not in excess of the first design.

Thus can an architect become an indispensable collaborator in bridge design. Examples cited concern large bridges, but the principles involved apply with equal force to designs of all types. Simple culvert bridges, grade separations, complicated highway crossings, waterway suspension bridges, railroad viaducts—each structure can have an aesthetic value as well as an economic justification for sound engineering. Though it is obviously impossible to list all the architectural requirements, each type of problem has a common need—application of architectural intelligence, trained to produce a balanced and economical relation between function and form.

So here is opportunity. But it is hardly opportunity for independent architectural thought or action. While a bridge designed by an architect may be more beautiful than one designed by an engineer alone, it may not be structurally satisfactory. No longer can the architect perform a dual function; and collaborative effort is the only workable formula that assures successful results. A good start toward a general practice of cooperation has been made. Much, however, remains to be done before architects can be regarded as a prime essential to bridge designing. Credit must be divided; fees must be adjusted between architect and engineer; and most important of all, the collective attitude of Public Works Commissioners toward "the unnecessary architect" must be changed by the initiative, professional ability and salesmanship of the architect himself.

. . As It Looks

Good Showmanship

AN advertising agency issues a booklet called "The Wedge." The subject of a recent number was "Put on a Good Show." Many examples of different types of showmanship were cited. The statement was made, "....showmanship is simply a spontaneous appeal to an emotion common to all. It isn't reasonable or logical. It has nothing to do with studied technique." The piece discusses showmanship with specific relation to advertising. Good showmanship, however, is equally valuable in other lines of endeavor. Good showmanship could make the public more conscious of architecture and the architect. This would increase the business of architecture; help improve the appearance of America's towns and cities; and provide better buildings in which to live, work and play.

N R A Codes

PUBLIC hearings on the Codes of Fair Competition of the Construction Industry, General Contractors and Architects were held in Washington on September 6 and 7 before Deputy Administrator Malcolm Muir. Sections of the codes most subject to argument concerned wages and hours and bid peddling. The Architects' Code was presented by William Stanley Parker, Chairman of the Code Committee of the A. I. A. A brief was filed by a representative of the retail lumber dealers. This brief probably attacked the clause in the code which provides for established basic fees for architectural work distributed through merchandising agencies. The adoption of a scale of minimum fees for architects, as a part of the code, was urged by M. H. Furbringer, Chairman of the Committee on Schedule of Charges, American Institute of Architects.

A Good Suggestion

THOMAS K. HENDRYX, A.I.A., Bradford, Pa., has suggested to the Federal Home Loan Bank that architects be employed to make appraisals of property entitled to loans under the Home Owners' Loan Act of 1933. Architects are well qualified to make appraisals of this nature and the suggestion should interest them as well as those in charge of administering the act. It should be possible to provide this service at a most reasonable and attractive cost. The benefit to the Home Loan Bank need not be cited here.

Don't Be Too Busy

SEVERAL months ago an editorial in Collier's magazine said, "In a changing world, the railroads were too busy to change." Civilization is constantly changing. Right now it is changing very rapidly. This may partly account for the seeming lack of direction which characterizes the actions of people almost everywhere. Individuals every so often pass through a similar mental and physical condition. Some recognize what is happening and "change" for the better. It may be a little while before architects are "too busy," but they must understand what is happening and be prepared to change with the times as conditions may prove necessary. Unlearned lessons are of little value.

The Handicap To Progress

A NEWSPAPER cartoon by "Ding" depicts our most persistent handicap to progress as a monster labled "primitive human selfishness" standing in the path of progress crowded by human beings trying to get by. Selfishness is the basis of most of the evils that afflict us. It makes necessary the formulating of codes of ethics and practice. It sometimes forces the architect to be a "policeman" on the job. It is a reason for preferring charges against members of societies. Until this trait of human nature changes—and it probably will not—progress will be slow and the evils of competition as well as others will be with us. About all we can do is to make the path of selfish individuals and companies as difficult as possible.

Speculative Work Fees

THE Royal Institute of British Architects has issued a "Scale of Architects' Fees for Speculative Builders' Work," based upon a minimum of ten houses. The fee for the first of each distinct type is 10 pounds. The charge for repetitions up to ten houses is 2 pounds per house. The fee graduates up to 101 houses and over at one pound. These fees cover the making of scale working drawings "upon which the materials are to be indicated as far as practicable"; block plans for "Local Authorities"; two copies of the drawings to the builder; minor variations to suit conditions; and "personal interest and reasonable advice to enable the design to be carried out." The above scale is for houses to be sold at 400 to 850 pounds. An additional charge of 25 per cent is made when the plot, including roads and sewers, is laid out. No legal or mortgage valuation services are included. A similar scale adapted to conditions in the United States might be a good idea.

Three Generations

THE office of Hobart Upjohn is not the only architectural office in the United States to be maintained by the same family through three generations. T. T. Milburn began the practice of architecture in Arkansas in 1850. In 1888 he was joined by his son, the late Frank P. Milburn, and practiced in Arkansas and Kentucky under the firm name of Milburn & Milburn. Michael Heister later became a member of the firm. Mr. Heister has retired and the firm is now car-

to the Editors . .

ried on by Yancey Milburn in Washington, D. C. Mr. Milburn says: "While we have not yet made the one-hundred-year grade, perhaps we shall reach that as well as the third generation—and perhaps we'll make it the fourth generation too."

Architectural Economics

IT is to be hoped that every architect will give attention to the thoughtful article written by Elmer Roswell Coburn and published in this issue of AMERICAN ARCHITECT. A well-known economist states that Mr. Coburn's conclusions agree with his own and that the author has presented aspects of the economic situation that warrant careful consideration. Mr. Coburn has studied both architecture and engineering. His training in architectural design was obtained in Atelier Corbett and supplemented by travel and study abroad. Since that time he has been connected with the offices of Warren & Wetmore, Ludlow & Peabody, Welles Bosworth and Harry Creighton Ingalls. He is a registered architect of New York State.

A Good Fight Is Won

EVERY listed or registered architect in the country has been invited to file a prequalification form with the Office of the Supervising Architect at Washington, D. C. This is evidence of the radical change in policy which has taken place since the appointment of L. W. Robert, Jr., as Assistant Secretary of the Treasury in Charge of Public Buildings. It is also evidence of the unremitting activity of Louis La Beaume, Chairman of the Industrial Relations Committee of the A.I.A. For two years Mr. LaBeaume and his committee worked to get the Government out of the architectural business and to change the Government's policy toward architects and engineers in private practice. His efforts have been tireless, resourceful and wise. The fight is won. For the new opportunities that the victory opens up Mr. LaBeaume and each member of his committee deserves the thanks of architects in every section of the country.

Work Is Salvation

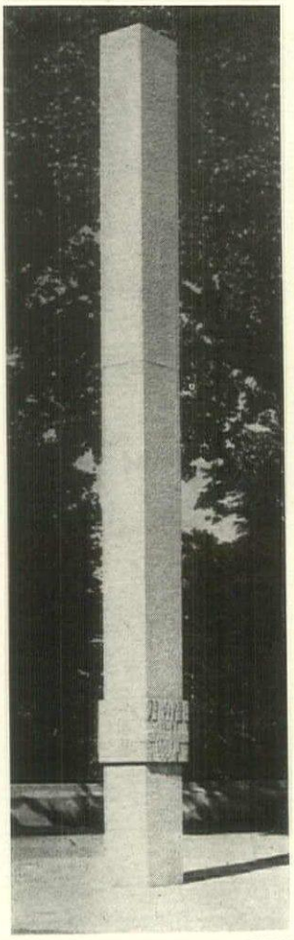
A FRONT-PAGE editorial in a recent issue of the New York American said, "There is overemphasis on the importance of codes and too little reliance on the natural factors in the economic situation making for recovery." This seems a pertinent observation. In the building industry, for example, one of the natural factors is the growing need for new construction and improvements. Labor and materials are both plentiful and cheap. But money is tight. If some of the barriers to financing could be removed, money for building would once more flow into normal channels of the construction industry. Projects already planned for would start in all parts of the country. Men in all building trades would go back to work. Activity would accelerate in industries that supply these trades, and every business in the country would feel the stimulating backwash of building activity. Fear and lack of money seem the roots of the building industry's troubles. That many things in the industry need some sort of control cannot be denied. But what it needs most is an opportunity to go to work. If efforts of the Administration can be directed toward that end, codes of fair practice will automatically be adhered to.

Architectural Provincialism

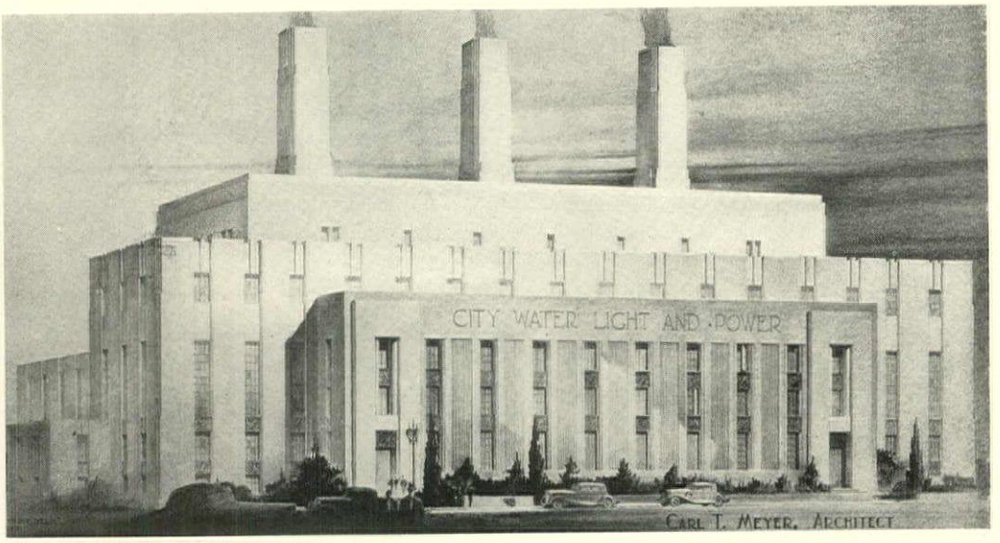
WE have had "Carpenter Gothic," "Semi-Colonial," "Tudoresque," "Neo-Greek" and a horrifying host of others. Now the term "Modernistic" is raising its ugly head to confuse further the uninitiated and excuse any shoddy result of inexpert design. The worst of it is that architects themselves have been prone to stamp their work with a misleading name of style. There is evidence that an actual American style is being developed in this country. But it is emerging from application of sound principles of design to the problems of American living conditions. Too many names for too many affected styles often befog the real purposes of architecture and building. Less provincial adherence to local tradition and more constructive adventures in sound planning can accomplish vivid and new realities.

Unification Essential

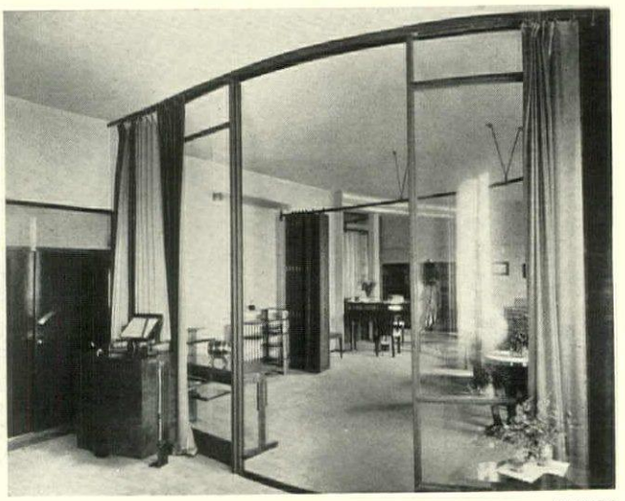
IN order to frame codes acceptable to all the units of the building industry, concerted action is necessary. The Construction League has formulated a basic code that is an able statement of minimum standards. The League undoubtedly has spoken for the entire industry, and in view of its success thus far it is particularly unfortunate that no architectural body can entirely emulate it, for unification is still a fact to be accomplished. Today more than ever before there is need for a united architectural front. With the lack of sympathy and understanding now existing between many different architectural societies, it is hard to say that even a pronouncement of the American Institute is truly representative of the entire profession. Some means should be found immediately to reconcile professional differences of opinion and to permit unification of all architectural bodies to proceed as rapidly as possible. To date, only two state associations have subscribed to the Institute's plan. Unification of the entire profession into a truly representative body is therefore but little nearer realization than it was several years ago. Unification is an objective necessary to the good of every individual architect and of the profession as a whole.



SHAND

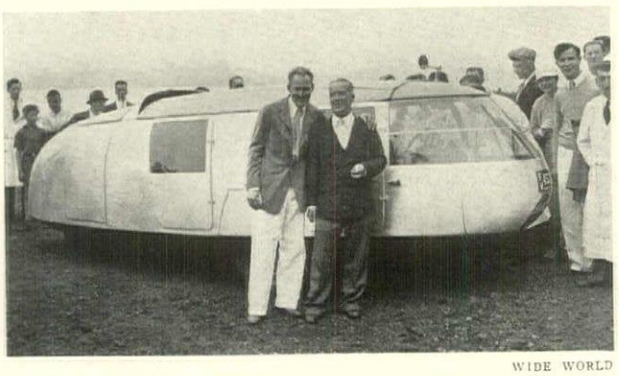


Above: new $525,000 steel and concrete Power Plant for Lake Springfield, Ill., Carl T. Meyer, architect. Exterior will be buff brick trimmed with stone. Left: granite memorial to Otto Wagner, architect, in Vienna, Austria, Josef Hoffmann, designer. Wagner (1841-1918) has been hailed as the real father of modern "functional" architecture. Right: movable partitions, long the subject of theoretical discussion, have been used by Pierre Chareau in a Paris apartment. Metal, wood and glass panels slide on tracks and divide a single space into living, dining and bed rooms



BONNEY

Left: A Century of Progress display that dramatizes the complex delivery-system of Standard Brands, Inc. H. B. Layman, architect. Below: Unique planning and design by Joseph Emberton mark an unusually interesting Advertising and Market Exhibition in London. Below, left: Starling Burgess and Buckminster Fuller, inventor of the Dymaxion house, with their revolutionary new Dymaxion automobile



WIDE WORLD

COURTESY, ARCHITECT'S JOURNAL

WARD

Panel of the winning design for a monument to the settlers of the West at Harrodsburg, Ky., Francis Keally, architect, Eric H. Ellerhusen, sculptor

Trends and Topics

• Dun & Bradstreet have released some interesting figures on the building industry. Under date of July 8th they stated that the nation's building was up 83.7% since February and there were now many evidences of definite recovery in this branch of business. Reasons included the facts that more business property is changing hands, more demolition work is in progress, and that small families are now demanding separate homes. The statisticians look on the rapid expansion of general business as favoring a revival of the building trades. At the same time, however, they point to a rising tide of material prices and estimate that the average cost of building is approximately 10% above that of a year ago. Apparently, now is the time to build. Under influence of N. R. A. codes building costs will probably soar.

• Architects interested in Public Works can obtain information regarding policies of the Administration from four circulars recently issued in Washington. Circular No. 1, is titled "The Purposes, Policies, Functioning and Organization of the Emergency Administration. The Rules Prescribed by the President." Circular No. 2 deals with "Information Required with Applications for Loans to States, Counties, Municipalities and Other Public Bodies." Circular No. 3 gives "Information Required With Applications for Loans to Private Corporations;" and Circular No. 4 bears the title "Information Required with Preliminary Applications for Loans for Low-Cost Housing or Slum Clearance Projects." Requests for the pamphlets should be addressed to the Federal Emergency Administration of Public Works, Washington, D. C.

• What is said to be the first Drive-In Theatre in the world was recently opened in Camden, N. J. The unusual part of this theatre which covers an area of one-quarter of a million square feet is that there are no seats. Seven rows of inclined grades give a parking area for 400 automobiles, each of which becomes the private box of each owner. An uninterrupted vision is assured by the five degree incline of the parking rows so that cars may come or go without disturbing their neighbors. More than 30 feet of space is available to each car for this purpose. The aisles are 50 ft. deep or more than three times the length of the average automobile. The theatre itself has been designed for presentation of sound motion pictures and for this unusual problem the RCA Victor Company has perfected a system of controlled directional sound. This means that the motorist seated in a car 500 ft. from the screen can see and hear as clearly as the occupants in the first row. It is said that sound may be clearly heard even in a rainstorm when car doors and windows are closed, yet volume is not objectionably loud in any part of the theatre. The entire project points to very wide possibilities in the development of future community recreation centers.

• The low cost housing bill has been defeated in the Michigan State Legislature. In its place, however, was enacted the Flynn-Case Bill, a measure that makes it possible for any Michigan city, county or township to create employment by constructing revenue-paying public works. Among other authorities that the bill grants is that of constructing or in other ways acquiring housing. The bill makes it possible for the Common Council of any city legally to become a body to regulate, control and borrow funds to be expended on revenue producing public works. The closest approach to a body with such powers is the Port Authority of New York which has been successful in producing structures without interference from politics. The (*Continued on page* 133)

ETCHING BY ROBERT LAWSON

Make No Little Plans..

BY WM. WARD WATKIN

Professor of Architecture, Rice Institute

THE National Industrial Recovery Act brings to the architectural profession the opportunity to regain faith, to achieve direction, and to accomplish needful rightness.

To imagine that recovery means resumption of the old manner is entirely wrong. Architecture has come to the crossroads. The old manner was wasteful and dull. The new manner must be sound and interesting. It must fit a nation which fearlessly moves toward finer solutions. Men shall seek to record faith in place of skepticism, with beauty in place of monotony. They will become alert rather than indifferent. Architecture must reflect the changed perspective of a new social order. Our underbuilt towns and villages are invited by the Recovery Act to picture their deals and to look forward toward wholesome and desirable conditions for living. Buildings are to be planned to meet the need for cultural advancement, for proper housing, and for relaxation and recreation; each with a suitable setting and convenience.

The recovery is a recovery of ideals; a making of America fit for Americans. It involves the disseminating of our normal advantages among all our people and away from concentration within the narrow bounds of cities, a more universal satisfaction and a more united faith. The architect's position in this new order should be primary. He must seek soundness, and reflect idealism. These must rise out of the problems of today. He dares bring to them no sentimental heresies of the past.

The haste with which programs are being presented to share in the vast recovery fund attests an underlying desire to build and to progress. The architect has the opportunity to show leadership in the way toward greater fineness of simple living. Plans of larger meaning than are possible of immediate realization should be formulated, their social relationships thoroughly studied, and their desirability made clear.

In order that this constructive program shall not be defeated, hasty plans must be avoided. Unsound ventures must be revealed in all their undesirable aspects. The work is not one of a year or two, but of a generation. Its vistas should be of completeness. To insure completeness, its initial undertakings must be sound. Architects must search through every problem for an interesting and practical solution. The inventiveness of the solutions and the comfort, convenience and attractiveness they carry to the people in creative concepts must be apparent.

It is high time for the architect to become the responsive agent of the people's interests. Those architects who have carried on through the depression have found fascinating the simpler solutions resulting from required economy. They have met reality and found it stimulating. It is important that they now share this understanding with the people; that they make clear to the public the relation of cost to structure and the relative extravagance of dull forms as compared with the economy of cleanly ones.

Under the Administration of Public Works let us have no little plans. Let us start in a definite direction with a clear objective ahead of us. Let our cities, towns, and villages sanely look to a gradual, well-rounded development. Let the plans be practical or they will lose all force. But let them carry the concept of completeness; that *American life can possess a constant of good living conditions with modest but adequate comfort and beauty.*

Our villages have been out of balance. They lack a sense of simple orderliness. Our towns are as dull and uninteresting. No wonder young men and women flock to our cities, often leaving behind them much more happiness than they shall find again. We must make architecture synonymous with order instead of with extravagance. It must once more associate happily with natural beauty and forget the artificial. It must be made useful in every aspect of American life, from the simplest to the most complex. If our architects wake to the new social order early enough to lead in its expression, the progress from this year forward will be toward a new America. They are prepared to tell truthfully the story of misguided planning and of wasted opportunity.

BUILDING with intelligent economy must be the new manner. A village can stand little annual expense, but it can stand that little as well as the city can stand its expense. A hundred thousand dollars spent in a single building of elaborate architecture is impossible to it. The same amount spent sanely, and over a period of years, can be carried without burden. A clean plan, a sense of architecture in grouping; openness and space; the shadows of friendly trees; squalor, dirt, and meagreness changed to beauty, cleanliness, and adequacy; modest but attractive buildings for common meeting, amusement, and recreation—with these we shall have made our start toward expressing American standards as worth while standards. Unsightliness should not be inherent in American life. Proud monuments based upon sentiment and civic boastfulness will only imperil progress. Sound economic completeness must be achieved.

The Recovery Act invites architects to become architects in the true sense: to lead America—city, town, and village—in reaching the quality it has every right to possess, but which the old manner denied.

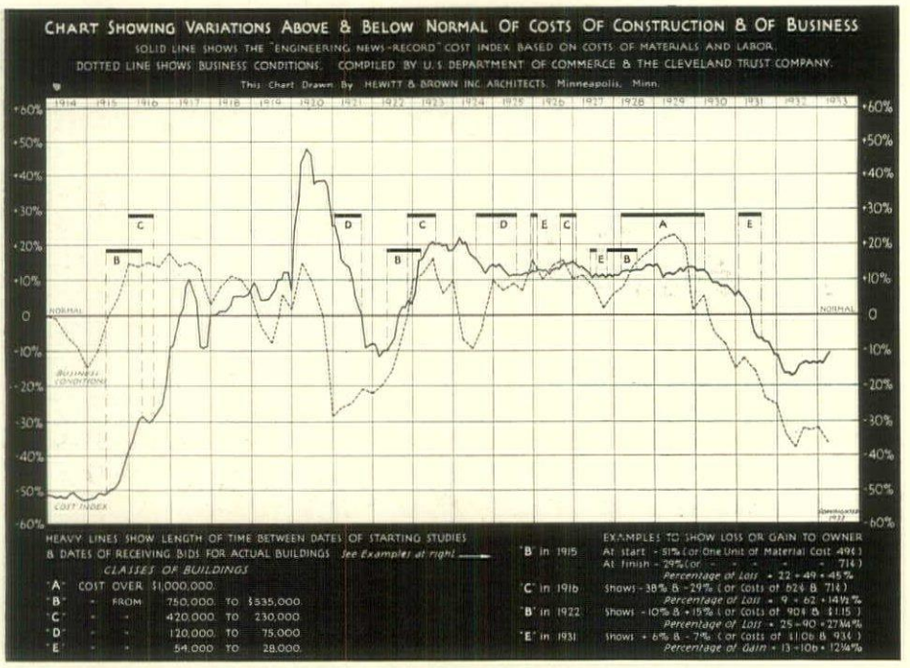
"De Wint Mansion" at Tappan, New York. It was used as a headquarters by General Washington. It was built in 1700 by Daniel de Clark and came into the possession of de Wint in 1746. Note the overhanging cornice supported by iron brackets and the date set in brick across the front

The Poe Cottage on the Grand Concourse, at Fordham, in New York City. Here Edgar Allan Poe lived in the later years of his life (1846 to 1849), and here he wrote "The Bells" and other poems. Now preserved as a museum and memorial

Good Small House Precedent

Above: Old house at Sciasconset, Nantucket Island, Mass. The wall and roof shingles have been turned gray by the salt air. Below: Old house in White Plains, New York, known locally as the "Miller House," is said to have been Washington's headquarters during two periods of the Revolution: from October 23 to November 10, 1776, and from July 20 to September 22, 1778

FOUR EARLY AMERICAN HOUSES PHOTOGRAPHED BY CHARLES PHELPS CUSHING



Developed by Hewitt & Brown for use among their clients and friends, this chart is not strictly applicable in all localities, due to variations in building costs. Also, variations in bids received will differ from those shown in the chart.

Cost index includes three material factors and one labor factor, but takes no account of contractors' overhead, profits or extras. "Normal," therefore, does not show an accurate cost base for complete building operations, but only a twenty-years' average of index figures.

A more nearly accurate normal trend of construction costs would probably show a smaller minus variation from the 1914 index. Apparent also would be a rise in the twenty-year period to cover increases in the use of more expensive manufactured building materials and the higher costs of skilled labor

TELL YOUR CLIENTS

Plan Now for Future Building

BY EDWIN H. HEWITT, F.A.I.A.

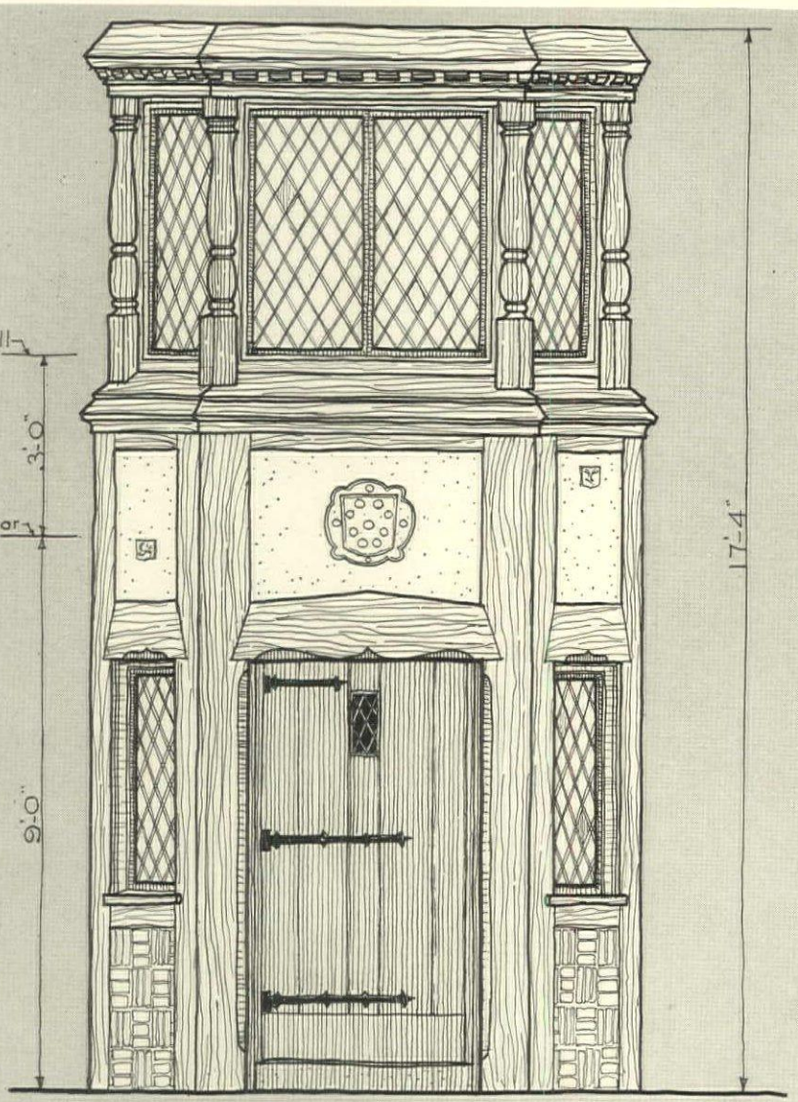
EXPERIENCE shows that in slack building periods a high premium is paid in building costs for the lack of timely preparation for construction which will be required on resumption of business activity. Failure to secure the advantage of depression prices results first: because decisions to build usually do not crystallize until the rising commodity market is well underway, and second: because the most important money-saving period, after the upward trend is recognized, must be consumed with investigations, studies and preparation of final plans and specifications. The point, therefore, to be brought home to the client is that he can save money by timely preparation for construction.

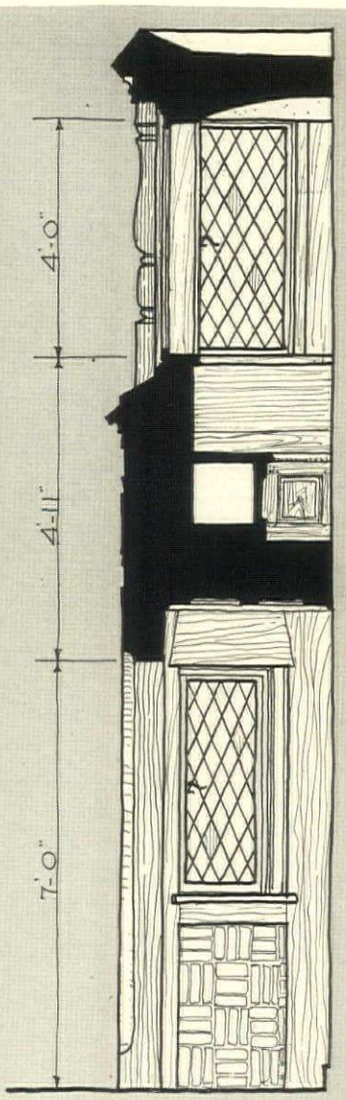
To illustrate this point we have taken a chart showing Department of Commerce variation in business conditions above and below a normal line. On this chart we have plotted the variations of the Engineering News Record's cost index numbers above and below the normal line, which in this case represents the twenty-year average of the indices. Horizontal lines marked A, B, etc., indicate time required for studying and drawing plans for several buildings of different classes. It is evident from the variations projected to the cost index that if plans had been prepared sooner, bids could have been taken when conditions were most favorable and the owner would have been able to save from 15 to 45 per cent of the final building cost. Even if preliminary studies alone had been made in advance, material savings would have accrued to the owner.

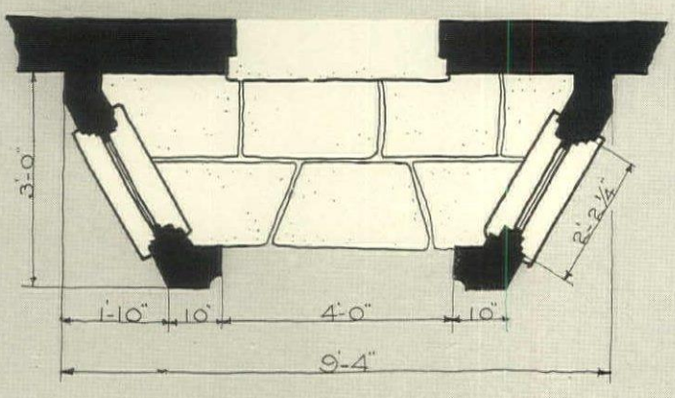
A building shortage is intensified by prolonged depression. When commodity prices rise, there ensues a demand for materials that causes prices to mount rapidly.

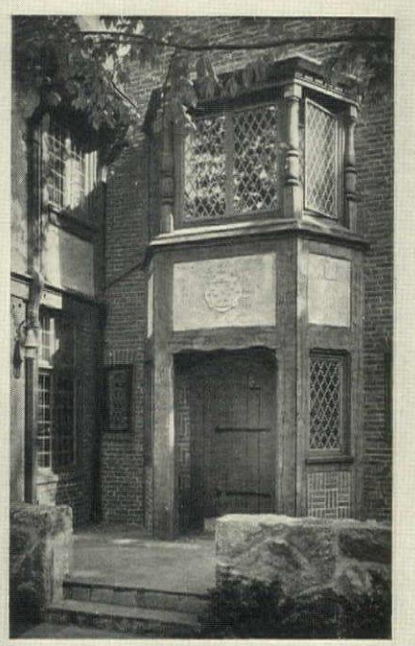
Such conditions are apt to be magnified in the recovery period that we are entering, because of the far-reaching effects of the depression upon industry. Additional factors will undoubtedly have a marked influence on the trend of building costs should there be much improvement in building activity. Some of these are:

1. Stocks of most building materials throughout the country are at unprecedentedly low points.
2. Materials requiring fabrication are now scarce. A sudden increase in demand would mean delay.
3. Organization cuts have been so drastic that many firms face a shortage of skilled help. Delays would be unavoidable in rebuilding efficient production to a higher volume level.
4. Failures, the closing of production units and reorganizations have eliminated most less-than-cost selling, leaving price scales sensitive to stiffening factors.
5. A potential demand, sufficient to absorb materials produced under stress and to tax present capacity of industry, already exists. Government construction and the large accumulated amount of necessary repair, replacement and modernization will increase commodity prices.





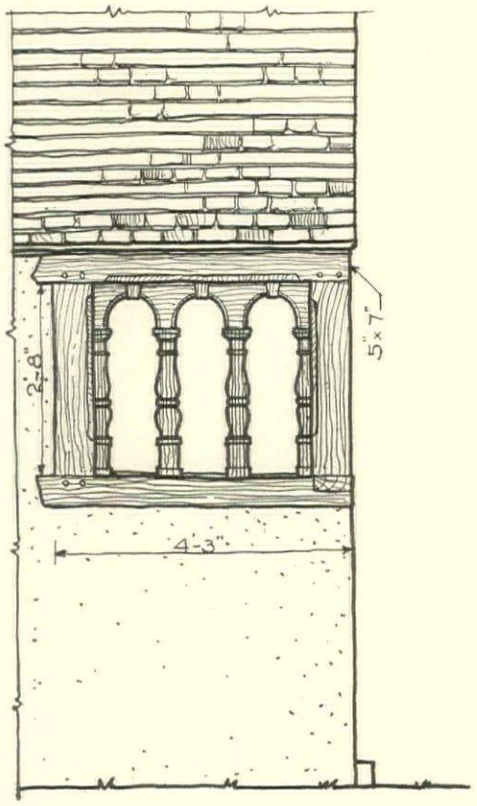


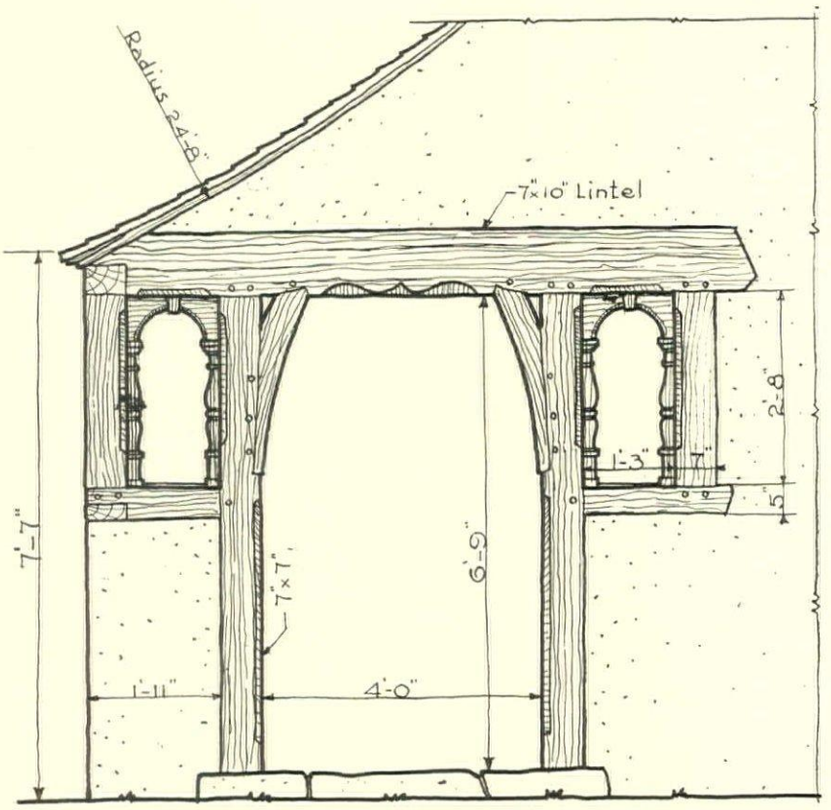


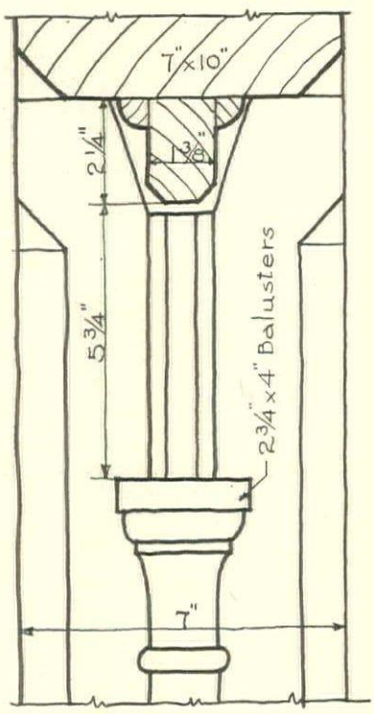
HOUSE OF HENRY HEIDE, JR., FIELDSTON, N. Y.

Julius Gregory, Architect

TIMBER ENTRANCES

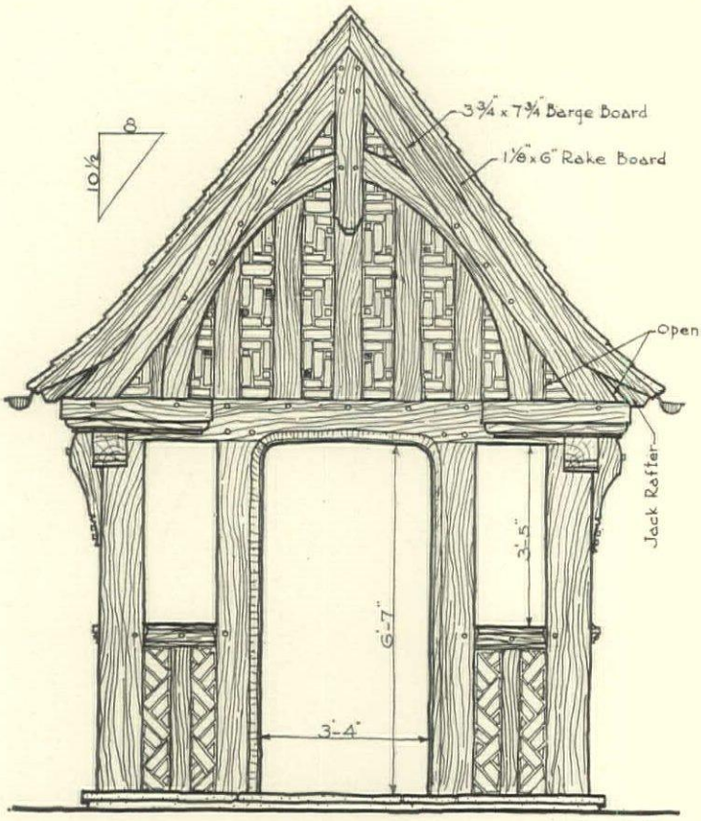


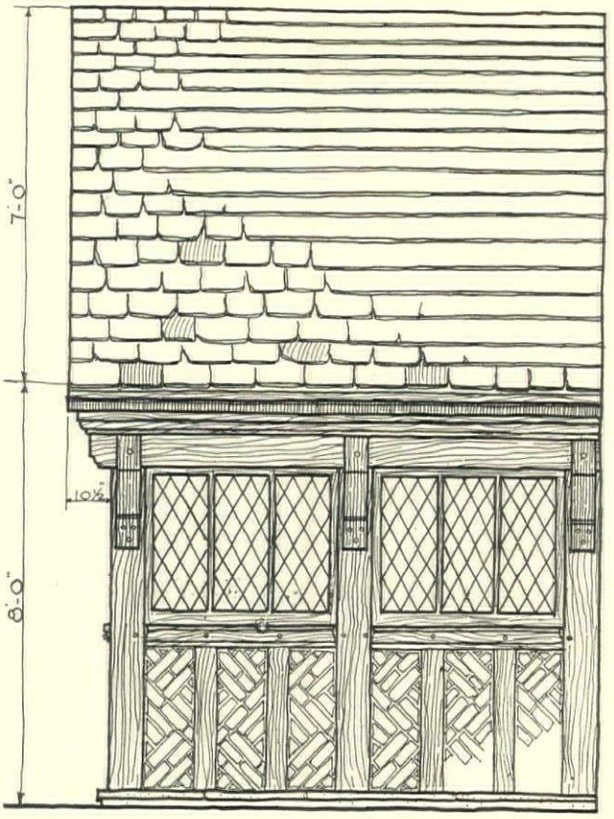


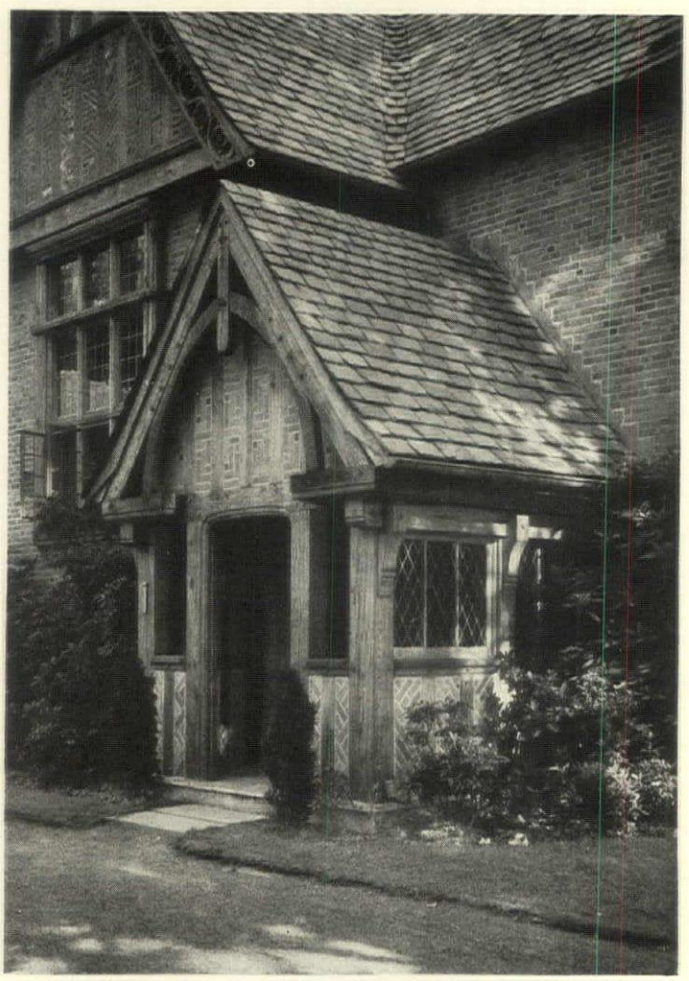


HOUSE OF GERALD M. LAUCK,
UPPER MONTCLAIR, NEW JERSEY
FRANK J. FORSTER, ARCHITECT

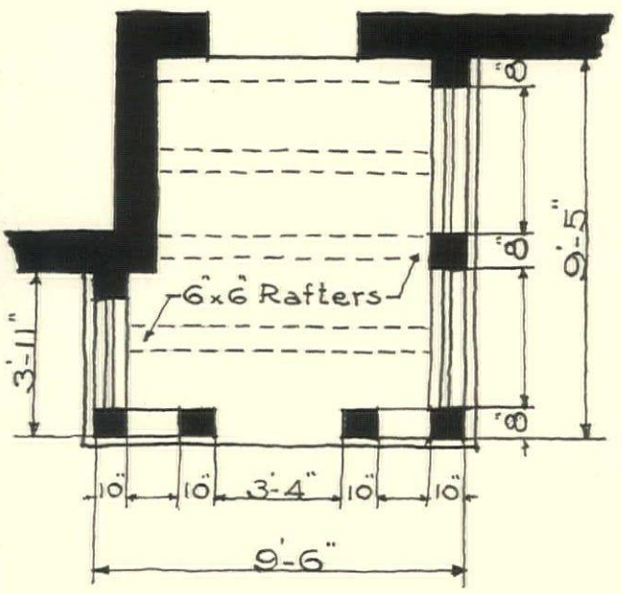
ROBERT GLASGOW



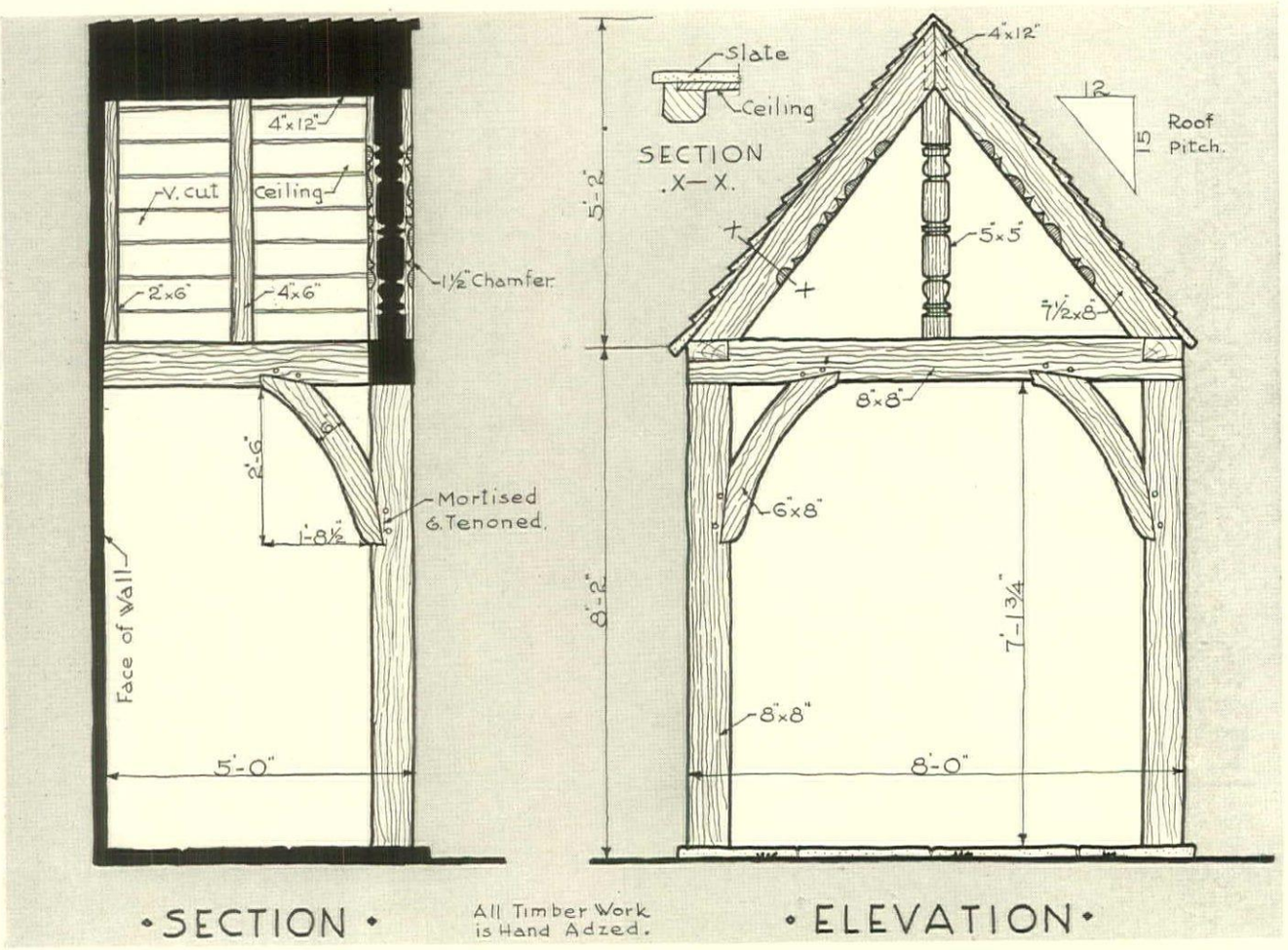


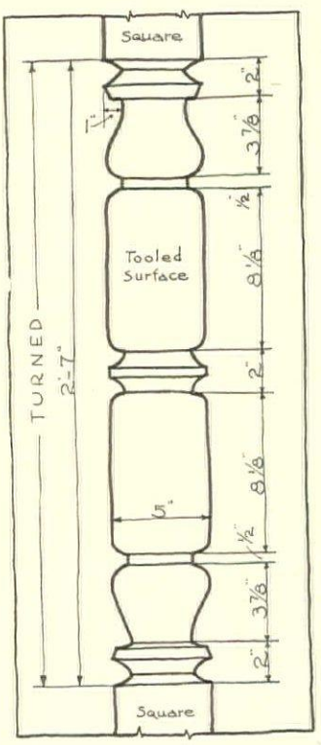


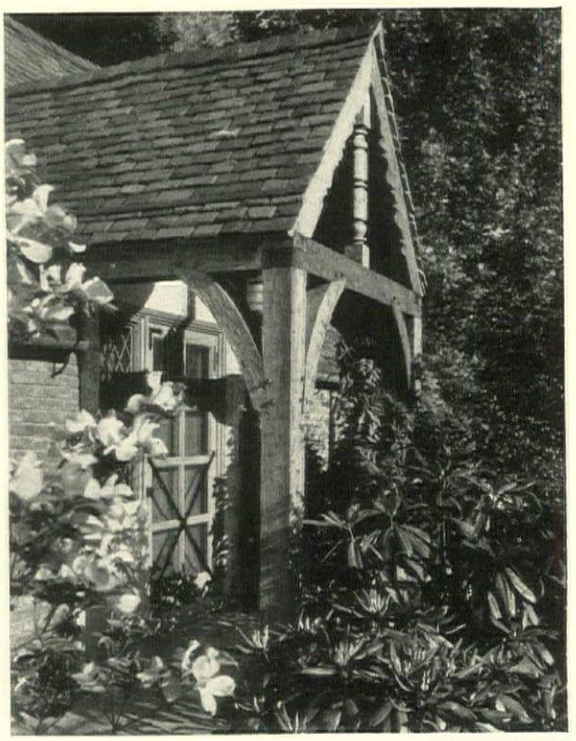
GEORGE VAN ANDA



HOUSE OF HAROLD HARTSBORN
RED BANK, NEW JERSEY
ROGER H. BULLARD, ARCHITECT

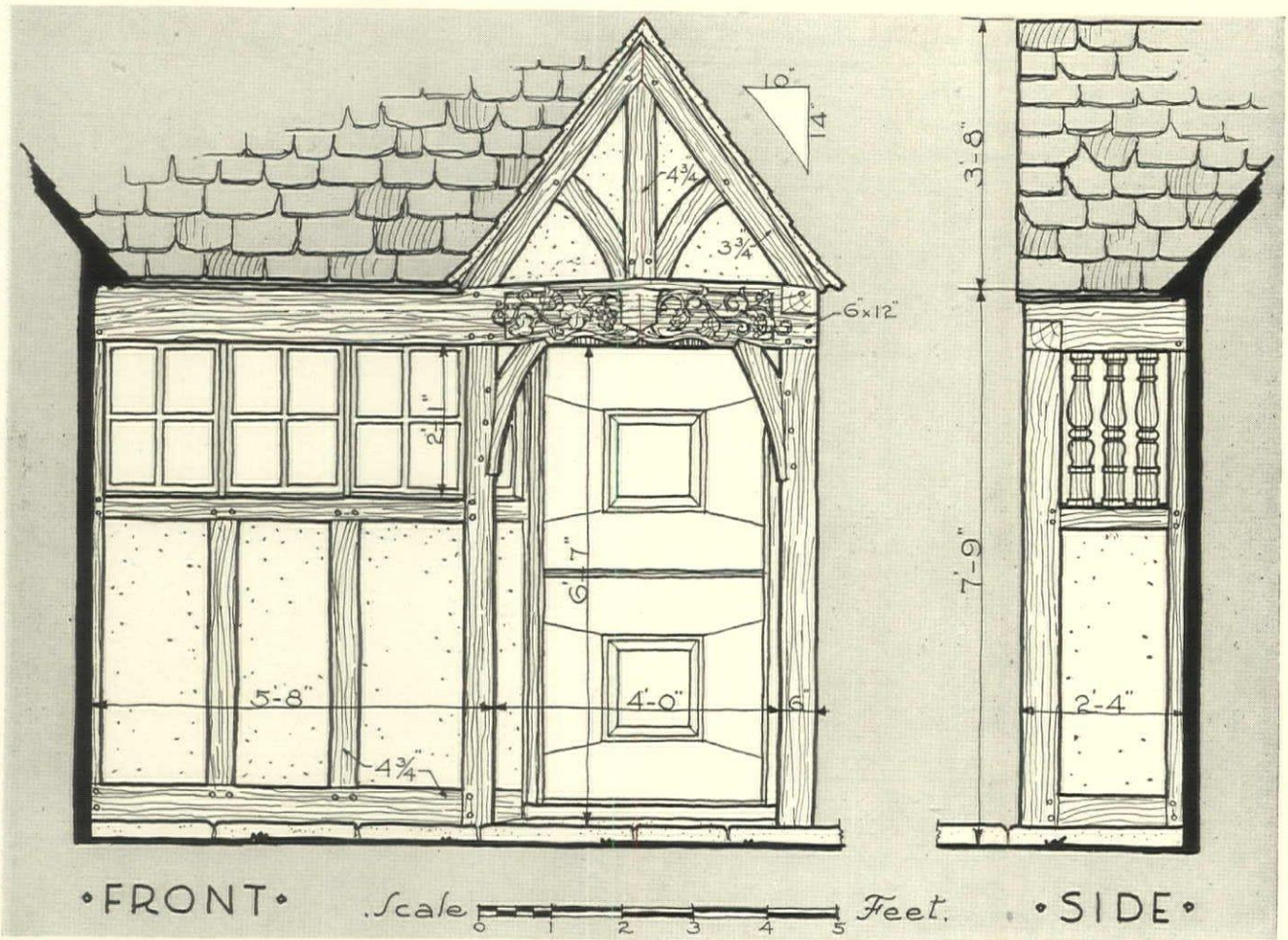


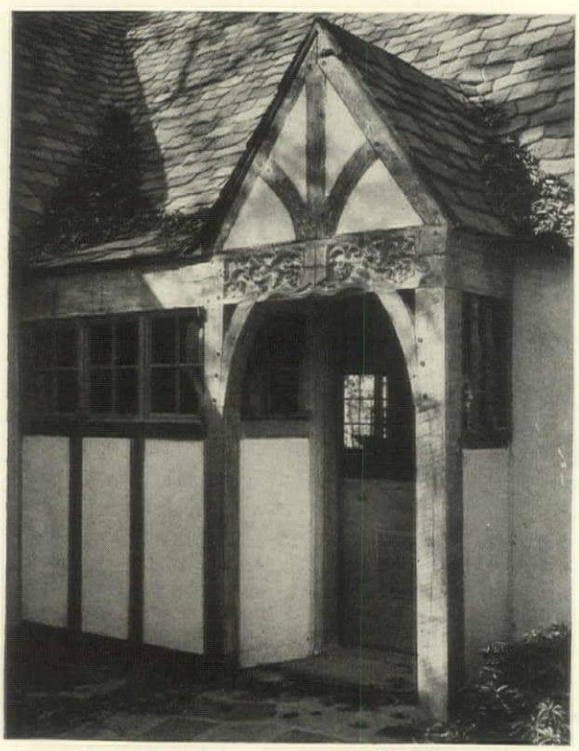




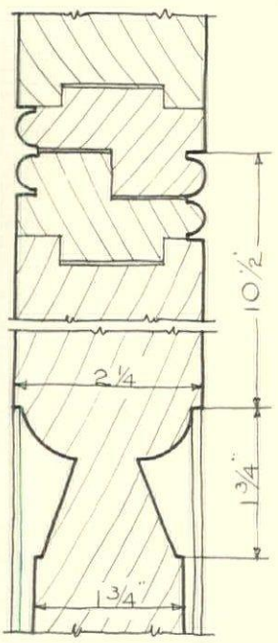
ERNEST GRAHAM

BATH HOUSE, E. H. AUGUSTUS ESTATE, WAITE HILL VILLAGE, OHIO, DUNN AND COPPER, ARCHITECTS



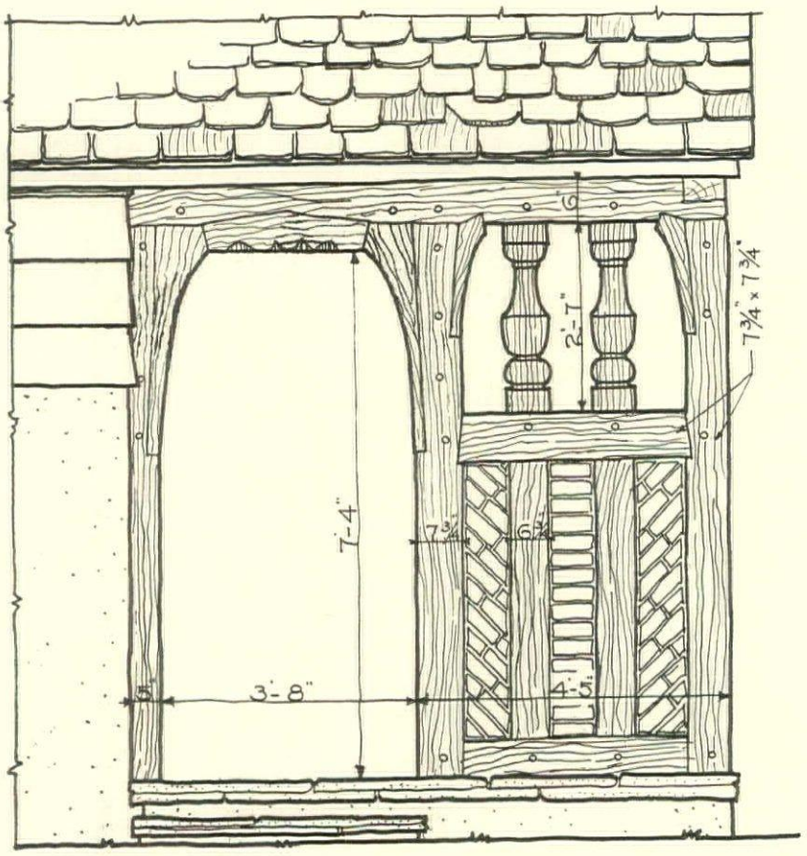


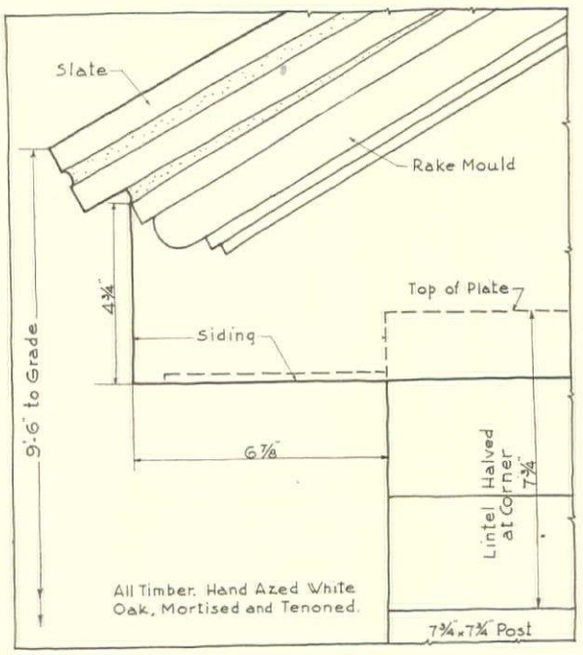
ROBERT GLASGOW



Section through
Dutch door

HOUSE OF FRANK J. FORSTER, GREAT NECK, LONG ISLAND, N. Y., FRANK J. FORSTER, ARCHITECT





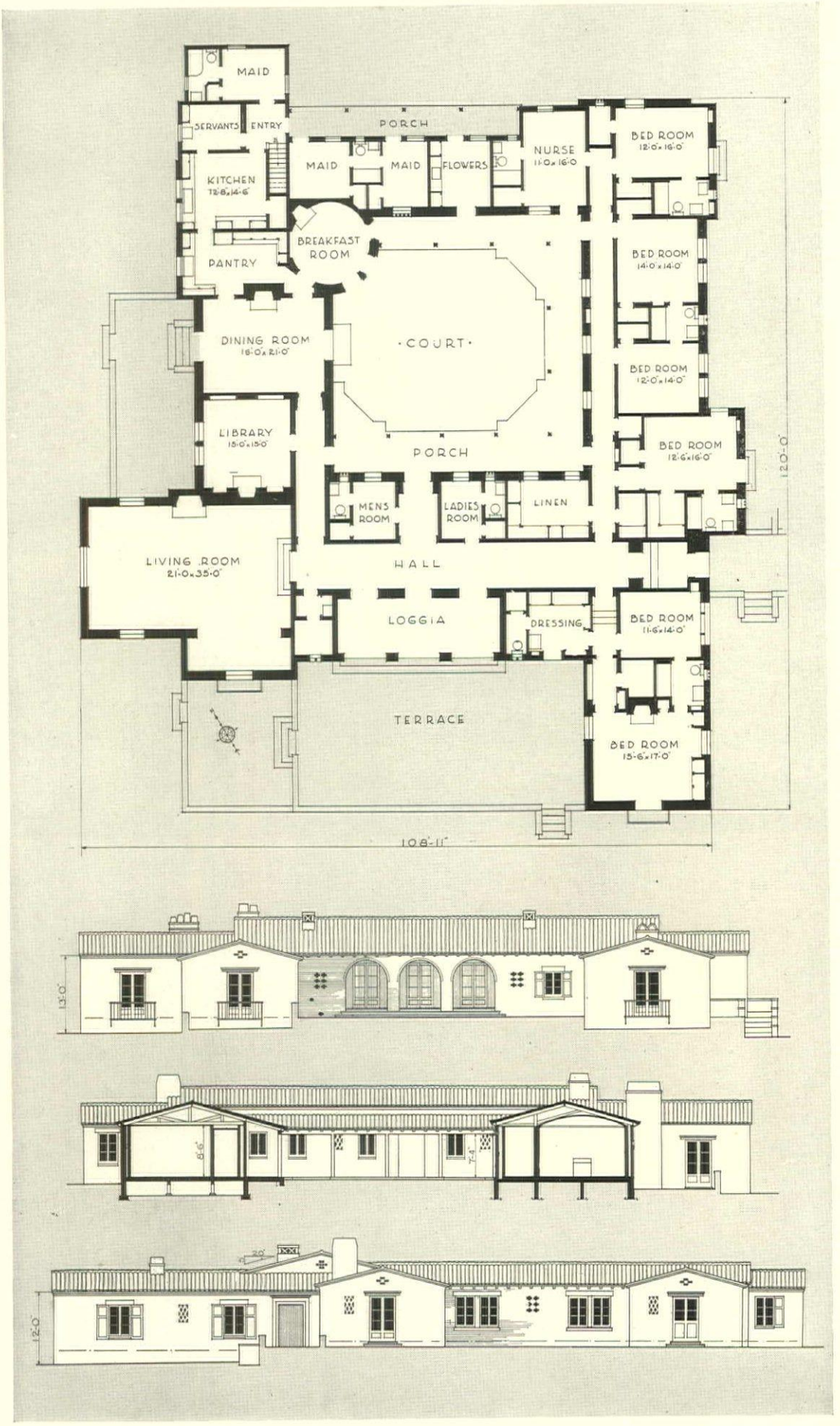
HOUSE OF FRED K. LAPHAM
RIDGEWOOD, NEW JERSEY
R. C. HUNTER, ARCHITECT

CONSTRUCTION DATA: Wood framing faced with smooth white plaster and some brick veneer painted white. Roof, mission tile, antique finish. Exterior beams, posts, lintels and cornice stained brown. Sash, doors and exterior blinds painted olive green. Outdoor paving and floor of loggia (see page 80), flagstone. Hall floor, red tile. Floors of main rooms are of broad oak boards; other floors are oak of usual width. Living room (see page 80) has plaster walls and an open trussed wood ceiling

HOUSE OF CLAYTON DEMOTTE, JR., HOPE PARK RANCH, SANTA BARBARA, CALIFORNIA

REGINALD D. JOHNSON, ARCHITECT

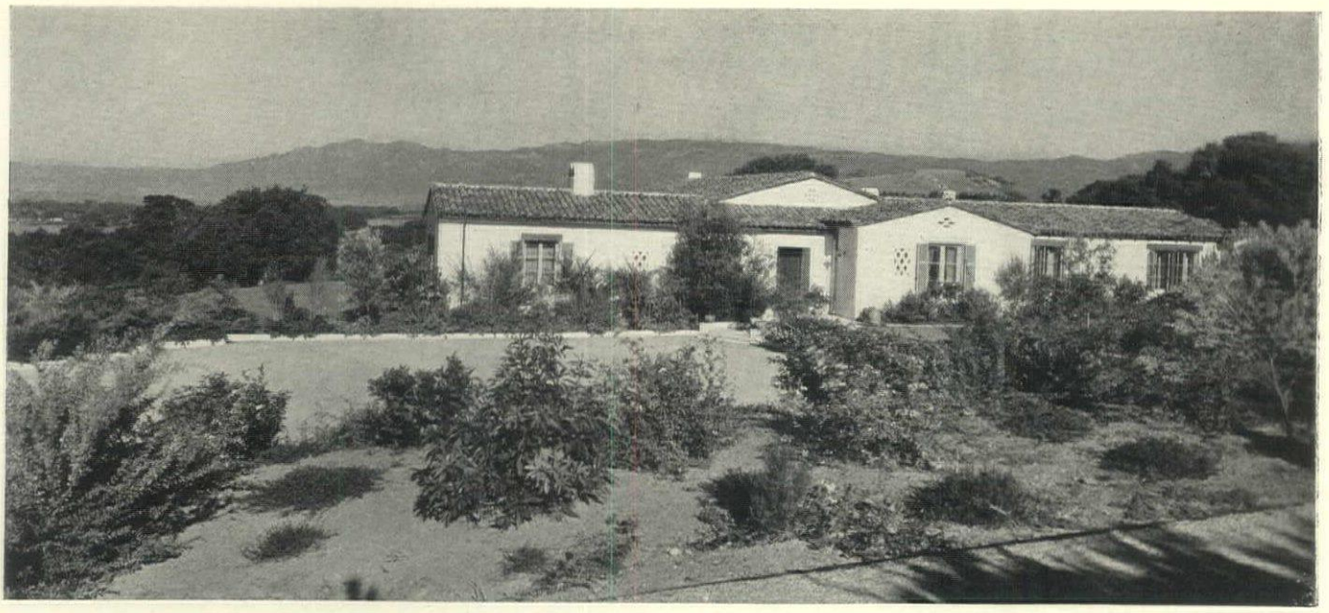
Photographs by Jessie Tarbox Beals



South Elevation

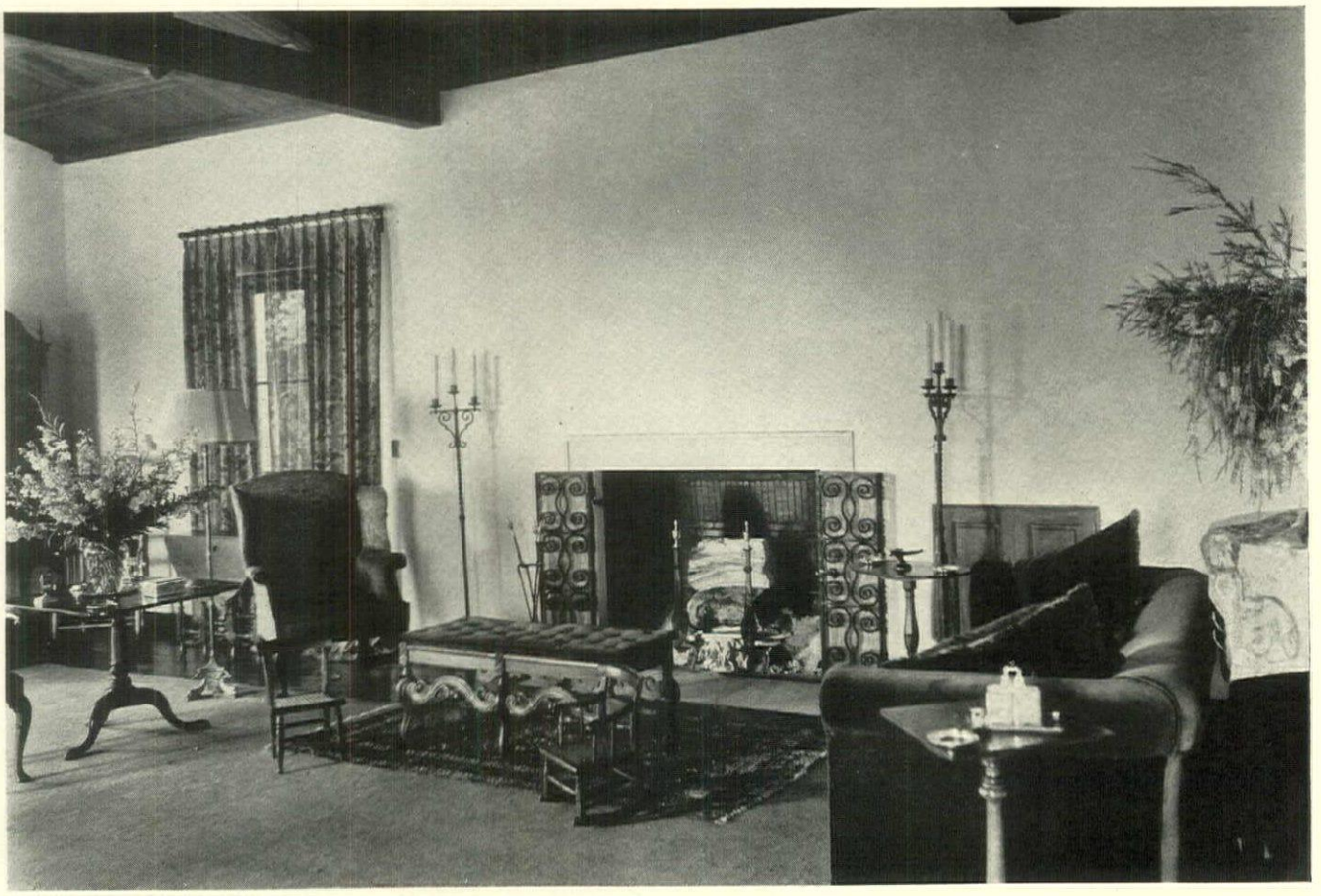
Section through court looking South

East Elevation



Above: House from the Southeast. Below: Detail of East entrance

HOUSE OF CLAYTON DEMOTTE, JR., SANTA BARBARA, CAL., REGINALD D. JOHNSON, ARCHITECT



Above: Living Room. Left: Loggia. Right: Vestibule entrance to hall

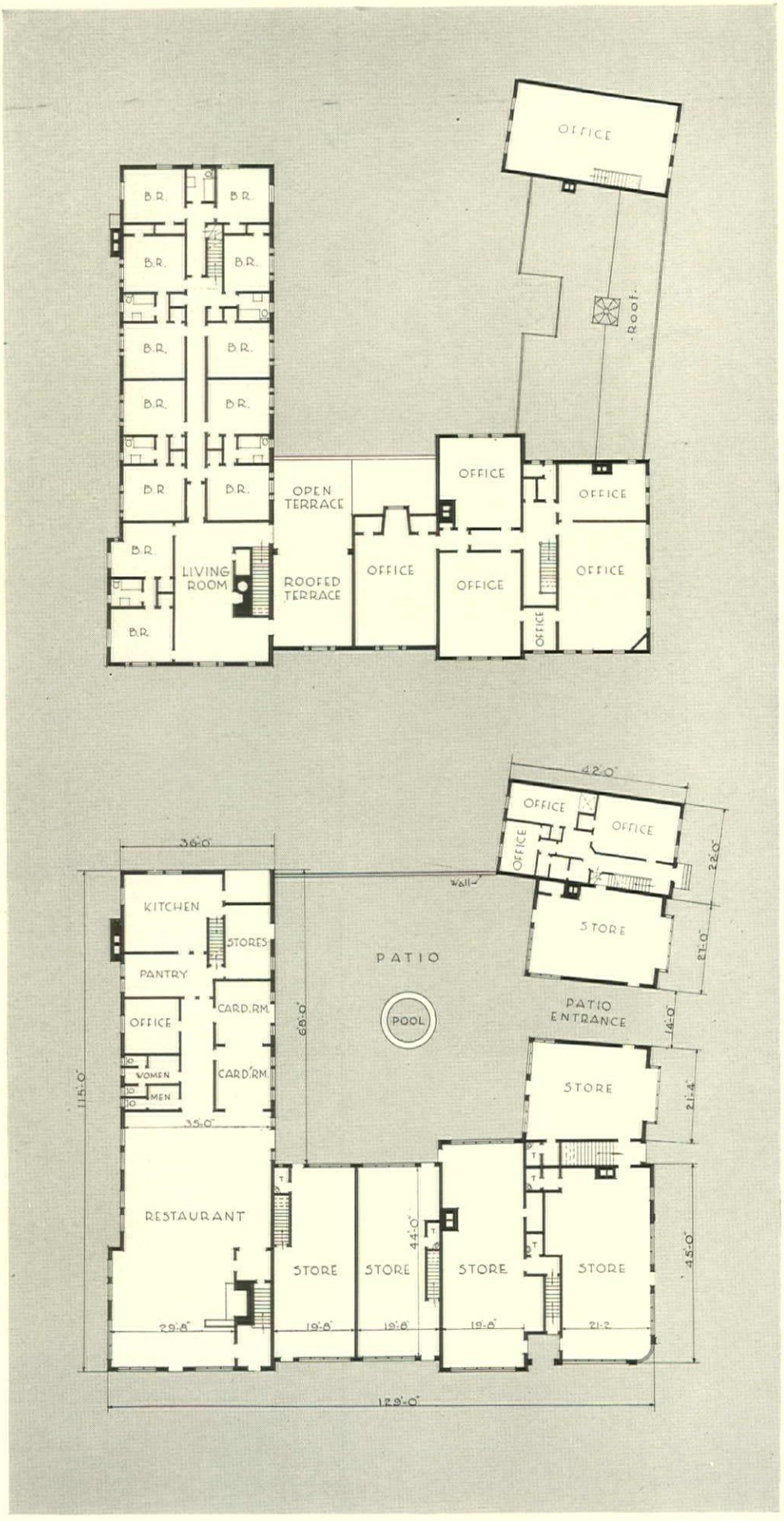
HOUSE OF CLAYTON DEMOTTE, JR., SANTA BARBARA, CAL., REGINALD D. JOHNSON, ARCHITECT

STORE GROUP FOR THE HEELBARP CORPORATION
WESTHAMPTON, LONG ISLAND, N. Y.

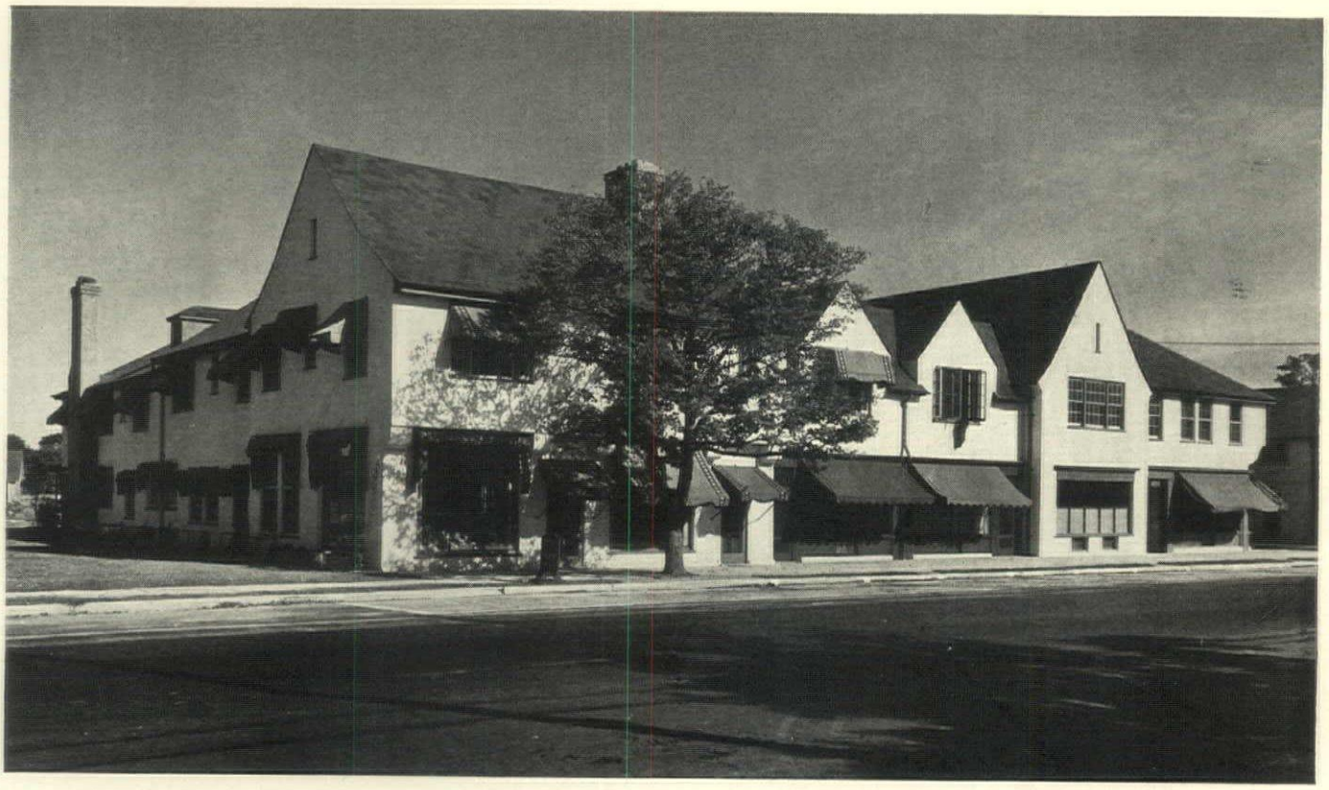
PEABODY, WILSON & BROWN, ARCHITECTS

Photographs by Samuel Gottscho

This small commercial group is planned to serve a variety of interests represented in the average suburban development. As the plans of the first and second floors indicate, it is designed to meet the needs of a restaurant, small stores, apartments, and a variety of offices. It was built in 1930 at a cost of about $80,000. The exterior is light cream color stucco; roof, blue-black slate; color of trim of stores is varied



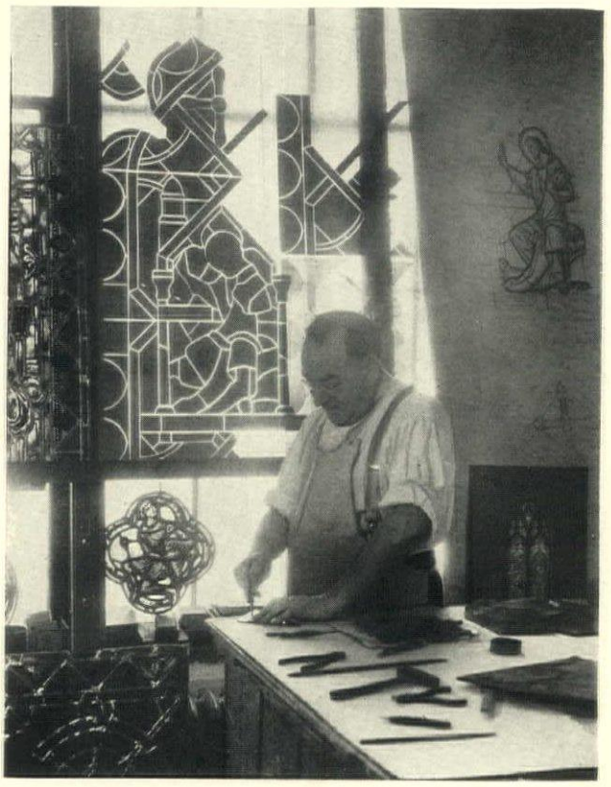
STORE GROUP
HEELBARP CORPORATION
WESTHAMPTON, L. I., N. Y.
PEABODY, WILSON & BROWN
ARCHITECTS



STORE GROUP, HEELBARP CORPORATION, WESTHAMPTON, L. I., N. Y. PEABODY, WILSON & BROWN, ARCHITECTS

STORE GROUP, HEELBARP CORPORATION, WESTHAMPTON, L. I., N. Y. PEABODY, WILSON & BROWN, ARCHITECTS

A Craft Untouched By Mass Production



Since the 12th century stained glass has remained a personal art, steeped in medieval tradition and untouched by factory methods of production

BY FREDERICK E. MAYER

THAT the ancient craft of stained glass, which has created so many beautiful examples of inspirational art, still survives with primitive simplicity in this age of million dollar machines, is evidence of its fundamental character and its highly favored position among the arts and crafts that serve the aesthetic aspirations of mankind.

The work of the glass blower who furnishes the raw material (the sheets of colored glass) remains in principle the same as when Pierre the apprentice stood by, clad in simple tunic, plain cloth chausses on his legs and felt shoes on his feet, holding a hand wrought pair of tongs, ready to assist the "patron" to block up the kiln and add fuel for another heating of pot metal glass.

Similarly the studio of the artist in stained glass retains much of the medieval atmosphere. The glazing bench and the soldering iron are as old as the craft itself. The primitive soldering iron, the strip of lead and the glazing nails remain in practical use just as in the 12th and 13th centuries.

Not only the glazier, but the glass painter also works with primitive tools: the stiff bristle brush, the flexible hair brush, the quill pen and pointed stick for scratching out highlights and cross hatching in semi-tones of light. Even the pigment comes to us practically unaltered from the medieval period.

The drawing table, covered with a coating of whiting on which the artist drew with a pointed piece of lead the full-size pattern of the design, is today a mere tradition. Large sheets of paper have superseded the ancient drawing table, but the practiced hand of the draughtsman and the trained eye of the artist as he draws the full-size cartoon with a primitive stick of charcoal, is, and always has been, a fundamental necessity of this interesting and inspiring craft. The diamond point, devised as early as the 17th century, and the cutting wheel have replaced the crude, ancient method of drawing a hot iron over the glass and then dipping it in cold water in order to fracture it at an indicated outline.

Fuel of modern type is, of course, used to heat the furnace of today, but the blowing, shaping and annealing of the sheets of glass remains as always a simple, direct method of handiwork, requiring an unusual degree of technical skill.

In fact, the stained glass industry remains one of the few instances of handiwork unspoiled by contact with our almost automatic mass production methods. It is sometimes difficult to realize that the beautiful stained glass in the Chapel of Merton College, Oxford, was designed and installed more than a half century before Chaucer created an epoch in the history of English literature, or that the glory of Chartres—the magnificent 12th and 13th century windows—was bequeathed to all lovers of the beautiful about three hundred years before the birth of Shakespeare's masterpieces. It is equally interesting to recall that the "verrours" or guild of glaziers, most appropriately took part in the pageants of the miracle plays of Corpus Christi at York.

Coming down to modern times the craft has retained much of its medieval character and technique, and in the present brilliant revival of American church architecture, American artists have created windows equal to the best in some of the ancient Cathedrals of Europe.

American craftsmen have reincarnated the glorious

color harmonies of the early and best period of stained glass. They have maintained, however, their own rugged individuality, applying the modern point of view in the creation of beautiful windows and interpreting this highest expression of luminous color, with line and symbolism in a manner that may be understood by the inhabitant of Main Street as well as by the eclectic art lover.

For instance, in the Washington Memorial Chapel at Valley Forge (Messrs. Zantzinger, Borie & Medary, Architects), Nicola D'Ascenzo of Philadelphia has designed thirteen windows descriptive of American history. They illustrate in sequence the periods of Discovery, Exploration, Settlement, Development, Revolution, etc., culminating in the foundation of the Federal Union. Ten years of earnest effort, interspersed with trips to Chartres, the fountain head of inspiration, were necessary to complete this unusual presentation of early American life that so profoundly influenced the philosophy of government and the currents of political history. In the Paul Jones window we find marked individuality of design in the use of water motifs where sea shells, sea weed, the sea horse and fish are conventionalized so as to produce the effect of 13th century motifs and methods of application.

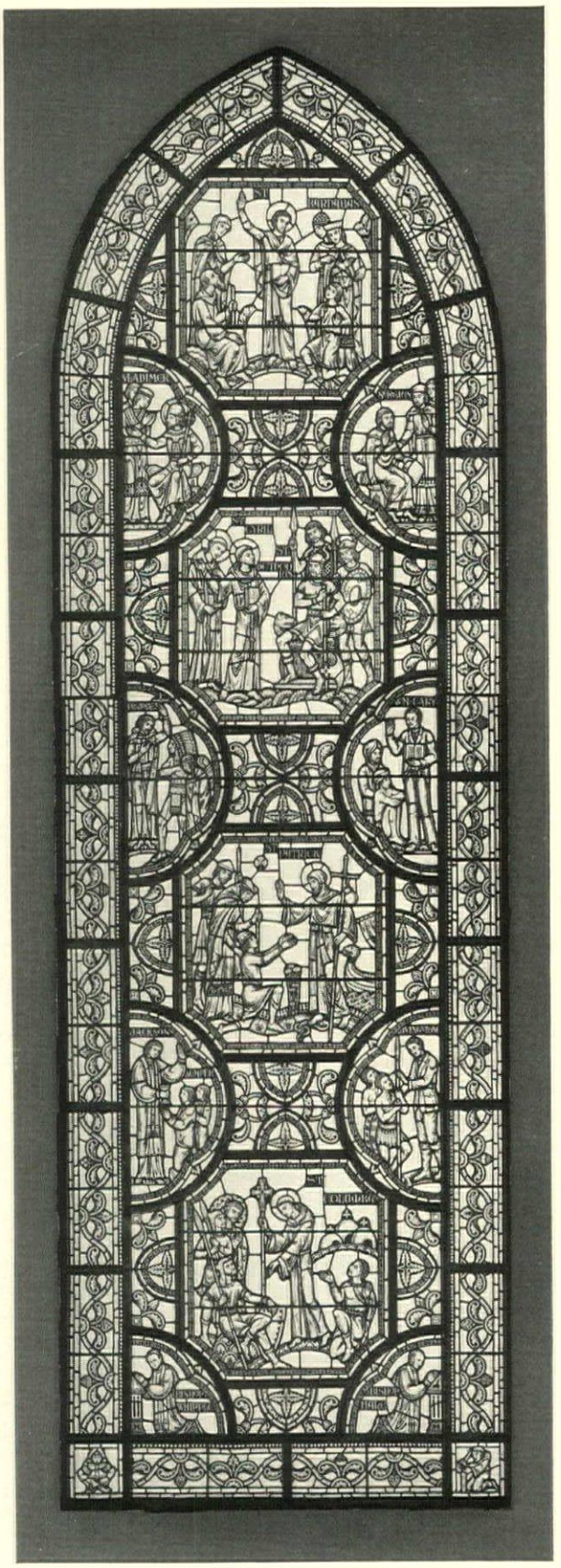
IN the Folger Shakespearean Library at Washington (Paul P. Cret, architect), D'Ascenzo illustrated the Seven Ages of Man in the great west window of the reading room, and introduced inserts of Portia, Cardinal Wolsey, Romeo, Touchstone the jester, etc., in the windows of Mr. Folger's room, recalling the rich humor and deep human sympathy of the great master.

D'Ascenzo, an Italian with a Latin's love of color, Burnham, a native of New England, Saint and Connick from Western Pennsylvania,—each has given to America something of permanent value through the medium of their beloved craft. And in the glass of each artist one finds a distinctive note of personality.

A definite touch of modernism is apparent in the later windows of Charles Connick, notably in his scholarly interpretation of the old classics, the Arthurian legends, Bunyan's Pilgrim's Progress, the Divine Comedy of Dante and Milton's Paradise Lost, installed in the four lateral windows of the choir of Princeton's recently completed University Chapel, designed by Cram & Ferguson.

In the windows of the Cathedral of St. Alban, Washington, D. C., designed by Architect Vaughn and in process of completion under the direction of Messrs. Frohman, Robb & Little, one finds the work of the artist Lawrence Saint, who has given much thought to the chemical composition of the glass, fabricated under his personal supervision, as well as a sincere application of the ancient idioms as expressed in his designs for the 13th century medallion "miracle windows" in the Chapel of St. John.

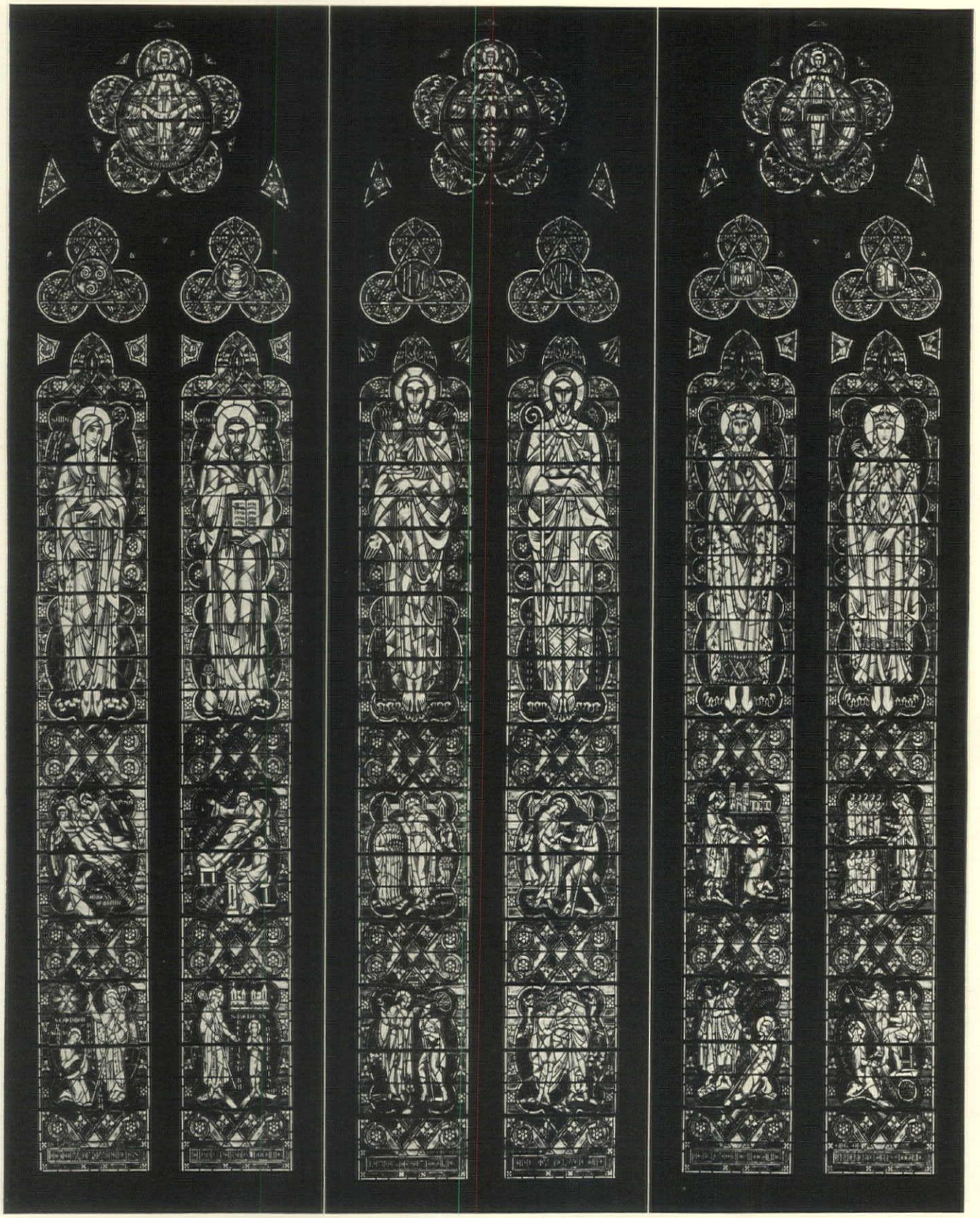
An interesting adaptation of modern historical themes is made in the ancient manner in Burnham's missionary window for the Cathedral of St. John the Divine, New York City, in which the artist has included among the modern missionaries, Father Jogues, William Cary and



Lancet for nave window, Cathedral of St. John the Divine

Cram and Ferguson, Architects

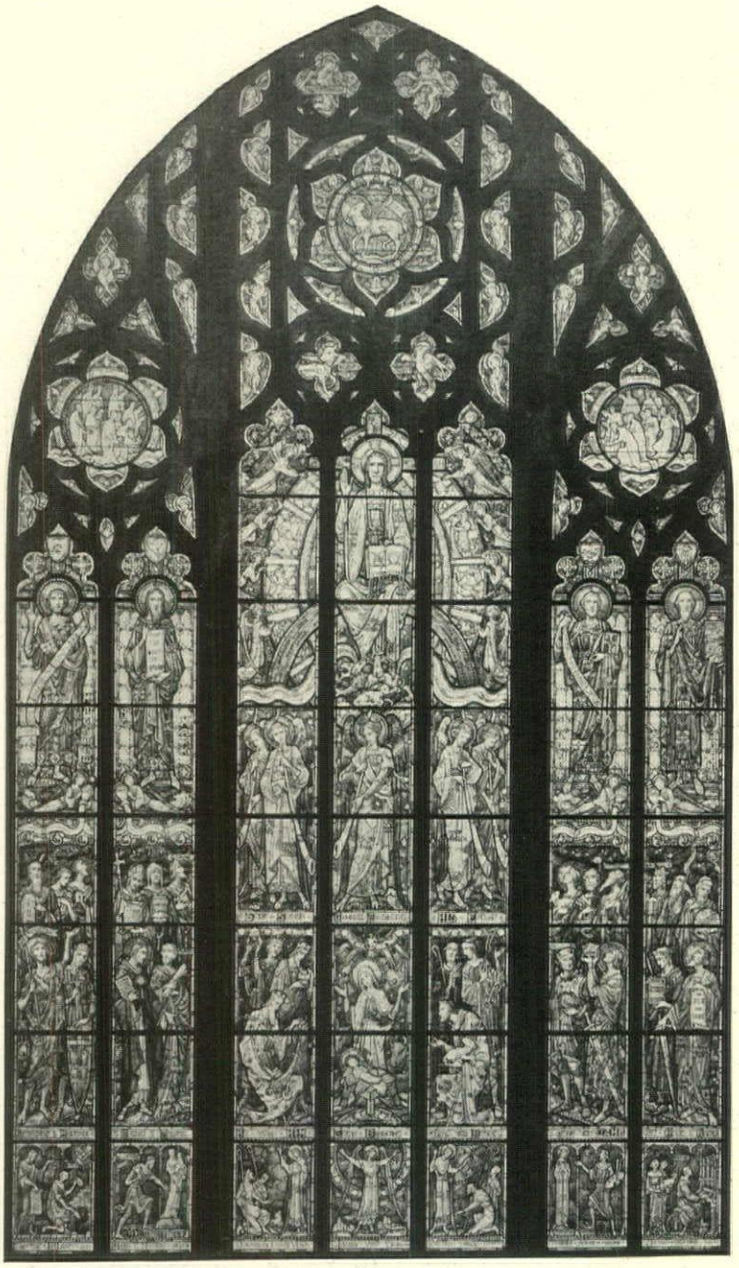
Designed and Made by Wilbur Herbert Burnham



Chancel Windows, Grace Cathedral, San Francisco, California

Lewis P. Hobart, Architect

Designed and Made by Charles J. Connick



Still working with the primitive tools of an ancient craft, the stained glass artist of today has adapted the motifs of tradition to the modern problem of consistency in architectural design and decoration.

The modern craftsman's mastery of color, pattern and symbolism is evident in this window, designed and made by the D'Ascenzo Studios for the University Chapel, Princeton, N. J. Cram and Ferguson were the architects

David Livingstone. Mr. Burnham aptly expresses his thought as follows:—"Although I adhere to the basic principles of medieval stained glass, I do not believe in slavishly copying old glass, rather believing that we today should draw in the spirit of the times in which we live." This is, of course, an accepted principle in the work of modern craftsmen.

That windows may be illustrative without being literal is the essence of good art and of the highest type of craftsmanship. The pattern of vibrant color makes its appeal in the language of symbolism and convention. Today we have not only new motifs to fit new requirements, but the medallion and grisaille as well. Their adaptation to our modern problem is furthering architectural consistency in decoration.

The old-time spirit of intimate personal relationship between the artist and his associates is always in evidence, for worth while stained glass windows cannot be designed and built by novices as though they were indulging in a new hobby. The choicest selection of glass is essential when one pursues the elusive quality of color harmony combined with the brilliant, flashing luminosity of antique glass. A Stradivarius violin in the hands of a tyro may be a disappointment; one expects a master to draw out its hidden harmonies.

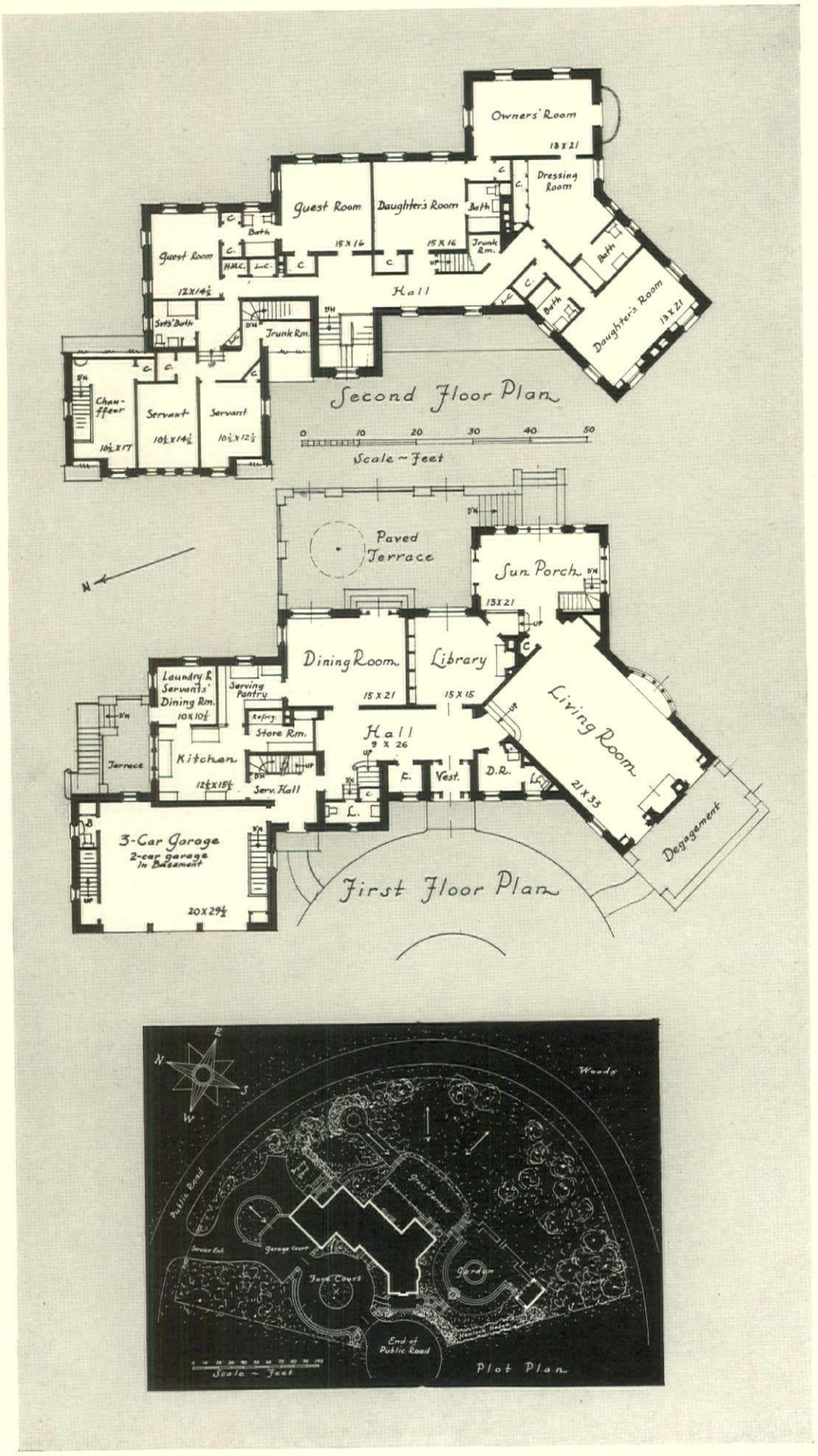
Factory methods of production, so peculiarly destructive to the arts, can have no place in the studios of artists who follow in the spirit of the early masters. The conscientious artist in stained glass realizes that his art cannot come to a generous realization of its brilliant possibilities except as he and his co-workers are in constant personal touch with the planning of windows that may become, through their mutual cooperation, a work of art and a source of inspiration to lovers of the beautiful.

Detail of garden elevation

HOUSE OF SETH T. McCORMICK, JR., WILLIAMSPORT, PA.

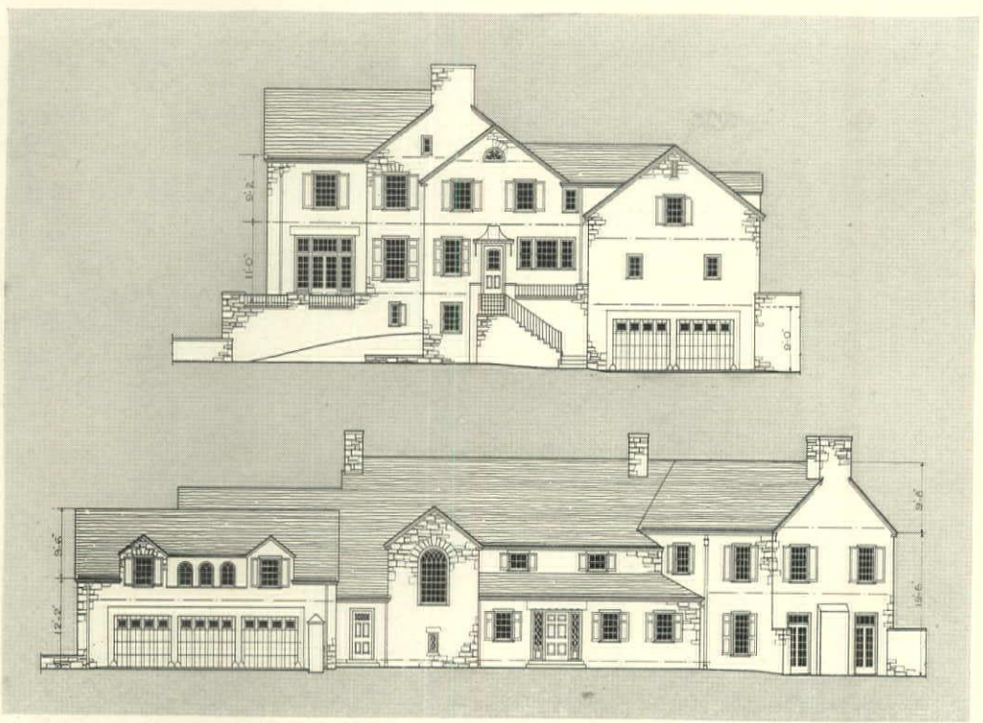
CARL C. TALLMAN, ARCHITECT

Allyn R. Jennings, Landscape Architect



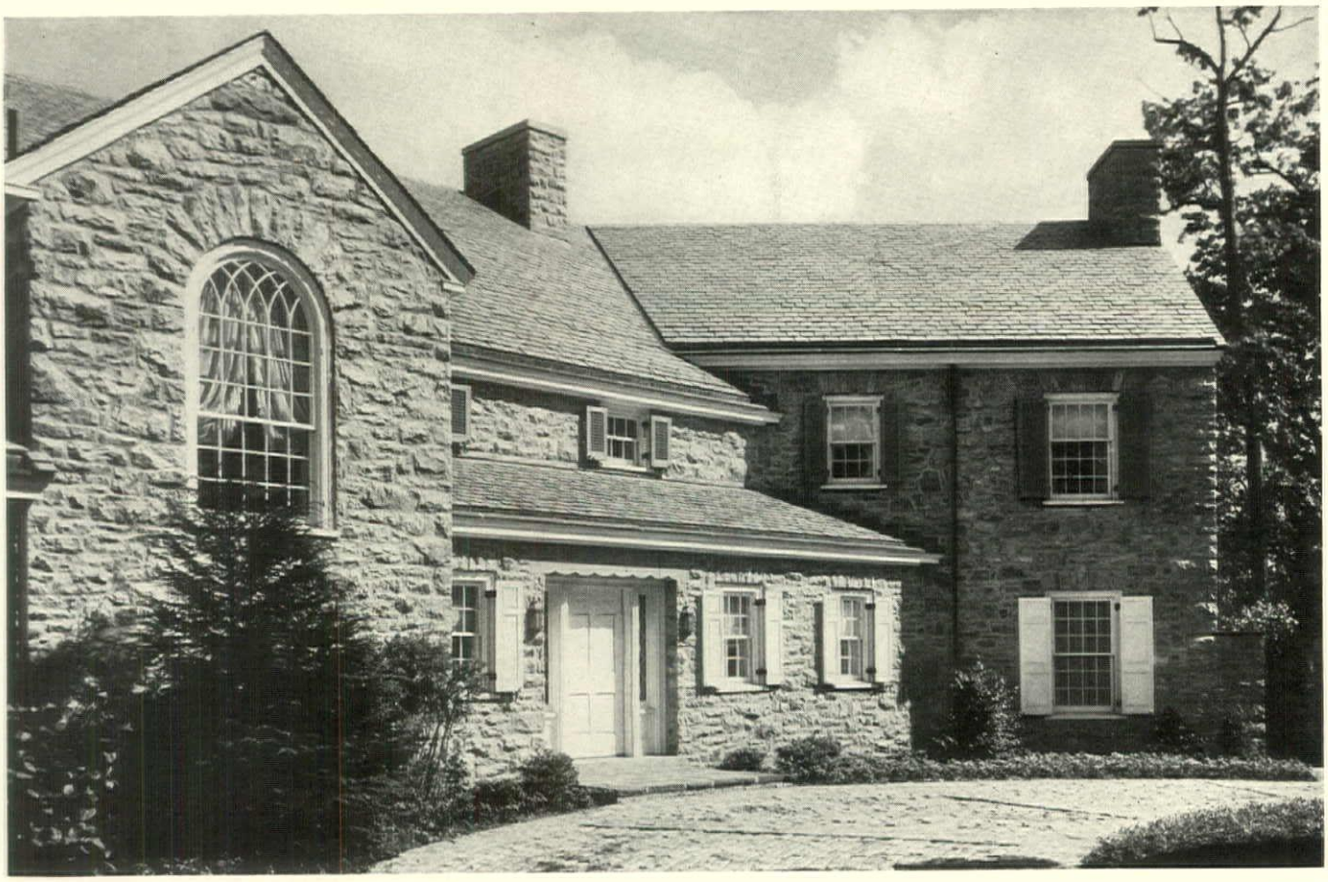
Construction: foundation walls, poured concrete; exterior walls, local stone backed with 4" cinder concrete blocks; roof, slate, varied in color, thickness and exposure; floor construction, steel joists and concrete slab; partitions, brick and gypsum block. Interior finish, plaster and wood; fireplaces, marble; main stairway, walnut treads and hand rail, with wrought iron balustrade. Equipment includes an air conditioning system and electrically operated garage doors. Cost per cubic foot, 60 cents; total cost, including landscaping, $87,000. Completed in 1932

HOUSE OF
SETH T. McCORMICK, JR.
WILLIAMSPORT, PA.
CARL C. TALLMAN
ARCHITECT



General view showing fore court and garage court and north and west elevations

HOUSE OF SETH T. McCORMICK, JR., WILLIAMSPORT, PA. CARL C. TALLMAN, ARCHITECT



HOUSE OF SETH T. McCORMICK, JR., WILLIAMSPORT, PA. CARL C. TALLMAN, ARCHITECT

Three Legal Cases of Frequent Occurrence

BY CLINTON H. BLAKE
Blake and Voorhees, Counsellors-at-Law

A NUMBER of cases have been recently decided by the courts which reiterate the law on some of the questions with which the architect is most frequently confronted in his practice. One of the decisions deals with the old and familiar problem of alleged guarantees as to cost by the architect and the effect of these on his right to compensation. Another deals with the architect's right to damage on the abandonment of the project and the basis upon which his compensation under those conditions shall be computed and determined. The third deals with the so-called doctrine of substantial performance, which is invoked by contractors in many instances.

Cost Guarantees Are Dangerous

In the first case the architect submitted to his client a sketch of a proposed apartment house somewhat similar to one which he had theretofore erected in a neighboring town and which had favorably impressed the client. He told her that the cost would be not over $60,000. Thereafter, he prepared a second sketch and estimated that the cost for the second building would be about $70,000.

After a considerable period, the client and architect had additional negotiations, as a result of which she directed the architect to proceed with working drawings for an apartment building which was materially different from either of the buildings shown on the first sketches. A written contract was entered into. This provided for a fee of four per cent for the plans and specifications, a fee of two per cent for supervision and, if construction did not go ahead by a specified date, an alternative fee of three per cent of the estimated cost. The architect proceeded with the working drawings.

Before bids were called for, the client ordered various changes. There was dispute as to this, the architect claiming that changes had been ordered and made which increased the cost, and the client denying it. The client claimed that the architect represented that the cost would be $86,000, and that she signed the contract on the express understanding that it should not have any binding effect if the cost exceeded this amount. The architect denied this and stated that he made an estimate of $92,000. The client abandoned the project and the architect sued for his services.

The court found, as a matter of fact, that when the contract was entered into it was contemplated by the parties that the cost of the building should be $92,000 but that the architect made no guaranty or contract that the cost would not exceed that amount. The court held, as a matter of law, that the burden in such case was upon the client to prove her affirmative defense, namely, that there had been an express understanding that the agreement should be of no effect and not binding upon her if the proposed building cost more than $86,000; that this burden of proof had not been met or sustained and that accordingly the architect was entitled to recover under the agreement (the building not having been proceeded with) the stipulated three per cent on an estimated cost of $92,000, together with interest from the date when the client abandoned the project.

This danger of cost representations is one which the architect must diligently guard against. The foregoing case is important, not merely because it again emphasizes the danger and shows how important it is to have any cost representations covered by written agreements, but also and specially because of its holding that, in the event the client makes such a defense, the burden is upon the client to sustain it. The architect will do well, however, to avoid the danger entirely, where possible, by reducing to writing any cost agreements or representations and keeping the record so clear that the client can not successfully set up a defense on the basis of an agreement as to a cost limit.

Fee for Work Abandoned

In the second case, the contract provided as follows: "Whether the work be executed or whether its execution be suspended or abandoned in part or in whole, payments to the Architects on their fee are to be made as follows: Upon the completion of the preliminary studies, a sum equal to twenty per cent (20%) of the basic rate of six per cent (6%). Upon completion of specifications and general working drawings, exclusive of details, a sum sufficient to increase payments on the fee to 60% of the rate or rates of commission arising from this agreement, computed upon a reasonable cost estimated on such completed specifications and drawings, or if bids have been received, then computed upon the lowest bona fide bid or bids."

The architects, it will be noted, were to be paid the specified fee (taking the usual form of the American Institute of Architects' percentages and instalments) "whether the work be executed or whether its execution be suspended or abandoned in part or in whole." The client abandoned the work and the architects sued for breach of contract, claiming that they had been unlawfully discharged and that they were entitled to recover a fee percentage based on the lowest bid.

The court held that the contract, specifying as it did

the architects' compensation, whether the work be executed or whether it be abandoned, clearly contemplated the right of the clients to abandon it and impliedly reserved to them the right to do so, accordingly, and that their exercise of this right was not an unlawful discharge of the architects. The court further held that, inasmuch as the building was not constructed, there was no cost price, and, the architects being able to prove no estimated or bid price, the court could not enforce the agreement with respect to compensation as it is quoted above. The court held that, nevertheless, the architects were entitled to prove the reasonable value of their services and to recover accordingly.

Doctrine of Substantial Performance

In the third case, the contractor sued to recover for putting a new shingle roof on defendant's building. The contract provided specifically that the job included taking off the old shingles. It appeared that the estimate in the first instance was higher than the contract price, but that the contractor expected to get some salvage value from the old shingles and reduced the price accordingly from that stated in the estimate. When it came to doing the work, the contractor found that he could not remove the old shingles without destroying them and he accordingly placed the new shingles over the old, without consulting the defendant. In a suit by the contractor for the contract price of the new roof, the defendant refused to pay on the ground that plaintiff had not performed, because he had not taken off the old shingles. Notwithstanding the circumstances and the showing that the price had been reduced on the theory that the contractor would get some salvage value from the old shingles, the court sustained the defendant on the ground that the removal of the old shingles had been definitely made a substantial part of the contract and that an intentional departure from a substantial provision of the contract, without the consent and approval of the other party, will prevent a recovery regardless of whether there is any intent to gain advantage thereby.

The doctrine of substantial performance has been adopted by the courts to obviate the injustice which would be done by insistence on the absolute letter of the contract and which would prevent the recovery by a contractor of any portion of his compensation, because some minor detail had not been completed or because some part of the work differed in some minor detail from the plans and specifications. To meet this situation, the courts have held that, where an omission has not been made intentionally and is slight and unsubstantial, the contractor will be allowed to recover the amount of the contract price, less, however, the amount needed to make good the omission. As the making good of this omission and the deduction from the contractor's payment of the amount necessary to make it good is an essential part of substantial performance, the contractor who claims substantial performance has the burden of furnishing the evidence required properly to measure and determine the deductions which are necessary to remedy any defects and omissions. In a case where the deviations from the contract are in matters of real substance, or are of such a substantial character that they can not be remedied without a partial reconstruction of the building, or where the cost of making them good is a substantial amount in comparison with the entire contract price, the rule of substantial performance will not be applied and the contractor will not be able to recover until and unless the defects are made good.

Every architect should understand the fundamentals of the doctrine of substantial performance. If there is a doubt whether a contract has been substantially performed, the only safe course for the architect to follow is to withhold his final approval and certificate. To approve the work under such circumstances might expose him to a claim by the client for substantial damages.

"Judgment of Solomon," a panel in the Nebraska State Capitol by Lee Lawrie, sculptor. Bertram G. Goodhue and Bertram G. Goodhue Associates, architects

NUMBER SEVEN—SEPTEMBER, 1933

AUTOMATIC HEATING EQUIPMENT

THE growing demand for heating plants that do not require manual attention for their daily operation is based upon four major considerations: (a) economy; (b) convenience, which means freedom from manual labor and frequent attention; (c) comfort, as evidenced by adequate and uniform heating; and (d) cleanliness through the elimination of dust, ash and smoke. These four major factors vary in degree according to the type of heating plant and the nature of control equipment used. Hence, the problem of the architect specifying an automatic heating installation is to appraise the performance of each type of plant and its control possibilities in terms of results to be achieved.

PRIMARY REQUIREMENTS

ECONOMY is the product of low cost fuel plus proper firing in a boiler or furnace efficiently adapted to that fuel. In some localities automatic stokers burning small sizes of anthracite or bituminous coal or coke show greatest operating economy. In other sections oil or gas is the cheapest fuel. The first problem to be solved in selecting automatic heating equipment is, therefore, determination of the fuel to be employed, unless operating economy is not the most important consideration. A convenient method for making such a comparison is presented in the table below, which gives formulae for determining relative heating costs per million B.t.u.

Having chosen the fuel the second problem is selection of a boiler or furnace and firing mechanism which is best adapted to the project under consideration. Relatively speaking, lowest efficiencies are experienced with manually operated boilers and furnaces; better efficiencies may be expected with automatic controls and manual firing; fairly high efficiences follow the use of automatically controlled stokers and oil or gas burners installed in boilers or furnaces designed for coal; and maximum efficiencies are obtained with equipment designed for the fuel and firing mechanism employed.

Convenience must be measured in relative terms. From a labor-saving point of view, gas is generally considered the most convenient fuel, followed in order by oil firing, stoker firing, and magazine feed boilers. Where modern oil distributing service is available, however, the chief difference in convenience between gas and oil disappears. Where gas mains are overloaded or subject to occasional freezing, oil may prove the more reliable. The degree of operating convenience or freedom from attention achieved with any system is directly influenced by completeness of the automatic control devices used to govern their performance.

Comfort, as expressed in uniformity of temperature and in an adequate supply of heat when and as wanted, is largely a matter of design of the system and adequacy of control mechanisms. Any properly designed system, whether steam, vapor, hot water, or warm air, can pro-

HOW TO CHECK COMPARATIVE HEATING COSTS WITH COAL, OIL AND GAS

To determine cost of heating per million B.t.u. where operating efficiencies are known or may be assumed, apply the following formulæ:

COAL

$$X = \frac{500 \times c}{C_c \times E_c}$$

where
X = cost of heating with coal in dollars per million B.t.u.
c = cost of coal in dollars per ton.
C_c = calorific value of coal, B.t.u. per pound.
E_c = overall or house efficiency for coal, expressed as a decimal.

OIL

$$Y = \frac{1{,}000{,}000 \times p}{C_o \times W \times E_o}$$

where
Y = cost of heating with oil in dollars per million B.t.u.
p = cost of oil in dollars per gallon.
C_o = calorific value of oil, B.t.u. per pound.
W = weight of oil per gallon, pounds. Note $C_o \times W$ equals B.t.u. per gallon.
E_o = overall or house efficiency for oil, expressed as a decimal.

GAS

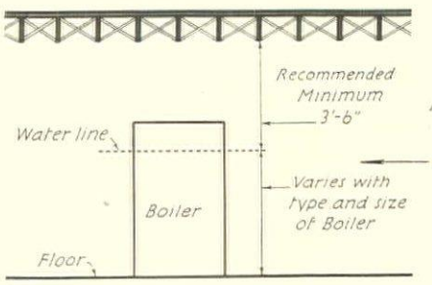
$$Z = \frac{1{,}000\ g}{C_g \times E_g}$$

where
Z = cost of heating with gas in dollars per million B.t.u.
g = average cost of gas, including demand and commodity charges, in dollars per thousand cubic feet.
C_g = calorific value of gas, B.t.u. per cubic foot.
E_g = overall or house efficiency for gas, expressed as a decimal.

Operating efficiencies listed by manufacturers of boilers, burners and stokers are not always based on uniform test conditions and should be used conservatively. They do not represent overall or house efficiency which embraces the distribution system. For comparative purposes only, and for a given building, operating efficiency of the boiler and firing device may be substituted for overall efficiency in these formulæ. Do not use these figures for determining total fuel consumption or costs.

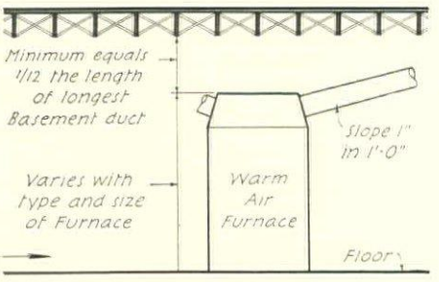
SPACE REQUIREMENTS

CEILING HEIGHTS



Recommended Ceiling Height in relation to Small Steam Boiler

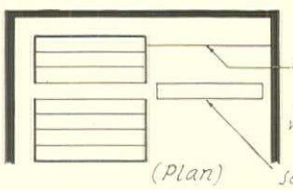
1

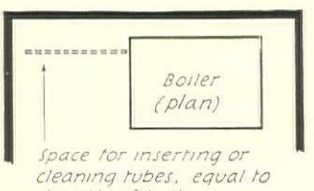


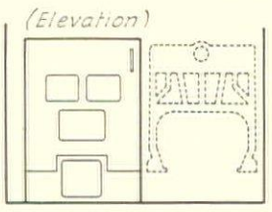
Recommended Ceiling Heights in relation to Warm Air Furnaces

2

CLEANING AND REPAIR



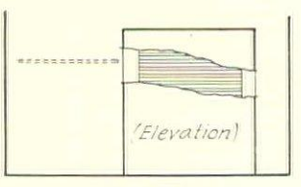




Tube Cleaning or Repair Space for Typical Tubular Boiler

Repair Space for Horizontal Cast Iron Section Boiler

3



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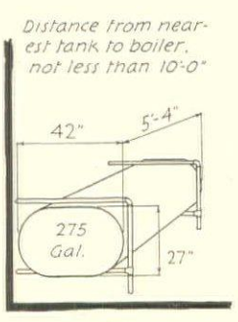

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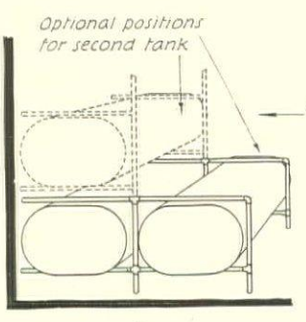
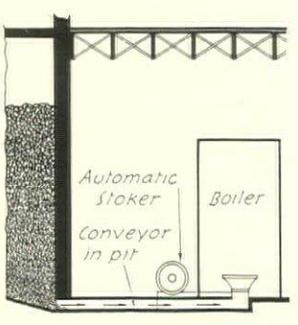


FUEL STORAGE

Single and Double Indoor tank Installation

6

Typical Automatic Feeder from Bin to Stoker



7

TYPICAL STORAGE TANKS AND CAPACITIES

Capacity of Tank—Gals.	Diamond, or Cross-Section	Length	Weight of Tank—Lbs.
275	27" x 42" (Obround)	5' - 4"	225
275	24" x 37" (Rectangular)	6' - 0"	233
550	4' - 0"	5' - 11"	484
1,100	4' - 0"	11' - 9"	830
1,500	4' - 0"	16' - 0"	1,825
1,500	4' - 8"	11' - 10"	1,730
1,500	5' - 4"	9' - 0"	1,550
2,000	5' - 4"	12' - 0"	2,000
2,000	5' - 0"	14' - 0"	2,180
3,000	6' - 0"	14' - 0"	2,700
3,000	5' - 4"	18' - 0"	2,912

Standard tanks are also made in 5,000 and 10,000 gallon capacities.

STORAGE SPACE FOR SOLID FUELS*

Fuel	Lbs. per cu. foot (Approx.)	Cubic feet per Long Ton 2240 Lbs.
Anthracite	55-60	41-37
Bituminous	50-55	45-41
Steam Coal	50-55	45-41
Coke Oven Coke		
3/4" to 1 1/2"	26-30	86-75
Rough	29-32	77-70
Horizontal Retort Coke	23-28	97-80
Vertical Retort Coke	21-23	107-97
Low Temperature Coke	19-20	118-112

* Computed from "Technical Data on Fuel," H. M. Spiers, British National Committee, World Power Conference.

vide requisite comfort; and it matters little what kind of fuel is used, if heat is effectively controlled.

Cleanliness, as compared to the hand-firing of solid fuels, depends, first, upon the type of equipment used; second, upon proper adjustment of that equipment to secure perfect combustion without smoke, and, third, upon the inherent cleanliness of fuel and the methods of handling it. All fuels can be burned without producing smoke if properly fired. Gas requires no handling whatever; oil handling is equally clean with modern equipment; solid fuels may be completely handled by closed conveyors to minimize coal and ash dust where cleanliness is a major consideration.

It is, therefore, obvious that all four basic requirements of automatic heating equipment are not fully met by any single type of plant or kind of fuel. The objectives most desired should govern selection of equipment and design of the system, with whatever sacrifice is necessary of the less important factors.

TYPE OF SYSTEM

HAVING decided upon performance factors, which must take precedent over all other considerations, the next step in the selection of automatic heating equipment is governed by more specific requirements of the particular project under consideration. There is a general relationship between the type of system employed and the kind of fuel to be used which deserves brief notice. Steam, vapor, and warm air systems are characteristically quick in responding to the application of heat, while hot water systems are comparatively slow in their response. For this reason a hot water system—theoretically—gives a more uniform heating effect when fired by intermittent gas or oil burners. On the other hand, warm air systems are extremely responsive and, therefore—again theoretically—tend to deliver a great deal of heat while the burner is operating, and little or no heat when the burner is shut down. Vapor systems possess many characteristics of hot water and are theoretically less affected by intermittent firing than either warm air or steam systems.

In practice, however, proper use of automatic controls almost entirely eliminates these considerations in the selection of equipment, and when initial cost is a factor, may make it possible to secure as uniform heating with steam, vapor or warm air and intermittent burners as with hot water installations.

SPACE REQUIREMENTS

AN important factor in the selection of automatically fired boilers or furnaces is the space required by different types of heating equipment, including storage facilities. Space for boiler or furnace is governed not only by the plan and dimensions of various units, but by the following factors:

(A)—For all types of steam, vapor and water boilers, ceiling heights should be governed by the height of the water line (in the case of steam or vapor) plus the required height for necessary piping above the boiler. Normally three and one-half feet clear space should be allowed above the normal water line in average size residential or small commercial heating systems. It should be noted that boilers of different types vary in their water line levels so that this factor may be important in selecting units for installation in basements with limited ceiling heights. With warm air furnaces or air conditioners the bonnet height in relation to the ceiling must provide adequate room for pitching the longest duct at a uniform slope of one inch per foot of run from bonnet to vertical riser. (See Figs. 1 and 2.)

(B)—With cast iron sectional boilers of horizontal type, enough space should be left at either side of the boiler to permit removal and replacement of a defective section without taking down the entire boiler. This should be slightly more than the width of the boiler itself. (Fig. 3.)

(C)—With horizontal fire tube boilers enough clear space should be left at the front or back of the boiler (according to its design) to permit cleaning or replacing boiler tubes. This space should be at least equal to the over-all length of the boiler itself. (See Fig. 4.)

(D)—Assembled boilers, furnaces, water heaters, storage tanks and fuel tanks, which are delivered and installed in large units, should be selected with regard to

SHORT-CUT METHODS OF ESTIMATING DOMESTIC FUEL REQUIREMENTS

In New Buildings

A rough approximation of fuel requirements based on oil burning experience and the computed radiation may be made as follows: To determine approximate number of gallons of oil required:

For Steam: Multiply number of square feet of direct steam radiation by 4.5.

For Hot Water: Multiply number of square feet of direct hot water radiation by 2.5.

For Warm Air: Multiply square inches of combined leader pipes by 3.1.

Where coal or gas fuels are contemplated convert by means of table at right.

Where Present Coal Consumption is Known

COAL	GALLONS OF OIL		GAS
Tons Anthracite Used per Season	U. S. Gals.	Imperial Gals.	Cubic Feet
6	780	624	180,000
8	1040	832	240,000
10	1300	1040	300,000
12	1560	1248	360,000
14	1820	1456	420,000
16	2080	1654	480,000
18	2340	1862	540,000
20	2600	2070	600,000

Above Table Based on Coal 12,000 B.t.u. per lb.; Oil 141,000 B.t.u. per U. S. Gallon; Gas 500 B.t.u. per cu. ft.
Data from manual of Gilbert & Barker Manufacturing Company.

the size of the doorway or other opening through which they must be moved.

(E)—Fuel storage requirements represent an important space factor if solid fuels or oil are to be stored within the building. Wherever possible consideration should be given to the use of a conveyor feeding directly from the bin, or to the use of elevated coal storage bins to provide a gravity feed to automatic stoker hoppers. Oil storage tanks may be buried outside of the building if space within is at a premium. (See Figs. 5, 6 and 7 and the fuel storage tables on page 96.)

(F)—Stacks or chimneys should be designed for coal. No allowance should be made for the somewhat lower draft requirements of oil or gas fuels, as it is far better to use a draft regulator or damper to maintain uniform draft under all conditions. Gas fired equipment must be provided with a draft diverter. Where possible, the flue for gas fired equipment should be lined with lead or with glazed tile set in Portland cement mortar.

AUTOMATIC CONTROLS AND SAFETY DEVICES

THE whole field of automatic heating has depended for its growth and present achievement upon the development of automatic control and safety devices. It may be said today that regardless of the care exercised in the design of a heating installation, the system may be made more convenient, more economical, and more uniform in its maintenance of desired temperatures by application of modern automatic controls.

The various types of control devices now on the market must be broadly grouped into three divisions: (a) those which control operation of the boiler and its firing mechanism according to the call for heat; (b) those which insure safety of the installation against operation under abnormal conditions; and (c) those which are designed to control or improve distribution of heat for maximum uniformity, economy, or other purposes. Devices in the latter group do not fall within the scope of this discussion, though they may be used in conjunction with primary thermostatic and safety controls. Control devices may be operated by electricity or compressed air, or in certain instances by direct mechanical action.

THERMOSTATIC CONTROLS

THE brain of the control system which regulates the supply of heat is the thermostat. This unit may be electrically operated on line voltages or through transformers on low voltages, the latter type generally being more sensitive and accurate. Thermostats are also developed for operation on air pressures with suitable air piping in lieu of electric wiring. The thermostat itself may be governed by electric or hand-wound clocks which will automatically vary day-time and night-time temperatures, or may even be equipped with program mechanisms to maintain lower temperatures over week-ends or holiday periods. Usually thermostats operate to open or close an electrical or air pressure mechanism which either starts or stops the firing device according to the call for more or less heat. A new type of thermostat "modulates" the generation of heat in precise accordance with the changes in temperature.

An improvement over simple thermostatic control has been developed to maintain periodic operation of the heating plant during protracted idle periods such as occur in mild weather. If radiators or warm air registers remain cold for any considerable period of time the air tends to stratify with cold air near the floor line, tempered air at the breathing zone where the thermostat is located, and warm air at the ceiling. This condition may create a sensation of cold even though the middle zone is at the desired temperature. These secondary thermostatic controls start the plant when the system cools enough to permit stratification and warm radiators sufficiently to re-establish circulation. They may either take the form of specially equipped clock units that periodically start and stop the boiler or furnace, even when there is no demand for heat, or they may consist of "low limit" devices attached to a radiator, heating duct, or supply pipe.

SUMMER WATER SUPPLY CONTROLS

ANOTHER type of thermostatic control may be applied to any boiler equipped with submerged hot water coils or other heating device to permit automatic operation of the boiler during the summer season as a source of hot water supply. On steam and vapor systems these devices prevent the firing mechanism from developing steam by maintaining the water temperature at any desired point from 120 to 180° F. On hot water heating systems electric or air pressure control valves prevent circulation of boiler water through the piping while maintaining sufficient heat in the boiler to keep the water storage tank hot.

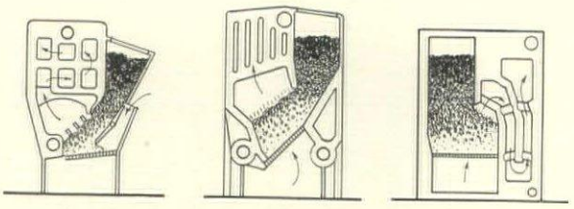
SUMMER FURNACE FAN CONTROLS

WARM air furnaces equipped with forced circulation fans may be employed for the cooling effect of constant air circulation during summer periods by using auxiliary controls that permit the fan to operate without allowing the firing mechanism to start. Other auxiliary controls are available for all-year operation of air conditioning equipment, including humidifiers, fans, air washers, and refrigerating equipment.

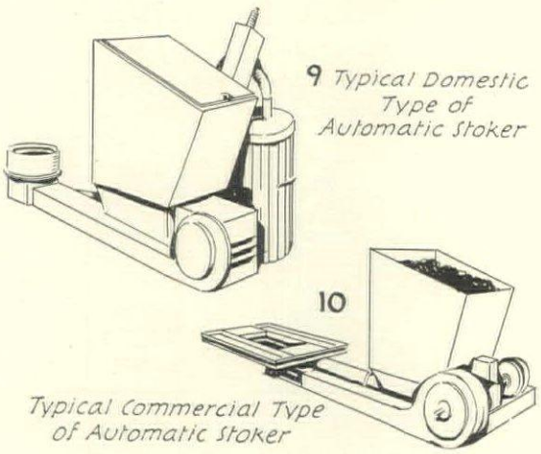
OPERATING AND SAFETY CONTROLS

IN this division there are a number of different types of controls. Those which govern the automatic operation of oil burners, gas burners, and stokers should always be provided by the burner manufacturer as part of the original equipment. These controls vary according to design of the apparatus. They usually include primary safety controls which stop the burner mechanism when any abnormal condition exists, such as (a) excessive pressure in steam or vapor boilers, or excessive temperatures in hot water or warm air systems, (b) failure of electric power or fuel supply, and (c) failure of flame due to improper ignition or other causes at any point in the operating cycle. Some types of control and safety equipment simply shut down operation in case of failure of any element; others automatically re-cycle—that is, attempt to start the firing mechanism over again one or two times—in case of initial failure.

TYPICAL MAGAZINE BOILERS AND AUTOMATIC STOKERS



8 Typical Magazine Feed Boilers



9 Typical Domestic Type of Automatic Stoker

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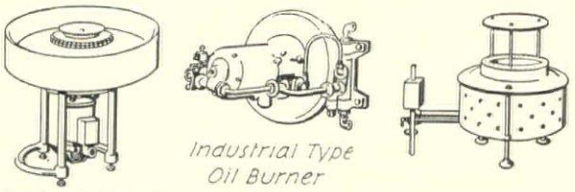
Typical Commercial Type of Automatic Stoker

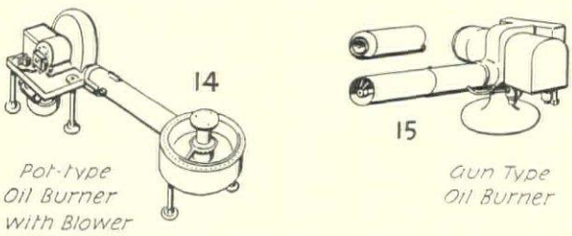
TYPES OF OIL BURNERS AND GAS CONVERSION BURNERS



Vertical Rotary Oil Burner 11

Industrial Type Oil Burner 12

13 Natural Draft Oil Burner



14

Pot-type Oil Burner with Blower

15

Gun Type Oil Burner

Typical Gas Conversion Burners

16

17

Inasmuch as these primary operating and safety controls should be considered a part of the firing mechanism, their selection is not a burden upon architect or buyer, but care should be exercised in comparing available equipment to ascertain the relative adequacy of the control devices offered.

Certain supplementary controls may be desirable, including: (a) On steam or vapor boilers, a low water cut-off or an automatic water feeder, or both. (b) On warm air furnaces equipped with fans, a means of starting the fan to protect the furnace from overheating if thermostatic control does not properly shut down the firing mechanism. (c) On automatic stoker mechanisms, a control that will intermittently operate the stoker to keep the fire from going out during protracted periods of idleness. (d) On conditioned air installations, automatic controls providing an adjustable sequence of operation for fire or furnace bonnet temperature and for air circulation. (e) Such supplementary controls as may be required for summer operation of hot water supply systems or circulation of cool air.

CONVERTING EXISTING EQUIPMENT

ANY existing manually fired heating plant can be converted to automatic operation by installation of an oil burner, gas-conversion unit, or an automatic stoker, plus automatic control devices of appropriate character. Satisfactory operation normally follows if the original installation performed properly with solid fuels. Typical units are illustrated in Figs. 9 to 17 inclusive.

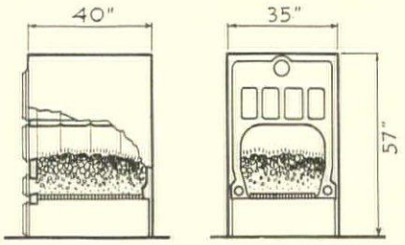
In new installations using solid fuels for the present, it is frequently desirable to provide for possible future conversion to oil or gas by choosing a unit favoring the change. It happens that the "Certified Loads" of the Heating and Piping Contractors' Association are based on different methods of rating boilers for coal and oil. Some boiler designs show a higher rating for oil than coal; in others the position is reversed. It is desirable to select a unit for initial use with coal which could be certified as adequate for the load when converted to oil or gas.

Wherever possible to install new heating equipment a number of marked advantages can be gained by selecting boilers and furnaces specifically designed for automatic operation with either stokers, oil burners, or gas fuel. Reasons for preferring boilers or furnaces especially designed for a particular type of fuel are indicated in the following paragraphs.

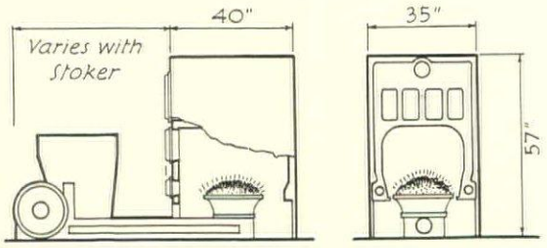
STOKER-FIRED BOILERS AND FURNACES

BOILERS and furnaces designed for manual firing of solid fuels—anthracite or bituminous coal or coke—may be equipped with automatic stokers without basic change in design in the majority of heating installations. Stokers require somewhat greater combustion space within the fire pot or boiler furnace than is needed with

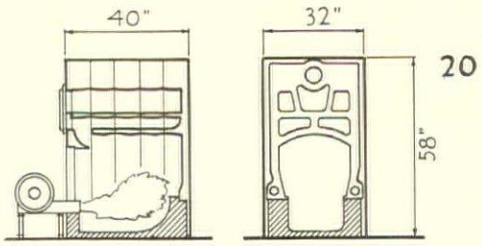
TYPICAL CAST IRON SECTIONAL BOILERS FOR COAL, OIL AND GAS



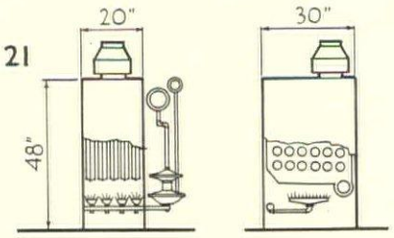
18 *Typical Solid Fuel Boiler Horizontal Cast Iron Sectional Type.*



19 *Typical Boiler shown at left, adapted to Automatic Stoker operation.*



20 *Horizontal Cast Iron Boiler of same rated capacity as above, designed for Oil Burning. Note smaller and longer flue passes, also larger combustion chamber.*



21 *Cast Iron Sectional Boiler for Gas, having same rated capacity as other Boilers illustrated. Note reduced combustion space, narrow and extended flue passes, smaller overall size.*

manual firing, but this space is usually gained by placing the stoker fire pot at the level of the original grates, using a shallow pit if necessary. Stokers are designed to make such location possible. Only in large boilers, and particularly in high pressure steam plants, is it necessary to increase combustion volume either by providing a pit for the stoker installation or by raising the boiler setting to a suitable height. In this class of installation the services of a competent mechanical engineer should be employed.

Disregarding commercial and industrial stokers used on large installations, the principal choice is between underfeed and overfeed stokers. In the residential class the most common type of mechanism is an underfeed stoker, consisting of a fire pot fed from the bottom by a worm screw or plunger mechanism with a forced air blower operated by the same motor that drives the coal feed. A hopper is commonly provided which will hold a supply of coal sufficient for several hours' or a full day's supply in severe weather, and several days' supply in mild weather. This hopper may in itself be automatically fed by gravity from an overhead coal bin or by a screw-type conveyor from a coal bin at floor level. In certain types, particularly in smaller residential sizes, another conveyor may automatically remove ash and deposit it in a suitable receptacle. Another basic type of relatively recent development consists of an overfeed mechanism which operates through the fire door of the heater and which throws coal on the fire according to the rate of combustion.

These residential stokers, and the smaller size apartment house and commercial heating stokers, are readily subjected to complete automatic control which eliminates all care except a periodic filling of the hopper and removal of ash receptacles. Controls have been devised to hold fire in stokers during long periods of idleness by occasionally putting the stokers in operation when boiler temperatures drop to a point which indicates the fire may die out. Stoker-fired heating plants may also be controlled so that the boiler may be used for summer hot water supply where an indirect heater is employed. Stokers are made for all solid fuels, including small sizes of anthracite, coke, and coking or semi-coking bituminous coals. Bituminous stokers do not have ash removal equipment.

MAGAZINE FEED BOILERS

MANY advantages of automatic stoker firing are obtained without use of such mechanism by employing magazine feed steam or water boilers. These boilers have one or two hoppers within the boiler itself large enough to hold fuel sufficient for 12 to 48 hours without refilling. The fuel drops by gravity onto a sloping fire bed, and when combustion is completed ashes drop off the edge of the grate to the ash pit. With automatic controls magazine feed boilers perform the same func-

tions as an automatic stoker installation, except that (a) they have no ash removal equipment, (b) they are not normally equipped with blowers or forced draft mechanisms and therefore require a good chimney draft, and (c) they are primarily adapted to small sizes of anthracite and coke rather than to bituminous coals. In Fig. 8 are shown diagrammatic representations of several single grate magazine feed boilers.

STOKER-FIRED WARM AIR FURNACES

AS in the case of steam and hot water boilers, standard types of warm air furnaces designed for manual firing with coal or coke are well adapted to installation of automatic stoker mechanisms and suitable control devices, making the plant completely automatic except for occasional handling of coal or ash. (See Figs. 22 and 23.)

OIL BURNING BOILERS

IN selecting heating plants for oil burning installations it is convenient to compare their design to that of standard coal burning boilers. The oil burning boiler should provide in proper proportions (a) considerably increased combustion space, (b) relatively smaller passages for the hot flue gases, and (c) a considerable increase in the distance flue gases must travel before reaching the stack.

In the design of horizontal cast iron sectional boilers requirements for greater combustion space are usually satisfied by extending the water cooled legs surrounding the combustion chambers or by firing into the ash pit space, while increased heat transfer area is provided by more flue gas passages of relatively smaller area. (See Figs. 18 and 20.) In steel and copper tubular boilers the difference between an oil burning boiler and one designed for coal is usually observed in the use of longer tubes or of more tubes of smaller diameter, with appropriate changes in the combustion chamber.

In addition to these adaptations of coal burning boilers to oil burning type there are a number of boilers of special design which have been developed exclusively for use with oil fuel. Typical examples are diagrammatically illustrated in Figs. 32 to 36, inclusive.

Advantages claimed for cast iron sectional boilers for oil burning are: (a) initial low cost, (b) ease of replacement of individual sections, and (c) ease of installation—especially of large boilers where sections may be introduced through narrow passages. Advantages claimed for steel boilers, including those made of wrought iron, steel or copper, are: (a) with these materials, relatively thin walls can be employed and rapid transfer of heat obtained, (b) tubular construction permits development of long, small area gas passes ideally adapted to requirements of oil heating, and (c) materials may be chosen for their resistance to the high temperatures and corrosive effects of the combustion gases of oil.

Selection of oil burners is fully discussed in AMERICAN ARCHITECT Reference Data No. 1—"Oil Burning Equipment"—published in the August, 1932, issue. This article also presents fundamental requirements in the proper installation of oil burners, stressing the importance of choosing a type of burner adapted to the kind of boiler with which it is to be used. As an additional aid a large number of burner and boiler manufacturers have cooperated in testing their combined equipment so that from either source may be obtained recommendations as to the type of burner best adapted to a given boiler or furnace.

OIL BURNING WARM AIR FURNACES

WARM air furnaces designed for oil burning are substantially like those which have traditionally been used for solid fuels, or they may be of radically new design. In the traditional form the furnace consists of a stove surrounded and enclosed by a jacket or casing. The stove may be of cast iron assembled in sections cemented together, or it may be of steel with welded or riveted joints. (See Figs. 22 and 23.) The stove must be gastight and must present sufficient heat radiating surface to permit air passing between casing and stove to absorb all of the heat generated. Newer designs seek to provide a maximum amount of heat transfer surface with which hot gases must come in contact before reaching the stack. (See Figs. 24 and 24A.)

In selecting warm air furnaces designed for oil, the same considerations given above for heating boilers apply again. That is, (a) there should be ample combustion space in the fire pot, (b) there must be adequate heat absorbing surfaces with (c) relatively small and extended flue gas passes.

OIL BURNING WATER HEATERS

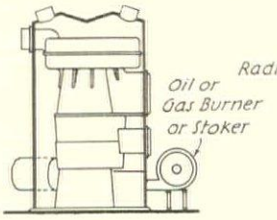
EXCEPT in the proportioning of the boiler element and the size of the units employed, the oil-fired water heater is substantially like a hot water heating boiler. Exceptions to this statement are mostly found in oil water heaters using natural draft burners. Representative units are diagrammatically illustrated in Figs. 40, 41 and 42. They are used primarily as adjuncts to warm air heating installations and for hot water loads large enough to require a separate unit.

An adequate hot water supply frequently may be obtained from oil burning steam and water boilers by means of indirect heaters attached to the exterior of the boiler, by water heating coils submerged within the boiler itself, or by steam coils submerged in a separate hot water storage tank. Several modern heating boilers have been developed with submerged coils of sufficient length and capacity to eliminate need for a separate storage tank, unless hot water requirements are exceptionally heavy.

By means of suitable control mechanisms an oil burning water or steam boiler may be operated throughout the summer season to provide an adequate hot water supply. Controls used on steam systems usually keep the temperature of boiler water well below the boiling point (a maximum of 180° F.) and thus prevent heat from rising to radiators. Those used on hot water systems generally involve a shut-off valve on risers to prevent circulation through the radiators. All-year operation of boiler and burner is considered advantageous as it tends to minimize deterioration of equipment. Water is heated economically and room heat is always available.

TYPES OF BOILERS AND FURNACES FOR AUTOMATIC FIRING

WARM AIR FURNACES



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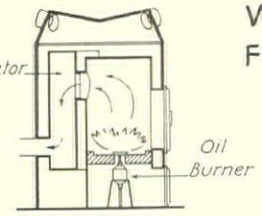

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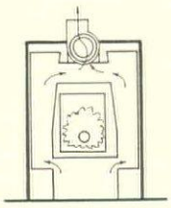

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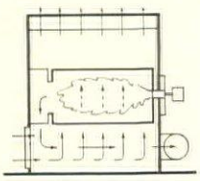

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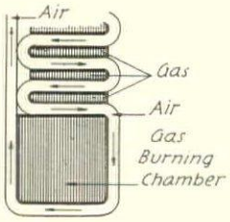

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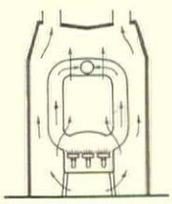

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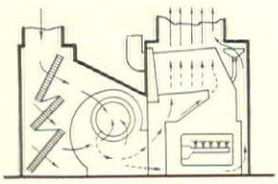
22, 23 *Typical Warm Air Furnaces for Coal, Oil, or Gas Conversion Burners*

24, 24 A *Special Oil Burning Warm Air Furnaces*

25, 26, 27 *Special Gas Fired Warm Air Furnaces*



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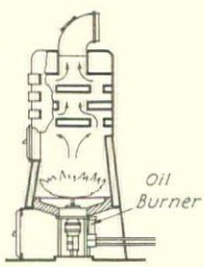
STEAM AND WATER BOILERS



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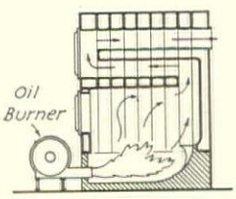

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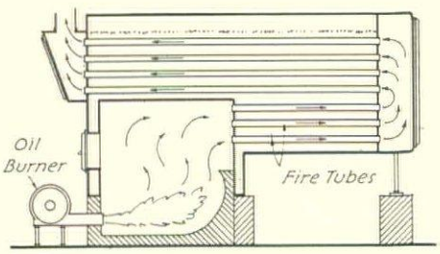

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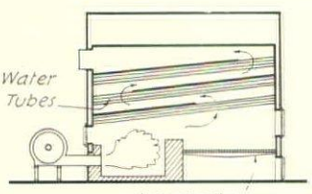

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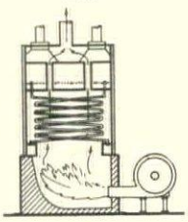

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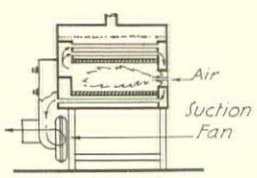

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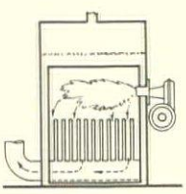

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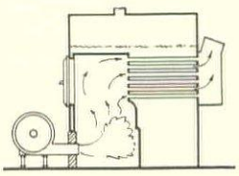

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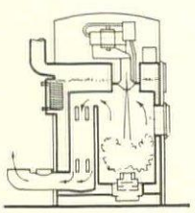

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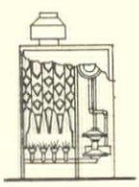

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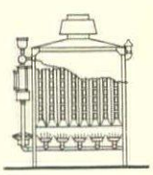

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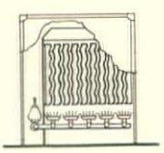


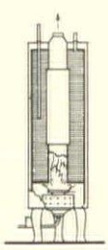
39

28, 29, 30, 31 *Standard Types of Boilers adapted to Oil, Gas or Stoker Firing*

32, 33, 34, 35, 36 *Special Types of Oil Burning, Steam and Water Boilers*

37, 38, 39 *Special Types of Gas Burning Boilers*

HOT WATER HEATERS



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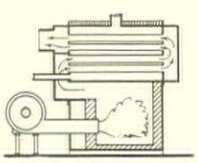
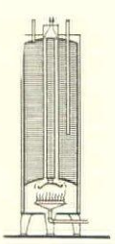


42

40, 41, 42 *Oil Burning Water Heaters*

43, 44 *Typical Gas Hot Water Heaters*

43



44

GAS BURNING BOILERS

WHILE adaptation of coal burning boilers to gas fuel is readily accomplished by the installation of a gas-conversion unit, boilers designed especially for gas burning devices differ radically from those using ordinary solid fuels. (Compare Figs. 18 and 21.)

Conditions ideal for combustion of gas include: (a) small combustion space as compared to solid fuel practice, (b) considerable increase in heat absorbing surfaces and in the scrubbing effect brought about by (c) relatively narrow flue gas passes. Materials of construction must be resistant to the acid condensation which may occasionally form within the boiler when flue gas temperatures are very low.

One type is sectional in construction with a single burner beneath each section. Sections are placed much closer together than would be possible when burning a soot-forming fuel. The aim is to break up hot gases into thin streams so that all particles of heat-carrying gases can come as closely as possible to the heat-absorbing surfaces. Another type of boiler uses copper coils closely interlaced to provide the requisite heat transfer area with a multiplicity of constricted gas passages. Typical gas burning boilers are diagrammatically illustrated in Figs. 37, 38 and 39.

In selection of gas fired boilers, the American Gas Association has determined by experience that the factor to be allowed for loss of heat from pipe and pick-up load must vary somewhat from that commonly employed with solid fuels. The following table gives this selection factor for installations ranging from 500 to 4,000 square feet of steam radiation.

SELECTION FACTORS FOR GAS BOILERS

Equivalent Cast Iron Steam Radiation (Square Feet of 240 B.t.u. Each)	Selection Factor (per cent)
500	56.0
800	54.0
1,200	51.0
1,600	48.0
2,000	45.0
3,000	42.5
4,000 and over	40.0

Since gas appliances have heat generating capacities that can be predicted accurately within one or two per cent, makers of these appliances rate their product on the basis of hourly B.t.u. output rating. The uniform standard for such rating has been developed by American Gas Association Testing Laboratory. To convert this rating to square feet of equivalent direct radiation divide the hourly B.t.u. output by 240 for steam and 150 for water. Either the original B.t.u. rating or the converted direct radiation rating should be increased by the selection factor given above to find the minimum size boiler that will handle the load. The next size larger boiler should be chosen if there is any likelihood of future additional load.

Architects should recommend only gas appliances that bear the approval seal of the American Gas Association Testing Laboratory.

GAS FIRED WARM AIR FURNACES

IN the warm air heating field, as in steam and water boilers, heating furnaces designed for coal may be adapted to gas by use of conversion units, but the furnace designed solely for gas firing differs radically from solid fuel practice. Special designs include (a) relatively small combustion space, (b) widely extended heat absorbing surfaces, usually of non-corrosive sheet metals of thin section, and (c) narrow flue gas passes designed to bring hot gases in intimate contact with the heat transfer surfaces. Representative units are diagrammatically illustrated in Figs. 25, 26 and 27.

Gas warm air heating embraces a variety of special types of systems in addition to the usual central system with appropriate distribution ducts. These special adaptations include warm air floor furnaces for heating one or two rooms, space heaters, radiant heaters, and individual gas fired warm air radiators. In most of these units products of combustion are released in the space heated rather than carried to an exterior flue or stack.

Recirculation of air should always be arranged with gas fired warm air furnaces, not only as an aid in heating, but because it is essential to economy. Use of a fan or blower for forced air circulation is also recommended.

GAS-CONVERSION UNITS FOR BOILERS AND FURNACES

ALL standard coal burning boilers and warm air furnaces within the range of sizes normally employed for low pressure heating systems may be adapted to gas firing by use of conversion burners. Many of these units employ radiants or refractories to convert some of the energy in gas to radiant heat. Others are of the blast type with luminous flames and operate without refractories. In all cases the aim is to transfer the majority of the heat units from gas to boiler or stove within the fire pot itself because of the low heat transfer that takes place in the relatively large flue passages of units designed for coal or coke. A number of conversion units provide means for controlling the admission of air and for closing air passages when the gas supply is cut off. This reduces the amount of surplus air passing through the combustion chamber and the tendency of this air to cool the boiler or furnace. Typical gas conversion burners of the refractory type for both round and square boilers are illustrated in Figs. 16 and 17.

GAS HOT WATER HEATERS

WHILE steam and hot water heating plants fired by gas may be employed to supply hot water during the summer season as described (Page 101) under oil burning equipment, the automatic gas hot water heater is more commonly used. It is, of course, an essential item in gas heating installations of the warm air type. Typical units are diagrammatically illustrated in Figs. 43 and 44. Automatic control may take two forms: (a) by the temperature of water in the storage tank—a low temperature automatically starting the burner—and (b) by a demand for water, using a "pressure-release" control.

Automatic Control

Methods and Refinements in Automatic Control to Increase Comfort, Convenience and Economy Which Should be Understood Before Designing a Heating Installation or Selecting Equipment

AUTOMATIC heating plants, — heating plants that "take care of themselves,"— are possible only through automatic temperature controls. Their popularity is based on the desire for the high degree of comfort, convenience and economy automatic control equipment has made possible.

The development of the science of automatic control has been so rapid that few people, other than those directly connected with the industry, realize what can be done today to improve the operation of existing heating plants and to insure up-to-the-minute operation in new plants.

The controls supplied with oil burners, gas burners, and automatic stokers as standard equipment—controls which govern their operating cycle—often represent merely the simplest type of automatic control. They are the nucleus upon which to build more complete control systems that will do much more to achieve comfort, convenience and economy than was dreamed of half a decade ago.

A working knowledge of what automatic controls can do, together with their description, is presented in these pages in non-technical terms.

Simple Thermostatic Control for All Types of Systems

The simplest type of automatic control system consists of a thermostat located in the space to be heated which governs either the dampers on a manually fired boiler, or furnace, or the operating controls of an oil or gas burner or automatic stoker.

When the temperature in the space to be heated falls below a predetermined level, the thermostat calls for more heat until temperature rises to the desired point, when heat is shut off. The use of such equipment results in substantial savings in fuel over manual firing and brings a very considerable measure of comfort and convenience. However, in such simple control applications, no provision is made for protective controls which are vitally important and must therefore be considered with any control system. These Safety or Limit Controls will be described later.

Time Operated Thermostatic Control for All Types of Systems

By adding a clock to the simple thermostat in the elementary control system above described, it is possible to have two temperature ranges—one for daytime and the other for night—each automatically controlled.

During the period when the building is actively occupied, the thermostat can be set at the desired day temperature. At any predetermined time, the clock will lower the setting to any desired level for the unoccupied or sleeping hours, thus conserving fuel. In the morning, at any predetermined time, the day temperature is automatically restored so that the building is comfortable without the necessity of firing, in the case of a manually operated heating plant, or without manually moving the thermostat up in the case of an automatic burner.

Clocks are available with one or eight day movements, or electrically operated by synchronous self-starting motors. In addition, clocks may be equipped with week-end or holiday shut-offs, or both, to maintain a low temperature range when the building is unoccupied for periods of a day or more.

Eliminating Air Stratification, or "Cold 70°," for All Types of Systems

When the thermostat does not call for heat for relatively long periods, as normally occurs in moderate weather, radiators cool, or warm air registers cease to deliver heat, and air does not circulate actively. Cold air, therefore, settles to the floor and warm air rises to the ceiling which leads to chilly floors and uncomfortable temperatures even though the thermostat located at the breathing level may be satisfied.

This condition, known as "Cold 70°", can be eliminated by using the Thermochron, which will be described in detail later. "Cold 70°" also can be eliminated by means of Low Limit Controls, which may be used with the conventional clock thermostats.

Summer-Winter Domestic Hot Water from Automatic Heating Equipment

To any steam, vapor or hot water heating system equipped with an indirect hot water supply heater and an automatic firing mechanism, a Summer-Winter Control System may be added, which automatically furnishes the domestic hot water supply throughout the year, including the summer months when the radiation is not in use.

This system produces an ample supply of domestic hot water at a very low cost. It also serves to prevent deterioration of the heating equipment by operating twelve months of the year, and to eliminate dampness in the basement during the summer.

Year-'Round Control of a Small Warm Air Heating Plant

Warm air furnaces may be equipped with power circulating fans to increase their efficiency. A marked summer cooling effect may be derived by reversing the thermostatic action in the summer months and using the fan to circulate the air without operating the furnace. With equipment embracing an air washer or humidifier, or when an artificial cooling unit is used, the control may be arranged to govern these functions as well.

Modulating Control

Modulating Controls constantly provide exactly the amount of heat, moisture or cooling necessary to compensate for changes in any or all of these conditions. Such controls instantly respond to any variations from the desired settings by maintaining valves, dampers or louvers in exactly the position required to supply precisely the degree of heat, humidity or cooling wanted.

While adaptable to many special problems, Modulating Controls are ideally suited to Air Conditioning installations.

The Modutrol System

The Modutrol System includes the many combinations of controls and functions needed to meet all heating and air conditioning requirements in old buildings or new, large or small. It is tailor-made for every installation, and, while the various controls are completely unified into one harmonious control system, each unit, being either self-contained or electrically operated, is self-sustaining and each serves a distinct purpose.

The Modutrol System provides local control in any space or part of a building. It can readily be installed in buildings already constructed, and may include provision for night, week-end and holiday shut-offs, to lower the temperature and to conserve fuel.

Zone Control

Zone Control is one of the types of control possible with the Modutrol System. It consists of dividing the building and its heating system into any number of parts, according to the types or periods of occupancy, and the exposure to the elements, and serving these zones with the required heat at the proper time.

Zone Control provides economy by supplying only enough heat to meet the requirements and by supplying this heat only when it is needed.

How Automatic Controls May Reduce the Cost of a Heating Installation

AUTOMATIC controls, because of their tremendous importance in the performance of any heating system, naturally play an important part in the choice of such a heating system.

It is possible, by using automatic control devices, to install a system of lower initial cost and secure better results than a more expensive type of heating system with manual operation, or with incomplete controls. It is advisable, therefore, to thoroughly investigate the possibilities of control equipment before specifying the heating system in order to insure the greatest heating satisfaction at the lowest cost.

Such consideration is advisable in every case but especially in the case of an automatic supply of heat, such as oil, gas, or central station steam, which supplies heat intermittently. Unless properly controlled, intermittent firing brings about an unsatisfactory condition. When applied to responsive systems, the heat supply falls off as quickly after the burner is shut off as it responds when turned on, causing alternate warm and cool periods. When applied to the unresponsive type of system, fluctuations are fewer but of greater duration, as the radiation lags behind the thermostat, and a period of discomfort results between the time the thermostat calls for heat and the time the heat actually is delivered.

By use of proper controls, however, the responsive systems are capable of maintaining reliably uniform temperatures, even under widely fluctuating outdoor temperatures. Conversely, the unresponsive type of system may be made more efficient by removing the inherent lag (which occurs both in turning heat on and in turning heat off) by the use of proper controls. It is generally true that a responsive heating system, under automatic control, will cost less to install, will provide greater convenience and comfort, and will operate at lower cost than a manually operated plant which is not responsive.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Elementary Temperature Controls

The Simplest Automatic Control System Consists of a Thermostat Operating a Damper Regulator Motor on a Manually Fired Heating Plant or Governing the Operating Controls Normally Supplied with Oil and Gas Burners and Automatic Stokers

THE brain of an automatic temperature control system is the thermostat. By mechanically responding to changes in temperature it opens or closes an electrical circuit which in turn operates dampers or starts and stops automatic firing mechanisms and thus governs the delivery of heat.

There are many different types of thermostats in the Minneapolis-Honeywell line, no two of which have identical characteristics. Each of these types is made with several variations to suit different conditions of service. The selection of a thermostat, like that of any other control device, therefore depends upon a number of considerations and should not be made until the whole control system is planned. Preferably the selection should be made or checked by a Minneapolis-Honeywell service engineer.

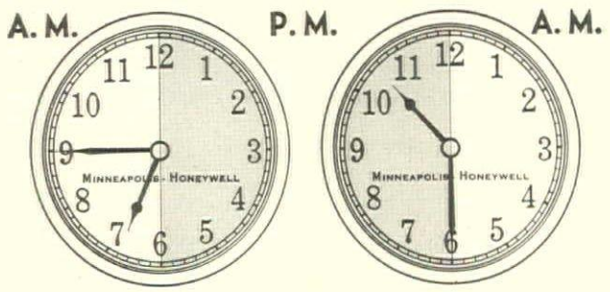
There are two basic types of thermostats: One has a bi-metallic element that flexes under temperature changes. This movement, while slight, is sufficient to open or close electrical contact points in low voltage circuits. The other employs a sealed bellows which expands or contracts with changes in temperature and moves with sufficient force to operate a mercury switch that can serve either a low voltage circuit or a line voltage circuit.

Time Control Possibilities with Clock Thermostats

THE loss of heat from buildings varies with the difference in temperature indoors and out. If the indoor temperature can be reduced at times when the building is not actively occupied or when its occupants are asleep, thereby lessening this temperature differential, it follows that there will be greater economy in operation.

Two temperature settings are therefore desirable for maximum operating economy. For convenience they will be referred to as the day and night levels. By adding a clock mechanism to a thermostat, the shift from day to night temperature, and vice versa, can be done automatically at predetermined times. A one day clock must be wound every night; therefore, this type is arranged only to make the shift from night to day level at some set time in the morning. Eight day and electric clock thermostats automatically shift the temperature settings twice daily.

In addition, any 8-day or electric clock may be equipped with additional dials to retain the night temperature over longer periods, as over week-ends or on holidays, or both. These inexpensive attachments are particularly desirable for schools, stores, libraries and other buildings that are closed at regular or occasional intervals of more than a day. Any control system may be subject to timed operation in the ways described.



DAY AND NIGHT CONTROL—All 8-day and Electric Clock Thermostats are equipped to lower temperature setting at any predetermined time and raise it another time—or to provide four changes if required.

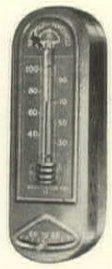
MONTH						
SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

FEBRUARY						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

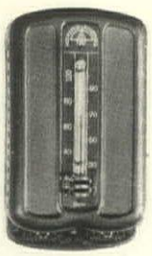
WEEK END AND HOLIDAY SHUT-OFF—All 8-day and Electric Clock Thermostats with low-voltage controls may be equipped, on order, with devices that maintain low temperature over weekends or on holidays or both.

Thermostats without Clocks

Low Voltage



MANUAL THERMOSTAT for use where hand adjustment of temperature setting is sufficient. Types 40 and 4010.



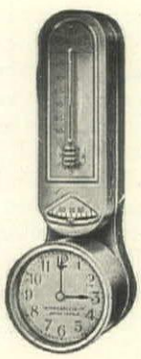
DA-NITE TWIN THERMOSTAT has two temperature ranges. Switched over manually or by remote time clock.

Line Voltage

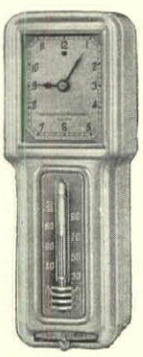
MERCURY SWITCH MANUAL THERMOSTAT for 2-wire line voltages or 3-wire low voltage. Uses bimetallic element.

MERCURY SWITCH MANUAL THERMOSTAT for 2- and 3-wire line voltage circuits, bellows-actuated element.

Clock Thermostats



ONE-DAY AND 8-DAY HAND WOUND CLOCK THERMOSTATS. The one-day clock raises temperature in the morning only. Eight-day clocks alternate the temperature range twice daily.



ELECTRIC CLOCK THERMOSTAT for A-C 60-cycle circuits with low-voltage control circuits, alternate temperature range twice daily without attention. This type offers the maximum of convenience.

LINE VOLTAGE 8-DAY CLOCK THERMOSTAT with mercury switch for A-C or D-C circuits. Has same day and night setting as other 8-day clock thermostats but operates line voltage devices.

Type of Electrical Circuit Influences Choice of Equipment

IN order to provide wider latitude in the operation of multiple devices, thermostats having many different functions have been developed. They employ various electrical circuits, depending on their function and the equipment with which they are to be used. It is therefore important to make clear the significance of the circuits employed by Minneapolis-Honeywell.

All equipment is identified by a series number that indicates the circuit to which it is adapted. All equipment of the same series may be used together. Some devices of one series may be used with those of another series, but this cannot be done in all cases, as various conditions and combinations of equipment must necessarily make use of different circuits.

The architect, or other buyer, need not be concerned with these electrical characteristics unless he chooses to study the more or less technical distinctions explained in special bulletins that may be had upon request. Minneapolis-Honeywell engineers will select the correct unit if informed of the electrical characteristics of any foreign equipment to be controlled, and of the results to be attained.

Operating and Protective Control Devices

Types Available for Manually Fired Plants and Special Applications

AUTOMATIC control of a manually fired heating plant requires a motor, actuated by the thermostat, to open and close the drafts which regulate the fire. These motors are available in several types and sizes to meet varying requirements.

For the operation of other apparatus in air conditioning systems which may be used with manually fired heating plants such as valves, louvers and dampers, other sizes and types are available. They are built for two-position, floating, or modulating action.

Each motor must be selected with relation to the thermostat and other controls to be used, as previously described.

Protective Controls

Various protective devices, known as Limit Controls, are necessary if completely automatic performance and safety are desired. These are made for all types of heating plants and protect against excessive water temperature, steam pressure and furnace temperature. For hot water or steam systems they also protect against failure of the water supply by shutting down the heating system in the event this supply is insufficient to permit safe operation. Special applications of Minneapolis-Honeywell Controls permit additional functions, such as the control of booster fans, to provide greater circulation of air during both winter and summer. Again it must be remembered that it is advisable only to consider these various controls in terms of a complete system. Certain of these Limit Controls and controls for special applications can be added to systems already installed, but if this is to be accomplished, the supplementary equipment must be of a type which will operate with the original installation.

Types Regarded as Standard Equipment on Oil or Gas Burners or Stokers

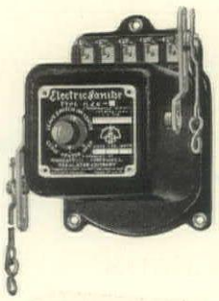
STANDARD equipment on oil or gas burners usually consists of a plain thermostat, without clock or other refinement, a relay, and in some cases, a protectice device. In the case of the oil or gas fired furnace or boiler, the relay, at the command of the thermostat, starts the motor or opens the gas or oil valve and turns on the ignition either continuously or for a timed period as required. When the room temperature demand has been satisfied, the relay shuts off the burner.

It is necessary, however, to provide against ignition and flame failure. Protection against such failures is made with a combustion safety control, which shuts off the burner in the event ignition does not take place within a certain period after the burner has been turned on or if the fire goes out.

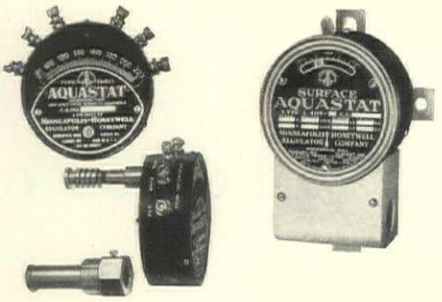
Further protective controls may cover any of those functions which protect against excessive water temperature, steam pressure, furnace temperature, or lack of adequate water supply. In many cases, the so-called standard control equipment furnished with automatically fired equipment is not adequate to provide the greatest efficiency, comfort and convenience to be derived from such equipment. **The selection of additional or optional controls may often represent the difference between satisfactory and unsatisfactory performance.**

In the case of stoker operation, the standard controls usually consist of the thermostat and a relay switch or motor which starts and stops the operation of the stoker. Further control is accomplished by means of the Stokerswitch, which is stack mounted. This control prevents dead fires by turning on the stoker long enough to replenish the fire in the event the stack temperature falls low enough to indicate that the fire may go out during those periods when the thermostat is not calling for heat. It likewise prevents green fuel being added to a dead fire should clinkers or ungovernable factors cause the fire to go out entirely. Protective controls as described above should be used with stoker installations.

Typical Operating and Protective Controls

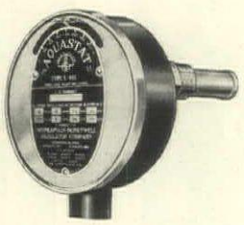


DAMPER MOTOR. Used to operate dampers on manually fired coal plants or to govern stoker operation. Controlled by low voltage thermostat. Low voltage external transformer.

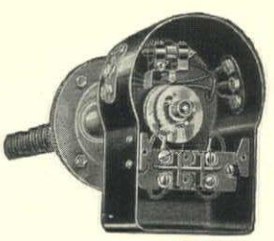


Left — **IMMERSION AQUASTAT** and **WARM AIR LIMIT CONTROL** for insertion in hot water boiler or riser, or furnace bonnet. Low voltage —3 wire. Right — **SURFACE AQUASTAT.** Limit control for attachment to riser of hot water plant. Low or line voltage — 2- or 3-wire. Both controls are adjustable and serve to limit temperatures.

Left—**VAPORSTAT.** Limit control for use on vapor heating plant. Right — **PRESSURETROL.** Limit control for use on steam heating plant. These controls are available in various ranges to limit vapor or steam pressures. Low or line voltage — 2- or 3-wire.

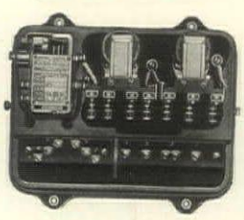


IMMERSION AQUASTAT. Limit control for insertion in hot water boiler. Adjustable to control water temperature — 2-wire line voltage.



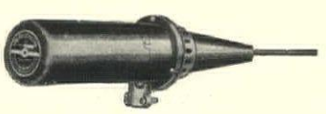
COMBINATION FURNACE CONTROL. For warm air furnace. Adjustable to limit bonnet temperature and operate booster fan. Low or line voltage—2- or 3-wire.

Controls Made for Oil and Gas Burners and Stokers



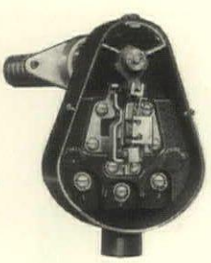
PROTECTORELAY (panel mounting). For controlling, stopping, starting and ignition of oil burner. Low voltage, 3-wire.

PROTECTORELAY (stack mounting type). Operating and protective control for oil burner. Low voltage, 3-wire.

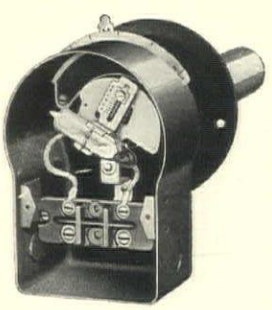


PROTECTOGLOW. Protective control for large oil or gas fired units. Low or line voltage.

PROTECTOSTAT. Door mounting protective control for oil. Operates upon presence or absence of flame. Low voltage, 3-wire.



PYROSTAT. Stack-mounting protective control for oil burners. Low or line voltage, 2- or 3-wire.



STOKERSWITCH. Stack-mounting protective and operating control for stokers. Low or line voltage, 2- or 3-wire.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Eliminating Air Stratification or "Cold 70°"

IDEAL temperature control means more than merely satisfying the room thermostat. It means that air stratification, or "Cold 70°", resulting in chilly floors even though the temperature at the thermostat level may be as desired must be prevented. This discomfort is experienced with practically any type of heating system which lacks proper controls. It is due to cold air piling up on the floors during periods when radiators or registers are cold and air is not circulating, and is particularly prevalent in the case of intermittently fired automatic heating plants or central station steam.

The Thermochron

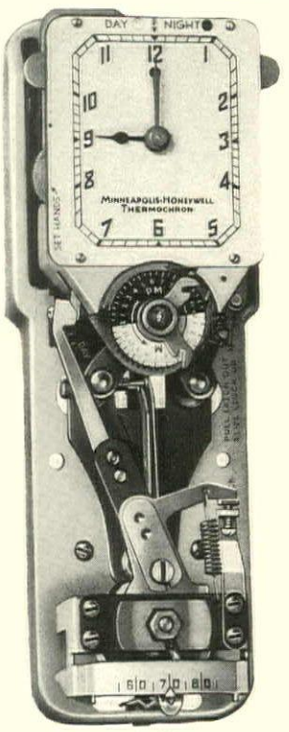
The Minneapolis-Honeywell Thermochron, which accomplishes considerably more than the ordinary thermostat, eliminates this condition entirely and in addition maintains an even temperature level within a small fraction of a degree. This is accomplished by combining thermostatic action with timed boiler or furnace operation. Actually, the Thermochron senses temperature requirements and turns heat on or off before the ordinary thermostat registers the need for such changes. It thus eliminates the period of discomfort between the time the thermostat turns heat on and the time heat is delivered. It also takes advantage of accumulated heat in the boiler, or furnace, and turns heat off in time to eliminate overheating and costly fuel waste. This is important because every degree of increased temperature adds 3.2% to fuel consumption.

The Thermochron takes the inherent lag out of the heating system by producing heat at regular intervals in the event there is any heat loss registered, and thus keeps radiators, or air from registers, constantly warm enough to cause circulation and prevent air stratification. Plain thermostats, or clock thermostats of earlier models, can be easily replaced with the Thermochron.

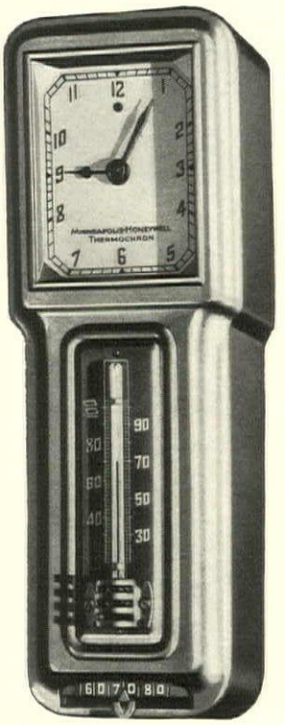
Other Controls to Eliminate Air Stratification

Air stratification, or "Cold 70°", can also be eliminated with Low Limit Controls. These controls work in conjunction with the room thermostat and are located in the warm air ducts, on radiators, or on the heating plant. They turn heat on often enough to keep radiation warm and to cause air to circulate, preventing stratification.

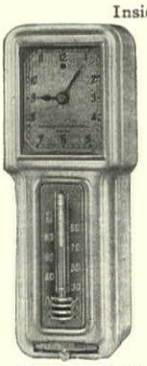
THE THERMOCHRON



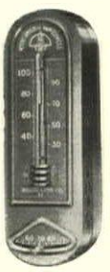
Inside



Outside



ELECTRIC CLOCK THERMOSTAT



MANUAL THERMOSTAT

8-DAY, 7-JEWEL CLOCK THERMOSTAT

Any of the above may be equipped with Low Limit cut-out feature — which prevents overheating.

LOW LIMIT CONTROLS

Left: for hot water or warm air systems.

Right: for steam or vapor systems.

Summer-Winter Domestic Hot Water from Automatic Heating Equipment

The Same Automatic Burner or Stoker for Steam, Vapor or Hot Water Systems May be Used to Furnish Domestic Hot Water Supply in Summer as Well as in Winter

THE automatic firing equipment used for heating with any steam, vapor or hot water system may be used to furnish the domestic hot water supply during the summer months when the heating plant itself is not operating as well as during the winter. This is accomplished through the use of an indirect water heater and of a Summer-Winter Control System. It enables the use of the burner throughout the year to provide economically a constant automatic supply of domestic hot water.

This Summer-Winter Control System in a hot water heating plant consists of motorized valves which automatically shut off the flow of water throughout the heating system during the summer and a domestic water supply control which turns on the burner often enough to keep this water supply constantly at the desired temperature level.

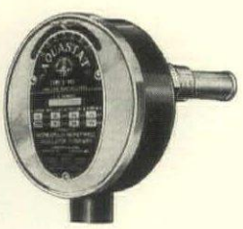
In a steam plant the domestic hot water supply control keeps the boiler water hot but below the boiling point. In either system an indirect water heater is of course required.

Several additional advantages are gained by installing the Summer-Winter controls. During cold weather, the heating plant responds more quickly to demands for heat because, with the Summer-Winter Control System, the fire box is always warm and the burner will operate far more efficiently than if it has to start with the fire box cold. The use of the burner throughout summer not only serves to prevent deterioration that usually sets in when equipment is left idle for a long period, but it also eliminates the moisture common to most basements in the summer months.

The Summer-Winter Control System is easily installed with a new burner or can be added to present installations, but it is advisable to consult the Minneapolis-Honeywell engineer for the controls best adapted to the heating plant with which it is to be used.

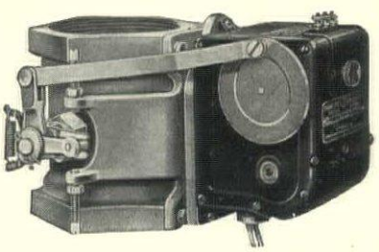
Typical Controls for Summer-Winter Hot Water Supply

IMMERSION AQUASTAT
Low voltage



IMMERSION AQUASTAT
Line voltage

One of these controls inserted in the domestic water tank or boiler governs the burner to keep water at desired temperature somewhere below the boiling point. Low or line voltage, 2- or 3-wire.



BUTTERFLY VALVE

These valves are made in various sizes for preventing circulation of hot water to the radiators during the summer when room heat is not wanted. Several variations of control system may be made to suit different requirements. Low voltage—3-wire only.

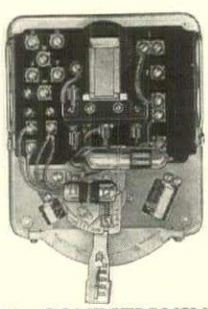
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Year-'Round Control of a Small Forced Warm Air Heating Plant

IN many warm air heating systems it is advisable to use a fan to provide greater circulation and greater heating efficiency and comfort. With the use of proper controls the sequence of fan operation may be adapted to the particular requirements of such a system. The fan may be regulated by the room thermostat which will turn it on simultaneously with turning on heat. The fan may be actuated by a control located in the furnace bonnet, turning it on when enough heat has been accumulated to warrant its circulation. It may be shut off simultaneously with the burner or may operate as long as there remains enough heat in the furnace to circulate. The fan also may be used as a safety device by starting up if the furnace temperature becomes too high, thus distributing the heat instead of allowing it to damage the furnace. Various supplementary controls may also be used to regulate humidification if humidifying equipment is to be employed.

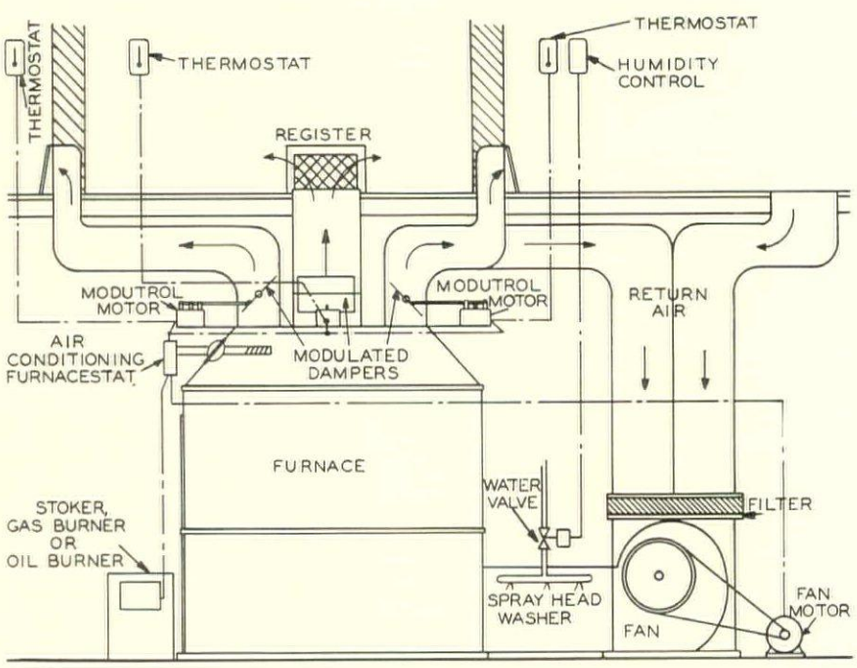
In the summer time the thermostat circuit may be reversed so that the fan starts as the temperature increases, permitting the air circulation to provide a cooling effect. In the event that an artificial cooling system is employed, controls may be supplied which will permit the operation of the fan, the humidifier and cooling unit in any desired sequence.

The Air Conditioning Furnacestat combines all of these functions (except those of artificial cooling) in one instrument, namely, a circulating fan control, a limit control, a summer cooling switch and temperature over-run safety. Provision is also made for its operation in conjunction with humidifying and refrigerating functions.



AIR CONDITIONING FURNACESTAT. Located as shown in drawing controls sequence of furnace and fan operation as desired.

HUMIDITY CONTROL. Mercury switch type. Governs humidifying or dehumidifying functions. Available in low or line voltage—2- or 3-wire.



This diagram illustrates the installation of a small but complete air conditioning system. If cooling and humidity apparatus were not included and if air distribution were not to be controlled by dampers, only one centrally located Thermostat would be used — the Modutrol motors and Humidity Control would not be used — and wiring from the Thermostat would run direct to the Air Conditioning Furnacestat.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Modulating Control as Applied To Air Conditioning Installations

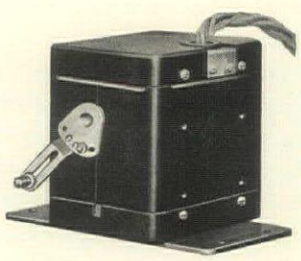
MODULATING control fundamentally means that enough heat, moisture or cooling is supplied to precisely compensate for the changes in any one or all of these conditions.

In order to accomplish true modulating control it is necessary that valves, dampers or louvers be automatically and accurately adjusted to such a position as to permit a supply of heat, moisture or fresh heated or cooled air to precisely balance the loss of any or all of these air conditioning, heating or ventilating factors.

To illustrate, the Modustat, which is a self-contained modulating radiator valve, automatically maintains itself in exactly the position necessary to permit passage of enough steam into the radiator to keep the room temperature at the desired level.

In handling moisture, fresh heated or cooled air, the Modutrol motor automatically governs the position of the controlling valves, dampers or louvers, in accordance with the exact requirements at the time.

Modulating equipment, therefore, provides constant and precise control without fluctuation. It can be applied to any installation, large or small. It is desirable where extreme accuracy is important.



MODUTROL MOTOR. Modulating type. Used in large or small air conditioning systems for modulated control of dampers, louvers or valves. Low voltage.

WATER VALVE. Used on domestic Humidity Control systems. Silent solenoid. Line voltage—2-wire.

Recommended Layouts, Estimates and Engineering Service on All Automatic Control Installations Available on Request

RECOMMENDED layouts and preliminary estimates of control equipment may be obtained from Minneapolis-Honeywell Service Engineers, together with complete and detailed information on any or all equipment manufactured by Minneapolis-Honeywell Regulator Company. Branch offices are maintained in all principal cities in the United States and Canada.

To obtain recommended layouts and preliminary estimates of control equipment, merely state what you wish to accomplish with controls, the types and occupancy of building, furnace or boiler, oil or gas burner or stoker, and the distribution system used. Special control problems, including auxiliary or air conditioning equipment to be controlled, together with provision for future controls, should also be outlined. In the event of alternate estimates, the items to be included should likewise be specified.

Where contract proposals are desired, however, complete drawings and specifications or a special job inspection by a Minneapolis-Honeywell Engineer are necessary.

The Minneapolis-Honeywell Engineer is at your service at all times. He will be glad to call on you to assist you with any problem. Minneapolis-Honeywell Regulator Company, 2738 Fourth Avenue South, Minneapolis, Minn.

The Modutrol System

Room and Zone Control

THE Modutrol System is the name given the many combinations of controls and functions needed to meet all heating and air conditioning requirements.

While the Modutrol System may consist of any number of combinations of controls or functions, which are either electrically operated or self-contained, they are completely unified into one harmonious control system with each component part performing a definite duty.

A Tailor Made System for Old or New Buildings

The Modutrol System is tailor made for every installation, large or small. It provides the flexibility that makes it possible to use exactly the type of equipment necessary to achieve the specific results required of the system and enables it to perform with the greatest efficiency and general satisfaction. The Modutrol System makes it unnecessary to compromise performance and results because of the limitations caused by the lack of adequate control equipment.

Because each unit is either self-contained or electrically operated, the Modutrol System is applicable to buildings already constructed. It is, therefore, easily installed in existing buildings.

This advanced automatic control system offers maximum comfort, maximum convenience, and maximum economy both in installation and in operation of the heating plant.

Adapted to Requirements

The Modutrol System may be wholly or partly proportioning, as conditions warrant. Direct radiation may be controlled by the Modustat—a self-contained automatic individual radiator control—or by motorized valves operated from a thermostat of the plain, clock, or modulating type.

Dampers or louvers are controlled by the Modutrol motor which provides true modulation by maintaining these dampers or louvers at exactly the position necessary to fill the requirements as indicated by the room thermostat. The Modutrol System likewise controls the steam coils in the central distributing chamber, where the proportioning principle may or may not be employed. Where unit ventilators are used both the steam flow and the dampers are controlled by either Modustats or electrically operated valves and the dampers by the Modutrol motor.

Zone Control

Zone Control is based upon two general factors, first, exposure to the elements, and second, the time and type of occupancy.

This particular application of the Modutrol System warrants special description. With Zone Control, the heating system and the building are divided into various sections or zones, dependent upon exposure to wind, cold and solar radiation, as well as to occupancy, with each zone provided with a master control.

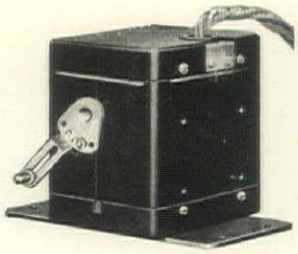
It is obvious that in cold windy weather the unprotected parts of the building will require more heat than the other parts. When some sections of buildings are occupied at distinctly different hours than others, Zone Control permits maintaining of temperatures in those sections and lowering of temperature in the sections which are not in use. In the case of a school building, for example, there is no need, with Zone Control, to heat the school rooms at night when merely the auditorium and certain corridors of the building are in use. Since every degree of temperature reduction saves 3.2% of the cost of fuel, great economies can be effected in many cases.

Certain buildings require less heat in some sections because of the use to which these sections are put. For example, less heat is required in a school gymnasium than in the rest of the building; or where a storage garage is operated in conjunction with an office building, it is not necessary that the same amount of heat be supplied there. The factory part of an industrial plant does not require as much heat as the executive offices, and Zone Control permits these temperature levels to be set at will.

Weekend or Holiday Shutoff

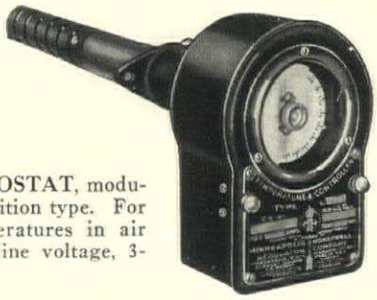
Automatic weekend and holiday shutoff can also be applied to the Modutrol System whereby the entire system, or parts of it, may be shut down when such parts are not in use.

Typical Controls Used in the Modutrol System



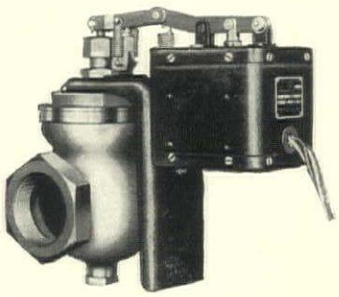
MODULATING MOTOR. Used to operate valves, louvers and dampers. Low voltage, 3-wire. External transformer.

MODULATING-TYPE THERMOSTAT to control modulating motored devices. Low voltage, 3-wire.

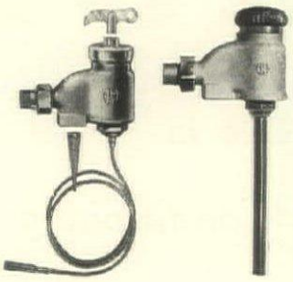


DUCT THERMOSTAT, modulating or two-position type. For controlling temperatures in air ducts. Low or line voltage, 3-wire.

MOTORIZED STEAM VALVE.—two-position type. Made in range of sizes for steam lines. Low voltage, 3-wire. Internal transformer.



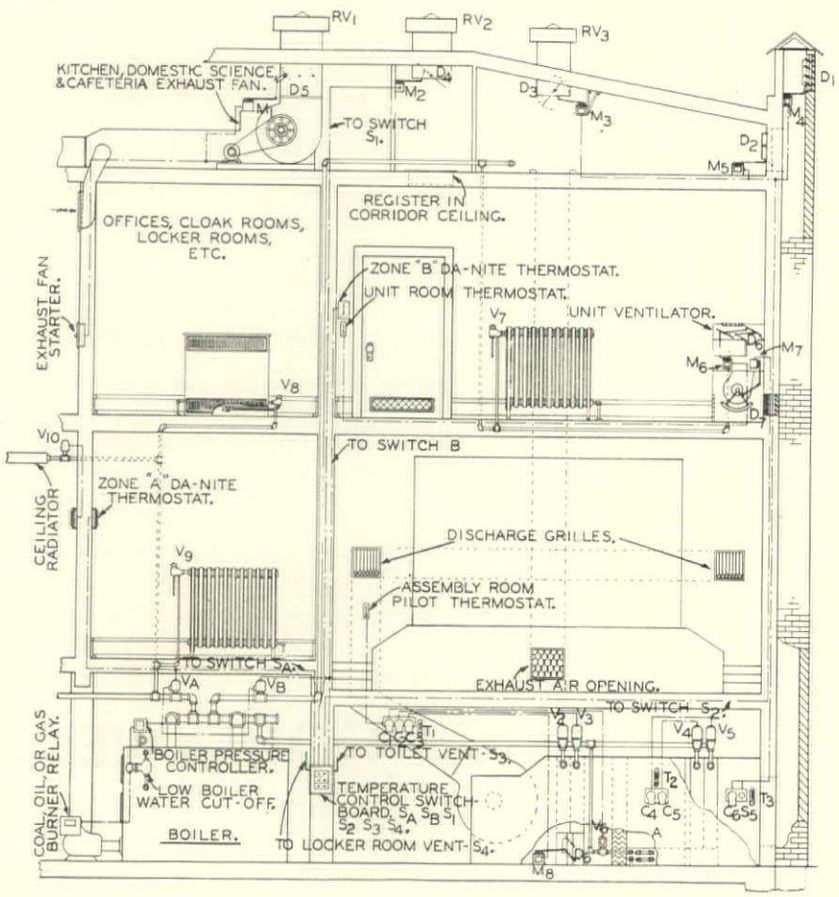
MOTORIZED STEAM VALVE.—Modulating type. Made in range of sizes for steam lines. For use with modulating type controls. Low voltage, 3-wire. External transformer.



MODUSTATS. Self-contained modulating individual radiator valves. For exposed or concealed radiation.

ELECTRIC RADIATOR VALVE. Motor driven, two position, for remote thermostat control. Low voltage, or line, 3-wire.

HUMIDITY CONTROL. For control of humidifying and dehumidifying apparatus. Low or line voltage, 2- or 3-wire.



Typical Modutrol System in a Large Building

This diagram illustrates a complete Modutrol System. It indicates the ability of the Modutrol System to meet any and all temperature and ventilation control requirements. Enlarged diagram and detailed description upon request.

KEY

M—Modulating Motor

D—Damper

S—Switch

C_1—Duct Humidity Control

C_2—Duct Thermostat

C_3—Duct Thermostat

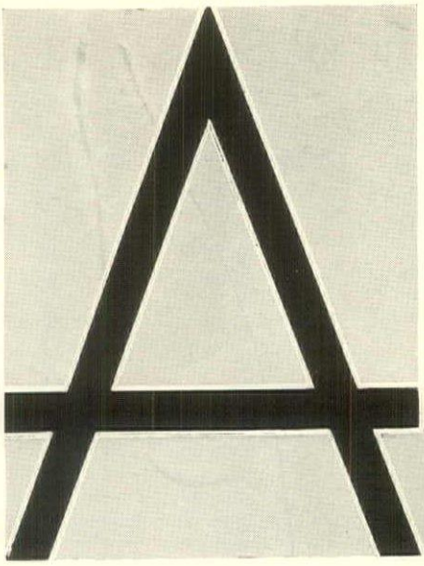
RV—Ventilator

T—Duct Thermostat

V—Motorized Valve or Modustat

SA, SB, S1—Switchboard Controls

VA, VB—Valves with Dual Control Switches governing automatic firing equipment.



AUTOMATIC CONTROL

the **BASIC FACTOR** *in*

Modern Heating and Air Conditioning

AUTOMATIC Heating or Air Conditioning Systems are no better than the automatic controls which govern their operation . . . The importance of proper controls, therefore, cannot be too strongly emphasized . . . Since 1885, Minneapolis-Honeywell has kept pace with the rapid development of automatic heat and air conditioning . . . The Minneapolis-Honeywell Engineer in your city offers the fullest co-operation in assisting you in laying out or selecting the proper control equipment for any installation. Call on him regarding any problem pertaining to this vital subject . . . Minneapolis-Honeywell Regulator Company, 2738 Fourth Avenue South, Minneapolis, Minnesota.

There is a Minneapolis-Honeywell Control System for every heating, air conditioning or industrial installation, in large buildings or small, old or new. Specify Minneapolis-Honeywell for every control problem.

■

MINNEAPOLIS-HONEYWELL

Control Systems

BRANCH AND DISTRIBUTING OFFICES: Allentown - Atlanta - Baltimore - Birmingham - Bismarck - Bloomfield - Boston - Buffalo - Butte Calgary - Chicago - Cincinnati - Cleveland - Columbus, O. - Dayton - Denver - Detroit - Duluth - Grand Rapids - Hartford - Indianapolis - Jackson Kansas City - Little Rock - Los Angeles - Milwaukee - Minneapolis - Montreal - New Orleans - New York City - Niagara Falls - Oklahoma City Peoria - Philadelphia - Pittsburgh - Portland, Me. - Portland, Ore. - Providence - St. Louis - Salt Lake City - San Francisco Seattle - Springfield - Syracuse - Toledo - Toronto - Washington - Wichita - Worcester - Youngstown. Canada: Minneapolis-Honeywell Regulator Company, Ltd., Toronto, Montreal and Calgary. - Export: 801 Second Avenue, New York City. - Cable Address: "Laboramus."

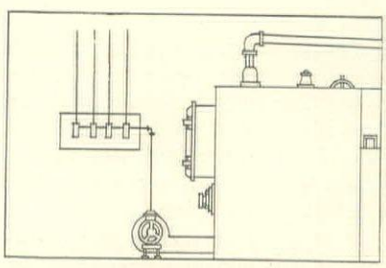
JOHNSON TEMPERATURE CONTROL SYSTEMS

applied to Automatic Firing . . .

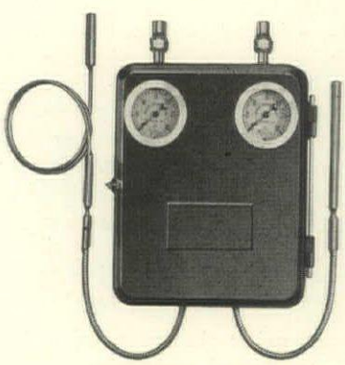
JOHNSON
ROOM THERMOSTAT
with Open and Closed Indicator

JOHNSON
"DUAL"
Room Thermostat

JOHNSON
RADIATOR VALVE



JOHNSON "CUMULATOR"
Controlling Automatic Firing Device



JOHNSON "DUO-STAT"

ROOM CONTROL

combined with regulation of firing.

THE **Johnson** System of Automatic Temperature Control has been for nearly fifty years an important consideration in making heating plants completely automatic. In residences and other buildings where **automatic firing** is desirable, as well as in buildings in which continuous firing is necessary, **Johnson** apparatus has an enviable record.

Johnson room thermostats are available in the single temperature model or in the well known **"Dual"** pattern, providing a reduced, economy temperature at night or when certain rooms or groups of rooms are unoccupied. All of these instruments may be equipped with a variety of adjusting devices and indicators showing whether the heat is off or on. . . . . **Johnson radiator valves,** operated by the room thermostats, are rugged, fool-proof—a seamless metal bellows and heavy spring operate the valve stem. **Johnson damper regulators,** used with indirect systems of heating, are similar in construction. Simple, dependable devices which regulate the temperature in each room—or in each principal room—automatically and independently!

When **automatic firing devices** are provided, **Johnson** room thermostats operate a cumulator to control the fire, as shown in the diagram at the left. Several of the thermostats which control the heating units in the rooms are selected because of relationship to critical exposures and are connected to the cumulator panel in the boiler room. After all of the critical thermostats have ceased to call for heat, the cumulator stops the stoker, oil burner, or gas burner, or reduces the firing effect as desired. When heat is required at one of the control stations, the reverse operation takes place.

PRIMARY CONTROL

When the limited extent of the heating system does not warrant independent heat regulation in individual rooms, the **Johnson "Duo-Stat"** is the answer to the problem of control from a single point. This instrument is located at the last radiator on the riser most distant from the source of heat and maintains the proper relationship between outdoor and radiator temperatures. The **"Duo-Stat"** controls the **automatic firing device** directly and may be interconnected with a room thermostat for low-limit control at night. A combination of room or "final" control and **"Duo-Stat"** primary control should be employed for maximum economy, comfort, and convenience.

Johnson sales engineers are available at more than thirty branch offices for the purpose of making recommendations and estimates.

JOHNSON SERVICE COMPANY

Main Office and Factory: Milwaukee, Wis. :: :: Branches in Principal Cities

Large Combustion Chambers, Lengthened Flue Gas Passes, and Corrugated Heat-Absorbing Surfaces Feature the Scientific WEIL-McLAIN "RO Series" Oil

1

ROUND boilers are preferable for heating loads up to 1200 square feet of steam radiation plus piping and pick-up loads. Their shape simplifies the correct positioning of the flame in relation to the heat-absorbing surfaces; it eliminates wasteful square corners and its vertical assembly permits increases in heating surface and fire travel without disturbing the well-balanced proportions of the combustion chamber.

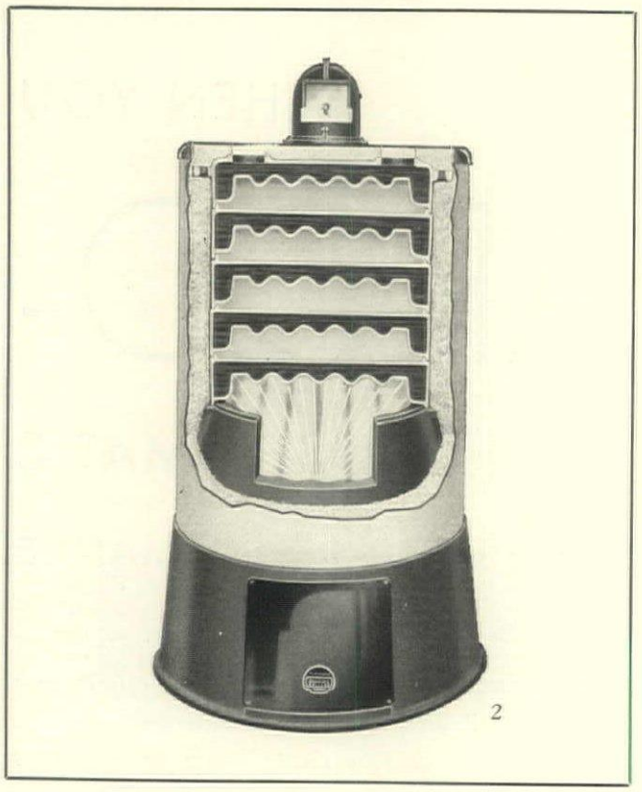
In the traditional round boiler, however, modern theories of maximum heat-absorbing surface, long flue passes and correctly proportioned combustion space have usually been satisfied by various expedients which have **not** basically changed the design. The necessity for redesigning these boilers to accord with modern discoveries and developments has been increased by the advent of oil burning.

In the Weil-McLain "RO Series" Oil Burning Boilers, the principles which have been found correct in the design of large, high efficiency boilers have been adapted to the round, cast iron sectional boiler, with the result that the Weil-McLain round boiler is different. The principal differences and their advantages are:

The combustion chamber has been newly and specially proportioned to provide greater diametric width. This permits the combustion chamber to be properly sized for pressure atomizing type burners and allows ample space for the correct size of hearth for rotary type burners as illustrated in figures 5 and 6. Thus the crowding and cramping of the oil burner ordinarily common to smaller boilers is eliminated. The increased length of flue gas passes (fire travel), so essential to good efficiency with oil burning equipment, has been provided in two ways: First, by providing multiple back and forth passes as illustrated in Figure 3; and second, by shaping the vertical passages to balance the draft across each section for distribution of the hot gases. See figure 4. The strongest draft is always across the center of the section. By making this center distance longer than at the sides, the draft is equalized across the whole face.

Heating surfaces have been very substantially increased by corrugating the under side of each section. An increase in vital heat-absorbing surface of approximately 30% is effected without adding to the overall dimensions of the boiler. At the same time the cross-sectional area of the flue passes has been scientifically proportioned so that there is no back pressure in the combustion chamber. The horizontal, yet easy, flow of the gases tends to increase the "scrubbing" effect and the rapidity of heat transfer. This permits the burning combustion gases of the oil burner (which is operating at its full capacity from the moment it starts) to give up their heat rapidly before completing passage to the stack.

These applications of scientific theory to round cast iron boilers for residential and equivalent heating loads have been thoroughly tested and proved sound. They are the product of an organization that has been active in the heating field for over 40 years and that produces a complete line of heating boilers for all types of fuels up to 15,230 square feet EDR in addition to radiators, humidifiers and other heating equipment.



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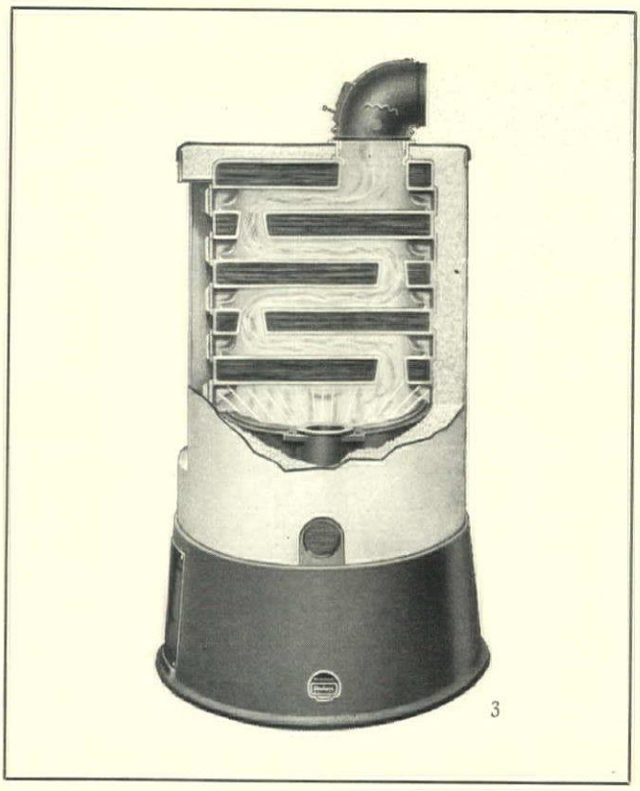


3

Burning Boilers

The Weil-McLain "RO Series" Oil Burning Boiler is made in five sizes for steam and five sizes for water, as listed in the accompanying table. In this table the range of net equivalent direct radiation gives in the first figure the rating of 4000 B.t.u. Transmission rate per square foot of heating surface; the second figure (our recommendation for ordinary conditions) is for a rate of 5000 B.t.u. Roughing-in dimensions and complete performance data will be supplied on request.

WEIL-MCLAIN COMPANY

General Offices: Chicago. Boiler Plant and Offices: Michigan City, Indiana. Radiator Plant and Offices: Erie, Pennsylvania. New York Office: 501-5th Avenue. Canadian Representatives: James Robertson Co., Ltd., Montreal, St. John, Toronto, Winnipeg.

Fig. 4—Balanced Fire Travel is achieved as illustrated here. Draft pull is naturally strongest from A to B, so the hot gases must travel farthest there, balancing the draft so that the pull is actually the same as from C to D and E to F.

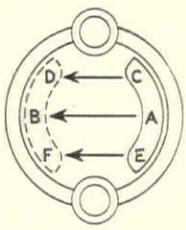


Figure 4

Figs. 5 and 6—Base Adaptable to Two Burner Types—Rotary type and Gun type oil burners. Figure 5 illustrates how Rotary type oil burners are quickly and easily installed. Figure 6 shows how Gun type oil burners can be easily installed. There is no cramping, crowding or sacrificing of valuable combustion chamber space.

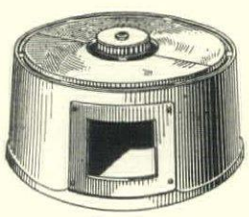


Figure 5

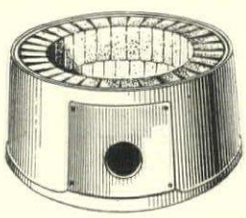
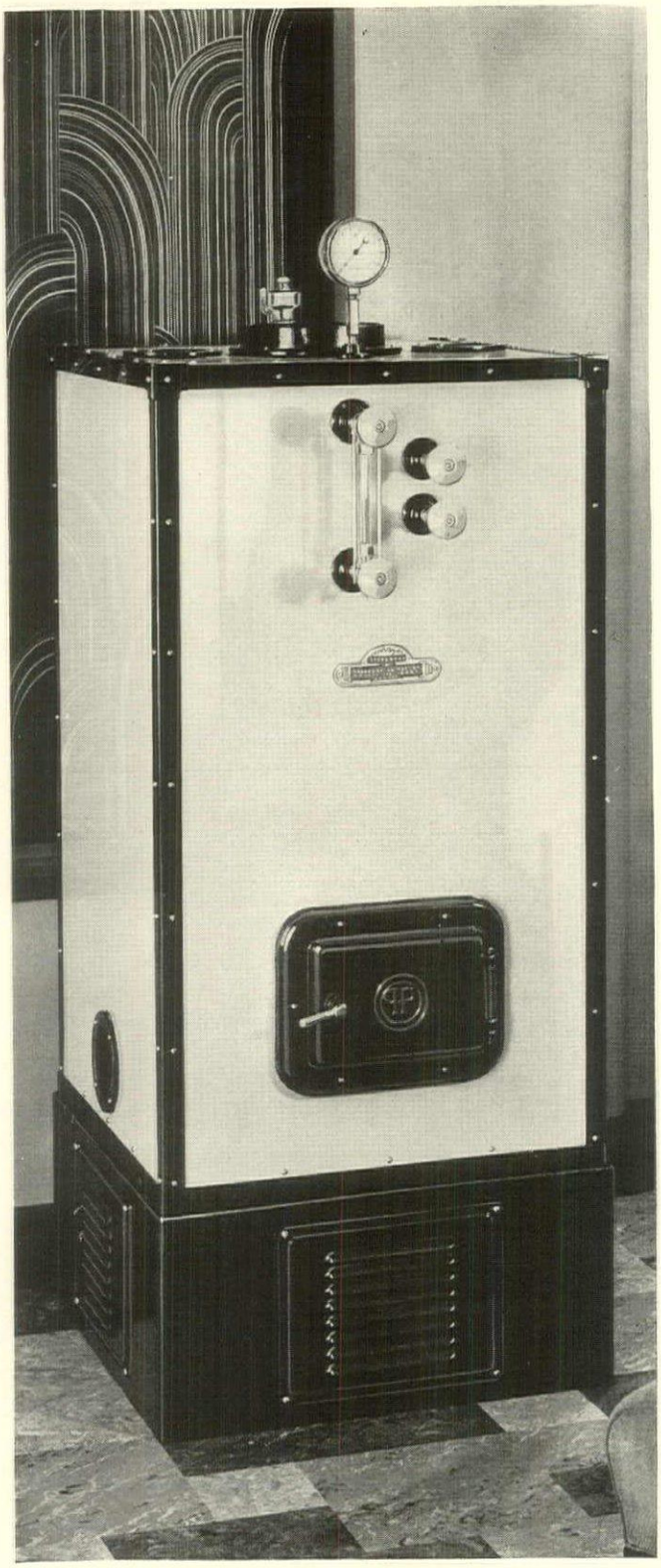


Figure 6

Model Number	Recommended Range EDR at 4000 and 5000 B.t.u. Trans. Rate		Recommended Minimum Capacity Burner in Gal. Oil/hr.	Chimney Size		Overall Dimensions		Water Line Height (Steam)
	Steam Net Load	Water Net Load		Flue Size	Height Feet	Diameter at Floor	Height Including Flue	
RO2-S-6 RO2-W-6	335 - 420	520 - 630	1.2 - 1.5	8 x 12	35	2′ 7⅞″	5′ 3½″ 4′10¼″	4′ 0¾″
RO3-S-6 RO3-W-6	410 - 520	625 - 790	1.5 - 1.8	8 x 12	35	2′11½″	5′ 6½″ 5′ 0¾″	4′ 2½″
RO3-S-7 RO3-W-7	495 - 620	770 - 950	1.8 - 2.1	8 x 12	40	2′11½″	5′11 13/16″ 5′ 6 1/16″	4′ 7 9/16″
RO4-S-6 RO4-W-6	525 - 675	815-1025	1.9 - 2.33	12 x 12	40	3′ 3⅞″	5′ 6⅞″ 5′ 1¾″	4′ 3⅝″
RO4-S-7 RO4-W-7	640 - 820	990-1250	2.3 - 2.9	12 x 12	45	3′ 3⅞″	6′ 0 7/16″ 5′ 7 5/16″	4′ 9 3/16″



THE ARCO-PETRO

A boiler-burner unit that extracts the greatest possible percentage of the heat units of the fuel as useful warmth. Today's most advanced automatic boiler as demonstrated by four full years of use in the homes of hundreds of users.

WHEN YOU

ARCO-

AUTOMATIC

...You specify PERFORMANCE

THE ARCO-PETRO is a boiler-burner unit that burns oil (or gas) under completely automatic control to provide either steam or hot water residential heat . . . also abundant hot water for all domestic purposes.

There is nothing new or untried about the Arco-Petro. Hundreds of these units have been in use for over four years, in all types of dwellings, in every part of the United States.

DEMONSTRATED FUEL ECONOMIES

UNDER laboratory test conditions, ARCO-PETROS have demonstrated an overall efficiency of more than 80%. And in the hands of home owners they have also proved unusually efficient, burning No. 3 oil and cutting former fuel bills by approximately 30 to 50%.

HOT WATER ALL YEAR

HOT WATER! . . . gallons of it, at any hour of the day or night, and every day in the year . . . and at a cost that is far less than any other means of producing hot water for domestic use. Hot water is produced like heat—automatically. No noise. No soot. No wearying trips up and down the stairs. It's THERE—always.

CAPACITIES AND COLORS

ARCO-PETRO boiler-burner units are made in 6 sizes, and in capacities from 300 to 1200 feet of steam radiation . . . a range that provides the economies of unit-boiler heat for homes from small cottages to large dwellings.

Since automatic boilers permit utilization of basement space for game rooms and similar purposes,

SPECIFY THE PETRO BOILER

that has been DEMONSTRATED

appearance is important. The neat exterior walls of the Arco-Petro (enclosing 2-inch, cellular asbestos insulation) are unspoiled by a mass of "gadgets". The clear, plain walls are finished in baked enamel with trim in contrasting tones. They are available in various color combinations, including two shades of green, tangerine, Chinese red, midnight blue, and black-and-white.

Prominent architects who have examined the Arco-Petro are unanimous in declaring that . . . in line, color, and finish . . . this automatic boiler represents a real achievement in modern industrial design.

A JOINT PRODUCTION OF PIONEERING LEADERS IN HOME HEATING

THE ARCO-PETRO is a joint production of the American Radiator Company and the Petroleum Heat & Power Company. It represents the combined experience of 96 years embodied in one heating unit.

The Arco-Petro is today's greatest advance in oil heating. Burner and boiler were each designed for the other, with all approved automatic safety controls built in as an integral part of the unit.

Instead of making sensational advertising "claims" of revolutionary changes, this company rests its case for the Arco-Petro on the sound basis of engineering evidence and the testimony of many years of trouble-free, economical service in the homes of hundreds of satisfied owners in all parts of the country.

PETRO-&-NOKOL BURNERS *for use in* PRESENT BOILERS

Petro-&-Nokol conversion burners are designed for use in present heating plants. It is obvious that no *one type* of burner can operate with maximum efficiency in round, square and long boilers.

•

Recognizing this sound engineering principle, the Petroleum Heat & Power Company has long built domestic burners of three distinct types, 16 models and 66 sizes . . . and provides a burner that exactly fits each type of heating plant: steam, hot water and hot air.

•

For commercial installations such as hotels, apartments, hospitals, factories and large buildings, you have available the Petro line of industrial burners. These burners are demonstrating their efficiency in many of the largest buildings of the country, among them the Riverside Memorial Church, Cornell Medical Center, Ritz-Carlton Hotel and many others.

•

Complete data for your information and files may be obtained on request.

ARCO-PETRO DATA AND DIMENSIONS

Boiler Model	T-11	T-12	T-13	T-14	T-2	T-3
Max. Cap. Sq. Ft. Steam Rad.	285	390	495	600	800	1200
Max. Cap. Sq. Ft. H.W. Rad.	456	624	794	960	1280	1920
Max. Cap. Gal. of Water per Hr. – 100° F. Rise	82	112	142	173	230	345
Max. Output—B.T.U. per Hr.	68,400	93,600	118,800	144,000	192,000	288,000
Water Cap. to Water Line Gal.	15	17	19	21	16	25
Outlets — Number and Size .	2-3"	2-3"	2-3"	2-3"	2-3"	2-4"
Returns — Number and Size .	2-3"	2-3"	2-3"	2-3"	2-3"	2-4"
Shipping Weight—Pounds . .	1300	1400	1500	1600	1350	1900
Overall Width	26 9/16	26 9/16	26 9/16	26 9/16	28 9/16	41 9/16
Height to Top of Jacket . . .	48	52 3/16	56 3/8	60 9/16	60 1/8	60 5/8

PETROLEUM HEAT AND POWER COMPANY. . . Stamford, Conn.

"World's Oldest and Largest Oil Heating Organization"

The Readers Have a Word to Say

• AN EVIL THAT SHOULD BE CORRECTED

A letter from an architect in the South said that business had been ruined by sharp practices and cutthroat competition of many recognized architectural firms. The following is a detailed explanation of his statement.

Editor, AMERICAN ARCHITECT:

PERHAPS I am guilty of poor taste in making someone else listen to personal troubles — even though that someone asked for it! Since the condition of which I speak may exist, to some extent, in other localities and may have some bearing upon problems which others must also solve, I will try to give you briefly the meaning of the last paragraph of my last letter.

Most of the trouble can be summed up in two words—fee cutting. It is my personal opinion that this practice has done more damage and has been more of a niggardly way to get work in hard times than it would have been when there was work for everybody.

I didn't think when I spent time and money passing the X—— Architectural Act (that the Chapter had given up in despair) that I would be relieved of competition. I did think that perhaps the cutthroats would resort to more elevated methods. It didn't work. It never does. The loyal supporters of high ethical practice remain loyal. The cutthroats go on cutting.

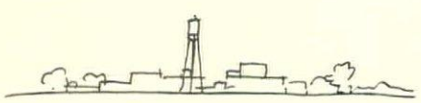
In a small town we must depend upon getting a few big jobs or we are sunk. We used to be able to do it. We have lost all of them during the past four years mostly through fee cutting —in one case through politics. Although we have one other architect in town outside of our office who is a young man and doing work for whatever the client will pay, the chief offenders are two Y—— offices, the members of which are members of the American Institute of Architects!

When I first started practice we were able to get 6% for our work. We were forced to 5% because of architects from other larger cities. Our refusal to drop below that rate is the cause of our having lost every job of importance during the past few years.

The first time I had definite information of what was going on was about three years ago. I was engaged in the Registration Board's work, so most of the time I was neglecting my private work. Instead of being appreciated I found that some architects were using my absence to their own advantage. We tried to get work but lost it. I asked why we lost it. The owners stated that not only was our 5% the highest anyone asked, but that all the others were from 4% down to 2½% and that they would accept the lowest "bid." They further advised that they might have considered employing one of the higher rate men on the basis of better service but that one of the "big X—— offices" offered to match the lowest rate so they felt that it should be O.K.

I could give you several other examples of cases like the above. It is one of the most unfortunate things, to my mind, that it is actually possible for a few fee cutters to force men who wish to live up to decent standards down to their own level or put them out of the running.

President Hoover *requested* industry to adopt high standards and wages so that everyone might make money and start spending again. President Roosevelt is *demanding* it and requiring it under legal authority. The former wouldn't work because the cutthroats wouldn't line up. The latter should work because they can be forced to line up. I hope that architects will be included and that they will have to submit a code and stick to it. It is the only way the offenders will ever be brought into line.—*"An Architect."*



• SOMETHING FOR ARCHITECTS TO THINK ABOUT

Editor, AMERICAN ARCHITECT:

ONE who travels about the American countryside is usually greeted at the approach of a neighboring town by the silhouette of a water tank which makes one wonder "What plant is this?" Quite often these cylinders or kettles are awkward structures visible for miles. As a pioneering movement this practical expedient of securing water pressure is economical, but there is much to be desired in standpipe design.

How long must American landscapes be marred by such factory emblems? In civic movements and town planning, is not the appearance of this important utility to be considered?

Some of our towns might be made civic-conscious and enthusiasm created by means of local and national competitions held by architectural schools as well as material manufacturers—especially of cement and aluminum. It would seem that these structures could be utilized as air beacons, radio aerials, observation towers, firehouses or even combinations of small municipal groups.

With some architectural guidance there is no reason why these water tanks could not at least reach the majesty of our grain elevators and silos. Let concrete preserve these pioneer systems in clothing pleasing to the eye and suitable for other uses. Truly a problem for modern designers and something for architects to think about. —*George Magnolo, Miami Beach, Fla.*

• MORE ABOUT STAIR RULES

Ernest Irving Freese, author of the article, "Correct Proportioning of Stair Treads and Risers," received a letter about the "25 stair rule." The inquiry and Mr. Freese's reply form an interesting addition to the information contained in the article.

Mr. Ernest I. Freese
c/o AMERICAN ARCHITECT

I WONDER whether you have ever heard of the "25 stair rule"; which is simply that the sum of twice the rise plus the tread should equal 25, or at least as closely as circumstances permit.

This rule I have used for nearly thirty years, as did my father before me since he first began to practice architecture in 1875.

—*E. W. Bartberger.*

Mr. E. W. Bartberger, Archt.
Pittsburgh, Pa.

You ask about the "25 stair rule."

Like all other stair rules that are based on a similar straight-line formula, this one gives too narrow a tread both for steep stairs and for very easy stairs. For instance, this particular rule reduces to the following formula:

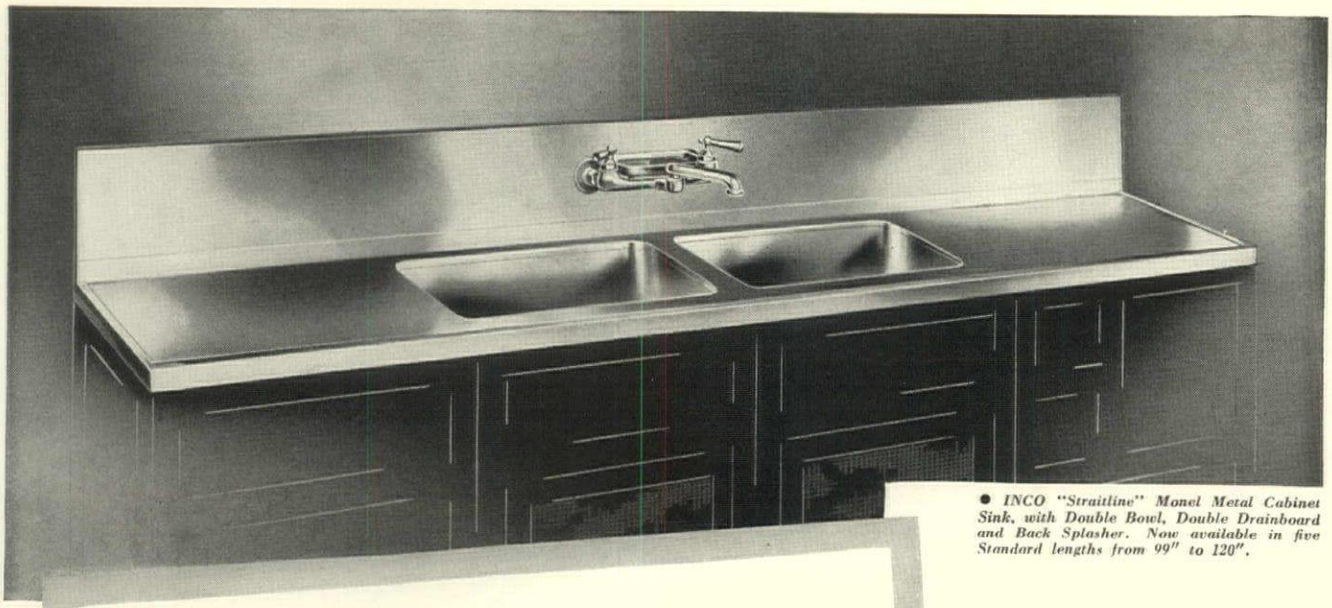
$$T = 25 - 2R$$

Hence, for a 9″ rise, it gives a tread of 7″.

Also, for a 5″ rise, it gives a tread of 15″.

Whereas the "hyperbolic" law gives an inch more tread in each of the above

(*Continued on page* 124)



● *INCO "Straitline" Monel Metal Cabinet Sink, with Double Bowl, Double Drainboard and Back Splasher. Now available in five Standard lengths from 99" to 120".*

DOUBLE BOWL

MONEL METAL *Cabinet Sinks now offered in*

4 NEW SIZES

This convenience, once possible only to the wealthy, can now be installed in homes of moderate price!

● *Women have always wanted this convenience. One compartment can be full of utensils, while the other remains free for use during the preparation of food.*

● Now, for the first time *Standardized* Monel Metal Double Bowl Cabinet Sinks are available in a full range of sizes, five different lengths, from 99" to 120" overall.

Women have always recognized the great convenience of the double bowl, not only because it provides a separate compartment for rinsing, but also because it affords all the advantages of a second sink.

During the preparation of a meal, one bowl can be stacked full of utensils put to soak, and the other bowl kept free for washing vegetables and countless incidental uses.

Monel Metal kitchen equipment is recognized as the last word in kitchen luxury, combined with practical economy. Obviously, it is easy to keep such equipment clean. Monel Metal is absolutely rust-proof, resists the corrosion of food acids and is not harmed by strong cleaning materials or abrasives.

Its steel-like strength resists dents or scratches from the hard knocks of pots and pans, and its hard surface is not easily marked by aluminum ware. Being solid metal right through, Monel Metal has no coating to chip, crack or wear off. Kitchen equipment made of this silvery metal maintains its beauty and lasts as long as the house itself.

In addition to the Straitline Double Bowl Cabinet Sinks in 5 sizes there are 52 other models and sizes of standardized Monel Metal Sinks and Cabinet Tops available. It is worth your while to have full information at your fingertips about the whole line. Write for the new illustrated Inco Catalog of Standardized Monel Metal Sinks and Tops.

• • •

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

INCO MONEL METAL

MONEL METAL

Readers Have a Word to Say . . . (*Continued from page* 122)

extreme cases. And this was my precise effort in evolving the hyperbolic law: to take care of all cases, the usual and both extremes.

Incidentally, a graph of the above equation will cut the graph of the hyperbolic equation in two points corresponding, respectively, to risers of 7 1/3" and 8". So for these two cases, the two formulas agree exactly. The straight line is merely a secant of the hyperbola.

$T = 5 + \sqrt{7\,(9-R)^2 + 9}$ = Hyperbola
$T = 25 - 2R$ = Straight line

—*Ernest Irving Freese*

• THE STOCK PLAN QUESTION

Mr. Roger B. Whitman
c/o The New York Sun
280 Broadway
New York City

Dear Mr. Whitman:

As part of your column "First Aid for the Ailing House" this paragraph appeared in the New York Sun for August 14th—

"Question—Where can I get books showing house construction in detail and ready cut plans?—*J. B., Woodcliff, New Jersey.*"

"Answer—Apply to the Architects Small House Service Bureau, 101 Park Avenue, New York, or call at the office of any of the architectural magazines; Architecture, 597 Fifth Avenue; Architectural Forum, 220 East 42nd St.; Architectural Record, 119 W. 40th St.; American Architect, Eighth Ave. and Fifty-Seventh St."

The reference to AMERICAN ARCHITECT in your answer implies an erroneous statement that we feel should be immediately corrected. At no time has AMERICAN ARCHITECT had available for distribution or for any other use, plan books or catalogs listing stock or ready cut house designs. On the contrary, AMERICAN ARCHITECT feels that the use of such stock plan publications is in many cases inimical to the interests of established architectural offices and often brings results which are detrimental to the public appreciation of what good architecture is.

For your information and further guidance let me emphasize the fact that AMERICAN ARCHITECT in its fifty-seven years of existence has championed the cause of the architect in every phase of his professional activity. From time to time the editors of AMERICAN ARCHITECT have received inquiries regarding stock plans and invariably have recommended that the prospective house builder consult an architect as an agent to insure sound construction and good design.

As a member of International Publications, Inc., AMERICAN ARCHITECT is associated with other magazines which are published for non-professional consumers of architectural products. Each recognizes the importance of proper architectural guidance in the home building field and advocates employment of an architect in preference to the use of stock plans.

In view of these facts, you can do no less than publicly set right the unfortunate impression created in your paragraph.—*Roger W. Sherman, Managing Editor.*

New Materials and Equipment

BRIEF REVIEWS OF MANUFACTURERS' ANNOUNCEMENTS
TO KEEP THE ARCHITECT INFORMED OF NEW PRODUCTS

Arco Unit Wall Sections

219M Through the Accessories Company, Inc., a subsidiary of American Radiator and Standard Sanitary Corp., announcement has recently been made of a series of bathroom unit wall panels. They were developed by George Sakier, director of the Bureau of Design and Development for modernizing old bathrooms or for equipping new ones.

Wall sections are manufactured in three types which may be used singly or in combination. Chief among their advantages is the fact that a bathroom may be installed without damage to walls or ceiling due to pipe installations. The wall sections are designed to enclose all plumbing so that it may easily be reached at any time and require only to be connected to service and sewer lines tapped at the floor.

Shown in the large illustration (upper right) are three standard units combined with a plain wall panel at the back of the tub. Lavatory sections are made in one standard type, as is the shower unit beside it. The tub section detailed in the smaller illustration is made to fit five, five and one-half and six foot tubs and can be arranged satisfactorily with the tub in various locations within the room. Though with the use of a plain panel a metal-walled bathroom can be installed, the units are well adapted to isolated installation and need not be combined as shown unless desired for uniformity of finish.

The wall sections have a depth sufficient to accommodate whatever plumbing is necessary for their installation. All are made of steel backed with a sound insulating material and are finished with two-coat baked enamel in ivory, green, gray and blue.

Electric Clock Without Hands

220M An electric clock which eliminates the dial with hands and substitutes large numerals visible through windows in the front plate of the clock has been developed by the General Electric Company. Time is read directly in hours and minutes and

the seconds are indicated by a rotating dial. The numerals are illuminated by a small lamp. Many applications for this new clock are anticipated, ranging from the timing of telephone calls and surgical operations to the operation of radio receivers. In railroad stations this clock will tell time as it is listed in the time tables.

Trem-Bar Machine Mountings

221M To dissipate vibration and subsequent noise of all types of fixed machinery the United States Gypsum Co. has developed a special base or mounting. Trem-Bar is a rigid platform supported on steel springs and is mounted between the machine and floor, walls or ceiling as the case may be. Construction is entirely of steel and all connections are either riveted or welded. Bases are not manufactured to standard weights or dimensions, but are designed to fit special cases upon advice of the manufacturer's sound control engineers.

New Capitol Oil Burning Boiler

222M The new cast iron boiler offered by the United States Radiator Co., Detroit, Michigan has been designed as an oil burning unit and is said to possess the full development of the manufacturer's knowledge and experience. The unit is furnished in two sizes with steam capacities of 500 and 700 sq. ft. of direct radiation. Boilers are insulated with rock wool and encased in an attractive jacket. Both sizes are equipped with low water cut off, and built-in domestic hot water heater and are designed for use with standard types of oil burning controls. High efficiencies, absence of gas stratification, controlled gas flow and low smoke hood temperatures are among the many advantages claimed by the manufacturers.

Extra Thick Temlock Insulation

223M To meet the demand for thicker insulating board Armstrong Cork and Insulation Co., Lancaster, Pa., announce that they are now producing fibreboard insulating lath a full one and one-half inches thick. The new product is an addition to the company's line of Temlock insulating board which is already made in one inch and one-half inch thicknesses. The manufacturers claim that the thicker board is an improved plaster base, that it offers added safeguards against plaster cracks and that the extra thickness entirely eliminates buckling and warping.

Mechanical Control for Water Heaters

224M Motor Wheel Corp., Lansing, Michigan, has developed a new thermostatic control for use with automatic oil-burning water heaters which does not depend upon electric current for operation. With the snap-action control unit actuated by a vacuum-type bellows, automatic heaters may be operated at a substantial saving according to the manufacturers. The control is compact and is completely assembled and is then attached to the heater by the manufacturers. A drop in the water temperature actuates a vacuum pull on the bellow portion of the assembly, throwing the snap-switch "on." A rise in temperature lessens the vacuum and the switch snaps back to its natural "off" position. The thermostat part of the unit may be manually adjusted to produce a desired change in water temperature.

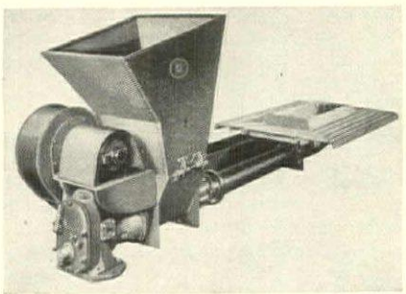
Moistureproof Bag for Lime

225M The Rockland and Rockport Lime Corporation, Rockland, Maine, has developed a bag lined with moistureproof Cellophane in which lime may be stored for a year or more with-

out deterioration as a result of moisture. The lining was perfected by Du Pont Cellophane Co., Inc.

New Smokeless Boiler

226M To increase overall efficiency of boilers ranging in capacity from 96,000 to 1,250,000 B. T. U. the Crane Co., Chicago, has announced an attachment which may be installed without removal of boiler sections or piping. The device consists of two hollow risers, a hollow distributing arch and a special short grate. The risers fit into the boiler grate socket and the entire installation is secured by bolts. Secondary air from the ashpit is preheated in passing through risers to the distributing arch. As the hot air leaves the arch it combines with the black distillate of soft coals and the mixture burns at high temperature. Relative completeness of combustion results and smoke nuisance is thereby minimized.

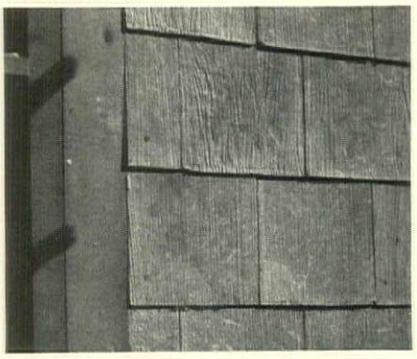


Link-Belt Automatic Underfeed Screw Stoker

227M A new stoker mechanism in sizes for boilers of 10 to 250 B. H. P. has been introduced by Link-Belt Company of Chicago. Features of the new device, called the Link-Belt Automatic Underfeed Stoker, include: variable speed transmission regulating the coal feed; safety shearing pin for overload protection; motor mounted in direct connection with forced draft fan shaft; chrome steel screw conveyor; automatic electric controls; and easy accessibility of all working parts.

New Base for Resin Laminations

228M By a process which is said to facilitate manufacture of decorative resin finishes Robertson Bonded-Metal is now being utilized as a panel backing for many types of resin-veneered or laminated panels. The fabric coating on the sheet steel gives an excellent base for a variety of finishes that may be much thinner than usual without loss of strength, according to the Mellon Institute of Industrial Research which developed the new process. Use of the fabric coated metal in place of sheets of resin-coated cloth or paper produces manufacturing economies in both time and materials. Finished products appear to have wide practical application due to the strength of the steel core and the decorative possibilities of the veneered surface.



Econotop Siding Shingles

229M The Eternit Division of the Rubberoid Co. has announced a new siding shingle designed particularly for use in modernization and repair operations. Called the Eternit "Econotop" because of the pointed top design, the new shingles are made of a combination of Portland cement and selected asbestos fibres. These materials assure firesafeness and the shingles are proof also against rot or other types of normal disintegration. The surface of the new product is textured to resemble weather-aged cypress and requires no painting since the shingle siding is furnished in cypress brown, silver green and gray. When installed the shingles provide a double layer of material said to be valuable as thermal insulation. The new siding shingles may be used for new work as well as a refinishing material for old structures, installation methods being the same in both cases.

Art Metal Kitchen Equipment

230M With long experience in the manufacture of metal equipment of offices and hospitals behind it, the Art Metal Construction Co., Jamestown, N. Y., has recently developed a complete line of all metal kitchen cabinets and equipment enclosures. Units are of standard design to conform to the latest practice in kitchen planning and are entirely of metal finished with a high gloss, acid-resisting ivory baked enamel. Drawers are lined with linoleum and all hardware is chromium finish. Work surfaces on cabinets are of stainless steel. The line includes base and wall cabinets and kitchenette enclosures.

Erskine Indirect Water Heater

231M A compact, all-copper hot water heater for indirect action has recently been announced by Erskine Copper Radiator Corp., of New York. Available in seven sizes, the new heater is designed for direct connection to steam or water boilers and heats circulating water through action of heating fluid from the boiler. During the winter water heating is automatic. During the summer the unit may be utilized with mechanically controlled plants by means of an aquastat control, or in conjunction with an independent gas or electric heater.

Stainless Clad Steel Shower Compartment

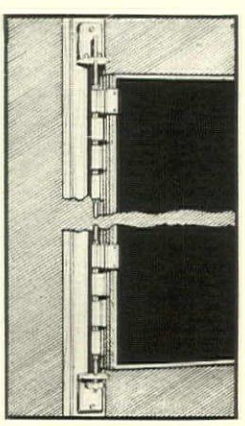
232M A shower bath compartment having walls and top of stainless clad steel and a base of precast terrazzo has been developed by Fiat Metal Manufacturing Company, Chicago, with the cooperation of the Ingersoll Steel & Disc Company (a division of Borg-Warner Company) producers of this new corrosion-resisting material. Compartments are of knock-down construction, having leak-proof joints of patented design. This feature, combined with the low cost of stainless clad steel, makes for initial and installation economy and adapts them to modernization and remodeling work as readily as to new construction. Compartments are sail to be particularly useful in small bathrooms.

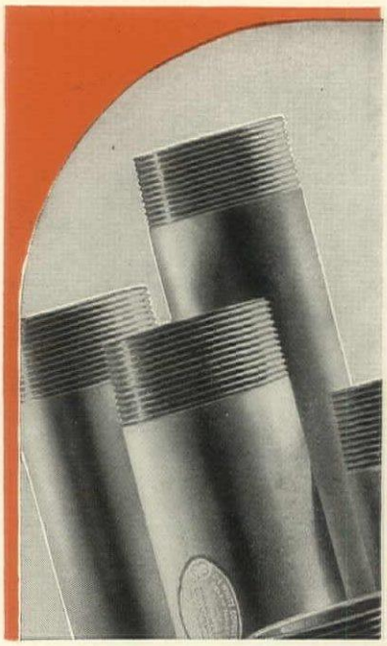
Copper Armored Sisalkraft Building Paper

233M Sisalkraft Co. has recently announced a new development in its line of building papers known as Copper-Armored Sisalkraft. The material consists of sheets of electro-deposit copper backed by sheets of Sisalkraft paper. The combination of the two materials is said to form a product having particular application for flashing and waterproofing. At the present time the manufacturers offer their new development in rolls ten inches wide for door and window flashing. Application can be made at the mill or in the field. The product is said to be very durable making both types of installation a simple matter.

Webco Swinging-Leaf Blackboard

234M A new design in blackboards has been introduced by the Weber-Costello Co., Chicago Heights, Ill. Measuring 3 x 3½ feet the new piece of school equipment is in effect a book of blackboards, consisting of four double surface leaves of Hylo plate, bound with metal at the edges and mounted on two wall brackets by means of the hinge pin. The device gives a writing area equivalent to the total writing surface of an average classroom and weighs but 50 pounds. It is adaptable as blackboard, or bulletin board when surfaced with pressed cork in place of Hyloplate. A locking device makes the unit practical for permanent references in all types of school work. Leaves can be combined so that blackboards and cork surfaces can be used at the same time.





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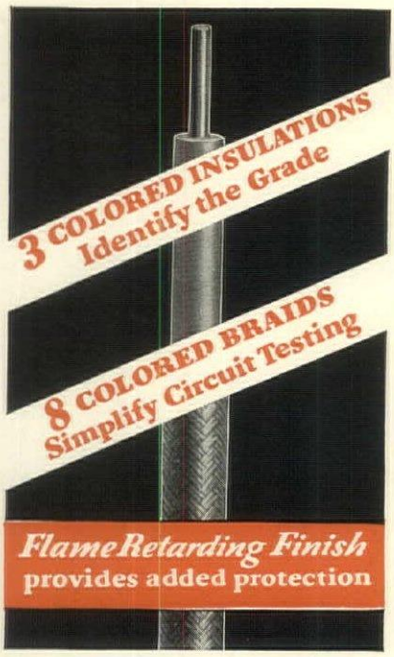

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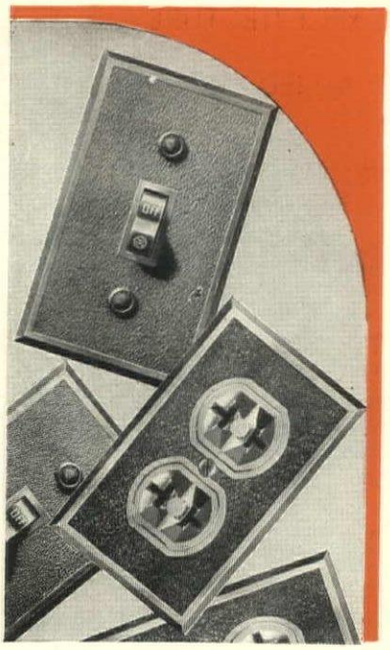
CODE WIRES



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PROTESTANTISCHER KIRCHENBAU SEIT 1900 IN DEUTSCHLAND

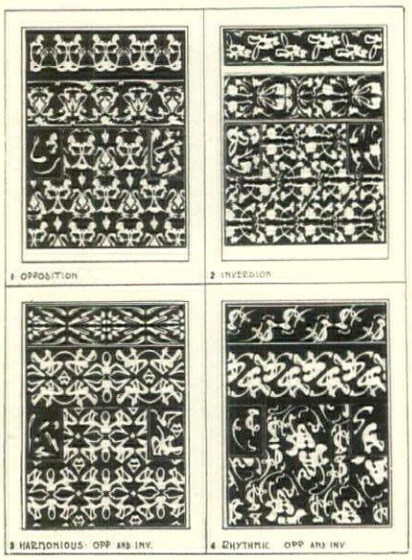
By Dr. Walter Distel. Published by Orell Füssli, Zürich, Leipzig, Berlin. Illustrated, indexed. 128 pages; size 8 x 10⅞; price 12 Reichmarks.

TO those who read German and are concerned with ecclesiastical architecture, Dr. Distel's volume should prove of absorbing interest. It would obviously be impossible within the confines of a 128-page book to treat thoroughly of all churches which have been built in Germany since 1900. The author has therefore confined this discussion to churches of the Protestant denomination and has further narrowed his field to those structures which are illustrative of contemporary trends in design. The text is profusely illustrated with excellent line drawings, and photographic reproductions

MODERN CREATIVE DESIGN AND ITS APPLICATION

By Herbert A. Fowler and Ross T. Bittinger. Published by George Wahr, Ann Arbor, Mich. Illustrated, indexed; 270 pages; size 7½ x 10⅜; price $4.50.

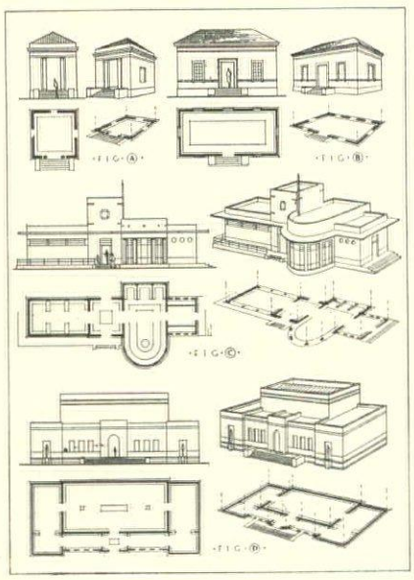
THIS volume might well stand as a new approach to a very old subject. It is written for students and is based on experience gained from working with students. The authors have based their discussion on the necessity of developing into decorative expression the forms of our modern age; and although they do not discard entirely an historical background they prefer to expound the theory of design in terms of contemporary forces. The text is topical and condensed to allow the student to express his own creative thought rather than echo his teacher's own individuality. Much of the volume is devoted to illustrations of decorative forms.



ARCHITECTURAL DESIGN

By Ernest Pickering. Published by John Wiley & Sons, Inc., New York. Illustrated; 311 pages; size 8½ x 11½; price $6.50 (plus postage).

TO those who are acquainted with the unusual curriculum which Professor Ernest Pickering has developed for architectural study at the University of Cincinnati, any book of which he is the author would prove stimulating. The preface denies an attempt to develop new theories of design. It does, however, state an object of bringing the study of architectural design into harmony with the Twentieth Century—an avowed object that must inevitably spring from a definite philosophy of architecture's place in the society of our times. Accordingly the text presents an historical background and an analysis of architectural functions, a discussion of the principles of design and methods of applying this information to current problems. The author divides his subject into five sections which deal with the elements of architectural design and stress particularly the influences of contemporary life. Primarily written as a textbook adaptable to various systems of teaching, it is equally useful as a source of stimulating information in the drafting room. Illustrations cover almost every type of contemporary building from the modest dwelling through churches, memorials and exposition structures to the skyscrapers of our larger cities. Included with them are many black and white sketches to illustrate points in the text not adequately covered by the photographic material.



STEEL FRAMING FOR SMALL RESIDENCES

Compiled and published by subsidiary companies of United States Steel Corporation, New York City. Illustrated; 54 pages; size 8½ x 11; price 50 cents.

ALTHOUGH this volume has been issued by the United States Steel Corporation as promotion literature, the evident thoroughness of compilation and the interesting method by which facts are presented gives it more than usual interest. The booklet specifically aims to provide architects, builders and fabricators with convenient information on the use of steel in the framework of small residences. It is illustrated with photographic reproductions, framing diagrams and details of structural installations. Included also are data on types and sizes of members and tables of allowable loads.

STAINED GLASS

A quarterly devoted to the craft of painted and stained glass. Maurice Lavanoux, editor. Published by Stained Glass Association of America. Illustrated, indexed; size 5¾ x 8½; price, 50 cents per copy.

RECENTLY the editors of this quarterly announced a change in format. The spring issue is the first of the changed editions and marks a great improvement over former numbers. The contents presents excellent illustrations, articles of interest to the layman as well as to members of the stained glass fraternity. Architects will enjoy the quality with which notes upon a subject of aesthetic interest are presented.

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WESTLAND CIPPOLINO finds much of its popularity centered in bank screens. But its flowing design, and soft marine tints, insure the greatest versatility in interior use. It has been used with unusual success and harmony in many important structures throughout the country, and has most recently made its appearance in the new United States Post Office at Boston.

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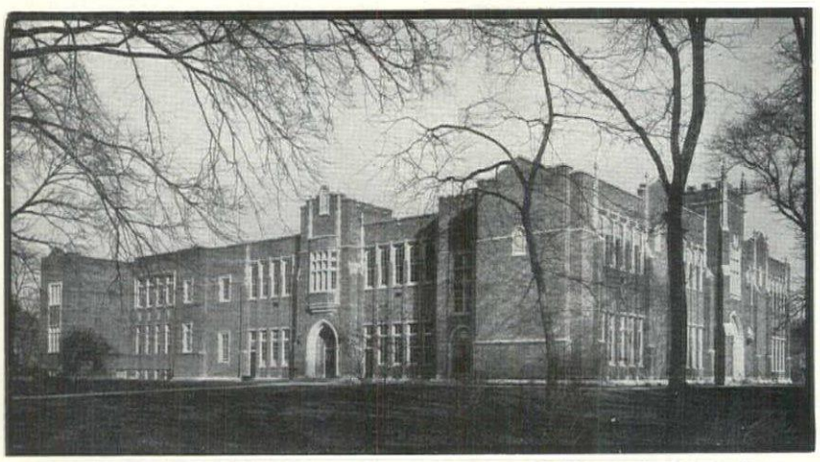

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E. Norman Brydges, Architect
Chicago and Elmhurst

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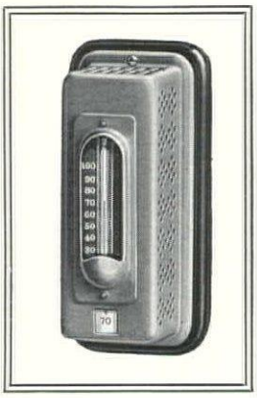
• • • THE ORIGINAL UNIT of the school building pictured above was built in 1919 and heated by a "direct blast" system. Johnson automatic heat regulation was installed to operate mixing dampers at the double plenum chamber, mixing hot and tempered air as required for each room.

In 1926 and 1927, the first and second additions were constructed and are heated by means of a "split" system. Johnson apparatus controls the direct radiators in the rooms and also maintains a uniform temperature in the ducts supplying air for ventilation. The original heating plant was not disturbed.

The third addition, 1929, is heated and controlled in the same manner. When this addition was built, the heating system in the original unit was changed to a split system, and the same Johnson thermostats were arranged to control the new heating apparatus.

In 1932, unit ventilators were installed in the fourth addition. Again the Johnson System was employed, this time to control valves and dampers in the unit ventilators, together with valves on the auxiliary radiators.



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Branch Offices in All Principal Cities

JOHNSON
HEAT CONTROL

Trends and Topics . . .

(*Continued from page 65*)

Flynn-Case bill may eventually prove even a better instrument than any state low cost housing measure. At this time certainly it seems a step in the right direction, and the way in which the various cities take advantage of its provisions should be watched with keen interest.

• A short time ago in Chicago a meeting of air conditioner manufacturers stressed among other things the need for certification of air conditioning systems by the installing contractor. Many air conditioning units are extremely complicated, mechanically not always adaptable to standard types of installations. Performance and technical excellence should be certified for the mutual protection of designing engineer and owner. This recommendation by air conditioning equipment manufacturers raises an interesting point in regard to other mechanical installations and even to buildings themselves. It seems probable that ultimately every such installation will bear some sort of certification covering both equipment and workmanship. Since mechanical equipment is really the heart of a modern building the next step—a general certificate of technical excellence and a subsequent building rating—does not seem far off. It would be of advantage to lending institutions and to owners who make a business of buying and selling structures.

• What may be a significant development of the new deal was recently announced in Chicago. It is a complete service organization for home building and improvements which includes arrangements for competent architectural advice, for contracting supervision and financing. Facilities of the organization headed by Lynn C. Jones, Vice President of the First National Homes Service, Inc., include complete financing service from loans on new home construction as high as 65% of the cost to be paid out of a 15-year period to projects as small as $100.00 which can be paid off in four months to a year. With adequate backing, supervision and control such methods should prove an aid to home building.

• The housing problem has finally entered the field of standardized production, under a plan formulated by Herbert W. Tullgren of Milwaukee. The Tullgren Plan is a patented principle of design for use in multiple family dwellings four stories or more in height, and involves the construction of two-story suites with public corridors eliminated on alternate floors. The plan is said to offer 15% more rentable space than conventional single floor suite plans; to cut construction costs 15%—or more if local pre-fabrication is used—and to show maintenance costs 20% lower than conventional apartments of comparable quality. Mr. Tullgren has developed an organization to act in a consulting capacity for all those concerned with housing projects and has worked out some interesting statistics regarding costs, financing and income. One of the most interesting things about the entire plan is the fact that a patent has been allowed for an architectural planning of space requirements. There have been many attempts to patent architectural arrangements in the past, but so far as is known no patents have been issued in the housing field.

• Clarence S. Stein asserts that there is a need for new technique in city planning and building in which individualistic methods will have no place. He says "We are not passing through a depression like other depressions. The ailment of the world is not temporary. The old world is dying and in dying it is giving birth to a new era. Architects will go back to work in another world. The old scenery they painted in 1920 will not fit the realities of this changed world. Unless architects have some idea of what the play is about they are going to make a pretty poor job of the setting and costumes. Our cities are obsolete. Our task is to build a new setting for a new era, but by the old piecemeal, wasteful, speculative methods we cannot attain that end."

• Writing in the Bulletin of the Minnesota Federation of Architectural and Engineering Societies, Rollin C. Chapin, architect, says "Whatever course the house of the future may take as to construction, design and equipment, enlightened public sentiment will demand that certain fundamentals be not lost sight of. Among these are comfort, convenience, beauty, homelikeness, permanence, excellence of plan, economy of space, labor saving equipment and good landscaping."

• In several non-professional magazines on home planning and building much space is being devoted to indicating opportunities for remodeling and modernization. At least two popular magazines have developed remodeling competitions and *Good Housekeeping* is running an ambitious campaign of this type under the able direction of the magazine's Studio for Interior Architecture and Decoration. *Good Housekeeping's* remodeling competition cannot help but achieve much good. The circulation of the magazine is large; and the publicity it gives home improvement may well be instrumental in initiating remodeling projects that require architectural assistance.

• A scheme to provide work for unemployed architects has been developed in London under the sponsorship of the Royal Institute of British Architects. In cooperation with the London society and the London Survey Committee, the men are measuring up the lesser known examples of good architecture. Work of each individual is confined largely to the locality in which he lives and material thus obtained will provide a source of exhaustive information to those interested in the city's future development. Data are being incorporated in a series of maps which, by a system of colors, shows the intermixture of residential, commercial and industrial districts. Concurrently, height studies are being made as well as large relief maps of suburban London. The idea might well be applied to cities in the United States where the unemployment problem among architects is serious. Such work is necessary as a foundation for further development of proper city planning.

• The resolutions of the National Conference on Slum Clearance held in Cleveland on July 6th and 7th are testimony to the tremendous difficulties faced by pioneers in urban slum clearance projects. It is obvious that advocates of Federal aid and control for slum clearance and low cost housing projects are most sincere in their efforts to raise the social status of the individuals whose problems they have at heart. Just as obvious, however, is the fact that they face the opposition of selfish interests and the powerful obstacles of legal custom and public inertia. The recommendation that solutions be found for these problems is useful only in that it shows a recognition of them. What is needed is some sort of an Alexander who can cut the knot of legal and financial hindrances to the low cost house ideal. Other countries have found that governmental aid was the only solution to their slum clearance problems and it is quite possible that the same answer will soon have to be made to the American question.

• What engineers can do with wire and copper tubing was demonstrated in an unusual manner a short time ago at the Century of Progress. One of the exhibitors decided to make a piece of toast. He put the bread in an electric toaster. Heat from the toaster set off an automatic fire alarm system and before the bread had been browned the city's fire eaters were on the scene with hose all ready to put out the blaze. This sounds as if it might be one of the most efficient fire alarm systems in the world. The tubing is only 1/12 inch in diameter and the system works pneumatically. Expansion of the air in the tube due to a rapid rise in temperature operates a copper siphon bellows and closes an electrical contact. Miles removed a gong rings and the firemen grab their tin hats in a hurry.

ANNOUNCEMENTS

• The United States Civil Service Commission has announced open competitive examinations for Senior Engineer, Engineer, Associate Engineer and Assistant Engineer. Applications for the positions must be on file with the United States Civil Service Commission not later than September 28th, 1933. Competitors will not be required to report for a written examination but will be rated on their education and experience. Salaries range from $2,600 to $5,400 per year. Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners, at the Post Office or Custom House in any city, or from the United States Civil Service Commission at Washington.

• Of interest to architectural specifications writers is the fact that Tuttle & Bailey of Brooklyn, N. Y., manufacturers of cast metal grilles and Hart & Cooley of New Britain, Conn., manufacturers of wrought steel registers, have consolidated their manufacturing operations and sales forces. Executive offices will be located in New Britain, Conn., and manufacturing for the United States trade will be done in the New Britain plant. Manufacturing for the Canadian trade will be continued by Tuttle & Bailey Mfg. Co. at Ontario, Canada. Main sales offices will be continued in both Brooklyn, N. Y., and New Britain, Conn., with branch offices in principal cities.

• The annual exhibition of the Architectural Sketch Club of Chicago has moved from Architects Club, 1801 So. Prairie Ave., Chicago, to the second floor of the General Exhibits Building at the Century of Progress. The exhibition will run concurrently with the Fair until November 1, 1933.

• The annual Graduate Scholarship Prize in Architecture of the New York University College of Fine Arts has been awarded to Frederick W. Bucky, Jr., of Jacksonville, Fla. Milton Sherman of Ventnor, N. J., received honorable mention and was designated first alternate. Mr. Bucky will receive free tuition and a year of graduate study in the College of Fine Arts leading to a degree of Master of Architecture.

• Among those who have organized the National Association for Better Housing are John R. Fugard, President of the Illinois Society of Architects and H. Vandervoort Walsh, Professor of Architecture at Columbia University. The National Association for Better Housing has been formed to raise standards of home building and to assist potential home owners in overcoming obstacles to building and home ownership. The organization will act as a clearing house for information and news of all industries and trades interested in housing and home building. Henry A. Guthrie is Secretary of the new organization, the offices of which are at 59 E. Van Buren St., Chicago.

PERSONALS

• Dean E. Raymond Bossange of the New York University College of Fine Arts has announced the appointment of Winold Reiss to the Assistant Professorship of Mural Painting. Professor Reiss is well known for his work in interior decoration and for the many unusual designs he has executed in many mediums. Among his latest works were the recently completed murals in a combination of cement and mosaics in the Cincinnati Railroad Station. He is best known perhaps for his paintings and mosaics of the American Indian. Professor Reiss is a native of Karlsruhe, Germany. He came to America in 1913.

• Stephen F. Voorhees of Voorhees, Gmelin and Walker, architects, has been appointed Chairman of the Code Committee of the Construction League of America. He has been active in the development of the Blanket Code for the Construction Industry which was recently submitted to NRA and approved by General Johnson and his aides.

(*Continued on page* 136)

SEALEX Wall-Covering is a new decorative material, equally suitable for new construction or for applying over shabby, hard-to-clean walls. It is washable, stain-proof, crack-proof—never needs to be painted. Especially desirable for renovating work in buildings where old walls need to be covered with a material which will give permanence at low cost. Many beautiful designs. Write our Architectural Service Dept. for information.

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LINOLEUM FLOORS

• Robert D. Kohn, past President of the American Institute of Architects and the Construction League of America, has been appointed Director of Housing under the National Industrial Recovery Act. Mr. Kohn has long been prominent as an advocate of improved housing conditions in America and should be a valuable aid to Secretary Ickes in the administration of the National Public Works Program.

• Mario Corbett has re-opened his office for the practice of architecture at 683 Sutter Street, San Francisco.

• George E. Trent, Registered Architect, has recently opened an office for the practice of architecture at Union National Bank Building, New Brighton, Pa. He requests manufacturers' catalogs and samples.

• James Riely Gordon, Registered Architect, has removed his office from 475 Fifth Avenue, N. Y., to 5 E. 44th Street, N. Y.

• Oliver O. Gauvin, Architect, has opened an office for the practice of architecture at 160 South Main Street, Providence. Catalogs and samples requested.

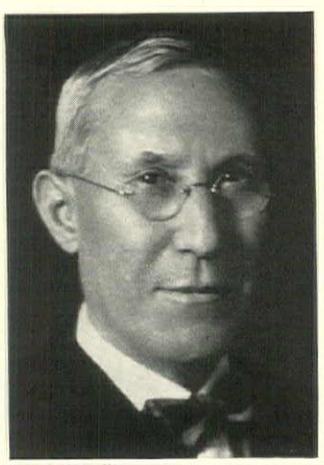
• Morris Rothstein, Registered Architect, announces the removal of his office from 186 Joralemon Street to 391 Fulton Street, Brooklyn, N. Y.

• Edward A. Bicks announces the opening of a residential office for the practice of architecture at 66 Wolf Place, Hillside, N. J.

• Bob Hubel, formerly a designer in the office of Albert Kahn, Detroit, is now associated with Gustave Mueller.

DEATHS

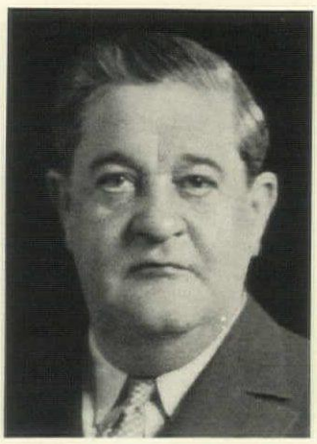
• Arthur Tappan North, formerly Engineering Editor of AMERICAN ARCHITECT and for several years Director of Architectural Relations for the American Institute of Steel Construction, died suddenly at his home in New York on August 16th. Mr. North was 69 years old. Born in Kewanee, Illinois, he was graduated in architectural engineering from the University of Illinois in 1885. He was a member of Tau Beta Pi. In the early part of his professional life Mr. North was associated with Louis Sullivan in Chicago. He numbered among his many friends some of the foremost architects in the country and was widely regarded as a keen critic of architecture and one of the most competent authorities in the field of architectural engineering. During the past several years Mr. North's work had been concerned chiefly with technical writing and construction. At one time he was on the staff of *The Architectural Forum* and was American contributing editor for a number of European magazines. His professional society memberships included the American Institute of Architects, American Society of Civil Engineers, Illinois Society of Architects, Architectural League of New York, the Construction Council and American Civic



Blank & Stoller

Association. Mr. North held honorary membership in the Bund Deutscher Architekten, Berlin, Germany, and Zentral-Vereinigung Der Architekten, Wien, Austria. He was also a member of the Masonic order and an honorary emmber of the Whitechapel Club of Chicago.

• Joseph Urban, artist, theatrical designer and architect, died in New York, July 11. Mr. Urban, who was 61 years old, was born in Vienna, Austria. He studied art and architectural engineering at the Art Academy and Polytechnicum and later entered the studio of Baron Carl Hasenaeur, the leading art teacher of his day. Mr. Urban had already established a wide reputation as an architect and artist before his first visit to America in 1901. In 1911 he returned to make the United States his permanent home. His first commission — the scenery designs for the Boston Opera Company—was the start of a repetition of his European success, and from his studio issued a vast amount of work which included architectural projects as well as theatrical designs. About seven years ago Mr. Urban entered the field of industrial design, making as signal a success there as in any of his other various activities. Although most widely known as a scenic designer, Mr. Urban was preeminently an architect. Abroad his most famous works include the Czar Bridge across the Neva at Leningrad, the palace of the Khedive of Egypt, the country houses of Count Carl Esterhazy and the interior of the municipal building in Vienna. In this country he was architect for the Ziegfeld Theatre, the New School for Social Research, both in New York, and many elaborate residences at Palm Beach, Florida. His latest outstanding achievement was the color synchronization of the Century of Progress in Chicago.



• Percy Ashe, Professor of Architecture at Pennsylvania State College died at Fryeburg, Maine, July 19th. Professor Ashe was 65 years old. A graduate of the University of Pennsylvania, he had been on the faculty of the University of Indiana and University of Michigan.

• Ralph K. Shephard died in Toronto, Canada, on August 23. He was 59 years old. Mr. Shephard was born in Brooklyn, N. Y., and had attended the Ecole des Beaux Arts in Paris.

• William Cook Haskell died August 18 in New Rochelle, N. Y. Mr. Haskell, who was 63 years old, was the last surviving memLer of the firm of Townsend, Steinle and Haskell, of New York, that had designed many prominent hotel and commercial buildings in that city. Mr. Haskell studied at the College of the City of New York, Cooper Union and the Atelier Masqueray Beaux Arts Society. He had long been active in civic affairs, and was a member of the American Institute of Architects, American Society of Engineers, Architectural League of New York, Michigan Society and New York Sketch Club.

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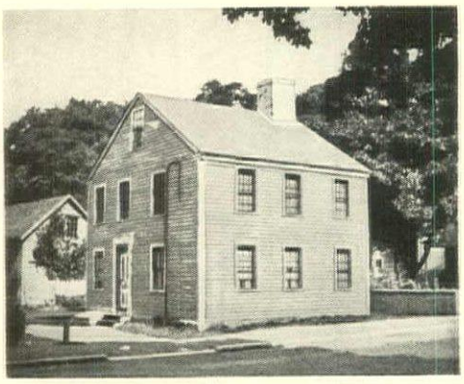
Main Office and Works, York, Pa.
Philadelphia Office, 1700 Walnut St.

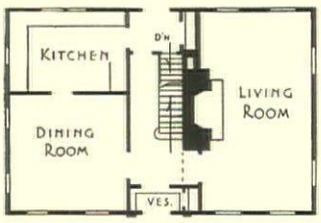


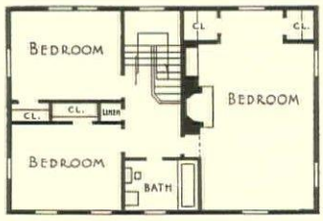
An old house such as the one shown here can be given real charm and character for a comparatively small outlay

Studio of Architecture and Furnishings

Helen Koues, Director

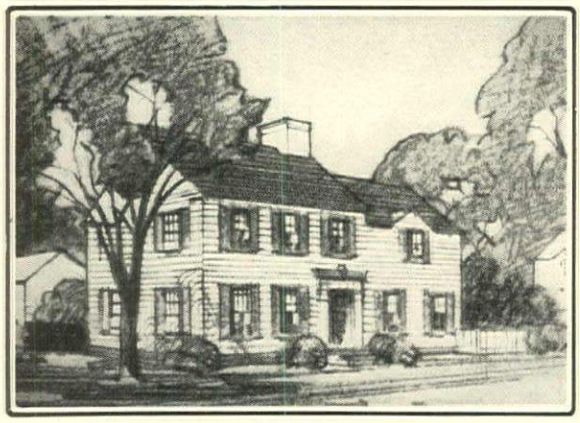
Consultant Architect
Dwight James Baum, F.A.I.A.
Associate Architects
Myron Hunt, F.A.I.A. — Los Angeles
Henry Ives Cobb, Jr., A.I.A. — New York
C. Herrick Hammond, F.A.I.A. — Chicago





Send For Our Free Booklet On Remodeling

You will find it full of pictures and ideas for renovating and remodeling, as well as the details of our remodeling contest which is open to every one who is interested in it



The sketch at the left shows what could be done to the old house above by adding a wing and making a new front doorway that has architectural character. The cost of work is low: it not only makes an attractive house out of a plain one, but adds to its re-sale value

Remodeling the Unattractive House

By J. M. Hamilton, Architect

REMODELING our present houses will occupy a large part of the efforts of architects and builders for some time to come, and will be an important phase of the recovery of the entire building industry. Good examples of remodeling have been published, but in general they seem too specific to have a wide application, or too expensive to come within the reach of the majority. Too seldom they offer ideas for a simple means of remodeling the average outmoded, tasteless little houses to be found in all communities—many of which could be economically renovated or slightly altered without changing their main lines. Here we illustrate three types: the box, the bungalow, and the cottage. Many such houses which are now a drug on the market could be modernized and become assets instead of liabilities.

The little box type of house at the top of the page is familiar to us all. It is simple, inoffensive, and has no individuality.

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Coupled with the Gold Medal Remodeling Contest Good Housekeeping is sponsoring in cooperation with the American Institute of Architects, articles such as this one in September Good Housekeeping are stimulating and sustaining the remodeling idea among home owners everywhere.

Good Housekeeping

Everywoman's Magazine


AMERICAN ARCHITECT